Science

Required Credits

High School Science
Models

Overview of Models:
Three models that fulfill the high school science graduation requirements are suggested. Model I is a traditional approach that includes physical, Earth/space, and life sciences. Two variations to Model I are presented. These variations include vocational education courses. In one variation, Agri-biology may be substituted to satisfy the life science credit for high school graduation. In another variation, Medical Science satisfies the life science credit for the high school graduation requirement.

In Model II, Earth/Space Science concepts are integrated with appropriate physics, chemistry, and biology concepts. One variation is presented: Principles of Technology with Earth/Space Science may be substituted for Introductory Physics with Earth/Space Science to complete the high school graduation requirement.

Model III integrates physical, Earth/space, and life science concepts into each of three courses: Integrated Science I, Integrated Science II, and Integrated Science III. This model reflects the multi-disciplinary nature of science.

Nutritional and Food science is presented as an elective class. It can not be substituted for the life science graduation credit because it does not contain all the life science conceptual understandings outlined in the *Program of Studies.*

Models that Meet High School Science Graduation Requirements:
Model I
- Physical Science
- Earth/Space Science
- Life Science

Vocational Education Model I with Agri-Biology
- Physical Science
- Earth/Space Science
- Agri-Biology

Vocational Education Model I with Medical Science
- Physical Science
- Earth/Space Science
- Medical Science

Model II
- Introductory Physics with Earth/Space Science
- Introductory Chemistry with Earth/Space Science
- Introductory Biology with Earth/Space Science

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High School Science
Models

Vocational Education Model II with Principles of Technology
- Principles of Technology with Earth/Space Science
- Introductory Chemistry with Earth/Space Science
- Introductory Biology with Earth/Space Science

Model III
- Integrated Science I
- Integrated Science II
- Integrated Science III

Elective Models:
Vocational Education Model
- Nutritional and Food Science

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High School Science
Model I: Physical Science

Course Overview:
Students develop a conceptual understanding of physical science through the use of scientific inquiry. They experience physical science concepts such as structure of atoms, structure and properties of matter, chemical reaction, motions and forces, conservation of energy and increase in disorder, and interactions of energy and matter. A scientific inquiry approach uses concrete, hands-on experiences that requires students to apply critical-thinking skills. For each guiding question, students apply and connect scientific concepts to real life. It is suggested that the physical science course be taken before either Earth/space science or life science.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How do observable properties of matter enable us to determine the structure of atoms?
- How are chemical and physical properties of matter related to the structure of matter?
- What causes chemical reactions that affect our daily lives?
- How can we use forces and the laws of motion to understand the motion of objects?
- How is the transfer of energy controlled by the conservation of energy and by the tendency toward disorder?
- What happens when energy interacts with matter?

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How do observable properties of matter enable us to determine the structure of atoms?	**Students will** **Physical Science** **Structure of Atoms** • analyze atomic structure and electric forces. • examine nuclear structure, nuclear forces, and nuclear reactions. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • explore the impact of science on personal and community health. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate atomic structure. Analyze visible spectrum emitted from heated elements (e.g., metallic salts suspended in flame, neon lights, fluorescent bulbs) using spectroscopes, prisms, or diffraction gratings. Produce pictorial model that relates wavelength and energy of light emitted to Bohr model of atom. Observe fireworks either directly or on videotape and use colors of displays to identify elements used in fireworks.	
• simulate radioactive decay. Examine radioactive half-life by placing 100 pennies (atomic nuclei) in closed container (sample of radioactive isotope), shaking it (nuclear reactions), then counting and removing pennies that are heads up. Repeat until all pennies have been removed. Graph number of pennies removed versus trial number. Determine from graph the number of trials it would take to completely remove 200 pennies. Produce investigative reports on radon in homes across Kentucky that show connections between radon occurrence and geological regions in Kentucky. Explain why the radioactive decay of radon is a dangerous nuclear reaction. Extend this report by describing how nuclear structure and nuclear forces cause radon to be radioactive. Present the investigative reports to local health departments. *Use this activity to develop possible writing portfolio entries (WP-Transactive).*	Randy understands concepts at the same level as his peers. He has difficulty manipulating small objects. For this activity, either pair Randy with a peer who can remove pennies or provide him with larger objects to manipulate *(Types of extensions: resources and materials, level of support).*

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High School Science
Model I: Physical Science

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How are chemical and physical properties of matter related to the structure of matter?	**Students will** **Physical Science** **Structure and Properties of Matter** • investigate structure and chemical properties of matter. • investigate structure and physical properties of matter. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • explore the impact of science on personal and community health. • use science to investigate hazards. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • analyze ways chemical properties are related to the structure of matter. Investigate simple chemical reactions between common household substances (e.g., charcoal burning, mixing baking soda with vinegar). Observe reactions and produce structural models (e.g., pictoral, physical). Explain observed chemical properties in brochures containing consumer safety information to be distributed by local home extension agent *(WP-Transactive).* ***Technology suggestion**: Use publishing software to create brochures.*	
• analyze ways physical properties are related to the structure of matter. Investigate physical properties such as the viscosities of 10W motor oil and 40W motor oil. Produce structural models (e.g., pictoral, physical) that explain observed physical properties. Use structural models to create videos to use in vocational school auto mechanic classes explaining viscosities. ***Technology Suggestion:** Use camcorder to make videos.*	Suzanne understands information presented in simple language. She can demonstrate knowledge by drawing or building models. When working on physical models, she works at a pace typically slower than her same-age peers. When making structural models for these activities, allow Suzanne to develop one model instead of multiple models *(Types of extensions: magnitude, pace, complexity).* Tim, Brianna, and Cory participated in a Saturday scholars chemistry class in which they investigated physical changes. They measured ice-melting and water-boiling temperatures. They will expand upon the class activity by adding salt and sugar (1g/10mL water) into water and remeasuring ice-melting and water-boiling temperatures. They will record and discuss results and observations and report to the class (*Types of extensions: purpose and appropriateness, order of learning, complexity, pace, resources and materials, level of support*).

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What causes chemical reactions that affect our daily lives?	**Students will** **Physical Science** **Chemical Reactions** • investigate chemical reactions and energy. • examine the transfer of electrons or hydrogen ions between ions, molecules, or atoms. • investigate factors affecting reaction rates. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate heat energy released when hydrocarbons (e.g., lamp oil, paraffin, alcohol) react with oxygen. Use oil lamp, candle, or alcohol lamp to heat beaker of water. Produce investigative reports that quantitatively compare the heat energy released from a variety of hydrocarbons (e.g., fuel oil, coal, wood, food). Distribute reports to local environmental groups concerned about proper use of natural resources *(WP-Transactive)*. ***Technology Suggestion**: Use probes and graphing calculators to collect and graph data.* • examine transfer of electrons during chemical reactions (e.g., zinc and dilute hydrochloric acid). Observe reactions and construct structural models (e.g., physical, pictorial) to explain observations. Write encyclopedia entries that use the models to show how transfer of electrons produces electricity in batteries *(WP-Transactive)*. ***Technology Suggestion:** Use publishing software to create brochures.* • investigate one factor affecting reaction rates. Observe smoldering splint of wood in air and when splint is placed into bottle of pure oxygen. Produce essays with student created drawings to explain how concentration of reactants increase reaction rate. Extend activity by investigating other factors (e.g., temperature, surface area). ***Technology Suggestion:** Use digital camera to create photo essays.*	Chancy understands concepts when they are presented using verbal descriptions or pictures along with hands-on activities. He can demonstrate his knowledge by explaining what he knows verbally or using drawings. For this activity, provide Chancy with an audiotape of the experiment and expectations prior to class. Allow Chancy to audio tape his prediction of which variables would need to be measured to determine the amount of heat transferred *(Types of extensions: procedures and routines, materials, order of learning, demonstration of knowledge).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How can we use forces and the laws of motion to understand the motion of objects?	**Students will** **Physical Science** **Motions and Forces** • investigate the effects of forces on the motion of objects. • investigate gravitational and electromagnetic forces. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • analyze the role science plays in everyday life and compare different careers in science. *(Continued on page 16)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate effects of forces on the motion of objects. Attach strings to carts and then attach each string to one standard mass of 100 grams. Place carts on tables and suspend standard masses over edge of tables. Use suspended masses to pull carts length of tables. Measure time with photogates. Repeat multiple trials with different masses loaded on carts. Use same 100 gram standard mass suspended over table edge for each trial. Produce graphs of distance versus time for different masses loaded on cart. Analyze slope of curves and predict relationships between mass and acceleration while using a constant force. Extend activity by comparing the force used to throw baseballs and golf balls with their mass and acceleration. ***Technology suggestion:*** *Use photogates and graphing calculators to measure time and graph data.*	Khoa has been in the country for two and one-half years. He grasps academic vocabulary quickly, has excellent listening skills, but needs help with written expression. Khoa will be paired with two English-speaking lab partners. The teacher will provide him with a list of essential physics vocabulary specific to this experiment (e.g., mass, length, distance, time, carts, photogate, slope, curves, relationship, acceleration). In his initial role as observer, he will write definitions of the vocabulary in Vietnamese to assist in writing the final lab report. During group activity his role will be to record data as dictated by his lab partners. The English-speaking lab partners' role will be to verify use of comparative language in expressing the relationship between force, mass, and acceleration (e.g., a Limited English Proficiency student might say "the more weight, the slower the cart moves." English-speaking students will provide more appropriate scientific description, such as "as mass increases, acceleration decreases") (*Types of extensions: procedures and routines, resources and materials, demonstration of knowledge, level of support).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	*(Continued from page 14)* How can we use forces and the laws of motion to understand the motion of objects?	**Students will** **Physical Science** **Motions and Forces** • investigate the effects of forces on the motion of objects. • investigate gravitational and electromagnetic forces. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate electromagnetic forces. Produce electricity by thrusting one end of strong bar magnet through wire coils that have different numbers of turns. Measure electricity produced. Produce lab reports identifying variables that affect amount of electricity created. Compare this production of electricity to the electricity produced when you speak into a dynamic microphone (the diaphragm thrusts a coil through a magnetic field and produces bursts of electricity in response to sounds). Produce consumer information pamphlets for local retail stores explaining the operation of microphones and speakers and the proper way to install them *(WP-Transactive).* ***Technology suggestion:*** *Use milliammeters, galvanometers, or probes and graphing calculators to measure electricity.*	Jessica is able to learn at the same rate as her peers when information is presented orally or in written form. She has difficulty translating thoughts to print. She is able to complete lab in same manner as other students. However, both lab reports and consumer brochures will be difficult for her. There are several students who have difficulty with writing and the teacher pairs them with students for whom writing is not a problem. One lab report per team is turned in for a grade. Jessica is able to identify variables that affect amounts of electricity and her partner records their answers. For brochures, she is able to orally contribute information. She is also able to produce accompanying diagrams. *(Types of extensions: level of support, procedures and routines, level of participation).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How is the transfer of energy controlled by the conservation of energy and by the tendency toward disorder?	**Students will** **Physical Science** **Conservation of Energy and the Increase in Disorder** • recognize that the total energy of the universe is constant. • distinguish between types of energy. • examine how everything tends to become less organized. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine energy transfer. Explain how thermal energy is produced in toasters by tracing energy back to its source. List forms of energy during different stages of transfer. Produce brochures to be distributed by local electric cooperatives containing consumer information about efficient energy use by home appliances *(WP-Transactive)*. • investigate types of energy. Use photogate timer, meter stick, and balance to collect data and calculate change in potential energy and kinetic energy during swing of simple pendulum. Develop reports for customers in local stores that sell grandfather clocks explaining the construction features of clocks that efficiently use kinetic and potential energy. Write encyclopedia entries explaining the interaction between kinetic and potential energy in grandfather clocks *(WP-Transactive).*	Seth learns information at the same rate and level as his peers. He uses hearing aides and requires audio trainers or interpreters (sign language) to understand information presented verbally or participate in conversations. He reads information on the same grade level as his peers. For these activities, the teacher will use an audio trainer or interpreter during instruction and discussion. Provide written directions for activities or description of concepts *(Types of extensions: resources and materials, level of support).*
• examine the tendency to become less organized. Design and conduct experiments to determine the rate of dispersion of food coloring dropped into water of different temperatures. Produce reports describing the inquiry approach, observations, and explanations of effects of temperature on rates of dispersion. ***Technology Suggestion****: Use photogates and graphing calculators to collect and graph data.*	Darlene is visually impaired. She is able to design and conduct experiments (e.g., dropping food coloring into different beakers of varying temperatures). Her partner verbally describes results. Darlene records her partner's descriptions and completes her lab report with a Braille writer. *(Types of extensions: level of support, resources and materials).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What happens when energy interacts with matter?	**Students will** **Physical Science** **Interactions of Energy and Matter** • investigate energy transfer caused when waves and matter interact. • investigate electrical energy and conductivity through matter. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate energy transfer between waves and matter. Collect data to produce colored charts of visible bright line spectra of various elements (e.g., metallic salts suspended in flame, neon lights, fluorescent bulbs) using spectroscopes, prisms, or diffraction gratings. Use these charts to identify elements in "unknown" samples supplied by teacher. Use the charts to produce consumer information articles with photos or color drawings to explain why each element absorbs and emits a specific packet of energy. Distribute articles to local hardware stores that sell light bulbs. Write encyclopedia entries explaining the interaction of light waves and various elements *(WP-Transactive).*	Steve works at the same level as his peers and is able to complete any assignment when in the same time frame. However, he has difficulty interacting with peers and adults. The teacher assigns groups of four to complete the lab. Because Steve is unable to work in groups of that size, the teacher assigns him to work with one other student to complete assignments. Prior to beginning labs, the teacher reviews lab rules, Steve's behavior plan, and point sheet. Following lab, the teacher gives positive or corrective feedback as necessary (*Types of extensions: procedures and routines, level of support, motivation, participation, resources and materials*).
• investigate the interaction of electrical energy and matter. Design and conduct experiments to identify variables that affect the amount of conductivity and resistance in metal wires. Produce articles that explain how these variables impact wiring for new speakers *(WP-Transactive).* ***Technology suggestion**: Use probes and graphing calculators to collect and graph data.*	Ermin is a Limited English Proficiency student who has been in the country for 14 months, has strong verbal skills due to his outgoing nature, but limited academic vocabulary, especially in reading and writing. Assuming that concepts and vocabulary required for lab report have been demonstrated prior to the experiment, physical and visual elements will facilitate him to apply newly acquired knowledge. To assist him in identifying variables, the teacher will provide stereo speakers and metal wires that vary in composition, thickness, length, and insulation. Ermin then will experiment physically with various types of wire to determine interactions of electrical energy and matter. English-speaking students can assist him in putting his ideas into writing *(Types of extensions: procedures and routines, level of support, participation, demonstration of knowledge).*

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NOTES

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High School Science
Model I: Earth/Space Science

Course Overview:
Students develop a conceptual understanding of Earth/space science through the use of scientific inquiry. They experience Earth/space concepts such as energy in the Earth system, geochemical cycles, formation and ongoing changes of the Earth system, and formation and ongoing changes of the universe. A scientific inquiry approach uses concrete, hands-on experiences that requires students to apply critical thinking skills. For each guiding question, students apply and connect scientific concepts to real life. It is suggested that the physical science course be taken before either Earth/space science or life science.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How do observable structures on Earth's surface enable us to determine the internal energy sources of the earth?

- How can we observe the effect of the Sun's energy on the Earth's surface and atmosphere?

- How are Earth's chemical reservoirs affected by the internal and external sources of energy?

- What evidence can be found that the Earth and solar system have changed over time?

- What evidence can we find that the universe is in the process of continuous change?

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How do observable structures on Earth's surface enable us to determine the internal energy sources of the Earth?	**Students will** **Earth/Space Science** **Energy in the Earth system** • examine internal and external sources of energy. • examine how internal sources of energy propel crustal plates. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • use science to analyze the use of natural resources. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. *(Continued on page 26)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • design investigations to examine the Sun as a source of external energy. Allow the Sun to heat water inside a soft drink can that has been painted black. Measure the temperature increase after 20 minutes and calculate the amount of heat energy reaching the water per minute. Prepare cost analyses and write articles to be distributed by local home builders associations comparing the cost of operating solar houses to conventional houses in Kentucky *(WP-Transactive).* ***Technology suggestion**: Use probes and graphing calculators to collect and graph data.*	Zhi-Jian has been in this country for two months and his oral/aural skills are extremely limited. His reading and writing abilities are somewhat better in spite of serious vocabulary gaps. Having had physics in China, he understands concepts but lacks technical vocabulary and basic language structure to express that understanding. He will use thermometer to determine temperature changes and will perform mathematical calculations required to complete lab report. His English-speaking lab partner will write the actual report. Zhi-Jian will copy technical vocabulary he is still learning and write definitions in Chinese *(Types of extensions: level of support, purpose and appropriateness, demonstration of knowledge).* Stella, Claudia, and Rob have demonstrated mastery of science concepts, providing them time to do additional investigations. They will vary the placement of cans, altering the amount of surface area exposed to the Sun's rays. They will also place the cans in different positions on aluminum to investigate the effects of reflection, and carry out experiments on cloudy days and sunny days to estimate the reduction of heat energy due to the presence of clouds. They will record their observations, draw conclusions, and share them with the class (*Types of extensions: purpose and appropriateness, time, complexity, order of learning, environment, participation, demonstration of knowledge, resources and materials, level of support*).

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	*(Continued from page 24)* How do observable structures on Earth's surface enable us to determine the internal energy sources of the Earth?	**Students will** **Earth/Space Science** **Energy in the Earth system** • examine internal and external sources of energy. • examine how internal sources of energy propel crustal plates. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • use science to analyze the use of natural resources. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • model the convection circulation in the mantle. Investigate how these convection currents propel crustal plates. Float small flat sections of styrofoam on the surface of water in a large beaker that is being heated by a hot plate. Compare the motion and causes of motion of the styrofoam to that of tectonic plates. Create investigative reports on movement of crustal plates and the New Madrid fault system. Share reports with local insurance companies for distribution to home owners that buy earthquake insurance *(WP-Transactive)*.	Jenny understands information when presented verbally. She uses special binocular glass lens to see large items. For this activity, Jenny will have trouble seeing subtle movements of the styrofoam. Provide her opportunities to hear descriptions of what is happening as the water heats up, get close to the styrofoam, or feel movement by having strings attached to the foam *(Types of extensions: resources and materials, level of support).* Montez needs individual attention and frequent redirection. He understands concepts two years above his peers, but demonstrates patterns of no eye contact or communication with others. He excels in technology. Because of use of hot plates, Montez will need close adult supervision to complete lab and for prompting. Montez is given the assignment to complete the comparison on his computer. He also completes his map using computers. He is given an extra day to complete these assignments (*Types of extensions: procedures and routines, complexity, time, resources and materials, demonstration of knowledge, level of support, motivation*).

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High School Science
Model I: Earth/Space Science

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How can we observe the effect of the Sun's energy on the Earth's surface and atmosphere?	**Students will** **Earth/Space Science** **Energy in the Earth system** • examine how external sources of energy produce winds and ocean currents. • examine how external sources of energy determine global climate. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • use science to analyze the use of natural resources. • use science to investigate hazards. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • model convection in the atmosphere and ocean. Place a large beaker of water on a hot plate and drop food coloring into the water. Explain how this models wind and ocean currents. Create maps of global wind patterns and ocean current patterns. Display maps in history classes and explain how these patterns influenced historical shipping trade routes. • model the water cycle. Boil water and allow steam to contact the bottom of pans of ice. Explain how this models components of the water cycle. Access New Jersey Networking Infrastructure in Education Project (NJ NIE) Ask an Expert http://njnie.dl.stevens-tech.edu/curriculum/aska.html and research the water cycle. ***Technology suggestion**: Use Internet to communicate with meteorologists about how energy transferred by water cycle affects global climate.*	Uyen has been in the country for 24 months and still communicates in sentence fragments. Teacher provides vocabulary list of terms (e.g., liquid, gas, solid, evaporation, condensation, precipitation, heat, energy, state). Uyen will have an English speaker show her what each term means and she will write definitions or examples in Vietnamese. After demonstration of water cycle, she will generate cyclical picture that illustrates three phases, labeling parts in sentence fragments with vocabulary from her list *(Types of extensions: level of support, resources and materials, demonstration of knowledge).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How are Earth's chemical reservoirs affected by the internal and external sources of energy?	**Students will** **Earth/Space Science** **Geochemical Cycles** • recognize that the Earth contains a fixed amount of elements. • analyze Earth's chemical reservoirs. • investigate how Earth's sources of energy drive geochemical cycles. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • use science to analyze the use of natural resources. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine the fixed amount of each stable chemical atom or element in the Earth system. Produce articles explaining how Earth's resources are being depleted while Earth's amount of atoms or elements essentially stays the same. • research Earth's chemical reservoirs. Produce articles explaining how plate tectonics affect ways geologists explore for economically important ore deposits *(WP-Transactive).* • investigate how Earth's energy drives geochemical cycles. Make a hot concentrated solution of water and sugar. Allow the solution to cool and evaporate undisturbed for one week. Observe the formation of crystals. Explain how energy drives the water cycle and how the water cycle aids the formation of Earth's minerals. Document observations and explanations in learning logs.	Brad works well with other students. He can demonstrate what he knows using picture cards and a talking computer. For this activity, Brad will work in a small group. As data is collected on the formation of crystals, Brad will choose correct picture representations for the degree of crystal formation and paste pictures in his journal. The pictures and the written description will be programmed into his computer so he can answer questions in class and can demonstrate his knowledge (*Types of extensions: demonstration of knowledge, participation, level of support, procedures and routines, resources and materials, magnitude).*

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High School Science
Model I: Earth/Space Science

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What evidence can be found that the Earth and solar system have changed over time?	**Students will** **Earth/Space Science** **The Formation and Ongoing Changes of the Earth System** • describe the formation of the solar system. • investigate how to estimate geologic time. • examine ongoing changes of the Earth system. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • model possible mechanisms for the formation of the solar system. Sprinkle lycopodium powder on top of water in beakers and stir (the swirling lycopodium powder represents mass particles coalescing under the influence of gravity). Produce articles describing other possible mechanisms for the formation of the solar system and describing current changes that are occurring in the solar system *(WP-Transactive).* ***Technology suggestion:*** *Use Internet to observe latest photographs of astronomical objects and events.*	
• investigate geologic time. Construct physical or pictorial models that show subdivisions of geologic time on time lines. Include descriptions of fossils found from each time period. Examine and map coal deposits and other rock sequences across the state. Create educational brochures describing rock formations that contain fossils and distribute at visitor centers *(WP - Transactive).* • explore how movement of continental plates affected distribution of species. Investigate matching fossils and rock formations across plate boundaries, the unique collection of species on some continents (e.g., marsupials in Australia), and distribution of biogeographical realms.	Josh is deaf. He is able to complete tasks similar to grade-level peers. He is provided with a written set of directions for this assignment. During the field trip to investigate coal deposits and other rock sequences, an interpreter signs the speaker's explanations *(Types of extensions: procedures and routines, resources and materials, level of support).*
• examine interactions that cause ongoing changes in the Earth system. Model chemical weathering by placing piece of chalk (limestone) in water and another piece in vinegar (acid). Produce articles to predict long term effects of acid rain on erosion of Earth's surface, limestone cave formation, monuments, and buildings (*WP-Transactive*). ***Technology suggestions:*** *Use digital cameras to create photo essays. Create multimedia presentations for city council or county fiscal courts documenting effects of weathering or acid rain on communities.* • investigate significant geologic events (e.g., mountain building, formation of volcanoes) and their impact on speciation. Research adaptive radiation on Hawaiian and Galapagos Islands. Create maps of islands showing locations of different species. Use graphic organizers to compare features of species. Develop models to explain how adaptive radiation occurs on island chains.	Stanley understands information well beyond the level of his peers. He is highly motivated when he is given independence in his study of new concepts. For this activity, Stanley already knows basic concepts of chemical weathering. Contract with Stanley to conduct a research project on the effects of chemical weathering on the local landscape. As part of the research, Stanley will develop a specific set of strategies to decrease the amount of weathering in his community. He will also present strategies to city council members (*Types of extensions: motivation, purpose and appropriateness, complexity, time, pace, environment, order of learning, demonstration of knowledge).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What evidence can we find that the universe is in the process of continuous change?	**Students will** **Earth/Space Science** **The Formation and Ongoing Changes of the Universe** • describe theories of the formation of the universe. • describe the formation of the stars. • examine stars. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine components and structure of the universe. Construct physical or pictorial models of the universe that show the position of our solar system and accurately represent size and distance. Display models in school cafeteria. Write reviews for the movie *Armageddon* commenting on scientific accuracy *(WP-Transactive).* • investigate factors that contribute to the formation of stars. Write articles explaining the use of stellar parallax to measure distances to stars. Distribute articles to local astronomy clubs *(WP-Transactive).* • investigate components of stars. Observe photographs of spectra from stars. Produce written comparisons to Sun's spectrum and explain similarities and differences. Create colored charts, posters, or multimedia presentations comparing spectra from stars to Sun's spectrum. Share multimedia presentations with school-based council. ***Technology suggestion**: Use multimedia software to develop presentation.*	

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High School Science
Model I: Life Science

Course Overview:
Students develop a conceptual understanding of life science through the use of scientific inquiry. They experience life science concepts such as the cellular organization; molecular basis of heredity; biological change; interdependence of organisms; matter, energy and organization in living systems; and behavior of organisms. A scientific inquiry approach uses concrete, hands-on experiences that requires students to apply critical-thinking skills. For each guiding question, students apply and connect scientific concepts to real life. It is suggested that the physical science course be taken before either Earth/space science or life science.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How do cell structures, functions, and processes affect living things?
- How does DNA transfer genetic information of organisms to the next generation?
- What evidence suggests that species change over time and how is biological classification used to explain relationships between diverse organisms?
- How are organisms dependent on the cycling of atoms and molecules, energy flow, and each other in an ecosystem?
- What processes are involved in the flow of matter and energy through and between living systems and the physical environment?
- How do behavioral responses to stimuli ensure individual survival and reproductive success for the species?

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How do cell structures, functions, and processes affect living things?	**Students will** **Life Science** **The Cell** • investigate cell structures and their functions. • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • explore the impact of science on personal and community health. • recognize how science influences human population growth. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. *(Continued on page 40)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine cell structures with light microscope. Produce photo essay or essay with student created drawings of basic cell structure (e.g., cell wall, cell membrane, nucleus, cytoplasm, chloroplast, vacuoles). Describe functions of cell structures on mechanical rather than biochemical level (e.g., nucleus and control of cell function, chloroplast and photosynthesis, mitochondria and respiration, cell membrane and transport). Include ways to test the assertion that chicken eggs are cells by comparing functions of different structures in eggs and in cells. ***Technology suggestion:*** *Use light microscopes or flex cams to examine cell structures.* • investigate reactants and products of the photosynthetic chemical reaction. Use light screens on Geranium leaves. Conduct iodine tests after a few days to determine effects of light and absence of light on production of carbohydrates in leaves. Place *Elodea* plants into carbonate solutions under bright light. Count oxygen bubbles as they emerge from cut ends of *Elodea* plants. Analyze these activities and produce an empirical word equation for the photosynthetic chemical reaction. Investigate ways to increase or decrease rate of oxygen production. Compare photosynthesis in plants adapted to life in arid conditions to plants living in Kentucky. • investigate the evolution of eukaryotic cells. Trace the origin of cell organelles. Use graphic organizers to compare characteristics of oldest known cells to modern cells. Create illustrated time lines documenting milestones in the development of the cell theory. • compare functions of cell organelles to school or city structures that have similar functions. Create multimedia presentations showing comparisons. • investigate how and when cells differentiate. Read *"How Does A Single Cell Become a Whole Body."* Trace formation of germ layers and identify organ systems that develop from each layer. Create informational bulletin boards, collages, or posters. Examine drugs (e.g., thalidomide, alcohol) and diseases (e.g., rubella) that interfere with differentiation and organogenesis. Write articles to encourage pregnant women to refrain from drinking alcohol. *Use this activity to develop possible writing portfolio entries* (*WP - Transactive).*	Carl is able to learn concepts and vocabulary presented in a very concrete manner. He has difficulty with new language and vocabulary and needs visual devices to remind him of the meaning of vocabulary (e.g., photosynthesis), adding one new term and reviewing old ones each day. Also, on the day of the activity, the teacher reviews techniques for using microscopes and parts of the microscope. She also presents a diagram of a cell and its structures. Carl copies it into his notebook. With a partner, Carl examines cell structures with the microscope and compares it to his diagram. Then Carl draws a diagram from the real cell and compares it to his notes, labeling all parts. Carl will answer simple questions to describe functions of cell structures. He does not complete the chicken egg section of the lab *(Types of extensions: order of learning, procedures and routines, complexity, magnitude, resources and materials, demonstration of knowledge, level of support).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	*(Continued from page 38)* How do cell structures, functions, and processes affect living things?	**Students will** **Life Science** **The Cell** • investigate cell structures and their functions. • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • recognize how science influences human population growth. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate the changes that occur during metamorphosis of animals (e.g., salamanders, insects, frogs). Create illustrated flow charts explaining the process. Create physical models of young and adult. Identify natural or human-induced hazards (e.g., acid rain) that affect development. Interview biologists about changes in local populations of aquatic organisms. Write letters to legislators regarding effects of acid rain or other pollutants on aquatic organisms (*WP-Transactive*). See *Project Wet Curriculum and Activity Guide* activity Where are the Frogs? • investigate embryonic development. Examine pictures of different species of embryos at different stages of development. Use graphic organizers to compare features. Research variables that affect embryonic development (e.g., thalidomide, alcohol, diseases). Develop informational brochures for expectant mothers explaining health hazards and distribute through local health care facilities (*WP-Transactiv*e). • trace what happens to food produced by rain forest trees when its leaves and fruit are eaten by other animals. Create bulletin boards illustrating flow of energy and explaining the photosynthetic process. • create illustrated time lines showing major discoveries in studies of photosynthesis. Include works of major researchers (e.g., Van Helmont, Priestley, Ingenhouz, Sachs, Engelmanson). ***Technology suggestion:*** *Use software to create time lines.*	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How does DNA transfer genetic information of organisms to the next generation?	**Students will** **Life Science** **The Molecular Basis of Heredity** • investigate DNA. • investigate encoding and replication. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • explore the impact of science on personal and community health. • analyze the role science plays in everyday life and compare different careers in science. • investigate advances that have effects on science and society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine DNA structure. Construct models of DNA molecules and show locations of genes. Display models in science labs. Write articles for the local school newspaper concerning future applications of Human Genome Project *(WP-Transactive)*. • examine replication. Create articles showing how one DNA molecule can form exact duplicate of itself (replication). Use photographs of DNA models in essays *(WP-Transactive)*. • investigate life cycles of cells. Examine videos, slides, or photographs of various stages of mitosis and interphase. Recreate stages using students to represent chromosomes. • investigate loss of control over cell division exhibited by cancer cells. Identify chemical substances used in chemotherapy and their purposes. Interview community members who have had chemotherapy, examine the process and how it affected their lives. Write articles for science sections of newspapers and explain the idea that cancer is a normal developmental process gone wrong or write editorials to explain why money should be spent on basic research regarding normal cell cycle (*WP-Transactive*). • read Watson's account of the discovery of DNA structure. Summarize methods used and evidence gathered. Investigate lives of other researchers who were involved in the discovery (e.g., Rosalind Franklin, Maurice Wilkins, Francis Crick). Write resumes for each researcher. • investigate protein synthesis including transcription and translation. Create models to demonstrate process. Identify types of RNA present, their function, and locations. Use graphic organizers to compare protein synthesis in eukaryotes and prokaryotes. Explore evolutionary significance of common genetic language. • investigate how some antibiotics work to interrupt protein synthesis of bacteria. Create informational brochures explaining how antibiotics work and distribute at drugstores (*WP-Transactive)*. • investigate how mutations in DNA affects protein synthesis. Identify mutagens (e.g., ultraviolet lights, ionizing radiation). Write articles explaining how mutations may be harmful, neutral, or beneficial, depending on how the proteins they specify interact with other genes and the environment (*WP-Transactive)*.	Angelica sustained a spinal cord injury in an auto accident. She has limited use of her arms. She received instruction on use of assistive technology and computers. She uses technology with assistive devices to access the key board. To complete this assignment, she is given instruction in use of a graphics program that can help her construct models. She constructs her models using her computer and displays them on a class computer monitor or TV screen. She completes the editorial using her computer *(Types of extensions: order of learning, purpose and appropriateness, procedures and routines, resources and materials, demonstration of knowledge)*.

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What evidence suggests that species change over time and how is biological classification used to explain relationships among diverse organisms?	**Students will** **Life Science** **Biological Change** • examine how species change over time. • examine diversity and classification. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate defense mechanisms (e.g., camouflage, mimicry, toxicity, aggressive behaviors, warning coloration) in plants and animals. Select a defense mechanism and identify organisms that exhibit that trait. Identify patterns among groups of organisms. Create graphic representations (e.g., circle graphs, histograms) to display data. Read articles describing industrial melanism (e.g., "Further Selection Experiments on Industrial Melanism in the Lepidoptera."). Explain in learning logs how process of natural selection altered populations of peppered moths *(Biston betularia).* • investigate evolution of various species (e.g., horses). Create murals depicting phylogenetic trees. Discuss how adaptations are advantageous to the survival of species. • examine diversity and unity of organisms. Observe organisms in areas close to school. Sort organisms by structure and develop classification system. Produce essays with photographs to be distributed during parents' night. • investigate biodiversity. Take field trips to riparian ecosystems. Map physical and biological features. List organisms living in each area and describe their roles. Explore how changes in environments might increase or decrease diversity. Write articles explaining why ecosystems with high biodiversity should be protected (*WP-Transactive*). • investigate impacts of introduced species (e.g., lamprey eel, rainbow trout, pheasant, purple loosestrife, water hyacinth, Japanese beetle, zebra mussel) on native species. Identify both benefits and liabilities of introduced species. Research ways introductions occur and develop plans to prevent them. Share plans with environmental clubs. • investigate diversity of fish species in Kentucky's lakes and streams. Invite fish biologist to discuss fish and fish habitats. Interview fishermen and compare with biologists' information. Use graphic organizers to compare characteristics of fish (e.g., habitats, food sources, mating and breeding patterns). Design dichotomous keys to identify species.	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What evidence suggests that species change over time and how is biological classification used to explain relationships among diverse organisms?	**Students will** **Life Science** **Biological Change** • examine how species change over time. • examine diversity and classification. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • explore the impact of science on personal and community health. • investigate how science can be used to solve environmental quality problems. • investigate advances that have effects on science and society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • explore methods of classifying organisms based on structure, function, biochemistry, behavior, nutrition, embryonic development, genetic systems, evolutionary histories, and ecological interactions. Classify various organisms based on pictures and measurements of features (e.g., body form, teeth, skull, feet, skeletal features, body temperature, heart, embryonic development). • examine diversity among plants. Identify major highlights of plant evolution (e.g., vascular tissue) and their impact on plant diversification. Identify divisions within plant kingdom and describe their characteristics and significant adaptations. Use graphic organizers to compare characteristics. Create bulletin boards, collages, or multimedia presentations on the economic or medical importance of plants from each division, including local agricultural products. • explore loss of biodiversity worldwide. Investigate why tropical rain forests are being destroyed at alarming rates. Debate whether or not developed nations have the right to ask developing nations to slow or stop destruction of their forests. • explore diversity among microorganisms. Research types of aerobic and anaerobic bacteria (e.g., *Staphylococcus aureus*, *Clostridium botulinum*). Discuss potential impacts on human health (e.g., botulism, vitamin K production). Research and categorize antimicrobial drugs. Investigate how antimicrobial drugs disrupt cell processes or structures or both. Create informational brochures explaining how antimicrobial drugs work and distribute at drugstores. • explore beneficial roles of microorganisms (e.g., food production). Organize food fairs for parents' night that highlight the role of microorganisms in food production.	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How are organisms dependent on the cycling of atoms and molecules, energy flow, and each other in an ecosystem?	**Students will** **Life Science** **The Interdependence of Organisms** • investigate the cycle of atoms and molecules within the biosphere. • analyze energy flow through ecosystems. • examine the factors that influence the interactions between organisms. • explore how human activities alter ecosystems. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate the relative abundance of carbon, hydrogen, nitrogen, and oxygen in living things. Identify major compounds found in living things (e.g., CO_2, H_2O, proteins, carbohydrates). Trace the movement of these elements between the living and nonliving world. Identify processes (e.g., respiration, photosynthesis, bacterial role in nitrogen cycle) critical to each cycle. Write short stories assuming role of elements or molecules as they cycle through the biosphere. (The element or molecule must pass through at least two organisms.) Share stories with other biology classes. • investigate the nitrogen cycle. Examine nodules from legumes' roots under microscopes after staining with methylene blue. Sketch nitrogen-fixing bacteria. Produce brochures to be distributed to farmers by agricultural field agents about importance of bacteria (*WP-Transactive*). • design food chains showing humans' position as primary and secondary consumers. Use food chains to construct food webs. Analyze humans' position in energy transfer. Compare vegetarian and non-vegetarian diets to determine effects of each on the environment. Use this information to argue that we should or should not become vegetarians *(WP-Transactive).* Determine ingredients needed to produce cows, including land, forage, fuel, fertilizers, corn, soybeans, insecticides, herbicides, antibiotics, hormones, and water. Examine distribution and use of resources among nations of the world. • examine how humans alter ecosystems. Explore effects of fertilizer runoff on water resources. Compare observations (e.g., nitrate level, phosphate level, level of dissolved oxygen) of water sources that are near agricultural land to sources that are not and prepare investigative reports. Participate in Kentucky's Water Watch Program *(WP-Transactive).* ***Technology suggestion***: *Use e-mail to compare findings with students across the state.*	Mandy needs opportunities to participate in activities to support and encourage her intense interest in scientific research. She will survey garden supply stores to find compounds in commonly used pesticides and other lawn and garden products. The gifted-talented specialist will assist in arranging for her to work with an environmental researcher either through mentorship projects at a university or government environmental agency or via e-mail. Mandy and her mentor will design and perform investigations or experiments related to effects of selected compounds in lawn and garden care products on water resources or on food chains. She will present her findings to local garden clubs or other appropriate audience *(Types of extensions: purpose and appropriateness, complexity, level of support, environment, time, order of learning, demonstration of knowledge, resources and materials, procedures and routines, magnitude).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What processes are involved in the flow of matter and energy through and between living systems and the physical environment?	**Students will** **Life Science** **Matter, Energy, and Organization in Living Systems** • recognize that living systems require energy. • investigate photosynthesis, cellular respiration and energy. • analyze the flow of matter and energy. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • explore the impact of science on personal and community health. • recognize how science influences human population growth. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine energy sources for living systems. Construct models of energy containing food molecules (e.g., sugars, proteins). Construct models of simple molecules (e.g., CO_2, H_2O) from which food molecules are formed. Display models in classroom. • research methods used to determine the number of calories in foods. Determine number of calories in walnuts by burning walnuts beneath small beakers filled with water. Compare water temperature before and after burning. Compare number of calories released by lipids, proteins, and carbohydrates. Write informational guides for dieters explaining which type of food provides the most calories and why (*WP-Transactive*). • investigate energy relationships between photosynthesis and respiration. Use models to illustrate the chemistry of photosynthesis and cellular respiration. Write children's stories about the life of plants describing when and where photosynthesis and respiration take place *(WP-Transactive).* ***Technology suggestion:*** *Use desktop publishing software to create books.* • write articles explaining why rain forests make little or no net contribution to global oxygen production or reduction of global warming (*WP-Transactive*). • analyze energy flow through ecosystems. Read feature articles from fishing, hunting, or nature magazines and use the information to create food webs. Display food webs on bulletin boards. Examine diagrams of energy pyramids for typical ecosystems. Develop diagrams and memos to be used by wildlife biologists for workshops explaining why energy pyramids are broad at bottom and narrow at top.	Mia has limited fine motor abilities, but her cognitive skills are commensurate with same-age peers. She will need theraputty rather than modeling clay, stiffer paper, larger objects, and peer or adult assistance constructing her models, but she should be allowed to perform construction of models herself. An occupational therapist will consult regarding appropriate types of materials (*Types of extensions: time, procedures and routines, resources and materials, level of support).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How do behavioral responses to stimuli ensure individual survival and reproductive success for species?	**Students will** **Life Science** **The Behavior of Organisms** • investigate behavioral responses. • analyze patterns of behavior. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • explore the impact of science on personal and community health. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate and compare innate and learned behaviors (e.g., habituation, imprinting, classical and operant conditioning) in graphic organizers. Create multimedia presentations illustrating examples of each. • investigate the evolutionary and genetic basis of behavior. Compare advantages and disadvantages of sexual reproduction and asexual reproduction. Explain the adaptive advantages of hermaphroditism, altruistic behavior, and mating systems (e.g., polygamy, polyandry, monogamy). Analyze how animal behaviors (e.g., feeding, mating, social behaviors, communication, territoriality, dominance hierarchies) maximize reproductive success. Explore successful reproductive behaviors of aquatic organisms (e.g., reproductive dormancy). Create posters, bulletin boards, or multimedia presentations giving examples and explaining behaviors. • explore circadian rhythms (e.g., metabolic role, body temperature, feeding times) and cirannual behaviors (e.g., breeding, hibernation). Investigate behavioral responses of organisms in tidal regions. Identify internal or external cues that regulate these behaviors and explore their adaptive nature. See *WOW! The Wonders of Wetlands* activity Salt Marsh Players • research seasonal affective disorder. Create informational brochures describing what can be done to alleviate or eliminate symptoms. Distribute through healthcare facilities (*WP-Transactive*). • investigate migration in animals (e.g., whales, butterflies, birds). Explore methods (e.g., piloting, orientation, navigation) and cues (e.g., Sun, magnetic fields, star patterns, chemical concentration gradients) used to find their destinations. Create multimedia presentations for other schools demonstrating how animals migrate.	

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High School Science
Model I: Agri-biology

Course Overview:
This one-credit course uses agricultural contexts to present the life science content outlined in the *Program of Studies.* As students study practical agricultural concepts, they apply scientific ways of thinking and working to real-life problems. During their study of agri-biology, students perform many practical tasks. They create models, extract DNA, analyze DNA fingerprints, construct tables and graphs to classify and analyze data, and test soils. Students also participate in cooperative and collaborative groups, use technology to solve problems, and participate in field trips to apply scientific concepts to agricultural and environmental problems. Students develop an understanding of many concepts such as cell structure and function, morphology and physiology of agriculturally significant animals, heredity principles and inheritance patterns, genetic engineering, animal behavior, biological change, interdependence of plants and animals, and the flow of matter and energy through ecosystems.

Models are organized around guiding questions. Guiding questions (in bold print) direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Essential questions may be included to further focus student learning.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding (in bold print) and essential questions along with related academic expectations and correlations to the *Program of Studies* and agri-biology content chart. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content or content from agri-biology content chart, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding and Essential Questions:
How do cell structure, function, and processes affect living things?

What is the molecular basis of heredity?

• How does DNA affect organisms' morphology and physiology?

How do behavioral patterns ensure reproductive process?

• How do agriculturalists manipulate reproductive success?

What are the processes of biological change?

• How do agricultural crops and animals reflect diversity in nature?

How are organisms within ecosystems interdependent?

• How do agricultural processes alter ecosystems?

• How are croplands different from natural ecosystems?

How do organ systems work together to keep animals healthy?

What skills and knowledge must I have to be successful in an agricultural career in Kentucky?

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High School Science
Model I: Agri-biology

Academic Expectations	Content/Process
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	**Students will** • identify functions of plant structures. • identify environmental factors that affect crop production. • identify physical properties and biological components of soils. • identify structural, physiological, and behavioral characteristics of vertebrates and invertebrates. • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns. • communicate recurring themes and processes of biology and chemistry common to all organisms. • identify major farm animal species, appropriate livestock enterprises, and their influence on world agriculture trends. • compare appropriate health programs for animal species. • compare anatomy, breeding, and reproduction of animal species. • explore career opportunities and job qualifications in agri-biology. • integrate Future Farmers of America (FFA) leadership activities.

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Agri-biology Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	**How do cell structure, function, and processes affect living things?**	**Students will** **Program of Studies** **Life Sciences** • investigate cell structures and their functions. • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. • investigate photosynthesis, cellular respiration, and energy. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • communicate recurring themes and processes of biology and chemistry that are common to all organisms. • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns. *(Continued on page 60)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine slides of various cell types from multicellular organisms. Discuss relationships between structure of different cell types and their functions. Determine common structures and functions of all cells. Create models of plant and animal cells, using biodegradable materials. Label and color code each organelle and describe its function. Identify organelles common to both and unique to each. • compare functions of cell organelles to school or city structures that have similar functions. Create multimedia presentations showing comparisons. • investigate use of microbes to produce substances needed by other plants, animals, and humans (e.g., insulin). Create illustrated flow charts, demonstrating processes. Write editorials, explaining need for increased funding for basic research in microbiology. *Use this activity to develop possible writing portfolio entries (WP - Transactive).* • research use of biotechnology and genetic engineering in development of new livestock breeds, plants, and disease control. Evaluate alternatives to genetic engineering methods. Evaluate impact of genetic engineering on their community and predict short- and long-term consequences. Develop policies that regulate use of genetic engineering. Present findings and recommendations to agricultural extension agents. ***Technology suggestion:*** *Use CD-ROMs, digital cameras, computers, video, and audio to create multimedia presentations for extension agents.* • investigate how and when cells differentiate. Read "How Does a Single Cell Become a Whole Body." Trace formation of germ layers and identify organ systems that develop from each layer. Create informational bulletin boards, collages, or posters to display in classrooms.	

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Agri-biology Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	*(Continued from page 58)* **How do cell structure, function, and processes affect living things?**	**Students will** **Program of Studies** **Life Sciences** • investigate cell structures, and their functions. • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • commmunicate recurring themes and processes of biology and chemistry that are common to all organisms. • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • observe chicken embryos at 24, 48, and 72 hours of development. Record observations throughout incubation period, including humidity, temperature, turning rate, weight, and stage of maturity. Compare in graphic organizers features at different stages. Identify body structures of developing embryos and explain their functions. Investigate factors that interfere with embryonic development. Create multimedia presentations for poultry farmers to explain embryonic development. • investigate prenatal and postnatal growth and development. Compare growth rate of organ systems after animals are born. Write summaries in learning logs, describe growth rates of different organ systems and effect growth rate has on animals.	Julie needs to develop confidence in her ability to contribute positively in class. Her family owns and manages a poultry industry. Julie will arrange for her class to visit and observe the chick incubation and hatching process (*Types of extensions: motivation, participation).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Agri-biology Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	**What is the molecular basis of heredity?** How does DNA affect organisms' morphology and physiology?	**Students will** **Program of Studies** **Life Sciences** • investigate DNA. • investigate encoding and replication. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns. • compare anatomy, breeding, and reproduction of animal species. *(Continued on page 64)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine structure of DNA. Extract DNA from onion cells to observe color, texture, and threadlike structure. Construct models of DNA molecules and show locations of genes. Display models in science labs. Write articles for school newspapers concerning future applications of information derived from the Human Genome Project *(WP - Transactive).* • research use of DNA fingerprinting in food and animal science. Run DNA fingerprinting through electrophoresis to show how DNA fragmentation analysis can be used for identification. Create multimedia presentations explaining how public health safety workers track spread of bacteria (e.g., *Listeria)* and other pathogens. Explain procedure and results in learning logs. • read Watson's account of his discovery of DNA structure. Summarize method used and evidence gathered. Investigate lives of other researchers who were involved in discovery (e.g., Francis Crick, Rosalind Franklin, Maurice Wilkins). Write resumes for each researcher. • examine replication. Use models of DNA molecules to show how one DNA molecule can form exact duplicate of itself. • investigate protein synthesis, including transcription and translation. Explore evolutionary significance of common genetic language. Create models to demonstrate process. • distinguish between simple Mendelian inheritance (e.g., coat color in rabbits), multiple allelic inheritance, and polygenic inheritance (e.g., cob length in corn).	Betty and Agnes already have an understanding of DNA as it applies to genetics. They will use the Internet and other sources to discover new or potential uses for DNA technologies. They will communicate with forensic medicine specialists about their findings and create presentations to share with their class *(Types of extensions: magnitude, motivation, resources and materials, complexity).*
• create hypothetical corn plants, using different colored paper clips for traits (e.g., height, leaf color, seed color). Record phenotypes and genotypes in learning logs. Investigate traits controlled by extranuclear DNA (e.g., mitochondrial). Determine inheritance patterns in plants (e.g., varigated leaf trait of *Brassica rapa).* Write feature articles for agricultural journals explaining differences in inheritance patterns *(WP - Transactive).* • study family relationships of livestock, using phenotypic records extending over two or more generations. Choose traits (e.g., dwarfism in Hereford cattle) and gather information about traits ancestors exhibited to complete pedigrees. Use Punnett squares to determine apparent inheritance patterns for that trait.	Bryan and Melissa are able to learn with their peers, but have difficulty following directions. They will pair with classmates to investigate phenotypic and genotypic inheritance patterns *(Types of extensions: complexity, resources and materials).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Agri-biology Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	*(Continued from page 62)* **What is the molecular basis of heredity?** How does DNA affect organisms' morphology and physiology?	**Students will** **Program of Studies** **Life Sciences** • investigate DNA. • investigate encoding and replication. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns. • compare anatomy, breeding, and reproduction of animal species.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • use sire summaries to distinguish between performance testing and progeny testing. Examine copies of pedigree papers of several animals of same breed. Compare animals based on pedigrees and performance records. Develop reports for agricultural advisory committees on beef breed improvement in their county. Investigate benefits of hybrid vigor. • research physical characteristics of economically important agricultural animals (e.g., sheep, cattle, swine). Determine whether traits are influenced more by genetics or environment. • obtain copies of dairy cattle sire catalogs and lineage classification data from dairy herds. Using data on females from herd records and data on sires from catalogs, choose most desirable sires for cows in that herd. Write introductions for catalogs describing how the information contained within can be used to improve herd quality *(WP - Transactive).*	

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Agri-biology Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**How do behavioral patterns ensure reproductive success?** How do agriculturalists manipulate reproductive success?	**Students will** **Program of Studies** **Life Sciences** • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. • investigate behavioral responses. • analyze patterns of behavior. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • compare anatomy, breeding, and reproduction of animal species. • identify functions of plant structures. • identify environmental factors that affect crop production. *(Continued on page 68)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate life cycle of flowering plants. Create models, bulletin boards, or collages demonstrating cycles. Label all plant parts and describe function. Summarize in learning logs why knowledge of plant life cycles is important to agriculturalists. • investigate various forms of pollination (e.g., wind, water, insect). Create charts to compare forms of pollination in plant families. Investigate coevolution between plants and pollinators. Design and conduct investigations to determine effects of absence of pollinators on plant reproduction. Research use of bees as pollinators and diseases that have reduced bee populations. Write articles for agricultural journals explaining impact of reduced bee populations on crops *(WP - Transactive).* • investigate reactants and products of photosynthetic chemical reaction. Use light screens on Geranium leaves. Conduct iodine tests after several days to determine effects of light and absence of light on production of carbohydrates in leaves. Place *Elodea* plants into carbonate solutions under bright light. Count oxygen bubbles as they emerge from cut ends of *Elodea* plants. Analyze activities and produce an empirical word equation for photosynthetic chemical reaction. Investigate ways to increase or decrease rate of oxygen production. Compare photosynthesis in plants adapted to life in arid conditions with plants growing in Kentucky. • investigate vegetative propagation (e.g., rhizomes, stolens, tubers, grafting). Compare advantages and disadvantages to plants and humans of vegetative propagation over sexual reproduction. Propagate different species of plants in class and compare results. Distribute plants at parents' night. • research behaviors (e.g., social, reproductive, feeding) of agricultural animals. Determine how livestock producers deal with animal behaviors (e.g., feeding schedules, facility designs). Observe flock or herd animals, listing observed behaviors and determine which behaviors are instinctive and which are learned. Shadow county extension agents or veterinarians to determine how agriculturalists deal with problems related to livestock behaviors.	

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Agri-biology Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	*(Continued from page 66)* **How do behavioral patterns ensure reproductive success?** How do agriculturalists manipulate reproductive success?	**Students will** **Program of Studies** **Life Sciences** • investigate behavioral responses. • analyze patterns of behaviors. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • compare anatomy, breeding, and reproduction of animal species. • identify functions of plant structures. • identify environmental factors that affect crop production.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • compare size and shape of sperm and egg cells of animal species. Check semen samples under microscopes for motility. Determine if any sperm cells are abnormal. Observe color, mobility, progressiveness, and abnormalities (e.g., tailless, two tails, two heads, pear-shaped heads). Examine prepared slides of ovary. Sketch ovary, including mature follicles and eggs. Prepare lab reports comparing features of each reproductive cell and explaining how traits of each help them perform their functions. • investigate codominants in livestock (e.g., shorthorn cattle). Design experiments to determine probability of different phenotypic expressions (e.g., coat color) in first and second generation offspring. Write lab reports detailing procedures and results to share with peers. ***Technology suggestion:*** *Use integrated software package to create tables and charts for analysis.* • research use of different breeding procedures in agricultural animals (e.g., horses, turkeys) and crops (e.g., corn). Write to breed associations to request information on disqualification of animals or plants for different breeds. Compare information from various associations. Interview livestock producers to determine traits for which they selectively breed. Investigate preferred plant traits in economically important crops. Research impact of selective breeding on agricultural animals and crops. Debate ethical and environmental implications of selective breeding. • demonstrate insemination process using female reproductive tracts acquired from biological supply houses or local slaughter houses. Identify different parts of female reproductive tracts. Identify appropriate insemination tools needed. Use tools to demonstrate insemination process, by placing dye solution in reproductive tract. Follow accepted procedures to dissect tracts to locate point where dye was deposited. Sketch reproductive tracts, identify parts, and describe steps of insemination process in lab reports. • survey local livestock producers to determine artificial insemination and embryo transfer techniques used. Investigate reasons for employing these techniques. Compare costs of semen and embryos from different breeders and examine reasons for cost differences. Write feature articles for agricultural journals explaining advantages and disadvantages of techniques *(WP - Transactive).*	Justin and Juanita have difficulty following directions. They are given instructions one day prior to assignment. They will be paired with peers to complete insemination procedures *(Types of extensions: time, motivation, environment, participation, demonstration of knowledge).*

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High School Science
Model I: Agri-biology

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Agri-biology Content Chart
Scientific Ways of Thinking and Working Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**What are the processes of biological change?** How do agricultural crops and animals reflect diversity in nature?	**Students will** **Program of Studies** **Life Sciences** • examine how species change over time. • examine diversity and classification. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • identify functions of plant structures. • identify structural, physiological and behavioral characteristics of vertebrates and invertebrates. • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate history of domestication of economically important plants (e.g., wheat, corn, sugar cane). Create illustrated time lines to document milestones. ***Technology suggestion:*** *Use software to create time lines.* • create plant models, labeling, describing, and explaining each structure. Write children's books describing functions of plant parts *(WP - Transactive).* • examine plant cell structures with light microscopes. Create cell models, labeling basic cell structure (e.g., cell wall, cell membrane, nucleus, cytoplasm, chloroplast, vacuoles). Describe functions of cell structures on mechanical rather than biochemical level (e.g., nucleus and control of cell function, chloroplast and photosynthesis, mitochondria and respiration, cell membrane and transport). ***Technology suggestion:*** *Use light microscope or flex cams to examine cell structures.* • investigate plant defenses (e.g., poisons, thorns, hormones) and coevolution between plants and herbivores. Identify selective pressures acting on both herbivores and plants. Write news articles for agricultural journals explaining how plants reduce predation *(WP - Transactive).* • investigate irradiation on plant seeds to induce mutations and produce new varieties (e.g., peppers, soybeans, cotton, sugar cane, sunflowers, irises, roses, chrysanthemums, azaleas). Write articles about benefits and drawbacks of irradiation *(WP - Transactive).*	Willie and Ann understand cell structure and have participated in class discussions. They have difficulty manipulating objects and will work with small groups to produce models of cells *(Types of extensions: resources and materials, complexity, demonstration of knowledge).*

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High School Science
Model I: Agri-biology

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Agri-biology Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**What are the processes of biological change?** How do agricultural crops and animals reflect diversity in nature?	**Students will** **Program of Studies** **Life Sciences** • examine how species change over time. • examine diversity and classification. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • identify functions of plant structures. • identify structural, physiological and behavioral characteristics of vertebrates and invertebrates. • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • explore diversity among plants. Identify major highlights of plant evolution (e.g., vascular tissue) and impact on plant diversification. Identify divisions within plant kingdom and describe their characteristics and significant adaptations. Use graphic organizers to compare characteristics. Create bulletin boards, collages, or multimedia presentations on economic or medical importance of plants from each division, including local agricultural products. • compare monocot and dicot seeds. Place corn and bean seeds between wet blotters or paper towels and keep moist. Bisect and compare seeds after one day and after five days. Sketch, identify and label structures, and describe function of seed structures. • investigate evolution of various species (e.g., horses). Create murals depicting phylogenetic trees. Discuss how adaptations are advantageous to increased survival. • investigate early systems of classification (e.g., Aristotle). Compare Aristotle's system to that of Linnaeus. Create dichotomous keys for domestic plants and animals. Display in science lab.	
• examine differences between tamed and domesticated animals. Create collages, bulletin boards, or multimedia presentations for class members, explaining differences. Compare traits of wild and domesticated pigs. Identify traits that resulted from natural selection or selective breeding. Explain how wild pigs are adapted to their environment. Research history of breeds of livestock, including origin of animals, traits that were selected for through natural selection, traits that were selected for through selective breeding, and changes of breeds over time. Create illustrated histories of breeds to display at county fairs. ***Technology suggestion:*** *Use CD-ROMs, digital cameras, computers, video, and audio to create multimedia presentations.*	Bambi and Renee are interested in the domestication of certain animals. They finish their class assignment ahead of other students and develop short skits to share with the class on the domestication of cats and dogs *(Types of extensions: motivation, complexity, demonstration of learning).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Agri-biology Content Chart
Scientific Ways of Thinking and Working Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**How are organisms within ecosystems interdependent?** How do agricultural processes alter ecosystems? How are croplands different from natural ecosystems?	**Students will** **Program of Studies** **Life Sciences** • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. • investigate the cycle of atoms and molecules within the biosphere. • analyze energy flow through ecosystems. • examine the factors that influence the interactions between organisms. • explore how human activities alter ecosystems. • recognize that living systems require energy. • analyze the flow of matter and energy. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • explore the impact of science on personal and community health. • recognize how science influences human population growth. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. **Agri-biology Content Chart** • identify environmental factors that affect crop production. • identify physical properties and biological components of soils. *(Continued on page 76)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • explain how stability of biochemical cycles may be disrupted by agricultural behaviors (e.g., cultivation of grasslands, fertilizer run-off). Survey agriculturalists and develop brochures of practices that reduce negative impacts on ecosystems *(WP - Transactive)*. Role-play town councils and agriculturalists as they discuss issues. • investigate relative abundance of carbon, hydrogen, nitrogen, and oxygen in living things. Identify major compounds found in living things (e.g., CO_2, H_2O, proteins, carbohydrates). Trace movement of these elements between living and nonliving systems. Identify processes (e.g., respiration, photosynthesis, bacterial role in nitrogen cycle) critical to each cycle. Write short stories assuming roles of elements or molecules as they cycle through biosphere. (Element or molecule must pass through at least two organisms). • design food chains showing humans' position as primary and secondary consumers. Construct food webs and analyze humans' position in energy transfer. Compare vegetarian and non-vegetarian diets to determine effects of each on environment. Analyze advantages and disadvantages. Determine ingredients needed to produce a cow, including land, forage, fuel, fertilizers, corn, soybeans, insecticides, herbicides, antibiotics, hormones, and water. Calculate costs, labor, and profit or loss. Debate economic versus environmental advantages. Write newspaper articles explaining distribution and use of resources among nations of the world *(WP -Transactive).* • create flow charts illustrating path of energy from Sun to humans and from humans to environment. Label charts, identifying major processes involved in each energy transformation. • investigate energy relationships between photosynthesis and respiration. Use models to illustrate chemistry of photosynthesis and cellular respiration. Write children's stories about life of plants describing when and where photosynthesis and respiration take place *(WP - Transactive).* ***Technology suggestion:*** *Use desktop publishing software to create books.* .	

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Agri-biology Content Chart
Scientific Ways of Thinking and Working Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	*(Continued from page 74)* **How are organisms within ecosystems interdependent?** How do agricultural processes alter ecosystems? How are croplands different from natural ecosystems?	**Students will** **Program of Studies** **Life Sciences** • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. • investigate the cycle of atoms and molecules within the biosphere. • analyze energy flow through ecosystems. • examine the factors that influence the interactions between organisms. • explore how human activities alter ecosystems. • recognize that living systems require energy. • analyze the flow of matter and energy. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • explore the impact of science on personal and community health. • recognize how science influences human population growth. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. **Agri-biology Content Chart** • identify environmental factors that affect crop production. • identify physical properties and biological components of soils.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate nitrogen cycle within biosphere. Examine nodules from roots of legumes (e.g., clover, alfalfa) under microscopes after staining with methylene blue. Sketch nitrogen-fixing bacteria. Write summaries in learning logs about importance of bacteria to nitrogen cycle. • investigate ways to change pH of soils. Interview agricultural extension agents to determine methods of changing pH. Analyze cost and efficacy of each method. Create how-to articles for agricultural publications *(WP - Transactive).* • design experiments to model processes that led to Dust Bowl of 1930s. Research soil conservation practices and techniques to prevent another Dust Bowl. Compare conservation practices and techniques of past with those of present in multimedia presentations. • investigate physical and chemical characteristics of ponds, springs, and rivers near agricultural cropland. Examine dissolved oxygen levels, turbidity, and bacterial growth. Compare data with students in other regions of Kentucky via Kentucky Water Watch Program. • investigate effects of pollutants (e.g., acid rain) on agricultural crops. Design and conduct investigations to measure acidity of rain water. Map Kentucky rain water acidity levels and compare crop loss due to pollutants with other Kentucky students. • investigate early and modern pesticides, comparing benefits of each. Debate effects of pesticides on beneficial organisms (e.g., soil invertebrates, insects, birds, mammals). Research pests (e.g., fungi, grasshoppers, corn borers) that damage major world crops. Research use of biological control of insects (e.g., ladybugs to control aphids). Produce articles for agriculturalists advocating biological control of pests (*WP - Transactive).* • investigate benefits and losses to crops due to recent weather patterns (e.g., floods, drought, wind, hail). Create collages of current news articles on agricultural impact by environmental forces. Research weather prediction techniques. Research current studies on causes of weather patterns (e.g., Arizona, 1998) and discuss validity of studies. Interview local agriculturalists to determine impact of economic losses due to weather. Write articles on impact weather has on agricultural crops and animals *(WP - Transactive).*	

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Agri-biology Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**How do organ systems work together to keep animals healthy?**	**Students will** **Program of Studies** **Life Science** • investigate cell structures and their functions. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • identify structural, physiological, and behavioral characteristics of vertebrates and invertebrates.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • identify and describe organs and organ systems and anatomical structures of important agricultural animals. List organs common to all and those that differ. Explain physiological functions of each structure. Research common diseases that affect each system and methods used to diagnose and treat diseases. Create brochures to be distributed at county extension offices that describe diseases and treatments (*WP - Transactive).*	

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High School Science
Model I: Agri-biology

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Agri-biology Content Chart
Scientific Ways of Thinking and Working Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**What skills and knowledge must I have to be successful in an agricultural career in Kentucky?**	**Students will** **Program of Studies** **Life Sciences** • examine the factors that influence the interactions between organisms. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • compare appropriate health programs for animal species. • identify major farm animal species, appropriate livestock enterprises, and their influence on world agriculture trends. • explore career opportunities and job qualifications in agri-biology. • integrate FFA Leadership activities.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine contributions of livestock industry to society. Investigate use of animals and animal by-products in medical research and development of food products. Prepare multimedia presentations showing uses of animals and animal by-products. ***Technology suggestion:*** *Use CD-ROMs, digital cameras, computers, video, and audio to create multimedia presentations.* • investigate other issues of animal welfare (e.g., raising animals in confinement, animal health, management practices, continuous ingestion of antibiotics). Investigate role of food pyramid in determining proper diet selections for animals. Examine laws governing use of agricultural animals. Role-play public hearing between National Cattlemen's Association, United States Department of Agriculture official, People for the Ethical Treatment of Animals, and different types of vegetarians. Debate animal welfare issues. • search Internet for alternatives to Kentucky's tobacco crop. Investigate new and nontraditional crops as possible solutions. Research economic and social implications. Write letters to congressmen explaining results of research and recommendations for alternative crops *(WP - Transactive).* ***Technology suggestions:*** *Use Internet to conduct research. Use e-mail to communicate with congressmen.* • research scientific technologies (e.g., hydroponics, tissue culturing) that enhance agricultural endeavors. Create models of food supply systems using hydroponics and tissue culturing technology. Compare hydroponic method of growing crops to traditional methods. Debate advantages (e.g., reduction of labor costs) and disadvantages (e.g., disease introduction).	Teresa and Larry will create brochures to promote the introduction of new economic and agricultural crops for Kentucky. They will collaborate with agriculturalists (e.g., universities, colleges, county extension offices) to discover feasibility of their suggestions *(Types of extensions: motivation, complexity, demonstration of learning, resources and materials).*

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NOTES

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High School Science
Model I: Medical Science

Course Overview:
This one-credit course uses health occupations as a vehicle to present the life science content outlined in the *Program of Studies*. The course is interdisciplinary in nature and integrates academic expectations and activities with the disciplines of life science, mathematics, health, social studies, language arts, arts and humanities, and vocational studies. During their study of medical science, students will gain an understanding of the normal structure and function of the human body through scientific inquiry. Life science conceptual understandings, applications, and connections make this science relevant to students. Anatomy, physiology, physics, and chemistry concepts are reinforced with real-life analogies and health-related examples are used to illustrate potentially difficult scientific concepts.

Models are organized around guiding questions. Guiding questions (in bold print) direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Essential questions may be included to further focus student learning.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding and essential questions along with related academic expectations and correlations to the *Program of Studies* and medical science content chart. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content or content from the medical science content chart, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding and Essential Questions:
How do cell structure, function, and processes affect living things?

- What disease processes result from changes in my body's cell structure and functions?

What is the molecular basis of heredity?

- How do errors in decoding and transmission of genetic traits affect my health?

What are the processes of biological change?

- How does aging affect the functioning of my body systems?
- How does the function of microorganisms in my world affect me?

How are organisms within ecosystems interdependent?

- What is my role in the cycling of matter and the flow of energy through ecosystems?
- What is my role in an ecosystem?
- How are chemical reactions responsible for the maintenance, growth, and development of my body?

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High School Science
Model I: Medical Science

How do body systems work together to keep me healthy and active?

- How does my body maintain homeostasis?

Why do organisms behave the way they do?

- How does my environment affect my behavior?
- What factors determine my marital status and the size of my family?

Why is a knowledge of chemistry and physics necessary in medical careers?

- How will participation in student organizations help prepare me for a career in health care?

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High School Science
Model I: Medical Science

Academic Expectations	Content/Process
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**Students will** • relate importance of chemistry and physics to students studying various body processes and the health professions. • investigate radioisotopes used in treatment and diagnosis of disease. • explain how lungs and kidneys help maintain constant and proper blood pH. • identify and analyze human body systems and how their components work together or affect each other. • compare body fluids and their functions. • describe acid/base balance of human body. • classify major disease processes affecting each body system. • relate medical terminology to body organs and systems. • integrate leadership activities of Health Occupations Students of America (HOSA). • apply mathematics, science, and communications skills to technical content. • relate radioisotopes to the treatment and diagnosis of disease.

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Medical Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**How do cell structure, function, and processes affect living things?** What disease processes result from changes in my body's cell structure and functions?	**Students will** **Program of Studies** **Life Science** • investigate cell structures and their functions. • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Medical Science Content Chart** • identify and analyze human body systems and the ways their components work together or affect each other. • classify major disease processes affecting each body system. • relate medical terminology to body organs and systems. • investigate radioisotopes in the treatment and diagnosis of disease.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • create cell models, using nontoxic, biodegradable materials, to illustrate appearance and position of various organelles within cells. Produce keys that include descriptions of organelle functions. • trace path of molecules (e.g., glucose, water) as they arrive at cell membranes and move through cells. Create bulletin boards demonstrating movement. • examine slides of various cell types from multicellular organisms. Discuss relationships between structure of different cell types and their functions. Determine what structure and functions all cells have in common.	Bill has difficulty expressing concepts in written form, but works well with manipulatives. Provide Bill various materials to create cell models. Models may be patterned on easily recognizable pictures *(Types of extensions: resources and materials, demonstration of knowledge).*
• compare functions of cell organelles to school or city structures that have similar functions. Create multimedia presentations showing comparisons. • research common diseases (e.g., cancer, influenza, diabetes, cystic fibrosis). Trace disease processes to changes in organ systems or cells. Develop informational brochures that describe diseases and changes they cause at the cellular and organ levels. Distribute brochures through county health departments.	Alicia has difficulty understanding complex words or directions. Provide her with picture cards to introduce new vocabulary and limit directions to three steps at a time. Alicia will need additional time to complete assignment *(Types of extensions: resources and materials, complexity).*
• investigate how and when cells differentiate. Read "How Does a Single Cell Become a Whole Body." Trace formation of germ layers and identify organ systems that develop from each layer. Create informational bulletin boards, collages or posters. Examine drugs (e.g., thalidomide, alcohol) and diseases (e.g., rubella) that interfere with differentiation and organogenesis. Explain U.S. governments' recommendation that pregnant women abstain from drinking alcohol. Write articles to encourage pregnant women not to drink. *Use this activity to develop possible writing portfolio entries (WP - Transactive).* • investigate organ systems (e.g., respiratory, digestive). Work in small groups to create physical models of systems. Research major diseases of each body system and methods used to diagnose and treat diseases (e.g., radioisotopes, surgery, drugs). Analyze how breakdown or disease in one system affects others. ***Technology suggestions:*** *Use Internet to conduct research. Create multimedia presentations for peers describing structure, function, and major diseases of each system.*	Cameron, Bart, Amanda and Alicia need opportunities to research and apply advanced level findings to real problems (e.g., they need to practice good listening skills). These students will prepare and participate in formal debates on whether the U.S. government should recommend that pregnant women abstain from drinking alcohol (or using other substances which interfere with differentiation and organogenesis). The teacher may stipulate that students will not know whether they represent affirmative or negative sides until day before debate *(Types of extensions: purpose and appropriateness, complexity, time, resources and materials, procedures and routines, demonstration of knowledge).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Medical Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**What is the molecular basis of heredity?** How do errors in decoding and transmission of genetic traits affect my health?	**Students will** **Program of Studies** **Life Science** • investigate DNA. • investigate encoding and replication. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal andcommunity health. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Medical Science Content Chart** • relate radioisotopes to the treatment and diagnosis of disease. • apply mathematics, science and communication skills to technical content.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • create and use models to illustrate DNA structure, replication, and protein synthesis. Investigate mutation by substituting DNA bases. Using models, demonstrate how changes in DNA affect structure of proteins and cause genetic disorders. Develop informational brochures on genetic disorders describing diseases, their inheritance patterns, and community resources for interested families. Distribute brochures through Youth Services Centers (*WP - Transactive).*	
• compare observed and expected outcomes of genetic crosses using both Punnett squares and basic probability. Create pedigree charts for observable genetic traits (e.g., tongue rolling, widow's peak, hitchhiker's thumb) or disorders. Include at least three generations. Use information from families, acquaintances, or history (e.g., hemophilia in descendants of Queen Victoria) to create charts. Role-play genetic counselors. Conduct mock counseling sessions for couples with histories of genetic problems. ***Technology suggestions:*** *Use Internet to conduct research. As alternative to brochures, students could develop multimedia presentations.*	Moses and Molly are two students in the gifted and talented program. They have demonstrated mastery with many basic biology concepts. They should be provided opportunities to shadow genetic counselors *(Types of extensions: purpose and appropriateness, motivation).*
• investigate factors (e.g., radiation) that alter DNA. Research effects of radiation on Japanese after the bombing of Hiroshima and Nagasaki. Read *Hiroshima* and discuss impacts of bombing on individuals and Japanese society. Correspond with survivors and their families about problems they still face. ***Technology suggestion:*** *Communicate with survivors via e-mail.*	Lum is an avid reader and history enthusiast. He has extensive knowledge of events surrounding WWII in the South Pacific. Allow him to select projects that will extend his knowledge *(Types of extensions: participation, pace).*
• research ways radiation can be used to diagnose and treat diseases. Shadow radiation technologists at local healthcare facilities. Create brochures on medical uses of radiation for distribution at healthcare facilities *(WP-Transactive*).	

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Medical Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**What are the processes of biological change?** How does aging affect the functioning of my body systems? How does the function of microorganisms in my world affect me?	**Students will** **Program of Studies** **Life Science** • examine how species change over time. • examine diversity and classification. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal andcommunity health. • recognize how science influences human population growth. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Medical Science Content Chart** • relate medical terminology to body organs and systems.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • research and summarize theories about origin of life. Survey community members to determine their beliefs. Read articles and literature (e.g., *Summer for the Gods*) regarding the teaching of evolution. Collect data and create bar graphs, showing differences among groups (e.g., male, female, African Americans, American Indian). Write personal essay describing their own beliefs. Debate issues related to different theories. Write editorials for school newspapers supporting beliefs on the teaching of evolution *(WP - Transactive).*	
• research news and magazine articles that document microorganisms' resistance to drugs (e.g., antibiotics). Investigate difficulties researchers have in developing vaccines for diseases (e.g., HIV, malaria, common cold, influenza). Interview doctors and pharmacists on proper use of antibiotics. Create flyers or posters to display in drugstores.	
• research frequency of genetic disorders (e.g., sickle-cell anemia in African Americans, cystic fibrosis in Caucasians, methemoglobinemia in Eastern Kentuckians) prevalent in different segments of human population. Create graphs comparing county, state, and national data. Identify factors responsible for prevalence of these disorders within different segments of population. Research cause and inheritance patterns of these disorders and medical tests used to identify genetic disorders in newborns. Create public service announcements for local radio or television stations to increase community knowledge of these disorders. Use Internet to conduct research. See The Nation's Prevention Agency: Centers for Disease Control and Prevention. http://www.cdc.gov/ See Centers for Disease Control and Prevention: Health Information http://www.cdc.gov/diseases/diseases.html	Jay and Rhonda enjoy research and are interested in genetics. They work better in small groups and require reinforcement. Rules for group conduct and expectations should be posted and reinforcements provided *(Types of extensions: motivation, procedures and routines).*
• investigate potential causes of changes in human gene pool. Debate how modern technologies (e.g., expensive medical treatments, genetic engineering, genetic testing) and lifestyles affect human gene pool.	
• observe microorganisms (e.g., bacteria, dinoflagellates, protozoans). Investigate beneficial and detrimental roles microorganisms play in environment (e.g., fermentation, food spoilage, diseases, decay, bioluminescence, food digestive processes, production of vitamins and antibiotics, nitrogen fixation). Create illustrated children's books describing microorganisms and their roles *(WP - Transactive).*	Since her accident, Jimmie Dee needs additional time to complete assignments. She will do an in-depth study of one organism, using visual aids and posters with steps outlined *(Types of extensions: complexity, time, magnitude, environment).*

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High School Science
Model I: Medical Science

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Medical Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**How are organisms within ecosystems interdependent?** What is my role in the cycling of matter and the flow of energy through ecosystems?	**Students will** **Program of Studies** **Life Science** • investigate the cycle of atoms and molecules within the biosphere. • analyze energy flow through ecosystems. • analyze the flow of matter and energy. • investigate behavioral responses. • explore how human activities alter ecosystems. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • explore the impact of science on personal andcommunity health. • analyze the role science plays in everyday life and compare different careers in science. • investigate advances that have effects on science and society. • use science to analyze the use of natural resources. **Medical Science Content Chart** • relate importance of chemistry and physics to students studying the health professions and to various body processes.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate relative abundance of carbon, hydrogen, nitrogen, and oxygen in living things. Identify major compounds found in living things (e.g., CO_2, H_2O, proteins, carbohydrates). Trace movement of these elements between living and nonliving world. Identify critical processes (e.g. respiration, photosynthesis, bacterial role in nitrogen cycle) to each cycle. Assume role of elements or molecules as they cycle through the biosphere. (Element or molecule must pass through at least two organisms.) Develop skits and present to class. ***Technology suggestion:*** *Use camcorders to videotape skits.*	
• design food chains showing humans' position as primary and secondary consumers. Use food chains to construct food webs. Analyze humans' position in energy transfer. Compare vegetarian and non-vegetarian diets to determine effects of each on the environment. Determine ingredients needed to produce a cow, including land, forage, fuel, fertilizers, corn, soybeans, insecticides, herbicides, antibiotics, hormones, and water. *W*rite newspaper editorials explaining the distribution and use of resources among nations of the world *(WP - Transactive).* • research methods used to determine number of calories in foods. Determine number of calories in walnuts by burning the walnuts beneath test tubes filled with water. Compare water temperature before and after burning. Compare number of calories released by lipids, proteins, and carbohydrates. Write informational articles for dieters explaining which type of food provides the most calories and why (*WP-Transactive*). • investigate mechanisms for heat gain and loss in humans. Research malfunctions in human thermoregulatory system (e.g., heat exhaustion, heat stroke) and use of induced hypothermia during surgery. Design activities to compare effects of physical activity and external environmental stimuli (e.g., temperature, layer of clothing) on regulation of body temperature. Create graphs to illustrate results. ***Technology suggestions:*** *Use computer-based laboratory equipment to collect data and create graphs.*	Ann has scored well on a pretest of biology topics. She should be allowed to be a peer tutor for other students in the class and select her own research project. Ann will work with ecologists at the local university research farms to investigate populations of grasses. *(Types of extensions: participation, order of learning, level of support).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Medical Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**How are organisms within ecosystems interdependent?** What is my role in an ecosystem? How are chemical reactions responsible for the maintenance, growth, and development of my body?	**Students will** **Program of Studies** **Life Science** • examine the factors that influence the interactions between organisms. • recognize that living systems require energy. • investigate photosynthesis, cellular respiration, and energy. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • explore the impact of science on personal and community health. • recognize how science influences human population growth. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. **Medical Science Content Chart** • relate importance of chemistry and physics to students studying various body processes and the health professions. • identify and analyze human body systems and how their components work together or affect each other.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • design self-contained ecosystems that support six people. List organisms required to keep ecosystems functioning for three years. Explain role of each organism. Create dioramas of ecosystems. Create and maintain living systems containing at least one producer and one consumer. • compare anaerobic to aerobic respiration. Compare amount of energy produced, chemical reactions, factors affecting rates, location of reactions, and types of cells that carry out each. • explore diversity among microoganisms. Research types of aerobic and anaerobic bacteria (e.g., *Stapholoccus aureus*, *Clostridium botulinum*). Discuss potential impacts on human health (e.g., botulism, vitamin K production). Research and categorize antimicrobial drugs. Investigate how antimicrobial drugs disrupt cell processes and/or structures. Create informational brochures explaining how antimicrobial drugs work and distribute at drugstores.	Phyllis does not read at the level of her same-age peers. She should be placed in multi-ability groups for activities that require sustained reading (*Type of extensions: purpose and appropriateness, complexity, motivation).*
• investigate dietary disorders (e.g., anorexia, malnutrition, bulimia) or dietary choices (e.g., vegetarian, diabetic, fad). Identify their effects on cells and organ systems. Write informational brochures for people suffering from these diseases or considering these dietary choices. Interview local healthcare professionals to determine nutritional problems in communities. Create action plans to solve problems and present to health classes. • investigate structure and function of enzymes. Create physical models to illustrate action of enzymes. Investigate how factors, such as temperature, pH, and substrate concentration affect enzyme activity. Use models to illustrate findings. • explore how toxins interfere with chemical reactions in humans. Investigate milk sickness and its historical importance. Read "Land of Milk and Poison" and discuss how medical detectives solved the mystery of milk sickness. Write short stories about how doctors and other healthcare workers solve mysteries of other diseases. • research process of fermentation. Investigate uses and misuses of fermentation products. Make bread and create children's books explaining the process (*WP - Transactive*). • create flow charts illustrating path of energy from Sun to humans and from humans to enviornment. Label charts, identifying major processes involved in each energy transformation.	The teacher is aware that incidences of bulimia and anorexia are significantly higher among intellectually gifted females than among other females. She has assigned clusters of gifted girls to investigate effects of these disorders on cells and organ systems, including their etiologies and treatment. Their activities include meeting with counselors trained in needs of these students for extended discussions related to setting personal goals and dealing with dilemmas of developing talents versus being popular. They will share their presentation with middle school girls selected by gifted and talented specialists *(Types of extensions: purpose and appropriateness, motivation, level of support, resources and materials, environment, demonstration of knowledge).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Medical Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**How do body systems work together to keep me healthy and active?** How does my body maintain homeostasis?	**Students will** **Program of Studies** **Life Science** • investigate behavioral responses. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Medical Science Content Chart** • explain how lungs and kidneys help maintain constant and proper blood pH. • describe acid/base balance of the human body. • compare body fluids and their functions.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate fluid and electrolyte balance. Compare percentages and types of body fluids (e.g., intracellular, extracellular, interstitial, plasma). Identify basic concepts of fluid and electrolyte regulation. Investigate hormonal control. Compare symptoms of water excess and water depletion. Investigate water and salt loss in athletes. Compare sports drinks for important electrolytes. Explain why adequate fluid replacement during exercise is important. • investigate three processes carried out by kidneys (e.g., filtration, reabsorption, secretion). Investigate effects of alcohol and drugs (e.g., diuretics, caffeine) on excretory system. Research how aging affects kidney functions. Create physical models of mammalian kidney to illustrate functions. Interview dialysis patients about the procedure and how it affects their lives.	Frank is interested in the effects of exercise on physiological functions, but he understands information presented in concrete manners using simple languages. Frank should receive extra support in strategies to improve his vocabulary development. As motivating tasks, Frank will work with college trainers to observe highly-skilled athletics (*Types of extensions: motivation, resources and materials).*
• identify types of acids and bases in the body. Explore buffers and buffer systems (e.g., protein, carbonic acid-bicarbonate, phosphate). Recognize that buffer systems provide only temporary solutions. Investigate how pulmonary mechanisms and renal mechanisms work together to maintain acid-base balance. Investigate disturbances of acid-base balance (e.g., emphysema, renal failure, heart failure, hypotension, neural damage). • research how severe diarrhea can affect blood pH, urine pH, and breathing patterns. Create models of human colon to illustrate importance of its structure to control diarrhea. ***Technology suggestions:*** *Use software programs that show three-dimensional views of human anatomy.*	Carole, Dianna, and Jamahl have expressed desires to become medical doctors. To expose them to fields of medical research and medical practice, these students will be matched with medical researchers under whose supervision they will learn to use state of the art research instruments and procedures to investigate topics agreed upon by researcher, student, and teacher. They will interview and shadow doctors in selected specialty areas. Each student will prepare poster board reports of their activities and career preparation, including options in selected fields *(Types of extensions: purpose and appropriateness, environment, level of support, participation, resources and materials, demonstration of knowledge, motivation).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Medical Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**Why do organisms behave the way they do?** How does my environment affect my behavior? What factors determine my marital status and the size of my family?	**Students will** **Program of Studies** **Life Science** • investigate behavioral responses. • analyze patterns of behavior. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • recognize how science influences human population growth. • investigate how science can be used to solve environmental quality problems. **Medical Science Content Chart** • identify and analyze human body systems and how their components work together or affect each other. • relate medical terminology to body organs and systems. • apply mathematics, science, and communication skills to technical content.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • research studies done on identical twins separated at birth and raised apart. Compare personalities, mannerisms, habits, and interests of twins. Debate nature-versus-nurture controversy. • investigate and compare innate and learned behaviors (e.g., habituation, imprinting, classical and operant conditioning) in graphic organizers. Create multimedia presentations illustrating examples of each. ***Technology suggestion:*** *Use CD-ROMs, digital cameras, computers, video, and audio to create multimedia presentations.* • compare advantages and disadvantages of sexual reproduction and asexual reproduction. Explain adaptive advantages of hermaphroditism, alturistic behavior, and mating systems (e.g., polygamy, polyandry, monogamy). Investigate evolution of behavioral patterns that (e.g., breeding seasons, mating behaviors) affect reproductive success of populations. • explore how growth of the human population is different from that of other species. Investigate how human activities have affected selected factors (e.g., climate, food shortages, accidental injuries, infectious diseases, predators) that control lives and numbers of other animals. Investigate and graph exponential growth of the human population since 1500s. Investigate warning signals (e.g., ozone depletion, global warming, air and water pollution, loss of biodiversity) that the human population has reached Earth's carrying capacity for the demands of our species. Investigate factors that govern human reproduction (e.g., social mores, traditional beliefs, economics). Debate the question: Have we reached Earth's carrying capacity for the demands of our species?	

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High School Science
Model I: Medical Science

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies and Medical Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**Why is a knowledge of chemistry and physics necessary in medical careers?** How will participation in student organizations help prepare me for a career in health care?	**Students will** **Program of Studies** **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • analyze the role science plays in everyday life and compare different careers in science. • investigate advances that have effects on science and society. **Medical Science Content Chart** • relate importance of chemistry and physics to students studying the health professions and to various body processes. • utilize activities of the Helath Occupation Students of America (HOSA) student organization as an integral component of course content and leadership development. • apply mathematics, science, and communication skills to technical content.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • develop career notebooks describing educational requirements for health related careers, job opportunities, salaries, opportunities for advancement, and job descriptions. ***Technology suggestion***: *Use career and desktop publishing software to create notebooks.* • design demonstrations to illustrate chemical basis of clinical procedures and tests (e.g., urinalysis, blood sugar, home pregnancy tests, pH of body fluids). • investigate the relationship between pressure and volume. Demonstrate these relationships using medical equipment (e.g., sphygmomanometer, spirometer). Design models to demonstrate breathing process. Record written explanations of processes in learning logs. • participate in local, regional, state, and national Health Occupations Students of America (HOSA) leadership conferences and competitions.	Faith learns best when she can discuss ideas with her peers. She will work in cooperative learning groups when participating in state competitions *(Types of extensions: level of support).*

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High School Science
Model II: Introductory Physics with Earth/Space Science

Course Overview:
Students develop a conceptual understanding of each guiding question through the use of scientific inquiry. They experience physics and Earth/space science concepts such as motions and forces, conservation of energy and the increase in disorder, interactions of energy and matter, and energy in the Earth system. A scientific inquiry approach uses concrete hands-on experiences that requires students to apply critical thinking skills. For each guiding question, students apply and connect scientific concepts to real life. For this model the suggested sequence is Introductory Physics with Earth/Space Science, Introductory Chemistry with Earth/Space Science, and Introductory Biology with Earth/Space Science.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How can we use forces and the laws of motion to understand the motion of objects?
- How is the transfer of energy controlled by the conservation of energy and by the tendency toward disorder?
- What happens when energy interacts with matter?
- How do observable structures on Earth's surface enable us to determine the internal energy sources of the Earth?
- How can we observe the effect of the Sun's energy on the Earth's surface and atmosphere?

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How can we use forces and the laws of motion to understand the motion of objects?	**Students will** **Physical Science** **Motions and Forces** • investigate the effects of forces on the motion of objects. • investigate gravitational and electromagnetic forces. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • analyze the role science plays in everyday life and compare different careers in science. *(Continued on page 106)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate effects of forces on the motion of objects. Attach strings to carts and then attach each string to one standard mass of 100 grams. Place carts on tables and suspend standard masses over edge of tables. Use suspended masses to pull carts length of tables. Measure time with photogates. Repeat multiple trials with different masses loaded on carts. Use same 100 gram standard mass suspended over table edge for each trial. Produce graphs of distance versus time for different masses loaded on cart. Analyze slope of curves and predict relationships between mass and acceleration while using a constant force. Extend activity by comparing the force used to throw baseballs and golf balls with their mass and acceleration. ***Technology suggestion:*** *Use photogates and graphing calculators to measure time and graph data.*	Khoa has been in the country for two and one-half years. He grasps academic vocabulary quickly, has excellent listening skills, but needs help with written expression. Khoa will be paired with two English-speaking lab partners. The teacher will provide him with a list of essential physics vocabulary specific to this experiment (e.g., mass, length, distance, time, carts, photogate, slope, curves, relationship, acceleration). In his initial role as observer, he will write definitions of the vocabulary in Vietnamese to assist in writing the final lab report. During group activity, his role will be to record data as dictated by his lab partners. The English-speaking lab partners' role will be to verify use of comparative language in expressing the relationship between force, mass, and acceleration (e.g., a Limited English Proficiency student might say "the more weight, the slower the cart moves." English-speaking students will provide more appropriate scientific description, such as mass increases, acceleration decreases") (*Types of extensions: procedures and routines, resources and materials, demonstration of knowledge, level of support).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	*(Continued from page 104)* How can we use forces and the laws of motion to understand the motion of objects?	**Students will** **Physical Science** **Motions and Forces** • investigate the effects of forces on the motion of objects. • investigate gravitational and electromagnetic forces. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate electromagnetic forces. Produce electricity by thrusting one end of strong bar magnet through wire coils that have different numbers of turns. Measure electricity produced. Produce lab reports identifying variables that affect amount of electricity created. Compare this production of electricity to the electricity produced when you speak into a dynamic microphone (the diaphragm thrusts a coil through a magnetic field and produces bursts of electricity in response to sounds). Produce consumer information pamphlets for local retail stores explaining the operation of microphones and speakers and the proper way to install them. *Use this activity to develop possible writing portfolio entries (WP-Transactive).* ***Technology suggestion:*** *Use milliammeter, galvanometers, or probes and graphing calculators to measure electricity.*	Jessica is able to learn at the same rate as her peers when information is presented orally or in written form. She has difficulty translating thoughts to print. She is able to complete lab in same manner as other students. However, both lab reports and consumer brochures will be difficult for her. There are several students who have difficulty with writing and the teacher pairs them with students for whom writing is not a problem. One lab report per team is turned in for a grade. Jessica is able to identify variables that affect amounts of electricity and her partner records their answers. For brochures, she is able to orally contribute information. She is also able to produce accompanying diagrams *(Types of extensions: level of support, procedures and routines, participation)*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How is the transfer of energy controlled by the conservation of energy and by the tendency toward disorder?	**Students will** **Physical Science** **Conservation of Energy and the Increase in Disorder** • recognize that the total energy of the universe is constant. • distinguish between types of energy. • examine how everything tends to become less organized. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine energy transfer. Explain how thermal energy is produced in toasters by tracing energy back to its source. List forms of energy during different stages of transfer. Produce brochures to be distributed by local electric cooperatives containing consumer information about efficient energy use by home appliances *(WP-Transactive).* • investigate types of energy. Use photogate timer, meter stick, and balance to collect data and calculate change in potential energy and kinetic energy during swing of simple pendulum. Develop reports for customers in local stores that sell grandfather clocks explaining the construction features of clocks that efficiently use kinetic and potential energy. Write encyclopedia entries explaining the interaction between kinetic and potential energy in grandfather clocks *(WP-Transactive).* ***Technology Suggestion****: Use photogates and graphing calculators to collect and graph data.*	Seth learns information at the same rate and level as his peers. He uses hearing aides and requires audio trainers or interpreters (sign language) to understand information presented verbally or participate in conversations. He reads information on the same grade level as his peers. For these activities, the teacher will use an audio trainer or interpreter during instruction and discussion. Provide written directions for activities or description of concepts *(Types of extensions: resources and materials, level of support).*
• examine the tendency to become less organized. Design and conduct experiments to determine the rate of dispersion of food coloring dropped into water of different temperatures. Produce reports describing the inquiry approach, observations, and explanations of effects of temperature on rates of dispersion.	Darlene is visually impaired. She is able to design and conduct experiments (e.g., dropping food coloring into different beakers of varying temperatures). Her partner verbally describes results. Darlene records her partner's descriptions and completes her lab report with a Braille writer *(Types of extensions: level of support, resources and materials).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What happens when energy interacts with matter?	**Students will** **Physical Science** **Interactions of Energy and Matter** • investigate energy transfer caused when waves and matter interact. • investigate electrical energy and conductivity through matter. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate energy transfer between waves and matter. Collect data to produce colored charts of visible bright line spectra of various elements (e.g., metallic salts suspended in flame, neon lights, fluorescent bulbs) using spectroscopes, prisms, or diffraction gratings. Use these charts to identify elements in "unknown" samples supplied by teacher. Use the charts to produce consumer information articles with photos or color drawings to explain why each element absorbs and emits a specific packet of energy. Distribute articles to local hardware stores that sell light bulbs. Write encyclopedia entries explaining the interaction of light waves and various elements *(WP-Transactive).*	Steve works at the same level as his peers and is able to complete any assignment when in the same time frame. However, he has difficulty interacting with peers and adults. The teacher assigns groups of four to complete the lab. Because Steve is unable to work in groups of that size, the teacher assigns him to work with one other student to complete assignments. Prior to beginning labs, the teacher reviews lab rules, Steve's behavior plan, and point sheet. Following lab, the teacher gives positive or corrective feedback as necessary (*Types of extensions: procedures and routines, level of support, motivation, participation, resources and materials*).
• investigate the interaction of electrical energy and matter. Design and conduct experiments to identify variables that affect the amount of conductivity and resistance in metal wires. Produce articles that explain how these variables impact wiring for new speakers *(WP-Transactive).* ***Technology suggestion**: Use probes and graphing calculators to collect and graph data.*	Ermin, a Limited English Proficiency student who has been in the country for 14 months, has strong verbal skills due to his outgoing nature, but limited academic vocabulary, especially in reading and writing. Assuming that concepts and vocabulary required for lab report have been demonstrated prior to the experiment, physical and visual elements will facilitate him to apply newly acquired knowledge. To assist him in identifying variables, the teacher will provide stereo speakers and metal wires that vary in composition, thickness, length, and insulation. Ermin then will experiment physically with various types of wire to determine interactions of electrical energy and matter. English-speaking students can assist him in putting his ideas into writing *(Types of extensions: procedures and routines, level of support, participation, demonstration of knowledge).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How do observable structures on Earth's surface enable us to determine the internal energy sources of the Earth?	**Students will** **Earth/Space Science** **Energy in the Earth system** • examine internal and external sources of energy. • examine how internal sources of energy propel crustal plates. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • use science to analyze the use of natural resources. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. *(Continued on page 114)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • design investigations to examine the Sun as a source of external energy. Allow the Sun to heat water inside a soft drink can that has been painted black. Measure the temperature increase after 20 minutes and calculate the amount of heat energy reaching the water per minute. Prepare cost analyses and write articles to be distributed by local home builders associations comparing the cost of operating solar houses to conventional houses in Kentucky *(WP-Transactive).* ***Technology suggestion**: Use probes and graphing calculators to collect and graph data.*	Zhi-Jian has been in this country for two months and his oral/aural skills are extremely limited. His reading and writing abilities are somewhat better in spite of serious vocabulary gaps. Having had physics in China, he understands concepts but lacks technical vocabulary and basic language structure to express that understanding. He will use thermometer to determine temperature changes and will perform mathematical calculations required to complete lab report. His English-speaking lab partner will write the actual report. Zhi-Jian will copy technical vocabulary he is still learning and write definitions in Chinese *(Types of extensions: level of support, purpose and appropriateness, demonstration of knowledge).* Stella, Claudia, and Rob have demonstrated mastery of concepts in text. This provides time for them to do further investigations while others are discussing concepts. These students will vary placement of can altering amount of surface area exposed to the Sun's rays, place can in different positions on bright aluminum pan to investigate effects of reflection, and carry out experiments on partially overcast days and bright cloudless days to estimate degrees of reduction of heat energy by clouds. They will record their observations and conclusions and share them with the class (*Types of extensions: purpose and appropriateness, time, complexity, order of learning, environment, participation, demonstration of knowledge, resources and materials, level of support*).

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	*(Continued from page 112)* How do observable structures on Earth's surface enable us to determine the internal energy sources of the Earth?	**Students will** **Earth/Space Science** **Energy in the Earth system** • examine internal and external sources of energy. • examine how internal sources of energy propel crustal plates. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • use science to analyze the use of natural resources. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • model the convection circulation in the mantle. Investigate how these convection currents propel crustal plates. Float small flat sections of styrofoam on the surface of water in a large beaker that is being heated by a hot plate. Compare the motion and causes of motion of the styrofoam to that of tectonic plates. Create investigative reports on movement of crustal plates and the New Madrid fault system. Share reports with local insurance companies for distribution to home owners that buy earthquake insurance *(WP-Transactive).*	Jenny understands information when presented verbally. She uses special binocular glass lens to see large items. For this activity, Jenny will have trouble seeing subtle movements of the styrofoam. Provide her opportunities to hear descriptions of what is happening as the water heats up, get close to the styrofoam, or feel movement by having strings attached to the foam *(Types of extensions: resources and materials, level of support).* Montez needs individual attention and frequent redirection. He understands concepts two years above his peers, but demonstrates patterns of no eye contact or communication with others. He excels in technology. Because of use of hot plates, Montez will need close adult supervision to complete lab and for prompting. Montez is given the assignment to complete the comparison on his computer. He also completes his map using computers. He is given an extra day to complete these assignments (*Types of extensions: procedures and routines, complexity, time, resources and materials, demonstration of knowledge, level of support, motivation*).

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How can we observe the effect of the Sun's energy on the Earth's surface and atmosphere?	**Students will** **Earth/Space Science** **Energy in the Earth system** • examine how external sources of energy produce winds and ocean currents. • examine how external sources of energy determine global climate. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • use science to analyze the use of natural resources. • use science to investigate hazards. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • model convection in the atmosphere and ocean. Place a large beaker of water on a hot plate and drop food coloring into the water. Explain how this models wind and ocean currents. Create maps of global wind patterns and ocean current patterns. Display maps in history classes and explain how these patterns influenced historical shipping trade routes. • model the water cycle. Boil water and allow steam to contact the bottom of pans of ice. Explain how this models components of the water cycle. Access New Jersey Networking Infrastructure in Education Project (NJ NIE) Ask an Expert http://njnie.dl.stevens-tech.edu/curriculum/aska.html and research the water cycle. ***Technology suggestion**: Use Internet to communicate with meteorologist about how energy transferred by water cycle affects global climate.*	Uyen has been in the country for 24 months and still communicates in sentence fragments. Teacher provides vocabulary list of terms (e.g., liquid, gas, solid, evaporation, condensation, precipitation, heat, energy, state). Uyen will have an English speaker show her what each term means and she will write definitions or examples in Vietnamese. After demonstration of water cycle, she will generate cyclical picture that illustrates three phases, labeling parts in sentence fragments with vocabulary from her list *(Types of extensions: level of support, resources and materials, demonstration of knowledge).*

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High School Science
Model II: Introductory Chemistry with Earth/Space Science

Course Overview:
Students develop a conceptual understanding of each guiding question through the use of scientific inquiry. They experience chemistry and Earth/space science concepts such as the structure of atoms, structure and properties of matter, chemical reactions, geochemical cycles, and formation and ongoing changes of the universe. A scientific inquiry approach uses concrete hands-on experiences that requires students to apply critical thinking skills. For each guiding question, students apply and connect scientific concepts to real life. For this model the suggested sequence is Introductory Physics with Earth/Space Science, Introductory Chemistry with Earth/Space Science, and Introductory Biology with Earth/Space Science.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How do observable properties of matter enable us to determine the structure of atoms?
- What evidence can we find that the universe is in the process of continuous change?
- How are chemical and physical properties of matter related to the structure of matter?
- What causes chemical reactions that affect our daily lives?
- How are Earth's chemical reservoirs affected by the internal and external sources of energy?

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How do observable properties of matter enable us to determine the structure of atoms?	**Students will** **Physical Science** **Structure of Atoms** • analyze atomic structure and electric forces. • examine nuclear structure, nuclear forces, and nuclear reactions. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • explore the impact of science on personal and community health. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate atomic structure. Analyze visible spectrum emitted from heated elements (e.g., metallic salts suspended in flame, neon lights, fluorescent bulbs) using spectroscopes, prisms, or diffraction gratings. Produce pictorial model that relates wavelength and energy of light emitted to Bohr model of atom. Observe fireworks either directly or on videotape and use colors of displays to identify elements used in fireworks. • simulate radioactive decay. Examine radioactive half-life by placing 100 pennies (atomic nuclei) in closed container (sample of radioactive isotope), shaking it (nuclear reactions), then counting and removing pennies that are heads up. Repeat until all pennies have been removed. Graph number of pennies removed versus trial number. Determine from graph the number of trials it would take to completely remove 200 pennies. Produce investigative reports on radon in homes across Kentucky that show connections between radon occurrence and geological regions in homes across Kentucky. Explain why the radioactive decay of radon is a dangerous nuclear reaction. Extend this report by describing how nuclear structure and nuclear forces cause radon to be radioactive. Present the investigative reports to local health departments. *Use this activity to develop possible writing portfolio entries (WP-Transactive).*	Randy understands concepts at the same level as his peers. He has difficulty manipulating small objects. For this activity, either pair Randy with a peer who can remove pennies or provide him with larger objects to manipulate *(Types of extensions: resources and materials, level of support).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time	What evidence can we find that the universe is in the process of continuous change?	**Students will** **Earth/Space Science** **The Formation and Ongoing Changes of the Universe** • describe theories of the formation of the universe. • describe the formation of the stars. • examine stars. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine components and structure of the universe. Construct physical or pictorial models of universe that show the position of our solar system and accurately represent size and distance. Display models in school cafeteria. Write reviews for the movie *Armageddon* commenting on the scientific accuracy *(WP-Transactive).* • investigate factors that contribute to the formation of stars. Write articles explaining the use of stellar parallax to measure distances to stars. Distribute articles to local astronomy clubs *(WP-Transactive).* • investigate components of stars. Observe photographs of spectra from stars. Produce written comparisons to Sun's spectrum and explain the similarities and differences. Create colored charts, posters, or multimedia presentations comparing spectra from stars to Sun's spectrum. Share multimedia presentations with school-based council. ***Technology suggestion**: Use multimedia software to develop presentations.*	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How are chemical and physical properties of matter related to the structure of matter?	**Students will** **Physical Science** **Structure and Properties of Matter** • investigate structure and chemical properties of matter. • investigate structure and physical properties of matter. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • explore the impact of science on personal and community health. • use science to investigate hazards. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • analyze ways chemical properties are related to the structure of matter. Investigate simple chemical reactions between common household substances (e.g., charcoal burning, mixing baking soda with vinegar). Observe reactions and produce structural models (e.g., pictorial, physical). Explain observed chemical properties in brochures containing consumer safety information to be distributed by local home extension agent *(WP-Transactive).* ***Technology suggestion**: Use publishing software to create brochures.*	
• analyze ways physical properties are related to the structure of matter. Investigate physical properties such as the viscosities of 10W motor oil and 40W motor oil. Produce structural models (e.g., pictorial, physical) that explain observed physical properties. Use structural models to create videos that will be used in vocational school auto mechanic classes explaining viscosities. ***Technology Suggestion:** Use camcorder to make videos.*	Suzanne understands information presented in simple language. She can demonstrate knowledge by drawing or building models. When working on physical models, she works at a pace typically slower than her same-age peers. When making structural models for these activities, allow Suzanne to develop one model instead of multiple models *(Types of extensions: magnitude, pace, complexity).* Tim, Brianna, and Cory participated in a Saturday scholars chemistry class in which they investigated physical changes. They measured ice-melting and water-boiling temperatures. They will expand upon the class activity by adding salt and sugar (1g/10mL water) into water and remeasuring ice-melting and water-boiling temperatures. They will record and discuss results and observations and report to the class (*Types of extensions: purpose and appropriateness, order of learning, complexity, pace, resources and materials, level of support*).

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What causes chemical reactions that affect our daily lives?	**Students will** **Physical Science** **Chemical Reactions** • investigate chemical reactions and energy. • examine the transfer of electrons or hydrogen ions between ions, molecules, or atoms. • investigate factors affecting reaction rates. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate heat energy released when hydrocarbons (e.g., lamp oil, paraffin, alcohol) react with oxygen. Use oil lamp, candle, or alcohol lamp to heat beaker of water. Produce investigative reports that quantitatively compare the heat energy released from a variety of hydrocarbons (e.g., fuel oil, coal, wood, food). Distribute reports to local environmental groups concerned about proper use of natural resources *(WP-Transactive).* ***Technology Suggestion**: Use probes and graphing calculators to collect and graph data.* • examine transfer of electrons during chemical reactions (e.g., zinc and dilute hydrochloric acid). Observe reactions and construct structural models (e.g., physical, pictorial) to explain observations. Write encyclopedia entries that use the models to show how transfer of electrons produces electricity in batteries *(WP-Transactive).* ***Technology Suggestion:** Use publishing software to create brochures.* • investigate one factor affecting reaction rates. Observe smoldering splint of wood in air and when splint is placed into bottle of pure oxygen. Produce essays with student created drawings to explain how concentration of reactants increase reaction rate. Extend activity by investigating other factors (e.g., temperature, surface area). ***Technology Suggestion:** Use digital camera to create photo essays.*	Chancy understands concepts when they are presented using verbal descriptions or pictures along with hands-on activities. He can demonstrate his knowledge by explaining what he knows verbally or using drawings. For this activity, provide Chancy with an audio tape of the experiment and expectations prior to class. Allow Chancy to audio tape his prediction of which variables would need to be measured to determine the amount of heat transferred *(Types of extensions: procedures and routines, materials and resources, order of learning, demonstration of knowledge).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How are Earth's chemical reservoirs affected by the internal and external sources of energy?	**Students will** **Earth/Space Science** **Geochemical Cycles** • recognize that the Earth contains a fixed amount of elements. • analyze Earth's chemical reservoirs. • investigate how Earth's sources of energy drive geochemical cycles. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • use science to analyze the use of natural resources. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine the fixed amount of each stable chemical atom or element in the Earth system. Produce articles explaining how Earth's resources are being depleted while Earth's amount of atoms or elements essentially stays the same. • research Earth's chemical reservoirs. Produce articles explaining how plate tectonics affect ways geologists explore for economically important ore deposits *(WP-Transactive).* • investigate how Earth's energy drives geochemical cycles. Make a hot concentrated solution of water and sugar. Allow the solution to cool and evaporate undisturbed for one week. Observe the formation of crystals. Explain how energy drives the water cycle and how the water cycle aids the formation of Earth's minerals. Document observations and explanations in learning logs.	Brad works well with other students. He can demonstrate what he knows using picture cards and a talking computer. For this activity, Brad will work in a small group. As data is collected on the formation of crystals, Brad will choose correct picture representations for the degree of crystal formation and paste pictures in his journal. The pictures and the written description will be programmed into his computer so he can answer questions in class and can demonstrate his knowledge (*Types of extensions: demonstration of knowledge, participation, level of support, procedures and routines, resources and materials, magnitude).*

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High School Science
Model II: Introductory Biology with Earth/Space Science

Course Overview:
Students develop a conceptual understanding of each guiding question through the use of scientific inquiry. They experience biology and Earth/space science concepts such as structure and function of cells; molecular basis of heredity; biological change; changes in the Earth system; interdependence of organisms; matter, energy and organization in living systems; and the behavior of organisms. A scientific inquiry approach uses concrete hands-on experiences that requires students to apply critical thinking skills. For each guiding question, students apply and connect scientific concepts to real life. For this model the suggested sequence is Introductory Physics with Earth/Space Science, Introductory Chemistry with Earth/Space Science, and Introductory Biology with Earth/Space Science.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How do cell structures, functions, and processes affect living things?
- How does DNA transfer genetic information of organisms to the next generation?
- What evidence can be found that the Earth and solar system have changed over time?
- What evidence suggests that species change over time and how is biological classification used to explain relationships among diverse organisms?
- How are organisms dependent on the cycling of atoms and molecules, energy flow, and each other in an ecosystem?
- What processes are involved in the flow of matter and energy through and between living systems and the physical environment?
- How do behavioral responses to stimuli ensure individual survival and reproductive success for the species?

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How do cell structures, functions, and processes affect living things?	**Students will** **Life Science** **The Cell** • investigate cell structures and their functions. • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • explore the impact of science on personal and community health. • recognize how science influences human population growth. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. *(Continued on page 134)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine cell structures with light microscope. Produce photo essay or essay with student created drawings of basic cell structure (e.g., cell wall, cell membrane, nucleus, cytoplasm, chloroplast, vacuoles). Describe functions of cell structures on mechanical rather than biochemical level (e.g., nucleus and control of cell function, chloroplast and photosynthesis, mitochondria and respiration, cell membrane and transport). Include ways to test the assertion that chicken eggs are cells by comparing functions of different structures in eggs and in cells. ***Technology suggestion:*** *Use light microscopes or flex cams to examine cell structures.* • investigate reactants and products of the photosynthetic chemical reaction. Use light screens on Geranium leaves. Conduct iodine tests after a few days to determine effects of light and absence of light on production of carbohydrates in leaves. Place *Elodea* plants into carbonate solutions under bright light. Count oxygen bubbles as they emerge from cut ends of *Elodea* plants. Analyze these activities and produce an empirical word equation for the photosynthetic chemical reaction. Investigate ways to increase or decrease rate of oxygen production. Compare photosynthesis in plants adapted to life in arid conditions to plants living in Kentucky. • investigate the evolution of eukaryotic cells. Trace the origin of cell organelles. Use graphic organizers to compare characteristics of oldest known cells to modern cells. Create illustrated time lines documenting milestones in the development of the cell theory. • compare functions of cell organelles to school or city structures that have similar functions. Create multimedia presentations showing comparisons. • investigate how and when cells differentiate. Read *"How Does a Single Cell Become a Whole Body."* Trace formation of germ layers and identify organ systems that develop from each layer. Create informational bulletin boards, collages, or posters. Examine drugs (e.g., thalidomide, alcohol) and diseases (e.g., rubella) that interfere with differentiation and organogenesis. Write articles to encourage pregnant women to refrain from drinking alcohol. *Use this activity to develop possible writing portfolio entries* (*WP - Transactive).*	Carl is able to learn concepts and vocabulary presented in a very concrete manner. He has difficulty with new language and vocabulary and needs visual devices to remind him of the meaning of vocabulary (e.g., photosynthesis), adding one new term and reviewing old ones each day. Also, on the day of the activity, the teacher reviews techniques for using microscopes and parts of the microscope. She also presents a diagram of a cell and its structures. Carl copies it into his notebook. With a partner, Carl examines cell structures with the microscope and compares it to his diagram. Then Carl draws a diagram from the real cell and compares it to his notes, labeling all parts. Carl will answer simple questions to describe functions of cell structures. He does not complete the chicken egg section of the lab *(Types of extensions: order of learning, procedures and routines, complexity, magnitude, resources and materials, demonstration of knowledge, level of support).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	*(Continued from page 132)* How do cell structures, functions, and processes affect living things?	**Students will** **Life Science** **The Cell** • investigate cell structures and their functions. • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • recognize how science influences human population growth. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate the changes that occur during metamorphosis of animals (e.g., salamanders, insects, frogs). Create illustrated flow charts explaining the process. Create physical models of young and adult. Identify natural or human-induced hazards (e.g., acid rain) that affect development. Interview biologists about changes in local populations of aquatic organisms. Write letters to legislators regarding effects of acid rain or other pollutants on aquatic organisms (*WP-Transactive*). See *Project Wet Curriculum and Activity Guide* activity Where are the Frogs? • investigate embryonic development. Examine pictures of different species of embyos at different stages of development. Use graphic organizers to compare features. Research variables that affect embryonic development (e.g., thalidomide, alcohol, diseases). Develop informational brochures for expectant mothers explaining health hazards and distribute through local health care facilities (*WP-Transactiv*e). • trace what happens to food produced by rain forest trees when its leaves and fruit are eaten by other animals. Create bulletin boards illustrating flow of energy and explaining the photosynthetic process. • create illustrated time lines showing major discoveries in studies of photosynthesis. Include works of major researchers (e.g., Van Helmont, Priestley, Ingenhouz, Sachs, Engelmanson). ***Technology suggestion:*** *Use software to create time lines.*	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How does DNA transfer genetic information of organisms to the next generation?	**Students will** **Life Science** **The Molecular Basis of Heredity** • investigate DNA. • investigate encoding and replication. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • explore the impact of science on personal and community health. • analyze the role science plays in everyday life and compare different careers in science. • investigate advances that have effects on science and society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine DNA structure. Construct models of DNA molecules and show locations of genes. Display models in science labs. Write articles for the local school newspaper concerning future applications of Human Genome Project *(WP-Transactive).* • examine replication. Create articles showing how one DNA molecule can form exact duplicate of itself (replication). Use photographs of DNA models in essays *(WP-Transactive).* • investigate life cycles of cells. Examine videos, slides, or photographs of various stages of mitosis and interphase. Recreate stages using students to represent chromosomes. • investigate loss of control over cell division exhibited by cancer cells. Identify chemical substances used in chemotherapy and their purposes. Interview community members who have had chemotherapy, examine the process and how it affected their lives. Write articles for science sections of newspapers and explain the idea that cancer is a normal developmental process gone wrong or write editorials to explain why money should be spent on basic research regarding normal cell cycle (*WP-Transactive*). • read Watson's account of the discovery of DNA structure. Summarize methods used and evidence gathered. Investigate lives of other researchers who were involved in the discovery (e.g., Rosalind Franklin, Maurice Wilkins, Francis Crick). Write resumes for each researcher. • investigate protein synthesis including transcription and translation. Create models to demonstrate process. Identify types of RNA present, their function, and locations. Use graphic organizers to compare protein sythesis in eukaryotes and prokaryotes. Explore evolutionary significance of common genetic language. • investigate how some antibiotics work to interrupt protein synthesis of bacteria. Create informational brochures explaining how antibiotics work and distribute at drugstores (*WP-Transactive).* • investigate how mutations in DNA affects protein synthesis. Identify mutagens (e.g., ultraviolet lights, ionizing radiation). Write articles explaining how mutations may be harmful, neutral, or beneficial, depending on how the proteins they specify interact with other genes and the environment (*WP-Transactive).*	Angelica sustained a spinal cord injury in an auto accident. She has limited use of her arms. She received instruction on use of assistive technology and computers. She uses technology with assistive devices to access the key board. To complete this assignment, she is given instruction in use of a graphics program that can help her construct models. She constructs her models using her computer and displays them on a class computer monitor or TV screen. She completes the editorial using her computer. *(Types of extensions: order of learning, purpose and appropriateness, procedures and routines, resources and materials, demonstration of knowledge).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What evidence can be found that the Earth and solar system have changed over time?	**Students will** **Earth/Space Science** **The Formation and Ongoing Changes of the Earth System** • describe the formation of the solar system. • investigate how to estimate geologic time. • examine ongoing changes of the Earth system. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • model possible mechanisms for the formation of the solar system. Sprinkle lycopodium powder on top of water in beakers and stir (the swirling lycopodium powder represents mass particles coalescing under the influence of gravity). Produce articles describing other possible mechanisms for the formation of the solar system and describing current changes that are occurring in the solar system *(WP-Transactive).* ***Technology suggestion:*** *Use Internet to observe latest photographs of astronomical objects and events.*	
• investigate geologic time. Construct physical or pictorial models that show subdivisions of geologic time on time lines. Include descriptions of fossils found from each time period. Examine and map coal deposits and other rock sequences across the state. Create educational brochures describing rock formations that contain fossils and distribute at visitor centers *(WP - Transactive).* • explore how movement of continental plates affected distribution of species. Investigate matching fossils and rock formations across plate boundaries, the unique collection of species on some continents (e.g., marsupials in Australia), and distribution of biogeographical realms.	Josh is deaf. He is able to complete tasks similar to grade-level peers. He is provided with a written set of directions for this assignment. During the field trip to investigate coal deposits and other rock sequences, an interpreter signs the speaker's explanations *(Types of extensions: procedures and routines, resources and materials, level of support).*
• examine interactions that cause ongoing changes in the Earth system. Model chemical weathering by placing piece of chalk (limestone) in water and another piece in vinegar (acid). Produce articles to predict long term effects of acid rain on erosion of Earth's surface, limestone cave formation, monuments, and buildings (*WP-Transactive*). ***Technology suggestions:*** *Use digital cameras to create photo essays. Create multimedia presentations for city council or county fiscal courts documenting effects of weathering or acid rain on communities.* • investigate significant geologic events (e.g., mountain building, formation of volcanoes) and their impact on speciation. Research adaptive radiation on Hawaiian and Galapagos Islands. Create maps of islands showing locations of different species. Use graphic organizers to compare features of species. Develop models to explain how adaptive radiation occurs on island chains.	Stanley understands information well beyond the level of his peers. He is highly motivated when he is given independence in his study of new concepts. For this activity, Stanley already knows basic concepts of chemical weathering. Contract with Stanley to conduct a research project on the effects of chemical weathering on the local landscape. As part of the research, Stanley will develop a specific set of strategies to decrease the amount of weathering in his community. He will also present strategies to city council members (*Types of extensions: motivation, purpose and appropriateness, complexity, time, pace, environment, order of learning, demonstration of knowledge).*

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Academic Expectations	Guiding Questions	Correlation to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What evidence suggests that species change over time and how is biological classification used to explain relationships among diverse organisms?	**Students will** **Life Science** **Biological Change** • examine how species change over time. • examine diversity and classification. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze the role science plays in everyday life and compare different careers in science. *(Continued on page 142)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate defense mechanisms (e.g., camouflage, mimicry, toxicity, aggressive behaviors, warning coloration) in plants and animals. Select a defense mechanism and identify organisms that exhibit that trait. Identify patterns among groups of organisms. Create graphic representations (e.g., circle graphs, histograms) to display data. Read articles describing industrial melanism (e.g., *"Further Selection Experiments on Industrial Melanism in the Lepidoptera."*). Explain in learning logs how process of natural selection altered populations of peppered moths *(Biston betularia).* • investigate evolution of various species (e.g., horses). Create murals depicting phylogenetic trees. Discuss how adaptations are advantageous to the survival of species. • examine diversity and unity of organisms. Observe organisms in areas close to school. Sort organisms by structure and develop classification system. Produce essays with photographs to be distributed during parents' night. • investigate biodiversity. Take field trips to riparian ecosystems. Map physical and biological features. List organisms living in each area and describe their roles. Explore how changes in environments might increase or decrease diversity. Write articles explaining why ecosystems with high biodiversity should be protected (*WP-Transactive*). • investigate impacts of introduced species (e.g., lamprey eel, rainbow trout, pheasant, purple loosestrife, water hyacinth, Japanese beetle, zebra mussel) on native species. Identify both benefits and liabilities of introduced species. Research ways introductions occur and develop plans to prevent them. Share plans with environmental clubs. • investigate diversity of fish species in Kentucky's lakes and streams. Invite fish biologist to discuss fish and fish habitats. Interview fishermen and compare with biologists' information. Use graphic organizers to compare characteristics of fish (e.g., habitats, food sources, mating and breeding patterns). Design dichotomous keys to identify species.	

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Academic Expectations	Guiding Questions	Correlation to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	(*Continued from page 140*) What evidence suggests that species change over time and how is biological classification used to explain relationships among diverse organisms?	**Students will** **Life Science** **Biological Change** • examine how species change over time. • examine diversity and classification. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • explore the impact of science on personal and community health. • investigate how science can be used to solve environmental quality problems. • investigate advances that have effects on science and society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • explore methods of classifying organisms based on structure, function, biochemistry, behavior, nutrition, embryonic development, genetic systems, evolutionary histories, and ecological interactions. Classify various organisms based on pictures and measurements of features (e.g., body form, teeth, skull, feet, skeletal features, body temperature, heart, embryonic development). • examine diversity among plants. Identify major highlights of plant evolution (e.g., vascular tissue) and their impact on plant diversification. Identify divisions within plant kingdom and describe their characteristics and significant adaptations. Use graphic organizers to compare characteristics. Create bulletin boards, collages, or multimedia presentations on the economic or medical importance of plants from each division, including local agricultural products. • explore loss of biodiversity worldwide. Investigate why tropical rain forests are being destroyed at alarming rates. Debate whether or not developed nations have the right to ask developing nations to slow or stop destruction of their forests. • explore diversity among microoganisms. Research types of aerobic and anaerobic bacteria (e.g., *Staphylococcus aureus*, *Clostridium botulinum*). Discuss potential impacts on human health (e.g., botulism, vitamin K production). Research and categorize antimicrobial drugs. Investigate how antimicrobial drugs disrupt cell processes or structures or both. Create informational brochures explaining how antimicrobial drugs work and distribute at drugstores. • explore beneficial roles of microorganisms (e.g., food production). Organize food fairs for parents' night that highlight the role of microorganisms in food production.	

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Academic Expectations	Guiding Questions	Correlation to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How are organisms dependent on the cycling of atoms and molecules, energy flow, and each other in an ecosystem?	**Students will** **Life Science** **The Interdependence of Organisms** • investigate the cycle of atoms and molecules within the biosphere. • analyze energy flow through ecosystems. • examine the factors that influence the interactions between organisms. • explore how human activities alter ecosystems. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate the relative abundance of carbon, hydrogen, nitrogen, and oxygen in living things. Identify major compounds found in living things (e.g., CO_2, H_2O, proteins, carbohydrates). Trace the movement of these elements between the living and nonliving world. Identify processes (e.g., respiration, photosynthesis, bacterial role in nitrogen cycle) critical to each cycle. Write short stories assuming role of elements or molecules as they cycle through the biosphere. (The element or molecule must pass through at least two organisms.) Share stories with other biology classes. • investigate the nitrogen cycle. Examine nodules from legumes' roots under microscopes after staining with methylene blue. Sketch nitrogen-fixing bacteria. Produce brochures to be distributed to farmers by agricultural field agents about importance of bacteria (*WP-Transactive*). • design food chains showing humans' position as primary and secondary consumers. Use food chains to construct food webs. Analyze humans' position in energy transfer. Compare vegetarian and non-vegetarian diets to determine effects of each on the environment. Use this information to argue that we should or should not become vegetarians *(WP-Transactive)*. Determine ingredients needed to produce cows, including land, forage, fuel, fertilizers, corn, soybeans, insecticides, herbicides, antibiotics, hormones, and water. Examine distribution and use of resources among nations of the world. • examine how humans alter ecosystems. Explore effects of fertilizer run-off on water resources. Compare observations (e.g., nitrate level, phosphate level, level of dissolved oxygen) of water sources that are near agricultural land to sources that are not and prepare investigative reports. Participate in Kentucky's Water Watch Program. ***Technology suggestion***: *Use e- mail to compare findings with students across the state.*	Mandy needs opportunities to participate in activities to support and encourage her intense interest in scientific research. She will survey garden supply stores to find compounds in commonly used pesticides and other lawn and garden products. The gifted-talented specialist will assist in arranging for her to work with an environmental researcher either through mentorship projects at a university or government environmental agency or via e-mail. Mandy and her mentor will design and perform investigations or experiments related to effects of selected compounds in lawn and garden care products on water resources or on food chains. She will present her findings to local garden clubs or other appropriate audience *(Types of extensions: purpose and appropriateness, complexity, level of support, environment, time, order of learning, level of support, demonstration of knowledge, resources and materials, procedures and routines, magnitude).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What processes are involved in the flow of matter and energy through and between living systems and the physical environment?	**Students will** **Life Science** **Matter, Energy, and Organization in Living Systems** • recognize that living systems require energy. • investigate photosynthesis, cellular respiration and energy. • analyze the flow of matter and energy. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • explore the impact of science on personal and community health. • recognize how science influences human population growth. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine energy sources for living systems. Construct models of energy containing food molecules (e.g., sugars, proteins). Construct models of simple molecules (e.g., CO_2, H_2O) from which food molecules are formed. Display models in classroom. • research methods used to determine the number of calories in foods. Determine number of calories in walnuts by burning walnuts beneath small beakers filled with water. Compare water temperature before and after burning. Compare number of calories released by lipids, proteins, and carbohydrates. Write informational guides for dieters explaining which type of food provides the most calories and why (*WP-Transactive*). • investigate energy relationships between photosynthesis and respiration. Use models to illustrate the chemistry of photosynthesis and cellular respiration. Write children's stories about the life of plants describing when and where photosynthesis and respiration take place *(WP-Transactive).* ***Technology suggestion:*** *Use desktop publishing software to create books.* • write articles explaining why rain forests make little or no net contribution to global oxygen production or reduction of global warming (*WP-Transactive*). • analyze energy flow through ecosystems. Read feature articles from fishing, hunting, or nature magazines to create food webs. Display food webs on bulletin boards. Examine diagrams of energy pyramids for typical ecosystems. Develop diagrams and memos to be used by wildlife biologists for workshops explaining why energy pyramids are broad at bottom and narrow at top.	Mia has limited fine motor abilities, but her cognitive skills are commensurate with same-age peers. She will need theraputty rather than modeling clay, stiffer paper, larger objects, and peer or adult assistance constructing her models, but she should be allowed to perform construction of models herself. An occupational therapist will consult regarding appropriate types of materials (*Types of extensions: time, procedures and routines, resources and materials, level of support).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How do behavioral responses to stimuli ensure individual survival and reproductive success for species?	**Students will** **Life Science** **The Behavior of Organisms** • investigate behavioral responses. • analyze patterns of behavior. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • explore the impact of science on personal and community health. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate and compare innate and learned behaviors (e.g., habituation, imprinting, classical and operant conditioning) in graphic organizers. Create multimedia presentations illustrating examples of each. • investigate the evolutionary and genetic basis of behavior. Compare advantages and disadvantages of sexual reproduction and asexual reproduction. Explain the adaptive advantages of hermaphroditism, altruistic behavior, and mating systems (e.g., polygamy, polyandry, monogamy). Analyze how animal behaviors (e.g., feeding, mating, social behaviors, communication, territoriality, dominance hierarchies) maximize reproductive success. Explore successful reproductive behaviors of aquatic organisms (e.g., reproductive dormancy). Create posters, bulletin boards, or multimedia presentations giving examples and explaining behaviors. • explore circadian rhythms (e.g., metabolic role, body temperature, feeding times) and cirannual behaviors (e.g., breeding, hibernation). Investigate behavioral responses of organisms in tidal regions. Identify internal or external cues that regulate these behaviors and explore their adaptive nature. See *WOW! The Wonders of Wetlands* activity Salt Marsh Players • research seasonal affective disorder. Create informational brochures describing what can be done to alleviate or eliminate symptoms. Distribute through healthcare facilities (*WP-Transactive*). • investigate migration in animals (e.g., whales, butterflies, birds). Explore methods (e.g., piloting, orientation, navigation) and cues (e.g., Sun, magnetic fields, star patterns, chemical concentration gradients) used to find their destinations. Create multimedia presentations for other schools demonstrating how animals migrate.	

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High School Science
Model II: Principles of Technology with Earth/Space Science

Course Overview:
Students develop understandings of traditional physics and Earth/space science concepts through the use of scientific inquiry. Students investigate concepts of force, work, efficiency, rate, and energy. Hands-on inquiry experiences develop problem-solving and critical-thinking skills. Students apply conceptual understandings to industrial, technological, and personal situations. It is suggested that Principles of Technology with Earth/Space Science be taken before either Introductory Chemistry with Earth/Space Science or Introductory Biology with Earth/Space Science.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How can forces and laws of motion be used to explain movement in operating systems?

- How is energy used to produce work and alter efficiencies in operating systems? (e.g., electrical energy, thermal energy)

- How does energy conservation and the tendency toward disorder influence energy transfers in operating systems?

- How do interactions of energy and matter affect operating systems?

- What are Earth's internal and external energy sources and how are they used to generate power for operating systems?

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How can forces and laws of motion be used to explain movement in operating systems?	**Students will** **Physical Science** **Motions and Forces** • investigate the effects of forces on the motion of objects. • investigate gravitational and electromagnetic forces. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine forces and motion of objects. Measure speed of objects (e.g., washer, screws moving on conveyors). Measure production rates of multiple objects coming off conveyors. Determine angular speed (RPMs) of conveyor belts. Predict time changes due to speed changes. Compare objects of varying weights and effects on speed. Produce interoffice memos for production managers relating production rate to product weight. • explore effects of gravitational force on flow rates. Measure volumes of water exiting elevated channels over time. Calculate flow rates of channels. Construct training pamphlets for county extension agents to distribute to local farmers on how to determine flow rates of irrigation ditches, including descriptions of potential problems. *Use this activity to develop possible writing portfolio entries (WP-Transactive).*	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How are different types of energy used to produce work and alter efficiencies in operating systems?	**Students will** **Physical Science** **Conservation of Energy and the Increase in Disorder** • recognize that the total energy of the universe is constant. • distinguish between types of energy. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • recognize how science influences human population growth. • investigate how science can be used to solve environmental quality problems. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • apply law of conservation of energy to operating systems. Measure and calculate energy supplied to air motors and output energy from attached generators. Compare energy entering systems with output energy. Identify where energy changes to other forms. Write essays about illustrated systems. Identify ways to monitor or utilize wasted energy. Write articles to help local industrial managers monitor and utilize wasted energy *(WP-Transactive).* • compare types of energy. Compress springs using weights. Measure changes in spring length. Determine spring constants to find potential energies. Research and write articles about uses of springs in athletic equipment and submit to local athletic supply stores *(WP-Transactive).*	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How does conservation of energy and the tendency toward disorder influence transfers of energy in operating systems?	**Students will** **Physical Science** **Conservation of Energy and the Increase in Disorder** • examine how everything tends to become less organized. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine heat flow to determine specific heats of materials. Measure the temperature differences when hot metals are transferred to cold water. Use masses and temperature differences to calculate specific heats. Write articles relating specific heat to tempering. Present articles on applications of tempering to welding instructors for classroom use *(WP-Transactive).*	

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High School Science
Model II: Principles of Technology with Earth/Space Science

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How do interactions of energy and matter affect operating systems?	**Students will** **Physical Science** **Interactions of Energy and Matter** • investigate energy transfer caused when waves and matter interact. • investigate electrical energy and conductivity through matter. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate interaction of waves and matter. Transfer negative charges to rubber rods by rubbing them with fur. Use rubber rods to charge clean shiny small zinc plates. Attach zinc plates to electroscopes after visible light has shined on the plate for a few minutes. Start over with neutral zinc plates and charge them negatively. Attach zinc plates to electroscopes before and after ultraviolet has shone on them. Explain any changes in charge on plates. Write articles explaining how these activities relate to use of phototransistors in remote infrared controllers for televisions and videocassette recorders. • investigate electrical energy and conductivity through resistors. Construct series and parallel circuits with resistors. Measure voltage across each resistor and total circuit resistance. Calculate resistance from voltage drop and value of current. Draw schematic diagrams of circuits. Research electrical safety related to overloading circuits. Create consumer information brochures on electrical safety for distribution in areas with houses older than thirty years.	

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High School Science
Model II: Principles of Technology with Earth/Space Science

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What are internal and external energy sources of Earth and how are they used to generate power for operating systems?	**Students will** **Earth/Space Science** **Energy in the Earth System** • examine internal and external sources of energy. • examine how internal sources of energy propel crustal plates. • examine how external sources of energy produce winds and ocean currents. • examine how external sources of energy determine global climate. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • explore the impact of science on personal and community health. • use science to analyze the use of natural resources. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine internal sources of energy by investigating applications of geothermal energy. Research source, types, and uses of geothermal energy by contacting local electric companies. Compare advantages, disadvantages, proportion of use, and diversity of uses to other energy sources. Write articles for local newspaper explaining how geothermal energy for heating and cooling could be used in homes to save money and energy *(WP-Transactive).* ***Technological suggestion**: Research source of geothermal energy and its use on the Internet and communicate by e-mail with students that use geothermal energy.* • examine movement of crustal plates and relationship to earthquakes. Research and model plate tectonic movement. Investigate geological activity associated with crustal plate boundaries. Design buildings that are earthquake proof. Investigate local school systems for earthquake plans and compile report to be presented to school-based decision-making councils with recommendations for improvement or recommendations on plans. ***Technological suggestion**: E-mail students that live near the North American plate boundary and ask how it affects their lives.* • investigate wind currents. Collect data for one month by measuring atmospheric pressure and wind speed. Graph data and investigate correlation between pressure and speed. Relate wind currents to sources of energy external to the Earth system. Write articles on wind damage in Kentucky and how to minimize future damage *(WP-Transactive).* • examine global climate. Research causes of El Niño, its effect on Kentucky's climate, and its economic impact on Kentucky's industries. ***Technological suggestion:** Use Internet to monitor climate throughout the world and explain the relationship to sources of energy external to Earth system.*	

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High School Science
Model III: Integrated Science I

Course Overview:
This inquiry based introductory course is designed around the themes of patterns of change and systems, order, and organization. Students examine the organization of the universe by beginning with the fundamental laws that give order, continue with the way these laws affect the Earth and the organization of life, and conclude with how life responds to these laws.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding questions along with related academic expectations and correlations to the *Program of Studies.* Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How can we use forces and the laws of motion to understand the motion of objects?
- How do observable structures on Earth's surface enable us to determine the internal energy sources of the Earth?
- How can we observe the effect of the Sun's energy on the Earth's surface and atmosphere?
- How does Earth's internal and external sources of energy affect Earth's geochemical cycles?
- How are organisms dependent on the cycling of atoms and molecules, energy flow, and each other in an ecosystem?
- How do behavioral responses to stimuli ensure individual survival and reproductive success for species?
- When energy is transferred what forms can it assume?

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How can we use forces and the laws of motion to understand the motion of objects?	**Students will** **Physical Science** **Motions and Forces** • investigate the effects of forces on the motion of objects. • investigate gravitational and electromagnetic forces. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • analyze the role science plays in everyday life and compare different careers in science. *(Continued on page 166)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate effects of forces on the motion of objects. Attach strings to carts and then attach each string to one standard mass of 100 grams. Place carts on tables and suspend standard masses over edge of tables. Use suspended masses to pull carts length of tables. Measure time with photogates. Repeat multiple trials with different masses loaded on carts. Use same 100 gram standard mass suspended over table edge for each trial. Produce graphs of distance versus time for different masses loaded on cart. Analyze slope of curves and predict relationships between mass and acceleration while using a constant force. Extend activity by comparing the force used to throw baseballs and golf balls with their mass and acceleration. ***Technology suggestion:*** *Use photogates and graphing calculators to measure time and graph data.*	Khoa has been in the country for two and one-half years. He grasps academic vocabulary quickly, has excellent listening skills, but needs help with written expression. Khoa will be paired with two English-speaking lab partners. The teacher will provide him with a list of essential physics vocabulary specific to this experiment (e.g., mass, length, distance, time, carts, photogate, slope, curves, relationship, acceleration). In his initial role as observer, he will write definitions of the vocabulary in Vietnamese to assist in writing the final lab report. During group activity his role will be to record data as dictated by his lab partners. The English-speaking lab partners' role will be to verify use of comparative language in expressing the relationship between force, mass, and acceleration (e.g., a Limited English Proficiency student might say "the more weight, the slower the cart moves." English-speaking students will provide more appropriate scientific description, such as "as mass increases, acceleration decreases") (*Types of extensions: procedures and routines, resources and materials, demonstration of knowledge, level of support).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	*(Continued from page 164)* How can we use forces and the laws of motion to understand the motion of objects?	**Students will** **Physical Science** **Motions and Forces** • investigate the effects of forces on the motion of objects. • investigate gravitational and electromagnetic forces. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate electromagnetic forces. Produce electricity by thrusting one end of strong bar magnet through wire coils that have different numbers of turns. Measure electricity produced. Produce lab reports identifying variables that affect amount of electricity created. Compare this production of electricity to the electricity produced when you speak into a dynamic microphone (the diaphragm thrusts a coil through a magnetic field and produces bursts of electricity in response to sounds). Produce consumer information pamphlets for local retail stores explaining the operation of microphones and speakers and the proper way to install them. *Use this activity to develop possible writing portfolio entries (WP-Transactive).* ***Technology suggestion:*** *Use milliammeters, galvanometers, or probes and graphing calculators to measure electricity.*	Jessica is able to learn at the same rate as her peers when information is presented orally or in written form. She has difficulty translating thoughts to print. She is able to complete lab in same manner as other students. However, both lab reports and consumer brochures will be difficult for her. There are several students who have difficulty with writing and the teacher pairs them with students for whom writing is not a problem. One lab report per team is turned in for a grade. Jessica is able to identify variables that affect amounts of electricity and her partner records their answers. For brochures, she is able to orally contribute information. She is also able to produce accompanying diagrams *(Types of extensions: level of support, procedures and routines, level of participation).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How do observable structures on Earth's surface enable us to determine the internal energy sources of the Earth?	**Students will** **Earth/Space Science** **Energy in the Earth system** • examine internal and external sources of energy. • examine how internal sources of energy propel crustal plates. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • use science to analyze the use of natural resources. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. *(Continued on page 170)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • design investigations to examine the Sun as a source of external energy. Allow the Sun to heat water inside a soft drink can that has been painted black. Measure the temperature increase after 20 minutes and calculate the amount of heat energy reaching the water per minute. Prepare cost analyses and write articles to be distributed by local home builders associations comparing the cost of operating solar houses to conventional houses in Kentucky *(WP-Transactive).* ***Technology suggestion**: Use probes and graphing calculators to collect and graph data.*	Zhi-Jian has been in this country for two months and his oral/aural skills are extremely limited. His reading and writing abilities are somewhat better in spite of serious vocabulary gaps. Having had physics in China, he understands concepts but lacks technical vocabulary and basic language structure to express that understanding. He will use thermometer to determine temperature changes and will perform mathematical calculations required to complete lab report. His English-speaking lab partner will write the actual report. Zhi-Jian will copy technical vocabulary he is still learning and write definitions in Chinese *(Types of extensions: level of support, purpose and appropriateness, demonstration of knowledge).* Stella, Claudia, and Rob have demonstrated mastery of concepts in text. This provides time for them to do further investigations while others are discussing concepts. These students will vary placement of can altering amount of surface area exposed to the Sun's rays, place can in different positions on bright aluminum pan to investigate effects of reflection, and carry out experiments on partially overcast days and bright cloudless days to estimate degrees of reduction of heat energy by clouds. They will record their observations and conclusions and share them with the class (*Types of extensions: purpose and appropriateness, time, complexity, order of learning, environment, participation, demonstration of knowledge, resources and materials, level of support*).

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	*(Continued from page 168)* How do observable structures on Earth's surface enable us to determine the internal energy sources of the Earth?	**Students will** **Earth/Space Science** **Energy in the Earth system** • examine internal and external sources of energy. • examine how internal sources of energy propel crustal plates. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • use science to analyze the use of natural resources. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • model the convection circulation in the mantle. Investigate how these convection currents propel crustal plates. Float small flat sections of styrofoam on the surface of water in a large beaker that is being heated by a hot plate. Compare the motion and causes of motion of the styrofoam to that of tectonic plates. Create investigative reports on movement of crustal plates and the New Madrid fault system. Share reports with local insurance companies for distribution to home owners that buy earthquake insurance *(WP-Transactive).*	Jenny understands information when presented verbally. She uses special binocular glass lens to see large items. For this activity, Jenny will have trouble seeing subtle movements of the styrofoam. Provide her opportunities to hear descriptions of what is happening as the water heats up, get close to the styrofoam, or feel movement by having strings attached to the foam *(Types of extensions: resources and materials, level of support).* Montez needs individual attention and frequent redirection. He understands concepts two years above his peers, but demonstrates patterns of no eye contact or communication with others. He excels in technology. Because of use of hot plates, Montez will need close adult supervision to complete lab and for prompting. Montez is given the assignment to complete the comparison on his computer. He also completes his map using computers. He is given an extra day to complete these assignments (*Types of extensions: procedures and routines, complexity, time, resources and materials, demonstration of knowledge, level of support, motivation*).

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	*(Continued from page 170)* How can we observe the effect of the Sun's energy on the Earth's surface and atmosphere?	**Students will** **Earth/Space Science** **Energy in the Earth system** • examine how external sources of energy produce winds and ocean currents. • examine how external sources of energy determine global climate. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • use science to analyze the use of natural resources. • use science to investigate hazards. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • model convection in the atmosphere and ocean. Place a large beaker of water on a hot plate and drop food coloring into the water. Explain how this models wind and ocean currents. Create maps of global wind patterns and ocean current patterns. Display maps in history classes and explain how these patterns influenced historical shipping trade routes. • model the water cycle. Boil water and allow steam to contact the bottom of pans of ice. Explain how this models components of the water cycle. Access New Jersey Networking Infrastructure in Education Project (NJ NIE) Ask an Expert http://njnie.dl.stevens-tech.edu/curriculum/aska.html and research the water cycle. ***Technology suggestion**: Use Internet to communicate with meteorologists about how energy transferred by water cycle affects global climate.*	Uyen has been in the country for 24 months and still communicates in sentence fragments. Teacher provides vocabulary list of terms (e.g., liquid, gas, solid, evaporation, condensation, precipitation, heat, energy, state). Uyen will have an English speaker show her what each term means and she will write definitions or examples in Vietnamese. After demonstration of water cycle, she will generate cyclical picture that illustrates three phases, labeling parts in sentence fragments with vocabulary from her list *(Types of extensions: level of support, resources and materials, demonstration of knowledge).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How does Earth's internal and external sources of energy affect Earth's geochemical cycles?	**Students will** **Earth/Space Science** **Geochemical Cycles** • investigate how Earth's sources of energy drive geochemical cycles. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • use science to analyze the use of natural resources. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate how Earth's energy drives geochemical cycles. Make a hot concentrated solution of water and sugar. Allow the solution to cool and evaporate undisturbed for one week. Observe the formation of crystals. Explain how energy drives the water cycle and how the water cycle aids the formation of Earth's minerals. Document observations and explanations in learning logs.	Brad works well with other students. He can demonstrate what he knows using picture cards and a talking computer. For this activity, Brad will work in a small group. As data is collected on the formation of crystals, Brad will choose correct picture representations for the degree of crystal formation and paste pictures in his journal. The pictures and the written description will be programmed into his computer so he can answer questions in class and can demonstrate his knowledge (*Types of extensions: demonstration of knowledge, participation, level of support, procedures and routines, resources and materials, magnitude).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How are organisms dependent on the cycling of atoms and molecules, energy flow, and each other in an ecosystem?	**Students will** **Life Science** **The Interdependence of Organisms** • investigate the cycle of atoms and molecules within the biosphere. • analyze energy flow through ecosystems. • examine the factors that influence the interactions between organisms. • explore how human activities alter ecosystems. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate the relative abundance of carbon, hydrogen, nitrogen, and oxygen in living things. Identify major compounds found in living things (e.g., CO_2, H_2O, proteins, carbohydrates). Trace the movement of these elements between the living and nonliving world. Identify processes (e.g., respiration, photosynthesis, bacterial role in nitrogen cycle) critical to each cycle. Write short stories assuming role of elements or molecules as they cycle through the biosphere. (The element or molecule must pass through at least two organisms.) Share stories with other biology classes. • investigate the nitrogen cycle. Examine nodules from legumes' roots under microscopes after staining with methylene blue. Sketch nitrogen-fixing bacteria. Produce brochures to be distributed to farmers by agricultural field agents about importance of bacteria (*WP-Transactive*). • design food chains showing humans' position as primary and secondary consumers. Use food chains to construct food webs. Analyze humans' position in energy transfer. Compare vegetarian and non-vegetarian diets to determine effects of each on the environment. Use this information to argue that we should or should not become vegetarians *(WP-Transactive).* Determine ingredients needed to produce cows, including land, forage, fuel, fertilizers, corn, soybeans, insecticides, herbicides, antibiotics, hormones, and water. Examine distribution and use of resources among nations of the world. • examine how humans alter ecosystems. Explore effects of fertilizer runoff on water resources. Compare observations (e.g., nitrate level, phosphate level, level of dissolved oxygen) of water sources that are near agricultural land to sources that are not and prepare investigative reports. Participate in Kentucky's Water Watch Program. ***Technology suggestion***: *Use e- mail to compare findings with students across the state.*	Mandy needs opportunities to participate in activities to support and encourage her intense interest in scientific research. She will survey garden supply stores to find compounds in commonly used pesticides and other lawn and garden products. The gifted-talented specialist will assist in arranging for her to work with an environmental researcher either through mentorship projects at a university or government environmental agency or via e-mail. Mandy and her mentor will design and perform investigations or experiments related to effects of selected compounds in lawn and garden care products on water resources or on food chains. She will present her findings to local garden clubs or other appropriate audience *(Types of extensions: purpose and appropriateness, complexity, level of support, environment, time, order of learning, demonstration of knowledge, resources and materials, procedures and routines, magnitude).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How do behavioral responses to stimuli ensure individual survival and reproductive success for species?	**Students will** **Life Science** **The Behavior of Organisms** • investigate behavioral responses. • analyze patterns of behavior. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • explore the impact of science on personal and community health. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate and compare innate and learned behaviors (e.g., habituation, imprinting, classical and operant conditioning) in graphic organizers. Create multimedia presentations illustrating examples of each. • investigate the evolutionary and genetic basis of behavior. Compare advantages and disadvantages of sexual reproduction and asexual reproduction. Explain the adaptive advantages of hermaphroditism, altruistic behavior, and mating systems (e.g., polygamy, polyandry, monogamy). Analyze how animal behaviors (e.g., feeding, mating, social behaviors, communication, territoriality, dominance hierarchies) maximize reproductive success. Explore successful reproductive behaviors of aquatic organisms (e.g., reproductive dormancy). Create posters, bulletin boards, or multimedia presentations giving examples and explaining behaviors. • explore circadian rhythms (e.g., metabolic role, body temperature, feeding times) and cirannual behaviors (e.g., breeding, hibernation). Investigate behavioral responses of organisms in tidal regions. Identify internal or external cues that regulate these behaviors and explore their adaptive nature. See *WOW! The Wonders of Wetlands* activity Salt Marsh Players • research seasonal affective disorder. Create informational brochures describing what can be done to alleviate or eliminate symptoms. Distribute through healthcare facilities (*WP-Transactive*). • investigate migration in animals (e.g., whales, butterflies, birds). Explore methods (e.g., piloting, orientation, navigation) and cues (e.g., Sun, magnetic fields, star patterns, chemical concentration gradients) used to find their destinations. Create multimedia presentations for other schools demonstrating how animals migrate.	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	When energy is transferred what forms can it assume?	**Students will** **Physical Science** **Conservation of Energy and the Increase in Disorder** • distinguish between types of energy. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate types of energy. Use photogate timer, meter stick, and balance to collect data and calculate change in potential energy and kinetic energy during swing of simple pendulum. Develop reports for customers in local stores that sell grandfather clocks explaining the construction features of clocks that efficiently use kinetic and potential energy. Write encyclopedia entries explaining the interaction between kinetic and potential energy in grandfather clocks *(WP-Transactive).* ***Technology Suggestion**: Use photogates and graphing calculators to collect and graph data.*	Seth learns information at the same rate and level as his peers. He uses hearing aides and requires audio trainers or interpreters (sign language) to understand information presented verbally or participate in conversations. He reads information on the same grade level as his peers. For these activities, the teacher will use an audio trainer or interpreter during instruction and discussion. Provide written directions for activities or description of concepts *(Types of extensions: resources and materials, level of support).*

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High School Science
Model III: Integrated Science II

Course Overview:
The theme of this inquiry based course is constancy and change over time. Students examine constancy in the natural world as well as changes that continually occur. Students examine the formation of matter and energy, properties and interactions, formation of the solar system, and conclude with the constancy of matter and energy in living systems.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding questions along with related academic expectations and correlations to the *Program of Studies.* Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- What are the components and structure of the universe?
- How are chemical and physical properties of matter related to the structure of matter?
- What happens when energy interacts with matter?
- What evidence can be found that the Earth and solar system have changed over time?
- What evidence suggests that species change over time and how is biological classification used to explain relationships among diverse organisms?
- What processes are involved in the flow of matter and energy through and between living systems and the physical environment?
- How does the law of conservation of energy help me understand the movement of energy?

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High School Science
Model III: Integrated Science II

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What are the components and structure of the universe?	**Students will** **Earth/Space Science** **The Formation and Ongoing Changes of the Universe** • describe theories of the formation of the universe. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine components and structure of the universe. Construct physical or pictorial models of universe that show the position of our solar system and accurately represent size and distance. Display models in school cafeteria. Write reviews for the movie *Armageddon* commenting on the scientific accuracy *(WP-Transactive).*	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How are chemical and physical properties of matter related to the structure of matter?	**Students will** **Physical Science** **Structure and Properties of Matter** • investigate structure and chemical properties of matter. • investigate structure and physical properties of matter. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • explore the impact of science on personal and community health. • use science to investigate hazards. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • analyze ways chemical properties are related to the structure of matter. Investigate simple chemical reactions between common household substances (e.g., charcoal burning, mixing baking soda with vinegar). Observe reactions and produce structural models (e.g., pictorial, physical). Explain observed chemical properties in brochures containing consumer safety information to be distributed by local home extension agent *(WP-Transactive).* ***Technology suggestion**: Use publishing software to create brochures.*	
• analyze ways physical properties are related to the structure of matter. Investigate physical properties such as the viscosities of 10W motor oil and 40W motor oil. Produce structural models (e.g., pictorial, physical) that explain observed physical properties. Use structural models to create videos that will be used in vocational school auto mechanic classes explaining viscosities. ***Technology Suggestion:** Use camcorder to make videos.*	Suzanne understands information presented in simple language. She can demonstrate knowledge by drawing or building models. When working on physical models, she works at a pace typically slower than her same-age peers. When making structural models for these activities, allow Suzanne to develop one model instead of multiple models *(Types of extensions: magnitude, pace, complexity).* Tim, Brianna, and Cory participated in a Saturday scholars chemistry class in which they investigated physical changes. They measured ice-melting and water-boiling temperatures. They will expand upon the class activity by adding salt and sugar (1g/10mL water) into water and remeasuring ice-melting and water-boiling temperatures. They will record and discuss results and observations and report to the class (*Types of extensions: purpose and appropriateness, order of learning, complexity, pace, resources and materials, level of support*).

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High School Science
Model III: Integrated Science II

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What happens when energy interacts with matter?	**Students will** **Physical Science** **Interactions of Energy and Matter** • investigate energy transfer caused when waves and matter interact. • investigate electrical energy and conductivity through matter. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate energy transfer between waves and matter. Collect data to produce colored charts of visible bright line spectra of various elements (e.g., metallic salts suspended in flame, neon lights, fluorescent bulbs) using spectroscopes, prisms, or diffraction gratings. Use these charts to identify elements in "unknown" samples supplied by teacher. Use the charts to produce consumer information articles with photos or color drawings to explain why each element absorbs and emits a specific packet of energy. Distribute articles to local hardware stores that sell light bulbs. Write encyclopedia entries explaining the interaction of light waves and various elements *(WP-Transactive).*	Steve works at the same level as his peers and is able to complete any assignment when in the same time frame. However, he has difficulty interacting with peers and adults. The teacher assigns groups of four to complete the lab. Because Steve is unable to work in groups of that size, the teacher assigns him to work with one other student to complete assignments. Prior to beginning labs, the teacher reviews lab rules, Steve's behavior plan, and point sheet. Following lab, the teacher gives positive or corrective feedback as necessary (*Types of extensions: procedures and routines, level of support, motivation, participation, resources and materials*).
• investigate the interaction of electrical energy and matter. Design and conduct experiments to identify variables that affect the amount of conductivity and resistance in metal wires. Produce articles that explain how these variables impact wiring for new speakers *(WP-Transactive).* ***Technology suggestion****: Use probes and graphing calculators to collect and graph data.*	Ermin, a Limited English Proficiency student who has been in the country for 14 months, has strong verbal skills due to his outgoing nature, but limited academic vocabulary, especially in reading and writing. Assuming that concepts and vocabulary required for lab report have been demonstrated prior to the experiment, physical and visual elements will facilitate him to apply newly acquired knowledge. To assist him in identifying variables, the teacher will provide stereo speakers and metal wires that vary in composition, thickness, length, and insulation. Ermin then will experiment physically with various types of wire to determine interactions of electrical energy and matter. English-speaking students can assist him in putting his ideas into writing (Types of extensions: procedures and routines, level of support, participation, demonstration of knowledge).

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What evidence can be found that the Earth and solar system have changed over time?	**Students will** **Earth/Space Science** **The Formation and Ongoing Changes of the Earth System** • describe the formation of the solar system. • investigate how to estimate geologic time. • examine ongoing changes of the Earth system. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • model possible mechanisms for the formation of the solar system. Sprinkle lycopodium powder on top of water in beakers and stir (the swirling lycopodium powder represents mass particles coalescing under the influence of gravity.) Produce articles describing other possible mechanisms for the formation of the solar system and describing current changes that are occurring in the solar system *(WP-Transactive).* ***Technology suggestion:*** *Use Internet to observe latest photographs of astronomical objects and events.*	
• investigate geologic time. Construct physical or pictorial models that show subdivisions of geologic time on time lines. Include descriptions of fossils found from each time period. Examine and map coal deposits and other rock sequences across the state. Create educational brochures describing rock formations that contain fossils and distribute at visitor centers *(WP - Transactive).* • explore how movement of continental plates affected distribution of species. Investigate matching fossils and rock formations across plate boundaries, the unique collection of species on some continents (e.g., marsupials in Australia), and distribution of biogeographical realms.	Josh is deaf. He is able to complete tasks similar to grade-level peers. He is provided with a written set of directions for this assignment. During the field trip to investigate coal deposits and other rock sequences, an interpreter signs the speaker's explanations *(Types of extensions: procedures and routines, resources and materials, level of support).*
• examine interactions that cause ongoing changes in the Earth system. Model chemical weathering by placing piece of chalk (limestone) in water and another piece in vinegar (acid). Produce articles to predict long term effects of acid rain on erosion of Earth's surface, limestone cave formation, monuments, and buildings (*WP-Transactive*). ***Technology suggestions:*** *Use digital cameras to create photo essays. Create multimedia presentations for city council or county fiscal courts documenting effects of weathering or acid rain on communities.* • investigate significant geologic events (e.g., mountain building, formation of volcanoes) and their impact on speciation. Research adaptive radiation on Hawaiian and Galapagos Islands. Create maps of islands showing locations of different species. Use graphic organizers to compare features of species. Develop models to explain how adaptive radiation occurs on island chains.	Stanley understands information well beyond the level of his peers. He is highly motivated when he is given independence in his study of new concepts. For this activity, Stanley already knows basic concepts of chemical weathering. Contract with Stanley to conduct a research project on the effects of chemical weathering on the local landscape. As part of the research, Stanley will develop a specific set of strategies to decrease the amount of weathering in his community. He will also present strategies to city council members (*Types of extensions: motivation, purpose and appropriateness, complexity, time, pace, environment, order of learning, demonstration of knowledge).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What evidence suggests that species change over time and how is biological classification used to explain relationships among diverse organisms?	**Students will** **Life Science** **Biological Change** • examine how species change over time. • examine diversity and classification. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze the role science plays in everyday life and compare different careers in science. *(Continued on page 194)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate defense mechanisms (e.g., camouflage, mimicry, toxicity, aggressive behaviors, warning coloration) in plants and animals. Select a defense mechanism and identify organisms that exhibit that trait. Identify patterns among groups of organisms. Create graphic representations (e.g., circle graphs, histograms) to display data. Read articles describing industrial melanism (e.g., Kettlewell, H.B.D. "Further Selection Experiments on Industrial Melanism in the Lepidoptera."). Explain in learning logs how process of natural selection altered populations of peppered moths *(Biston betularia).* • investigate evolution of various species (e.g., horses). Create murals depicting phylogenetic trees. Discuss how adaptations are advantageous to the survival of species. • examine diversity and unity of organisms. Observe organisms in areas close to school. Sort organisms by structure and develop classification system. Produce essays with photographs to be distributed during parents' night. • investigate biodiversity. Take field trips to riparian ecosystems. Map physical and biological features. List organisms living in each area and describe their roles. Explore how changes in environments might increase or decrease diversity. Write articles explaining why ecosystems with high biodiversity should be protected (*WP-Transactive*). • investigate impacts of introduced species (e.g., lamprey eel, rainbow trout, pheasant, purple loosestrife, water hyacinth, Japanese beetle, zebra mussel) on native species. Identify both benefits and liabilities of introduced species. Research ways introductions occur and develop plans to prevent them. Share plans with environmental clubs. • investigate diversity of fish species in Kentucky's lakes and streams. Invite fish biologist to discuss fish and fish habitats. Interview fishermen and compare with biologists' information. Use graphic organizers to compare characteristics of fish (e.g., habitats, food sources, mating and breeding patterns). Design dichotomous keys to identify species.	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	(*Continued from page 192*) What evidence suggests that species change over time and how is biological classification used to explain relationships among diverse organisms?	**Students will** **Life Science** **Biological Change** • examine how species change over time. • examine diversity and classification. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • explore the impact of science on personal and community health. • investigate how science can be used to solve environmental quality problems. • investigate advances that have effects on science and society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • explore methods of classifying organisms based on structure, function, biochemistry, behavior, nutrition, embryonic development, genetic systems, evolutionary histories, and ecological interactions. Classify various organisms based on pictures and measurements of features (e.g., body form, teeth, skull, feet, skeletal features, body temperature, heart, embryonic development). • examine diversity among plants. Identify major highlights of plant evolution (e.g., vascular tissue) and their impact on plant diversification. Identify divisions within plant kingdom and describe their characteristics and significant adaptations. Use graphic organizers to compare characteristics. Create bulletin boards, collages, or multimedia presentations on the economic or medical importance of plants from each division, including local agricultural products. • explore loss of biodiversity worldwide. Investigate why tropical rain forests are being destroyed at alarming rates. Debate whether or not developed nations have the right to ask developing nations to slow or stop destruction of their forests. • explore diversity among microoganisms. Research types of aerobic and anaerobic bacteria (e.g., *Staphylococcus aureus*, *Clostridium botulinum*). Discuss potential impacts on human health (e.g., botulism, vitamin K production). Research and categorize antimicrobial drugs. Investigate how antimicrobial drugs disrupt cell processes or structures or both. Create informational brochures explaining how antimicrobial drugs work and distribute at drugstores. • explore beneficial roles of microorganisms (e.g., food production). Organize food fairs for parents' night that highlight the role of microorganisms in food production.	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	What processes are involved in the flow of matter and energy through and between living systems and the physical environment?	**Students will** **Life Science** **Matter, Energy, and Organization in Living Systems** • recognize that living systems require energy. • investigate photosynthesis, cellular respiration and energy. • analyze the flow of matter and energy. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • explore the impact of science on personal and community health. • recognize how science influences human population growth. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine energy sources for living systems. Construct models of energy containing food molecules (e.g., sugars, proteins). Construct models of simple molecules (e.g., CO_2, H_2O) from which food molecules are formed. Display models in classroom. • research methods used to determine the number of calories in foods. Determine number of calories in walnuts by burning walnuts beneath small beakers filled with water. Compare water temperature before and after burning. Compare number of calories released by lipids, proteins, and carbohydrates. Write informational guides for dieters explaining which type of food provides the most calories and why (*WP-Transactive*). • investigate energy relationships between photosynthesis and respiration. Use models to illustrate the chemistry of photosynthesis and cellular respiration. Write children's stories about the life of plants describing when and where photosynthesis and respiration take place *(WP-Transactive).* ***Technology suggestion:*** *Use desktop publishing software to create books.* • write articles explaining why rain forests make little or no net contribution to global oxygen production or reduction of global warming (*WP-Transactive*). • analyze energy flow through ecosystems. Read feature articles from fishing, hunting, or nature magazines and use information to create food webs. Display food webs on bulletin boards. Examine diagrams of energy pyramids for typical ecosystems. Develop diagrams and memos to be used by wildlife biologists for workshops explaining why energy pyramids are broad at bottom and narrow at top.	Mia has limited fine motor abilities, but her cognitive skills are commensurate with same-age peers. She will need theraputty rather than modeling clay, stiffer paper, larger objects, and peer or adult assistance constructing her models, but she should be allowed to perform construction of models herself. An occupational therapist will consult regarding appropriate types of materials (*Types of extensions: time, procedures and routines, resources and materials, level of support).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1-2.6)	How does the law of conservation of energy help me understand the movement of energy?	**Students will** **Physical Science** **Conservation of Energy and the Increase in Disorder** • recognize that the total energy of the universe is constant. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine energy transfer. Explain how thermal energy is produced in toasters by tracing energy back to its source. List forms of energy during different stages of transfer. Produce brochures to be distributed by local electric cooperatives containing consumer information about efficient energy use by home appliances *(WP-Transactive).*	Seth learns information at the same rate and level as his peers. He uses hearing aides and requires audio trainers or interpreters (sign language) to understand information presented verbally or participate in conversations. He reads information on the same grade level as his peers. For these activities, the teacher will use an audio trainer or interpreter during instruction and discussion. Provide written directions for activities or description of concepts *(Types of extensions: resources and materials, level of support).*

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NOTES

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High School Science
Model III: Integrated Science III

Course Overview:
This inquiry based course is developed around the themes of evidence, models, and explanation. Students examine the evidence and models that scientists use to explain the natural world in order to expand on the concepts introduced in Integrated Science I and II. The course is designed to promote ways of applying and integrating scientific ways of thinking to daily life.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How do observable properties of matter enable us to determine the structure of atoms?
- What evidence can we find that the universe is in the process of continuous change?
- What causes chemical reactions that affect our daily lives?
- How are Earth's chemical reservoirs affected by the internal and external sources of energy?
- How do cell structures, functions, and processes affect living things?
- How does DNA transfer genetic information of organisms to the next generation?
- How does the tendency for everything to become less organized help me understand the movement of energy?

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	How do observable properties of matter enable us to determine the structure of atoms?	**Students will** **Physical Science** **Structure of Atoms** • analyze atomic structure and electric forces. • examine nuclear structure, nuclear forces, and nuclear reactions. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • explore the impact of science on personal and community health. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate atomic structure. Analyze visible spectrum emitted from heated elements (e.g., metallic salts suspended in flame, neon lights, fluorescent bulbs) using spectroscopes, prisms, or diffraction gratings. Produce pictorial model that relates wavelength and energy of light emitted to Bohr model of atom. Observe fireworks either directly or on videotape and use colors of displays to identify elements used in fireworks.	
• simulate radioactive decay. Examine radioactive half-life by placing 100 pennies (atomic nuclei) in closed container (sample of radioactive isotope), shaking it (nuclear reactions), then counting and removing pennies that are heads up. Repeat until all pennies have been removed. Graph number of pennies removed versus trial number. Determine from graph the number of trials it would take to completely remove 200 pennies. Produce investigative reports on radon in homes across Kentucky that show connections between radon occurrence and geological regions in Kentucky. Explain why the radioactive decay of radon is a dangerous nuclear reaction. Extend this report by describing how nuclear structure and nuclear forces cause radon to be radioactive. Present the investigative reports to local health departments. *Use this activity to develop possible writing portfolio entries (WP-Transactive).*	Randy understands concepts at the same level as his peers. He has difficulty manipulating small objects. For this activity, either pair Randy with a peer who can remove pennies or provide him with larger objects to manipulate *(Types of extensions: resources and materials, level of support).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	What evidence can we find that the universe is in the process of continuous change?	**Students will** **Earth/Space Science** **The Formation and Ongoing Changes of the Universe** • describe the formation of the stars. • examine stars. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate factors that contribute to the formation of stars. Write articles explaining the use of stellar parallax to measure distances to stars. Distribute articles to local astronomy clubs *(WP-Transactive).* • investigate components of stars. Observe photographs of spectra from stars. Produce written comparisons to Sun's spectrum and explain the similarities and differences. Create colored charts, posters, or multimedia presentations comparing spectra from stars to Sun's spectrum. Share multimedia presentations with school-based council. ***Technology suggestion**: Use multimedia software to develop presentation.*	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	What causes chemical reactions that affect our daily lives?	**Students will** **Physical Science** **Chemical Reactions** • investigate chemical reactions and energy. • examine the transfer of electrons or hydrogen ions between ions, molecules, or atoms. • investigate factors affecting reaction rates. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate heat energy released when hydrocarbons (e.g., lamp oil, paraffin, alcohol) react with oxygen. Use oil lamp, candle, or alcohol lamp to heat beaker of water. Produce investigative reports that quantitatively compare the heat energy released from a variety of hydrocarbons (e.g., fuel oil, coal, wood, food). Distribute reports to local environmental groups concerned about proper use of natural resources *(WP-Transactive)*. ***Technology Suggestion**: Use probes and graphing calculators to collect and graph data.* • examine transfer of electrons during chemical reactions (e.g., zinc and dilute hydrochloric acid). Observe reactions and construct structural models (e.g., physical, pictorial) to explain observations. Write encyclopedia entries that use the models to show how transfer of electrons produces electricity in batteries *(WP-Transactive)*. ***Technology Suggestion:** Use publishing software to create brochures.* • investigate one factor affecting reaction rates. Observe smoldering splint of wood in air and when splint is placed into bottle of pure oxygen. Produce essays with student created drawings to explain how concentration of reactants increase reaction rate. Extend activity by investigating other factors (e.g., temperature, surface area). ***Technology Suggestion:** Use digital camera to create photo essays.*	Chancy understands concepts when they are presented using verbal descriptions or pictures along with hands-on activities. He can demonstrate his knowledge by explaining what he knows verbally or using drawings. For this activity, provide Chancy with an audiotape of the experiment and expectations prior to class. Allow Chancy to audiotape his prediction of which variables would need to be measured to determine the amount of heat transferred *(Types of extensions: procedures and routines, materials, order of learning, demonstration of knowledge).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	How are Earth's chemical reservoirs affected by the internal and external sources of energy?	**Students will** **Earth/Space Science** **Geochemical Cycles** • recognize that the Earth contains a fixed amount of elements. • analyze Earth's chemical reservoirs. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • use science to analyze the use of natural resources. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine the fixed amount of each stable chemical atom or element in the Earth system. Produce articles explaining how Earth's resources are being depleted while Earth's amount of atoms or elements essentially stays the same. • research Earth's chemical reservoirs. Produce articles explaining how plate tectonics affect ways geologists explore for economically important ore deposits *(WP-Transactive).*	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	How do cell structures, functions, and processes affect living things?	**Students will** **Life Science** **The Cell** • investigate cell structures and their functions. • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • explore the impact of science on personal and community health. • recognize how science influences human population growth. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. *(Continued on page 212)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine cell structures with light microscope. Produce photo essay or essay with student created drawings of basic cell structure (e.g., cell wall, cell membrane, nucleus, cytoplasm, chloroplast, vacuoles). Describe functions of cell structures on mechanical rather than biochemical level (e.g., nucleus and control of cell function, chloroplast and photosynthesis, mitochondria and respiration, cell membrane and transport). Include ways to test the assertion that chicken eggs are cells by comparing functions of different structures in eggs and in cells. ***Technology suggestion:*** *Use light microscopes or flex cams to examine cell structures.* • investigate reactants and products of the photosynthetic chemical reaction. Use light screens on Geranium leaves. Conduct iodine tests after a few days to determine effects of light and absence of light on production of carbohydrates in leaves. Place *Elodea* plants into carbonate solutions under bright light. Count oxygen bubbles as they emerge from cut ends of *Elodea* plants. Analyze these activities and produce an empirical word equation for the photosynthetic chemical reaction. Investigate ways to increase or decrease rate of oxygen production. Compare photosynthesis in plants adapted to life in arid conditions to plants living in Kentucky. • investigate the evolution of eukaryotic cells. Trace the origin of cell organelles. Use graphic organizers to compare characteristics of oldest known cells to modern cells. Create illustrated time lines documenting milestones in the development of the cell theory. • compare functions of cell organelles to school or city structures that have similar functions. Create multimedia presentations showing comparisons. • investigate how and when cells differentiate. Read *"How Does a Single Cell Become a Whole Body."* Trace formation of germ layers and identify organ systems that develop from each layer. Create informational bulletin boards, collages, or posters. Examine drugs (e.g., thalidomide, alcohol) and diseases (e.g., rubella) that interfere with differentiation and organogenesis. Write articles to encourage pregnant women to refrain from drinking alcohol. *Use this activity to develop possible writing portfolio entries* (*WP - Transactive).*	Carl is able to learn concepts and vocabulary presented in a very concrete manner. He has difficulty with new language and vocabulary and needs visual devices to remind him of the meaning of vocabulary (e.g., photosynthesis), adding one new term and reviewing old ones each day. Also, on the day of the activity, the teacher reviews techniques for using microscopes and parts of the microscope. She also presents a diagram of a cell and its structures. Carl copies it into his notebook. With a partner, Carl examines cell structures with the microscope and compares it to his diagram. Then Carl draws a diagram from the real cell and compares it to his notes, labeling all parts. Carl will answer simple questions to describe functions of cell structures. He does not complete the chicken egg section of the lab *(Types of extensions: order of learning, procedures and routines, complexity, magnitude, resources and materials, demonstration of knowledge, level of support).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	*(Continued from page 210)* How do cell structures, functions, and processes affect living things?	**Students will** **Life Science** **The Cell** • investigate cell structures and their functions. • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • recognize how science influences human population growth. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate the changes that occur during metamorphosis of animals (e.g., salamanders, insects, frogs). Create illustrated flow charts explaining the process. Create physical models of young and adult. Identify natural or human-induced hazards (e.g., acid rain) that affect development. Interview biologists about changes in local populations of aquatic organisms. Write letters to legislators regarding effects of acid rain or other pollutants on aquatic organisms (*WP-Transactive*). See *Project Wet Curriculum and Activity Guide* activity Where are the Frogs? • investigate embryonic development. Examine pictures of different species of embryos at different stages of development. Use graphic organizers to compare features. Research variables that affect embryonic development (e.g., thalidomide, alcohol, diseases). Develop informational brochures for expectant mothers explaining health hazards and distribute through local healthcare facilities (*WP-Transactiv*e). • trace what happens to food produced by rain forest trees when its leaves and fruit are eaten by other animals. Create bulletin boards illustrating flow of energy and explaining the photosynthetic process. • create illustrated time lines showing major discoveries in studies of photosynthesis. Include works of major researchers (e.g., Van Helmont, Priestley, Ingenhouz, Sachs, Engelmanson). ***Technology suggestion:*** *Use software to create time lines.*	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	How does DNA transfer genetic information of organisms to the next generation?	**Students will** **Life Science** **The Molecular Basis of Heredity** • investigate DNA. • investigate encoding and replication. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • explore the impact of science on personal and community health. • analyze the role science plays in everyday life and compare different careers in science. • investigate advances that have effects on science and society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine DNA structure. Construct models of DNA molecules and show locations of genes. Display models in science labs. Write articles for the local school newspaper concerning future applications of Human Genome Project *(WP-Transactive)*. • examine replication. Create articles showing how one DNA molecule can form exact duplicate of itself (replication). Use photographs of DNA models in essays *(WP-Transactive)*. • investigate life cycles of cells. Examine videos, slides, or photographs of various stages of mitosis and interphase. Recreate stages using students to represent chromosomes. • investigate loss of control over cell division exhibited by cancer cells. Identify chemical substances used in chemotherapy and their purposes. Interview community members who have had chemotherapy, examine the process and how it affected their lives. Write articles for science sections of newspapers and explain the idea that cancer is a normal developmental process gone wrong or write editorials to explain why money should be spent on basic research regarding normal cell cycle (*WP-Transactive*). • read Watson's account of the discovery of DNA structure. Summarize methods used and evidence gathered. Investigate lives of other researchers who were involved in the discovery (e.g., Rosalind Franklin, Maurice Wilkins, Francis Crick). Write resumes for each researcher. • investigate protein synthesis including transcription and translation. Create models to demonstrate process. Identify types of RNA present, their function, and locations. Use graphic organizers to compare protein synthesis in eukaryotes and prokaryotes. Explore evolutionary significance of common genetic language. • investigate how some antibiotics work to interrupt protein synthesis of bacteria. Create informational brochures explaining how antibiotics work and distribute at drugstores (*WP-Transactive)*. • investigate how mutations in DNA affects protein synthesis. Identify mutagens (e.g., ultraviolet lights, ionizing radiation). Write articles explaining how mutations may be harmful, neutral, or beneficial, depending on how the proteins they specify interact with other genes and the environment (*WP-Transactive)*.	Angelica sustained a spinal cord injury in an auto accident. She has limited use of her arms. She received instruction on use of assistive technology and computers. She uses technology with assistive devices to access the key board. To complete this assignment, she is given instruction in use of a graphics program that can help her construct models. She constructs her models using her computer and displays them on a class computer monitor or TV screen. She completes the editorial using her computer *(Types of extensions: order of learning, purpose and appropriateness, procedures and routines, resources and materials, demonstration of knowledge)*.

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	How does the tendency for everything to become less organized help me understand the movement of energy?	**Students will** **Physical Science** **Conservation of Energy and the Increase in Disorder** • examine how everything tends to become less organized. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze the role science plays in everyday life and compare different careers in science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine the tendency to become less organized. Design and conduct experiments to determine the rate of dispersion of food coloring dropped into water of different temperatures. Produce reports describing the inquiry approach, observations, and explanations of effects of temperature on rates of dispersion.	Darlene is visually impaired. She is able to design and conduct experiments (e.g., dropping food coloring into different beakers of varying temperatures). Her partner verbally describes results. Darlene records her partner's descriptions and completes her lab report with a Braille writer (Types of extensions: level of support, resources and materials).

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High School Science
Nutritional and Food Science

Course Overview:
Nutritional and food science is a one-credit, interdisciplinary, elective course in which students gain an understanding of selected physical and life science concepts and apply them to everyday life. Much of the study and work in this course is directed toward providing students with an understanding of concepts of nutrition and relationships between nutrition and science. Students use inquiry methods to conduct laboratory investigations. In addition, students explore career possibilities in science, nutrition, microbiology, family and consumer sciences, dietetics, and other research specialties.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding questions along with related academic expectations and correlations to the *Program of Studies* and nutritional and food science content chart. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content or content from the nutritional and food service content chart, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- What knowledge and skills are necessary to conduct scientific investigations in food science?
- How are nutrients used by the body?
- How is food energy used and stored in the body?
- What factors do microorganisms play in food preparation and decomposition?
- What careers are related to food science?

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High School Science
Nutritional and Food Science

Academic Expectations	Content/Process
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**Students will** • formulate procedures for food science experiments. • conduct scientific sensory evaluations of food. • identify chemical symbols most often seen in food science. • interpret basic science such as composition of matter, atomic structure, chemical formulas and equations, and chemical and physical changes in food. • identify properties of acids and bases. • test pH of common foods and food ingredients. • determine function of water in the human body and food preparation. • identify properties and composition of lipids, carbohydrates, proteins, vitamins, and minerals and how the body uses each. • analyze functions of enzymes. • analyze breakdown of food molecules. • examine chemical bonds of leavening agents. • analyze roles and interrelationships of microorganisms and food and analyze benefits and disadvantages of microbial action. • investigate uses of food additives. • explore career paths in nutritional science. • integrate activities of Future Homemakers of America (FHA) as an integral component of course content and leadership development. • apply math, science, and communication skills within technical content. • demonstrate employability and social skills relevant to the career cluster.

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies and Nutritional Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	What knowledge and skills are necessary to conduct scientific investigations in food science?	**Students will** **Program of Studies** **Physical Science** • investigate structure and physical properties of matter. • analyze atomic structure and electric forces. • investigate chemical reactions and energy. • examine the transfer of electrons or hydrogen ions between ions, molecules, or atoms. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • explore the impact of science on personal and community health. • recognize that scientific knowledge is subject to change. **Nutritional Science Content Chart** • formulate procedures for food science experiments. • conduct scientific sensory evaluations of food. • interpret basic science such as composition of matter, atomic structure, chemical formulas and equations, and chemical and physical changes in food. • identify properties of acids and bases. • test pH of common foods and food ingredients. • apply math, science, and communication skills within technical content. • identify chemical symbols most often seen in food science. *(Continued on page 226)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • use scientific journals (e.g., *Scientific American, Science*) and Internet resources to investigate methods used to conduct and document results of scientific research. Discuss organizational format used in scientific research.	
• design and conduct investigations to become familiar with measuring equipment and skills. Determine density of various substances. Compare volume measurements using various types of glassware (e.g., beaker, graduated cylinder). Compare masses using electronic and triple-beam balances. Organize data in tables. Graph mass versus volume measurements. Calculate slope to determine density. Explain in written laboratory reports differences in volume and mass measurements and explain why density may or may not be precise. ***Technology suggestion:*** *Use integrated software package to create graphs.*	Randy understands concepts at the same level as his peers. He has difficulty manipulating objects. For this activity, pair Randy with a peer for lab experiences in measuring. Each partner will be responsible for arriving at his own conclusions, based on raw data. Randy will audiotape his laboratory report *(Types of extensions: resources and materials, participation, demonstration of learning, level of support).*
• develop observation skills by participating in tasting parties to identify senses used to enjoy food. Compare taste, texture, color, smell, and shape of foods (e.g., low-fat varieties, convenience foods, home-cooked items). Rank foods in order of preference. Discuss significance of test results. Visit local restaurants and write critiques of foods' sensory appeal. Write articles to review restaurants' appeal to diners. *Use this activity to develop possible writing portfolio entries (WP Transactive).* See *Nutrition Curriculum Activities Kit Level 1* activities Tasting Party Sensory Food Evaluation Lab See *Diet and Nutrition* activities Dare to Compare Variety is the Spice of Life	
• explore physiological and emotional reasons for hunger. Survey peers to determine how emotions influence eating habits. Keep daily journals of meals and snacks to explain thoughts and feelings prior to eating. Analyze observations to determine patterns and identify emotional reasons for hunger. See *Diet and Nutrition Activities* activity Eating and Emotions	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies and Nutritional Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	(*Continued from page 224)* What knowledge and skills are necessary to conduct scientific investigations in food science?	**Students will** **Program of Studies** **Physical Science** • investigate structure and physical properties of matter. • analyze atomic structure and electric forces. • investigate chemical reactions and energy. • examine the transfer of electrons or hydrogen ions between ions, molecules, or atoms. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • explore the impact of science on personal and community health. • recognize that scientific knowledge is subject to change. **Nutritional Science Content Chart** • formulate procedures for food science experiments. • conduct scientific sensory evaluations of food. • interpret basic science such as composition of matter, atomic structure, chemical formulas and equations, and chemical and physical changes in food. • identify properties of acids and bases. • test pH of common foods and food ingredients. • apply math, science, and communication skills within technical content. • identify chemical symbols most often seen in food science.

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Sample Activities	Sample Extensions for Diverse Learners
Students will: • examine effects of advertising on food choices. Record types of foods shown on TV advertisements, length of ad time, and time of advertisement in graphic organizers. Plot results in circle graphs. Extend activity by using magazine ads. Create and videotape their own ads. Determine optimal viewing time to target appropriate markets. See *Diet and Nutrition Activities* activity Sense Appeal ***Technology suggestion:*** *Use integrated software package to create graphs.* • investigate physical and chemical properties and changes that occur during food preparation. Organize chemical parties. Make fudge, rock candy, no-bake cookies, and powdered, granulated drink mix to observe physical changes and bake cakes, fry eggs, and sour milk to observe chemical changes. Bring examples of elements, compounds, and homogeneous and heterogeneous mixtures to the party. Describe physical properties of items in cookbooks for other science classes. • investigate formation of chemical bonds during chemical changes. Create models of atoms and compounds commonly found in foods, showing bonds. Write time-period news articles about discovery of atoms and subatomic particles. ***Technology suggestion:*** *See http://www.shef.ac.uk/chemistry/web-elements/index-fr.html.* • design and conduct investigations to determine pH of foods. Complete taste analysis of foods with different pH values and compare results of taste tests with peers. Create visual displays of foods with different pHs. Predict pH and describe properties of acids and bases of other foods. • design and conduct experiments to determine effects of cooking on pH of foods. Investigate how pH level of food influences food preservation techniques (e.g., canning, drying, freezing, pickling). Create multimedia presentations depicting optimum preservation techniques. • research causes and effects of abnormal levels of blood pH and tests used to determine blood pH. Discuss research on blood pH. Participate in discussions with dieticians to determine how foods affect blood pH. Extend activity to investigate effects of foods on blood sugar level. Interview people who must control sugar level in their diets.	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies and Nutritional Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**How are nutrients used by the body?**	**Students will** **Program of Studies** **Life Science** • investigate the cycle of atoms and molecules within the biosphere. • recognize that living systems require energy. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze how science and technology are necessary for solving issues. • use science to investigate hazards. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. • analyze the role science plays in every day life and compare different careers in science. **Nutritional Science Content Chart** • apply math, science and communication skills within technical content. • identify properties and composition of lipids, carbohydrates, proteins, vitamins, and minerals and how the body uses each. • determine function of water in the human body and food preparation. *(Continued on page 230)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate nutrients (e.g., water, carbohydrates, lipids (fats), protein, vitamins) essential to sustaining life. Analyze food labels from common foods to determine nutrient content. Interview medical technologists to determine ways nutrients are measured in blood (e.g., normal ranges versus abnormal ranges). Visit local hospitals to explore ways nutritionists use diet to treat disease and maintain health. Compare current dietary recommendations to past recommendations. Develop informational brochures explaining how proper diets are essential for maintaining health. Distribute brochures through drugstores and hospitals *(WP-Transactive).* See *Diet and Nutrition Activities* activities Food Guide Pyramid U.S. RDA Information Sheet Put the Label on the Table Label Able Understanding Food Labels See *Food Science Safety and Nutrition* activity Identifying Basic Components of Food • research community health problems associated with lack of clean water. Visit local water treatment plants to observe purification processes. Make small-scale models of water purification systems. Design and conduct investigations using common materials (e.g., charcoal) to purify water. Record data and findings. Write research articles for scientific journals outlining experimental procedures for purification experiments. Share experimental design with students in other schools. ***Technology suggestions:*** *Use CD-ROMs, digital cameras, computers, laser disks, video, and audio to create multimedia presentations. Share information via e-mail, Internet, or Kentucky's TeleLinking Network (KTLN).* • examine how carbohydrates (e.g., monosaccharides, disaccharides, polysaccharides) are used by the body. Taste test differences between natural sugars and artificial sweeteners. Describe diabetic (e.g., juvenile, mellitus) metabolism of carbohydrates. Develop one-day, balanced meal plans suitable for diabetics. Test for presence of carbohydrates (e.g., simple, complex) in foods. Discuss importance of carbohydrate loading prior to athletic events with athletic trainers. See *Food Science Safety and Nutrition* activities Structure of Carbohydrates Questions About Sugar and Sugar Labeling The Diet's Effect on Daily Activities	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies and Nutritional Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	(*Continued from page 228*) **How are nutrients used by the body?**	**Students will** **Program of Studies** **Life Science** • investigate the cycle of atoms and molecules within the biosphere. • recognize that living systems require energy. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze how science and technology are necessary for solving issues. • use science to investigate hazards. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. • analyze the role science plays in every day life and compare different careers in science. **Nutritional Science Content Chart** • apply math, science and communication skills within technical content. • identify properties and composition of lipids, carbohydrates, proteins, vitamins, and minerals and how the body uses each. • determine function of water in the human body and food preparation. *(Continued on page 232)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate roles of lipids in the body. Identify two types of lipids (e.g., saturated, nonsaturated) in foods and the body. Test for presence of lipids (fats) in foods. Visit fast food restaurants and analyze fat content of foods using nutritional literature published by restaurant. Compare percentage of fat in fast foods with American Heart Association's recommendation for fat. Analyze data and create graphs of findings, share with class. Examine connections between saturated fat, cholesterol, and heart disease. Interview cardiologists to identify causes and effects of heart disease (e.g., arteriosclerosis, atherosclerosis, athyrosis). Test fat content of different types of hamburger (e.g., 30% fat, 20% fat, 10% fat) from supermarkets, using solvents to remove fat from meat. Compare fat content to that listed on label. Prepare test tube displays showing percentages of fat content in foods. Develop menus using heart-healthy foods. ***Technology suggestions:*** *Use CD-ROMs, digital cameras, computers, laser disks, video, and audio to create multimedia presentations. Use integrated software package to create graphs.* • investigate roles of protein (e.g., complete, incomplete) in the body. Create diets that are nutritionally sound and use complete and incomplete proteins. Calculate number of calories from protein in diet. Present results of protein diets using multimedia sources. Compare vegetarian and nonvegetarian diets (e.g., lactovegetarian, pure vegetarian, ovolactovegetarian diet). Plan vegetarian diets that provide adequate protein. Analyze case studies to determine if Recommended Dietary/Daily Allowances (RDA) of protein are met. See *Nutrition Curriculum Activities Kit - Level 2* activities The Vegetarian Diet Complimentary Protein Relationships Complementing Your Proteins See *Nutrition Curriculum Activities Kit - Level 1* activities Nutrition Super Sleuth The Egyptian Connection Lost In Space See *Nutrition Curriculum Activities Kit - Level 1* activity All About Energy-yielding Nutrients: Protein	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies and Nutritional Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	*(Continued from page 230)* **How are nutrients used by the body?**	**Students will** **Program of Studies** **Life Science** • investigate the cycle of atoms and molecules within the biosphere. • recognize that living systems require energy. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze how science and technology are necessary for solving issues. • use science to investigate hazards. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. • analyze the role science plays in every day life and compare different careers in science. **Nutritional Science Content Chart** • apply math, science and communication skills within technical content. • identify properties and composition of lipids, carbohydrates, proteins, vitamins, and minerals and how the body uses each. • determine function of water in the human body and food preparation.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate role of vitamins (e.g., fat soluble, water soluble) and minerals (e.g., macro, trace) in the body. Design and conduct investigations to distinguish between fat-soluble and water-soluble vitamins. Interview local pharmacists about vitamin and mineral supplements and outline major points of presentation, including benefits and hazards of using supplements. Visit pharmacy and compare U.S. Pharmacopoeia (USP) standards of different brands of multivitamins and cost of brands. Use integrated software package to analyze data and create bar graphs of USP standards of different brands. Research diseases (e.g., pellagra, beri beri, kwashiorkor, scurvy, rickets, night blindness, anemia) caused by lack of vitamins and minerals. Videotape oral presentations to share with other classes. See *Nutrition Curriculum Activities Kit - Level 1* activity All About Vitamins, Minerals, and Water See *Nutrition Curriculum Activities Kit - Level 1* activities The Case of the Volunteer Victims The Case of the Wobbling Hens ***Technology suggestion:*** *Use camcorders to videotape presentations.* • determine effects of exercise on loss or maintenance of weight. Predict future weight gain or loss if eating and exercise habits remain constant. Critique various exercise videotapes (e.g., "Sweatin' to the Oldies") to determine which burns the most calories. Research exercise programs offered to the public. Analyze fad diets (e.g., grapefruit diet, protein supplement drinks, fat-burner pills) for nutritional value. Investigate their relationships to eating disorders (e.g., anorexia nervosa, bulimia) and evaluate for safety. Discuss problems associated with eating disorders. Watch videos about eating disorders. Debate positive and negative effects media has on body image. Conduct school surveys to determine number of students who have dieted and types of diets used. Write articles for school newspapers encouraging positive weight control programs *(WP - Transactive).* See *Diet and Nutrition Activities* activity Diet Spy	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies and Nutritional Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**How is food energy used and stored in the body?**	**Students will** **Program of Studies** **Physical Science** • investigate chemical reactions and energy. • examine the transfer of electrons or hydrogen ions between ions, molecules, or atoms. **Life Science** • analyze energy flow through ecosystems. • recognize that living systems require energy. • analyze the flow of matter and energy. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • use science to analyze the use of natural resources. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in every day life and compare different careers in science. • recognize that scientific knowledge is subject to change. **Nutritional Science Content Chart** • interpret basic science for food science such as composition of matter, atomic structure, chemical formulas and equations, and chemical/physical changes in food. • apply math, science, communication skills within technical content. • identify properties and composition of lipids, carbohydrates, proteins, vitamins, and minerals and how body uses each. • analyze functions of enzymes. • analyze breakdown of food molecules. *(Continued on page 236)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine how food is digested in the body. Draw or make models, labeling organs (e.g., mouth, esophagus, stomach, small intestine, gall bladder, liver, appendix, pancreas, large intestine) that are involved in the digestive process. Interview physicians and discuss disorders of the digestive system. See *Diet and Nutrition Activities* activities Breakdown As the Stomach Churns Liver, Gallbladder, and Pancreas • conduct interviews with family members or friends that have digestion problems (e.g., ulcers, acid reflux). Investigate contents of over-the-counter medications used to treat digestive problems. Design and conduct titrations to determine which over-the-counter remedies (e.g., Tums, Rolaids, Mylanta, Pepto-Bismol, Milk of Magnesia, baking soda) decrease pH of stomach acid. Document results of titration experiments and write summaries, defending best medications. • design and conduct experiments that compare substances that retard enzymatic browning of fruits (e.g., lemon juice, pectin). Record time-lapse enzymatic browning. Conduct blind taste tests comparing fresh fruit to fruit that has enzymatic browning. Determine effects fruit pH has on rate of enzymatic browning. ***Technology suggestion:*** *Use CD-ROMs, digital cameras, computers, laser disks, video, and audio to create multimedia presentations.* • record 3-day, food-intake in diary and 24-hour activity records (e.g., sleeping, studying, working, eating, exercising). Calculate basal metabolic rate (BMR), energy need, and energy output for one day. Complete case studies that examine factors (e.g., body size and composition, age, gender, environment, physiological state, personal life-style, pregnancy, infancy) affecting BMR, energy need, and energy output. See *Nutrition Curriculum Activities Kit- Level 2* activities Metabolism: Balancing Energy Input and Energy Output The Survival Mission What is the Energy Output? Case #1 What is the Energy Output? Case #2 What is the Energy Output? Case #3 See *Diet and Nutrition Activities* activity Calories and BMR	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies and Nutritional Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	*(Continued from page 234)* **How is food energy used and stored in the body?**	**Students will** **Program of Studies** **Physical Science** • investigate chemical reactions and energy. • examine the transfer of electrons or hydrogen ions between ions, molecules, or atoms. **Life Science** • analyze energy flow through ecosystems. • recognize that living systems require energy. • analyze the flow of matter and energy. **Scientific Inquiry** • identify and refine questions and identify scientific concepts. • design and conduct different kinds of scientific investigations. • use equipment, tools, techniques, technology, and mathematics. • use evidence, logic, and scientific knowledge. • communicate designs, procedures, and results. • review and analyze scientific investigations. **Applications/Connections** • use science to analyze the use of natural resources. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in every day life and compare different careers in science. • recognize that scientific knowledge is subject to change. **Nutritional Science Content Chart** • interpret basic science for food science such as composition of matter, atomic structure, chemical formulas and equations, and chemical/physical changes in food. • apply math, science, communication skills within technical content. • identify properties and composition of lipids, carbohydrates, proteins, vitamins, and minerals and how body uses each. • analyze functions of enzymes. • analyze breakdown of food molecules.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate foods containing each organic nutrient, describing its importance to the body. Examine importance of inorganic nutrients and their role as part of the diet. Create illustrated essays to explain chemical and physical processes of digestion. • investigate how cells store energy and how they use energy to carry out life activities. Research nutritional diets for different ages and activities. Determine total food energy value of selected diets. • examine energy sources for living systems. Construct models of energy containing food molecules (e.g., sugars, proteins). Construct models of simple molecules (e.g., CO_2, H_2O) from which food molecules are formed. Display models in classroom. • research methods used to determine number of calories in foods. Determine number of calories in walnuts by burning walnuts beneath small beakers filled with water. Compare water temperature before and after burning. Compare number of calories released by lipids, proteins, and carbohydrates. Write informational guides for dieters explaining which type of food provides most calories and why *(WP - Transactive).* • design food chains showing humans' position as primary and secondary consumers. Use food chains to construct food webs. Analyze humans' position in energy transfer. Compare vegetarian and nonvegetarian diets to determine effects of each on environment.	Mia has limited fine motor abilities, but her cognitive skills are commensurate with same age peers. She will need theraputty, rather than modeling clay, stiffer paper, larger objects. Peer or adult assistance constructing her models will be needed, but she should be allowed to perform construction of models herself. An occupational therapist will consult regarding appropriate types of materials *(Types of extensions: time, procedures and routines, resources and materials, level of support).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies and Nutritional Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	**What factors do microorganisms play in food preparation and preservation?**	**Students will** **Program of Studies** **Physical Science** • investigate chemical reactions and energy. • examine the transfer of electrons or hydrogen ions between ions, molecules, or atoms. **Life Science** • examine diversity and classification. • analyze the flow of matter and energy. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • examine the interaction between science and technology. • explore the impact of science on personal and community health. • recognize that scientific knowledge is subject to change. • recognize how science influences human population growth. • use science to investigate hazards. **Nutritional Science Content Chart** • interpret basic science for food science such as composition of matter, atomic structure, chemical formulas and equations, and chemical/physical changes in food. • apply math, science and communication skills within technical content. • analyze roles and interrelationships of microorganisms and food and benefits and disadvantages of microbial action. • investigate uses of food additives. *(Continued on page 240)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine types of food borne illnesses (e.g., salmonellosis, botulism, campylobacteriosis, listeriosis, shigellosis, staphylococcal food poisoning) and microorganisms (e.g., *Salmonella, Clostridium botulinum, Campylobacter jejun*i, *Listeria monocytogens, Clostridium perfringens, Shigella, Staphylococcus aureus*) that cause illnesses. Research microorganisms beneficial to food preparation and preservation. Compare organisms that caused diseases in the past to disease causing organisms of today. Draw or make models of microorganisms that cause food-borne illnesses. Visit toxicology/microbiology labs. Tour food processing plants to observe tests for presence of microorganisms in food samples. Interview health safety inspectors on inspection standards (e.g., Food and Drug Administration (FDA), United States Department of Agriculture (USDA), state and local health agencies) that must be met by all food establishments. Interview school, food services coordinators to determine how safety standards are enforced. Report findings from interviews in school newspapers. Create brochures about food-safety standards and food-borne illnesses. Distribute at local supermarkets *(WP-Transactive).* See *Food Science Safety and Nutrition* activities Regulations That Protect Our Food Supply Food Products - Who Regulates Them? Safe Handling Beyond the Retail and Wholesale Shelf Bacteriological Examination of Food Equipment and Eating Utensils Bacteria in Milk - A Chemical Analysis The Unwelcomed Dinner Guest - Prevent Food Borne Illness Organisms That Bug You ***Technology suggestion:*** *Use integrated software packages to develop brochures.* • investigate food additives. Design and conduct experiments to determine efficacy (e.g., enhance flavor or color, aid processing or preparation, preserve quality, add nutrients) of additives. Research United States Department of Agriculture (USDA) and Food and Drug Administration (FDA) control over additives manufacturers use, including process followed to be included on FDA's Generally Recognized as Safe (GRAS) list.	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies and Nutritional Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	*(Continued from page 238)* What factors do microorganisms play in food preparation and preservation?	**Students will** **Program of Studies** **Physical Science** • investigate chemical reactions and energy. • examine the transfer of electrons or hydrogen ions between ions, molecules, or atoms. **Life Science** • examine diversity and classification. • analyze the flow of matter and energy. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • examine the interaction between science and technology. • explore the impact of science on personal and community health. • recognize that scientific knowledge is subject to change. • recognize how science influences human population growth. • use science to investigate hazards. **Nutritional Science Content Chart** • interpret basic science for food science such as composition of matter, atomic structure, chemical formulas and equations, and chemical/physical changes in food. • apply math, science and communication skills within technical content. • analyze roles and interrelationships of microorganisms and food and benefits and disadvantages of microbial action. • investigate uses of food additives.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • design and conduct skits that demonstrate effects of microorganisms on food. Use microscopes to view different kinds of microorganisms grown on food samples. Sketch microorganisms. Visit dairy processing plants to learn how microorganisms are essential for production of foods. Make yogurt for parents' night. See *Food Science Safety and Nutrition* activities Dairy Products Lab Making Yogurt Subsurface Mold Growth in Foods - Control of Molds in Bread Desirable Microbial Growth in Foods - Yeast Fermentation ***Technology suggestion**: Use flex cams or light microscopes to view microorganisms.* • compare methods of food preservation (e.g., canning, dehydration, freezing, irradiation, pickling). Investigate functions of additives (e.g., nutritive, preservative, quality-giving, cosmetic) in foods. Tour supermarkets and determine most common method of food preservation. Conduct taste comparisons of food preserved by different methods and report results to class. Observe cooperative extension agents demonstrating safe food preservation methods. Debate how improved food quality has affected human population growth. See *Food Science Safety and Nutrition* activities Effects of Light on Food Flavor Food Dehydration Frozen Foods Desirable Microbial Growth in Foods - Experimental Modification of Pickle Fermentation See *Diet and Nutrition Activities* activities Food Inspector What Is That Stuff? Additives or Preservatives? See *Nutrition Curriculum Activities Kit - Level 2* activities Chemical You Eat Food Label Tree To Add or Not To Add Fortified Foods See *Food Science Safety and Nutrition* activities Food Safety Risk Assessment - Additives Classes and Function Food Safety Risk Assessment - Nitrites and Nitrates in Meat Food Safety Decisions	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies and Nutritional Science Content Chart
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	What careers are related to food science?	**Students will** **Program of Studies** **Applications/Connections** • analyze the role science plays in everyday life and compare different careers in science. **Nutritional Science Content Chart** • apply math, science and communication skills within technical content. • explore career paths in nutritional science. • integrate activities of FHA as an integral component of course content and leadership development.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate careers in food science (e.g., dietitian, nutritionist, bacteriologist, chemist, sensory evaluator) and food industries (e.g., quality assurance, production/operations management, product development, technical sales/service chef, cook, food processing plant employee, butcher, baker). Interview people in food-related careers (e.g., dietitian, cooperative extension agent). Compare different food science occupations with respect to potential income and career advancement. Prepare career day presentations comparing food science programs at postsecondary schools. Shadow chefs in hotels or restaurants. Develop informational articles on careers to distribute through school guidance offices *(WP-Transactive).* See *Food Science, Safety, and Nutrition* activity Careers in Food Science - Sensory Evaluation • participate in local, regional, state, and national FHA leadership conferences and competitions.	

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NOTES

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Science Glossary

Biodiversity: The diversity of different species and the genetic variability among individuals within each species.

Biogeographical realms: Major regions of the Earth with distinctive flora and fauna.

Biomass: The dry weight of organic matter comprising a groups of organisms in a particular habitat.

Biome: One of the world's major communities, classified according to the predominant vegetation and characterized by adaptations of organisms to that particular environment.

Calorie: A unit equivalent to the large calorie expressing heat-producing or energy-producing value in food when oxidized in the body.

Circannual behaviors: Behaviors that occur regularly at about one-year intervals.

Circadian rhythms: A sequence of behaviors that occur regularly at about 24-hour intervals.

Crepuscular: Appearing or active in the twilight.

Diffraction grating: Usually a glass or polished metal surface having a large number of very fine parallel grooves or slits cut in the surface and used to produce optical spectra by diffraction of transmitted or reflected light.

Diorama: A scenic representation in which sculptured figures and lifelike details are displayed usually in miniature so as to blend indistinguishably with a realistic painted background.

Diurnal: Active by day.

Electrophoresis: A technique used to sort proteins according to their responses in electric fields.

Emission-free: Does not discharge polluting substances into air.

Eukaryote: An organism having cells with well-defined nuclei.

Flex cam: A lightweight, high resolution video camera and lens mounted on a flexible wand.

Genetic engineering: Scientific activities that develop desirable characteristics in organisms by altering genes or inserting new genes in organisms' cells.

Genotype: The genetic makeup of an organism.

Geochemical cycles: A variety of cycles that connect and continually circulate energy and material through the components of the earth system.

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Science Glossary

Geographic tools: Maps, globes, and other items used to document natural features, or populations of regions.

Geothermal energy: Energy of or relating to the heat of the earth's interior.

Human genome project: Began in 1990, the U.S. Human Genome Project is a 15-year effort coordinated by the U.S. Department of Energy and the National Institutes of Health to:

- Identify all the estimated 80,000 genes in human DNA.
- Determine the sequences of the 3 billion chemical bases that make up human DNA, store this information in databases, and develop tools for data analysis.

Hydroponics: The cultivation of plants by placing their roots in liquid nutrient solutions.

Incandescent lamp: An electric lamp in which a filament gives off light when heated to incandescence by an electric current.

Lycopodium powder: A fine yellowish flammable powder composed of spores from any of a large genus (*Lycopodium*) of erect or creeping club mosses with evergreen one-nerved leaves in four to many ranks.

Melanism: An increased amount of black or nearly black pigmentation of an organism.

Mendelian inheritance: A model or mechanism of inheritance documented by Gregor Mendel.

Meteorologist: One who studies atmosphere and its phenomena (climate, weather).

Multiple allelic inheritance or trait: Inheritance pattern or trait controlled by three or more alleles of the same gene that codes for a single trait.

New Madrid Fault System: A series of faults beneath the continental crust in a weak spot known as the Reelfoot Rift. The fault system extends 150 miles southward from Cairo, Illinois through New Madrid, Missouri to Marked Tree, Arkansas.

Nocturnal: Active at night.

Operating systems: Mechanical, fluid, electrical and thermal systems used in modern technology.

Organogenesis: An early period of rapid embryonic development in which organs take form from primary germ layers.

Passive solar house: A house designed to receive and store the solar heat during the cool winter months. The design takes advantage of the sun's position.

Pedigree: A family record that shows how a trait is inherited over several generations.

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Science Glossary

Phenotype: The physical and physiological traits of organisms.

Photogate: An electronic device having an electrical output that varies in response to light.

Phototransistor: A transistor having highly photosensitive electrical characteristics.

Phylogenetic tree: A visual model of the inferred evolutionary relationships among organisms.

Polygenic inheritance: An additive effect of two or more genes on a single phenotypic character.

Probe: A device used to penetrate or send back information.

Prokaryote: A cellular organism the nucleus of which has no limiting membrane.

Seismograph: Any of various instruments for measuring and recording vibrations of earthquakes.

Spectra: Plural form of spectrum.

Spectroscope: An instrument for forming and examining optical spectra.

Spectrum: A series of images formed when a beam of radiant energy is subjected to dispersion and brought to focus so that the component waves are arranged in the order of their wavelengths (as when a beam of sunlight that is refracted and dispersed by a prism forms a display of colors).

Spin-offs : Derived products or effects as result of another project or program.

Stellar parallax: An apparent change in the direction of a star, caused by a change in observed position that provides a new line of sight.

Tempering: To harden metal by reheating and cooling.

Transactive reading: Reading for authentic purposes and audiences beyond completing assignments.

Transactive writing: Writing produced for authentic purposes and audiences beyond completing assignments to demonstrate learning.

Turbid: Not clear or transparent because of stirred-up sediment or the like; clouded; opaque.

Viscosity: The property of a fluid or semifluid that enables it to develop and maintain an amount of shearing stress dependent upon the velocity of flow and then to offer continued resistance to flow.

Watershed: Entire area of land that drains into rivers.

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Science Student Resources
Publications: Periodicals

Caldwell, M. "How Does a Single Cell Become a Whole Body?" *Discover (November 1992).*

Duffy, D.C. "Land of Milk and Poison." *Natural History* (July 1990).

Engel, C.W., and R.R. Smith. "Gizmos: Electronic Devices for Problem Solving." *Science Scope* 18(5) (1995): 30-34.

Faulkner, S.P., and R.V. Hairston "Supermarket Cytology." *Science Scope* 19(3) (1995): 23-25.

Higginson, L. "Selling an Energy Source." *Science Scope* 19(5) (1996): 20-24.

Kettlewell, H. B. D. "Further Selection Experiments on Industrial Melanism in the Lepidoptera." *Heredity* 10: 287-301, 1956.

Publications: Books

Barber, J. *To Build a House*, Berkley: University of California (GEMS), 1991.

Caidin, M. *Destination Mars: In Art, Myth, and Science*. Penguin Books, 1997.

Carson, Rachel. S*ilent Spring*.

Cherry, L. *A River Ran Wild*.

Hershey, S. *Hiroshima.*

Holling, H.C. *Minn of the Mississippi.*

Reading Rainbow. *Three Days on a River in a Red Canoe.*

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Science Teacher Resources

Programs

Challenger Learning Center Sites. *Challenger Learning Center of Kentucky*. Hazard , Radcliff, KY (800) 98-STARS http://www.challenger.org

Kentucky Transportation Cabinet. *Kentucky Engineering Exposure Network (KEEN)* Frankfort, KY (606) 677-4017).

The Kentucky Network (KET). *Kentucky Educational Television.* Lexington, KY. (800) 432-0951

Publications: Books

American Chemical Society. *Chemistry in the National Science Education Standards*. Washington DC: Author, 1997.
ISBN 8412-3551-1. (800) 209-0423

American Forest Foundation. *Project Learning Tree Environmental Education Activity Guide.* Washington, DC: Author, 1996.

Anderson, W. *Rocks and Minerals of Kentucky: Special Publication 20, Series 11*. Lexington: University of Kentucky Geologic Survey Publications Office.
(606) 257-3896

Bell, P., C. Byrd-Berdbenner, L. Hsu, I. Laquatra, J. Rye, and K. Sargad. *Nutrient Curriculum Activities Kit. Levels 1-2* West Nyack, NY: The Center for Applied Research in Education, Inc.

Campbell, Vincent, Jocelyn Lofstrom, and Brian Jerome. *Decisions Based on Science* Arlington: National Science Teachers Association, 1997.
ISBN: 0-87355-165-6. (800) 722-NSTA

Chronical Guidance Publications, Inc. *Food Scientist.* Moravia, NY: Author.

Ford, B.A., and P. Smith. *Project Earth Science: Physical Oceanography.* Arlington: National Science Teachers Association, 1995.

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Science Teacher Resources

Gonsalves, P. *Build It! Festival*. Berkley: Berkley: University of California, 1996.

Gould, A. *Hot Water Houses from Sunlight*. Berkley: Lawrence Hall of Science (GEMS), 1986.

Greb, S. *Geologic Map of Kentucky*. Lexington: University of Kentucky Geologic Survey Publications Office.
(606) 257-3896

Greb, S. *Progression of Life: Poster*. Lexington: University of Kentucky Geologic Survey Publications Office.
(606) 257-3896

Greb, S. *The Guide to Progression of Life: Special Publication 13 Series 11 with Notes on History of Life in Kentucky*. Lexington: University of Kentucky Geologic Survey Publications Office.
(606) 257-3896

Hartman, W.K. *Craters!*. Arlington: National Science Teachers Association, 1995.

Institute of Food Technologists. *Don't Be Puzzled About Your Future.* Chicago, IL: Author.

Institute of Food Technologists. *Food Science Experiments*. Chicago, IL: Author.

Institute of Food Technologists. *The World's Largest Industry.* Chicago, IL: Author.

Kaufman, J. *River Cutters*. Berkley: Lawrence Hall of Science (GEMS), 1989.

Kentucky Department of Education. *Transformations: Kentucky's Curriculum Framework.* Frankfort: Author. 1993, 95.

Kentucky Waterways Alliance. *Splashing in Kentucky: An Educators Guide to Nonpoint Source Water Pollution.* Frankfort, Ky: Kentucky Division of Water, 1998.
(502) 564-3410

Larson, E. *Summer for the Gods*. New York: Basic Books, 1997.

Mehas, K., and S. Rodgers. *Food Science and You.* Mission Hills, CA: Glencoe-McGraw Hill, 1989.

Modern Talking Picture Service. *In Good Taste: Careers In Food Science*. St. Petersburg, FL: Author.

National FFA Foundation. *Food Science, Safety, and Nutrition.* Madison, WI: Author.
(608) 829-3105 FAX (608) 829-3915

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Science Teacher Resources

National Research Council. *National Science Education Standards*. Washington, DC: National Academy Press, 1996.
ISBN 0-309-05326-9. (800) 624-6242

National Science Teachers Association. *AIR: Understanding Our Environment.* Arlington: Author, 1995.
NSTA Stock Number: PB115X, ISBN: 0-87355-133-8. (800) 722-NSTA

National Science Teachers Association. *LIFE: Understanding Our Environment.* Arlington: Author, 1995.
NSTA Stock Number: PB115X, ISBN: 0-87355-133-8. (800) 722-NSTA

National Science Teachers Association. *Planet: Understanding Our Environment.* Arlington: Author, 1995.
NSTA Stock Number: PB115X, ISBN: 0-87355-133-8. (800) 722-NSTA

Potter, N. *Food Science*. 4th ed. Florence, KY: VanNorstrand Reinhold. 1986.

The National Science Teachers Association. *Scope, Sequence, and Coordination of Secondary School Science, Volume I, The Content Core*. Washington, DC: Author, 1989, 1993.
ISBN 0-87355-107-9. (800) 722-NSTA

The National Science Teachers Association. *Scope, Sequence, and Coordination: A Framework for High School Science Education*. Arlington: Author, 1996.
ISBN 0-87355-142-7. (800) 722-NSTA

The National Science Teachers Association. *NSTA Pathways to the Science Standards, Elementary School Edition.* Arlington: Author, 1997.
ISBN 0-87355-161-3. (800) 722-NSTA

The National Science Teachers Association. *NSTA Pathways to the Science Standards, Middle School Edition*. Arlington: Author, 1998.
ISBN 0-87355-166-4. (800) 722-NSTA

The National Science Teachers Association. *NSTA Pathways to the Science Standards, High School Edition*. Arlington: Author, 1997.
ISBN 0-87355-144-3. (800) 722-NSTA

Project 2061, American Association for the Advancement of Science. *Benchmarks for Science Literacy.* New York: Oxford University Press, 1993.
ISBN 0-19-508986-3. (800) 451-7556

Project WET and the Western Regional Environmental Education Council. *Project WET Curriculum & Activity Guide.* Bozeman, MT: Author,1995.
(406) 994-5392 FAX: 406-994-1919 e-mail: rwwet@msu.oscs. montana.edu

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Science Teacher Resources

Rutherford, F. J. and A. Ahlgren. *Science for All Americans*. New York: Oxford University Press, 1989, 1990.
ISBN 0-19-506771-1. (800) 451-7556

Sumners, C. *Toys in Space*. Peoria, IL: McGraw Hill, 1997.

Sutter, D. *Moons of Jupiter*. Berkley: University of California (GEMS), 1993.

The American Forest Council. *Project Learning Tree.* Washington, DC : Author, 1988.

The Kentucky Environmental Quality Commission. *Kentucky's Environmen*t. Frankfort, KY: Author. 1993.

The Watercourse and Environmental Concern, Inc. *WOW! The Wonder of Wetlands*. St. Michaels, MD: Environmental Concern, 1995.
ISBN 1-888631-00-7 (410) 745-9620 FAX (410) 45-3517)

Toner, P. *Diet and Nutrition Activities*. West Nyack, NY: The Center for Applied Research in Education.

University of Wisconsin. *How Much Red Meat Do Americans Really Eat?* Extension-Agricultural Bulletin (87-2). Madison, WI: Author.

USDA Extension Service. *Lean Meat: The Consumer's Choice.* Washington, DC: Author.

Weise, J. *Roller Coaster Science*. New York: John Wiley and Sons, Inc., 1994.
ISBN: 0-471-59404-0 http://www.sci.mus.mn.us

Western Regional Environmental Education Council. *Aquatic Project WILD Education Activity Guide*. Bethesda, MD: Author, 1992,
Fax (301) 493-5627 e-mail: natpwild@igc.apc.org

Western Regional Environmental Education Council. *Project WILD*, Bethesda, MD: Author,1992, (Phone: 301-493-5447, Fax: 301-493-5627, e-mail: natpwild@igc.apc.org).

Wright, R.G. *Flood: An Event-Based Science Module*. New York: Addison Wesley, 1996.

Zubrowski, B. *Blinkers and Buzzers*. Surrey, England: Beech Tree Books, 1991.

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Science Teacher Resources

Software

DDA Software. Nutrient Analysis System 2. Long Valley, NJ: Author. 1993.

Internet Resources

ACS Lexington Section Homepage
http://www.nms.eku.edu/che/acs-ls/

American Association for the Advancement of Science
http://www.aaas.org/

American Association of Physics Teachers
http://www.aapt.org/

American Chemical Society
http://www.acs.org/

American Zoo and Aquarium Association
http://www.aza.org/

An Historical Reference for Chestnut Introductions into North America
http://www.state.ct.us/caes/fspp001s.htm

Appalachian Educational Laboratory
http://www.ael.org

Appalachia-Science in the Public Interest
http://www.kih.net/aspi

Association for Supervision and Curriculum Development
http://www.ascd.org

Bill Nye the Science Guy
http://nyelabs.kcts.org/

Biosphere 2 Center
http://www.bio2.edu

Bluegrass Water Watch
http://www.uky.edu/StudentOrgs/BWW/bww.html

Centers for Disease Control and Prevention
http://www.cdc.gov

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Science Teacher Resources

Chemistry in Kentucky
http://www.nms.eku.edu/che/kychelnx.htm

Chestnuts and the Introduction of Chestnut Blight
http://www.state.ct.us/caes/fspp0008s.htm

Christopher Reeve Foundation
http://www.apacure.com/crfound.html

Christopher Reeve Homepage
http://www.geocities.com/Hollywood/Studio/4071

Coal Education
http://www.coaleducation.org/

Complete Integrated Voice Solutions: Why Type?
http://www.whytype.com

Comprehensive Conceptual Curriculum for Physics
http://phys.udallas.edu

Council for Environmental Education: Project Wild
http://eelink.umich.edu/wild/index.html

DataBeam Corporation
http://www.databeam.com/

Developing Educational Standards - includes Links to National Standards and State Standards
http://putwest.boces.org/standards.html

Eisenhower National Clearinghouse for Mathematics and Science Education
http://www.enc.org

Eisenhower Regional Consortium for Mathematics and Science Education at AEL
(Appalachia Educational Laboratory)
http://www.ael.org

Environmental Education, K-12
http://www.campbellsvil.edu/~chmf/

ERIC Clearinghouse for Science, Mathematics, and Environmental Education
http://www.ericse.org/

EvaluTech features a searchable database of software, books and videotapes recommended for primary through 12th grade.
http://www.evalutech.sreb.org

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Science Teacher Resources

Everyday Classroom Tools (Spirit of Inquiry, Astrophysics K-6)
http://hea-www.harvard.edu/ECT/index.html

Facts About Multiples
http://mypage.direct.ca/c/csamson/multiples.html

Federal Resources for Educational Excellence, (FREE)
http://www.ed.gov/free

Flexfoot - Atlanta: A History of the Paralympic Games
http://www.flexfoot.com/atlanta/history.html

Food Chains, Webs, and Pyramids
http://explorer.scrtec.org/explorer/explorer-db/html/783751674-447DED81.html

Food Security and Climate Change
http://units.ox.ac.uk/departments/ecu/cirp/fscc.htm

Fossils of Kentucky
http://www.uky.edu/KGS/coal/webfossl/fosslbig.htm

Fruits and Nuts Fact Sheets
http://www.state.ct.us/caes/FSFruit.htm

Full Coverage: Science and Technology: Mir Space Station
http://headlines.yahoo.com/Full_Coverage/Tech/Mir_Space_Station

Hands-on Science Centers Worldwide links to interactive science museums around the world
http://www.cs.cmu.edu/~mwm/sci.html

How Things Work
http://www.phys.virginia.edu/Education/Teaching/HowThingsWork/

Illinois Mathematics and Science Academy
http://www.imsa.edu/

International Weather Satellite Imagery Center
http://www.fas.harvard.edu/~dbarou/sat/

Jet Propulsion Laboratory
http://www.jpl.nasa.gov/

Kentucky Association of Physics Teachers
http://www.jcc.uky.edu/kapt/

Kentucky Book Fair - Books about New Madrid Fault Zone
http://www.kdla.state.ky.us/events/BOOKFAIR/125.HTM

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Science Teacher Resources

Kentucky Educational Television
http://www.ket.org

Kentucky Geologic Survey: University of Kentucky
http://www.uky.edu/KGS/home.htm

Kentucky Science Teachers Association
http://www.hardin.k12.ky.us/ksta/

K6.Net Earthquake Page - New Madrid
http://www.k6.net/quake.html

Learning Technologies Channel
http://quest.arc.nasa.gov/ltc

London's National Museum of Science and Industry
http://www.nmsi.ac.uk/

Materials Safety Data Sheets (MSDS) sites
http://www.chem.utah.edu/chemistry/classes/labs/safety/links.htm

Math/Science Academic Village
http://www.wolfe.k12.ky.us/msav/msav.htm

Mid-continent Regional Educational Laboratory (McREL)
http://www.mcrel.org

MSNBC's Intellicast USA Weather
http://www.intellicast.com/weather/usa/

NASA
http://www.nasa.gov/

NASA's Ask Dr. Sue
http://dlt.gsfc.nasa.gov/Ask/

NASA's Office of Space Science
http://www.hq.nasa.gov/office/oss/

NASA Spacelink
http://spacelink.nasa.gov/index.html

NASA's Planetary Photojournal
http://photojournal.jpl.nasa.gov/

National Academy of Sciences
http:www.nas.edu

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Science Teacher Resources

National Association of Biology Teachers
http://www.nabt.org/index.html

National Center for Education Statistics TIMSS Web Site
http://nces.ed.gov/timss/

National Oceanic and Atmospheric Administration
http://www.noaa.gov/

National Science Center
http://www.nscdiscovery.org

National Science Education Standards
http://www.nap.edu/readingroom/books/nses/html/

National Science Foundation
http://www.nsf.gov

National Science Teachers Association
http://www.nsta.org/

National Zoo
http://www.si.edu/organiza/museums/zoo/

N.E.R.D.S., Nebraska Educators Really Doing Science
http://nerds.unl.edu/nerds.html

New Jersey Networking Infrastructure in Education (NJ NIE) project: Ask An Expert
http://njnie.dl.stevens-tech.edu/curriculum/aska.html

New Madrid Earthquakes of 1811-1812 and the New Madrid Fault
http://www.seas.upenn.edu/~hyzer/geo401/madrid/outline.html

Northern Nut Growers Association, Inc., Links to Resources on Chestnuts
http://www.icserv.com/nnga/links.htm

NPR's Science Friday Website
http://www.npr.org/programs/sfkids/

NSTA's Scope, Sequence, & Coordination Project
http://www.gsh.org/NSTA_ssandc/

Oak Ridge National Laboratory Review
http://www.ornl.gov/ORNLReview/

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Science Teacher Resources

PIViT (Project Integration and Visualization Tool) Software for concept mapping and units of instruction (or projects)
http://www.umich.edu/~pbsgroup/PIViT.html

Planet K-12, A search engine designed to help students find materials related to school projects and assignments.
http://www.planetk-12.com

Project 2061's Web Site
http://project2061.aaas.org/

Protecting Chestnut Trees from Blight
http://www.state.ct.us/caes/fspp044s.htm

Public Broadcasting System's Scientific American Frontiers.
http://www.pbs.org/saf/

Region 5 Service Center, Kentucky
http://www.rsc5.kde.state.ky.us/ca.html

River Watch Network
http://www.riverwatch.org/

Russell Fork Water Watch
http://www.kymtnnet.org/wwatch/wwatch.htm

Satellite Related companies
http://www.nlnnet.com/yel_sat.html

Science Learning Network courtesy of National Science Foundation
http://www.sln.org/

School Science and Mathematics Association
http://www.ssma.org/

Simulations Plus (Simulations software for science education in part through a grant from the National Science Foundation)
http://www.simulations-plus.com/

Space Settlement Home Page
http://science.nas.nasa.gov/Services/Education/SpaceSettlement/

Standards for Technology Education (International Technology Education Association)
http://scholar.lib.vt.edu/TAA/TAA.html

State Education and Environment Roundtable
http://www.seer.org

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Science Teacher Resources

Superland! Doug and Stephen's Earthquake Page
http://www.imsa.edu/team/spi/SADVI/studentsimsa/sb/g6/p2.html

Tapped In
http://www.tappedin.org/

Tates Creek High School Curriculum Resource Pages
http://www.tatescreek.fayette.k12.ky.us/tchs/curricul.htm

Technology Education (Agency for Instructional Technology)
http://www.ait.net/

Texas Instruments Calculators & Technology
http://www.ti.com/

The American Chestnut Foundation
http://www.acf.org

The Annenberg / CPB Projects Learner Online
http://www.learner.org/

The Exploratorium
http://www.exploratorium.edu/

The Foundation for Water and Energy Education
http://www.fwee.org/

The Franklin Institute Science Museum
http://www.fi.edu/

The Franklin Institute Science Museum's An Inquirer's Guide to the Universe
http://www.fi.edu/planets/index.html

The GLOBE Program
http://www.globe.gov/

The JASON Project
http://www.jason.org/front.html

The Journal of The American Chestnut Foundation
http://www.cheta.net/macgregor/journal/

The Kentucky Earthquake Page
http://www.uky.edu/ArtsSciences/Geology/webdogs/virtky/index.html

The Mackinaw River Project
http://www.mackinawriver.org

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Science Teacher Resources

The Natural Environments and Effects
http://elses1.msfc.nasa.gov/nee/nee_index.html

The Nature of Water Power
http://www.fwee.org/TG/toc.html

The New Madrid Fault System
http://www.ceri.memphis.edu/www/public_info/faultfacts.html

The New Teacher's Guide to the U.S. Department of Education
http://www.ed.gov/pubs/TeachersGuide

The Periodic Table on the WWW
http://www.shef.ac.uk/chemistry/web-elements/index-fr.html

The Satellite Encyclopedia
http://www.tbs-satellite.com/tse/online/

The Tech Museum of Innovation
http://www.thetech.org/

The Wonderful World of Insects
http://www.insect-world.com/

The World Village Project
http://www.worldvillage.org/

Third International Mathematics & Science Study (TIMSS)
http://nces.ed.gov/timss/

University of Kentucky
http://www.uky.edu/Libraries/

U.S. Census Bureau
http://www.census.gov/

U.S. Census Bureau: The Official Statistics
http://www.census.gov/cgi-bin/popclock

U.S. Geological Survey
http://www.usgs.gov/

USGS Water Resources of the United States
http://water.usgs.gov/

Views of the Solar System
http://bang.lanl.gov/solarsys/

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Science Teacher Resources

Virtual Frog Dissection Kit, developed by the Lawrence Berkeley National Laboratory
http://www-itg.lbl.gov/vfrog/

Whelmers exciting demonstrations
http://www.mcrel.org/whelmers/

Zelda's Zany Zoo
http://www.itdc.sbcss.k12.ca.us/curriculum/zanyzoo.html

CD-ROMs

Culture and Technology. Armonk, NY: The Learning Team, 1988.
http://www.learningteam.org/

Destination Mars. Compu-Teach, Inc. 1995-98.

Exploring the Nardoo. Armonk, NY: The Learning Team, 1988.
http://www.learningteam.org/

For additional resources, see the Kentucky Department of Education's Web Site at <www.kde.state.ky.us> and the *State Multiple List of Textbooks and Instructional Materials, Adoption Groups I - VI, Grades Primary through 12.*

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Social Studies

Required Credits

High School Social Studies
Models

Overview of Models:
Model I of the high school social studies program contains four courses: U.S. history (Reconstruction to present), world civilization (1500 to present), government, and economics. Students receive three credits upon completion of the sequence. The geography requirement for high school social studies is incorporated into the four courses. The geography content in the *Program of Studies* contains a total of 20 content statements. These geography statements are interspersed among the four courses and are placed in the "Correlations to the *Program of Studies*" column.

Model II of the high school social studies program contains six courses: U.S. history (Reconstruction to 1945), world civilization (1500 to 1945), U.S. and world history (1945 to present), world geography, government, and economics. Each course is designed as a 1/2-credit course, with the six courses meeting the three social studies credits required for high school graduation. This model provides a different way of studying U.S. and world history. U.S. history and world civilization are offered as separate courses until the time period of 1945. From that point on, the courses are combined into one course entitled U.S. and world history (1945 to present). The U.S. and world history course demonstrates the interconnections of American and world events during this time period.

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High School Social Studies
Model I: U.S. History (Reconstruction to Present)

Course Overview:
This one-credit U.S. history course covers the time period of 1865 to the present. Students study the social studies areas of economics, government and civics, and culture and society within the context of U.S. history, but they also study U.S. history through a geographic perspective.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Pages of models are arranged in pairs. On the left-hand page of each pair are guiding questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How have American citizens exercised their rights and assumed their responsibilities as members of a democratic society?

- How has the American political system functioned and affected the course of American history?

- How have America's social systems developed and changed to meet the needs of American citizens?

- How have the people from many countries, races, ethnic groups, and religious traditions contributed to the growth, development, and culture of America?

- How has America's economic system developed, changed, and responded to the needs of American citizens?

- How has geography affected the development of the United States and the lives of its people?

- How has the United States been shaped by the events, trends, conditions, issues, and decisions of the past?

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High School Social Studies
Model I: U.S. History (Reconstruction to Present)

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Government and Civics (2.14, 2.15)	How have American citizens exercised their rights and assumed their responsibilities as members of a democratic society? How has the American political system functioned and affected the course of American history?	**Students will** • trace the political development in the United States including the changing roles of stateand federal government and the relationships among the branches of government. • recognize how the U.S. Constitution, significant legislation, and landmark Supreme Count decisions have impacted American society. · analyze roles of political parties and citizen participation in a democratic society. • examine rights and responsibilities of individuals in American society and the development of democratic principles (e.g., liberty, justice, equality, individual human dignity, the rule of law).

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate the changing nature of state and federal governments. Compare the New Deal programs. Create report cards evaluating the effectiveness of these programs. ***Technology suggestions:*** *Use integrated software programs to organize information and desktop publishing software to create report cards.*	
• explore concept of "checks and balances" in historical settings. Investigate events surrounding the Watergate Scandal and use Venn diagrams to explain roles of executive, legislative, and judicial branches in response to those events. • analyze the influence of the Constitution, legislation, and court decisions on American society. Examine civil rights cases (e.g., Plessy v. Ferguson, Brown v. Board of Education). Create legal briefs that outline the case and summarize arguments. • evaluate the importance of being able to amend the Constitution. Examine voting amendments since Reconstruction to determine ways that the "blessings of liberty" have been expanded. Present findings in multimedia presentations. • role-play to examine the changing nature of political parties and their impact on American society. Compare Reconstruction Era party positions with party positions of today. Explain reasons for changes in party philosophies. Create campaign paraphernalia (e.g., buttons, posters, banners, pamphlets) that emphasize party positions. • discuss importance of citizen participation in a democratic society with community leaders. Conduct a "Meet the Press" forum on the importance of civic participation. Broadcast forums on local cable channels. ***Technology suggestions:*** *Conduct informal student polls via e-mail of students' understanding of citizen responsibilities. Display results in graphs produced by integrated software programs.* • examine the rights and responsibilities of individuals in American society and development of democratic principles. Present information on rights of the accused and discuss from various perspectives. Write editorials defending/not defending the position that the rights of the accused need to be preserved *(WP-Transactive).*	Robyn is a tactual learner who is unable to use printed materials to obtain information. She creates a Venn diagram using real objects. She also creates prose and poetry to explain the diagram. Since she is doing multiple activities, she is given more time to complete the assignment (*Types of extensions: complexity, magnitude, procedures and routines, resources and materials, time, participation*).

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High School Social Studies
Model I: U.S. History (Reconstruction to Present)

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Culture and Society (2.16, 2.17)	How have America's social systems developed, changed, and met the needs of American citizens? How have the people from many countries, races, ethnic groups, and religious traditions contributed to the growth, development, and culture of America?	**Students will** • explore how people and cultures of many countries, races, and religious traditions have contributed to the American experience. • examine ways in which cooperation, conflict, and competition occur as cultures emerge. • analyze origins and consequences of stereotyping, prejudice, and discrimination. • examine the social transformations reflected in the struggles for racial and gender equity and the extension of civil liberties. • recognize the roles social institutions (e.g., family, religion, education, government, economy) have played in American life. • analyze the origin and migration of cultures. • analyze the impact of movement on people and ideas. • analyze how regions and places can have distinct cultural characteristics.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate contributions of various groups to the American experience. Examine visual and written information (e.g., newspaper, magazine articles) concerning the contributions of various ethnic groups (e.g., Asian-Americans, Arab-Americans) on American society. Write articles documenting the contributions of different ethnic groups on their communities *(WP-Transactive).* ***Technology suggestion:*** *Use software to create time lines illustrating contributions of ethnic groups.* • participate in simulations that demonstrate ways events and experiences have been interpreted. Limit the ability of certain students to function within the room and make comparisons with the treatment of Japanese-Americans in World War II. Write personal essays expressing emotions as their freedoms were limited. • examine origins and consequences of stereotyping, prejudice, and discrimination. Study differing viewpoints of Booker T. Washington and W.E.B. DuBois to reflect differences of opinions about elements of American society. Investigate ways these differences lead to stereotyping, prejudice, and discrimination. Create written dialogues between Washington and DuBois. • investigate and discuss women's suffrage movement. Create mock radio broadcasts to examine social transformations reflected in group struggles in American society. • investigate roles social institutions have played in American life. Examine roles religion played in development of American society. Create historical road signs to indicate impact of religion and other social institutions on American society.	Sarah scored higher than the average college bound senior on the ACT social studies subtest. Her need to learn and apply advanced level research techniques will be addressed by providing her the opportunity to work with a college historian to design a study on a topic of her choice. Under the guidance eo her mentor, she will conduct the study and prepare a technology enhanced report of her findings to share with her class *(Types of extensions: purpose and appropriateness, level of support, time, procedures and routines, motivation, demonstration of knowledge*).

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Economics (2.18)	How has America's economic system developed, changed, and responded to the needs of American citizens?	**Students will** • examine the transformation of the United States from rural economy to an industrial economy to a leader in the global economy. • trace the economic development of the United States from laissez-faire economy to one with government intervention to a mixed economy. • analyze changing relationships among business, labor, and government. • illustrate how technology has changed and continues to change the United States economy. • recognize that all nations (specifically the United States) have to confront the problem of scarcity (imbalance between unlimited wants and limited resources). • understand how geography affects the way nations deal with issues of production, distribution, and consumption. • recognize that the location of activities (e.g., agriculture, production, distribution) impacts national and international relationships. • analyze how markets are affected by location and movement.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • evaluate transformation of United States from rural, agrarian nation to urban, industrialized nation. Select entrepreneurs from late 1800s. Create multimedia presentations about individuals highlighting their accomplishments and evaluating their impact on a changing America. • view visual images (e.g., slides, pictures, posters) of changing relationships between business, labor, and government. Study images and literature of labor unrest and response of business and government during the late 19th and early 20th centuries in the United States. Create reports to the president from labor-relations advisors concerning specific business, government, or labor events during this time period. • investigate major inventions during the 20th century. Create advertisements for products indicating ways technology has changed the United States economy. ***Technology suggestion:*** *Use multimedia software to create advertisements.*	Thurston and Alexis demonstrate the pronounced concern with ethics and tendency toward holding strong opinions typical of intellectually gifted students. These students will research the influence of lobby groups on the economy and culture on the U. S. and will participate in a formal debate on a resolution central to this issue. The teacher may wish to stipulate that the students will not be told until the day prior to the debate whether they will represent the negative or affirmative side (*Types of extensions: purpose and appropriateness, complexity, time, magnitude, level of support, demonstration of knowledge).*
• discuss roles of nations in deciding how to use their natural resources balancing unlimited wants with limited resources. Debate controversial nature of establishment and use of national parks from different perspectives (e.g., federal government, states, individuals). • investigate impact of geography on production, distribution, and consumption. Study production, distribution, and consumption of products. Create product-use labels and/or warning labels with information regarding natural resources used.	Gerhardt, a German student who has been in the country for two months, has high intermediate language skills but still needs assistance with academic vocabulary. Provided with a teacher-provided list of essential vocabulary, he will generate a bilingual list, using an English-German dictionary. He will use the list in Internet searches to research environmental issues. Working with an English-speaking partner, he will use images on a poster to role-play a television journalist and a newly-elected member of the government in an interview format to reflect on the United States political and economic position on environmental issues (*Types of extensions: complexity, procedures and routines, resources and materials, participation, demonstration of knowledge).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Geography (2.19)	How has geography affected the development of the world and the lives of its people?	**Students will** • understand that regions are areas on the surface of the Earth that are defined by certain unifying characteristics, both physical and human. • use geographic knowledge to analyze the location and distribution of human features in the United States. • understand how factors such as locations of resources and markets, transportation, and technology influence the placement, size, and function of human settlements and patterns of movement. • understand how changing resource needs and international trade relationships produce conflict and cooperation. • explore how modifications of the physical environment have impacted life in the United States. • examine how immigration and the movement of populations within the United States have impacted the culture of the United States. • understand historical changes in geographic patterns. • recognize how to locate and gather geographic information using primary and secondary sources. • analyze geographic information to evaluate past events and occurrences. • recognize how attempts to acquire territory and resources have resulted in national and international conflicts. • understand that human and physical features of the Earth's surface can be identified by absolute and relative location. • analyze the distribution of human and physical characteristics on Earth's surface. • understand how and why people interact with and change their environments. • analyze the origin and migration of cultures. • understand how the activities and beliefs of different cultural and social groups affect the use, form, and characteristics of landscapes. • analyze the impact of movement on people and ideas. • analyze how regions and places can have distinct cultural characteristics. • understand how technological advances have impacted cultural assimilation.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • create maps to show different regions of the U.S., both human and physical. Explore differences between human/cultural regions (e.g., the Bible Belt, the Wheat Belt, the "South") and physical regions (e.g., Northeastern seaboard). Create bulletin boards, collages, or multimedia presentations to demonstrate differences. • analyze location and distribution of human features in the United States. Examine industrial development of Northeastern United States and the influences of physical and human features. Create brochures for chambers of commerce describing reasons for development. • discuss why changing resource needs and availability have resulted in conflict and cooperation. Investigate the North American Free Trade Agreement (NAFTA). Write editorials from different perspectives (e.g., nations, management, labor, consumers) explaining its impact *(WP-Transactive).* • illustrate ways modifications of physical environments have impacted life in the United States. Use changing nature of buildings from one-story to skyscrapers to illustrate how American society has changed. Write stories from the perspective of the buildings indicating ways they have witnessed this change. • examine visual images (e.g., slides, pictures, posters) and literature that demonstrate movement of populations into the United States and the degree of assimilation. Examine movement of Hispanics into the American Southwest. Investigate their assimilation into American society and the impact of the move on their lives. E-mail students in other areas of the country (e.g., Miami, Houston). Survey them about their assimilation into American society and ask how their lives have been impacted. ***Technology suggestion:*** *Use software programs to create time lines depicting immigration shifts.* • participate in activities to reflect ways immigration and movement of populations in the United States have resulted in assimilation and diffusion of cultures. Create images (e.g., foods such as stews or salads) to illustrate different perspectives of American culture. • investigate the Westward Movement. Create maps noting areas of conflict between Native Americans and white settlers and instances of cooperation between the two parties. Write children's stories including elements of geography, conflict, and cooperation (*WP-Literary*).	A cluster of students with a store of knowledge and interest in geography and current events will partiicpate in the Global Challenge Competition sponsored by the National Mathematics League or another competition in the area of geography and economics (*Types of extensions: order of learning, participation, procedure and routines, time*). After researching locations of resources, the cluster group working with the gifted and talented consultant will forecast changes in the community, state, and country resulting from (NAFTA)(see future activities from *Enhancing Thinking and Creativity with Future Studies* by Charles Whaley) (*Types of extensions: complexity, magnitude, time, environment*). Corey needs enlarged materials to read and discriminate detail in pictures. He can access regular print through low vision devices such as hand-held magnifiers for short periods of time, The teacher uses highlighters to enhance visual images. Core uses a reading stand or lap desk to help reduce postural strain while doing close work. Corey needs additional time or receives a decreased number of visual images to which he must respond *(Types of extensions: resources and materials, time, routines and procedures, magnitude, level of support).*

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High School Social Studies
Model I: U.S. History (Reconstruction to Present)

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Historical Perspective (2.20)	How has the United States been shaped by the events, trends, conditions, issues, and decisions of the past?	**Students will** • use a variety of tools (e.g., primary and secondary sources, data, artifacts) to explore the interpretive nature of the history of the United States from Reconstruction to the present. • examine significant eras of United States history (Reconstruction, Industrialization, Progressive Movement, World War I, Great Depression, New Deal, World War II, Cold War, 20th Century) to develop chronological understanding and recognize cause-and-effect relationships and multiple causation. • examine the impact of significant individuals and groups. • analyze the social, political, and economic characteristics of various eras in the history of the United States. • recognize the significant impact of geography and natural resources on historical perspectives and events. • examine the impact of advances in research, science, and technology on historical events and American society. • trace the changing role of the United States in the global community from isolationism to a major world power.

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High School Social Studies
Model I: U.S. History (Reconstruction to Present)

Sample Activities	Sample Extensions for Diverse Learners
Students will • explore interpretive nature of the history of the United States. Use primary source documents to study Vietnam War and range of perspectives including those of "hawks and doves." Create patriotic and/or protest songs, poems, stories, and illustrations *(WP Literary).* ***Technology suggestion:*** *Create multimedia or presentations to share information.* • examine significant eras of United States history to develop chronological understanding and cause-and-effect relationships. Study the Great Depression and create museum displays that focus on different aspects of life during the Depression. Create Web pages about the Depression. • examine visual images (e.g., slide, pictures, posters) and literature to examine impact of significant individuals and groups on American history. Investigate third party candidates to determine degree of influence on the American scene. Create campaign paraphernalia (e.g., buttons, posters, banners) depicting their positions. • study reformers from different time periods, comparing their impact on this country. Role-play the impact of people from different eras on overall development of the United States. ***Technology suggestion:*** *Videotape scenes to share with other schools.* • conduct studies on impact of geography and availability of natural resources on historical perspectives and events. Use graphic organizers to compare influences geography and availability of natural resources have on communities and major developments in United States history. • analyze how advancements in science and technology have resulted in changes in American society. Create illustrated time lines of the development of Interstate Highway System of the United States. Show scientific and technological advancements resulting in increased and more efficient transportation. ***Technology suggestion:*** *Consult the American Memory Project on the Internet for primary source material. See <http://memory.loc.gov>* • examine visual images (e.g., slides, pictures, posters) and literature of events that reflect changing role of the United States in global affairs. Study images of American expansion during late 19th and early 20th centuries and create presentations reflecting development of the United States as a world power.	Clem and Brook often do not attempt new types of tasks for fear of failure. They would rather not get credit for an assignment than request assistance. The teacher meets with them and assists with development of a step by step task completion guide. Clem and Brook develop a goal for completing the task, They review the steps involved in completing the task and identify areas where they feel they need guidance. They schedule daily conferences to check progress and troubleshoot as they complete their assignment (*Types of extensions: level of support, procedures and routines*). A group of gifted and talented social studies will select reformers from the past that have successfully instituted reform efforts. The students will develop a list of attributes needed to be a successful agent of change and make a presentation to their school's site-based council (*Types of extensions; purpose and appropriateness, complexity, magnitude, order of learning, procedures and routines, demonstration of knowledge, participation, motivation).*

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High School Social Studies
Model I: World Civilization (1500 to Present)

Course Overview:
This one-credit world civilization course covers the time period from 1500 to the present. Students study the social studies areas of economics, government and civics, and culture and society within the context of world history. Students will also view history through a geographic perspective.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Pages of models are arranged in pairs. On the left-hand page of each pair are guiding questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:

- How have the democratic principles of justice, equality, equal opportunity, responsibility, and freedom impacted the development of the world and its people?

- How and why have governments occurred in different nations and parts of the world?

- How have social systems developed and changed, to meet the needs of people of the world?

- How have the people from many countries, races, ethnic groups, and religious traditions contributed to the growth, development, and culture of the world?

- How has economics impacted the development of different peoples, civilizations, and nations in different time periods?

- How has geography affected the development of the world and the lives of its people?

- How has the world been shaped by the events, trends, conditions, issues, and decisions of the past?

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High School Social Studies
Model I: World Civilization (1500 to Present)

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Government and Civics (2.14, 2.15)	How have the democratic principles of justice, equality, equal opportunity, responsibility, and freedom impacted the development of the world and its people? How and why have governments occurred in different nations and parts of the world?	**Students will:** • compare and contrast different political systems and recognize their sources of power. • analyze causes and consequences of various political revolutions and rebellions. • recognize the political causes and consequences of nationalism, militarism, and imperialism. • analyze conflicts between and among different forms of government and examine the impact of these conflicts on historical events and changes. · examine ways in which modern governments do or do not preserve and protect the rights and liberties of their constituents. • explore ways in which stability and peace are pursued in an interdependent world.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • develop matrices that compare different political systems. Include information concerning sources of power, organization and structure, decision-making responsibilities, and roles of the people. • analyze the causes and consequences of various political revolutions and rebellions. Examine the Russian Revolution from the perspective of the Czar and the ruling class, the Bolsheviks, the Mensheviks, and the workers. Role-play conflicts among these groups. • investigate causes and consequences of nationalism, militarism, and imperialism. Write letters or diary entries about the planned visit of Archduke Ferdinand to Sarajevo. ***Technology suggestion:*** *Use word processing programs to write letters or diary entries.* • discuss visual images (e.g., slides, pictures, posters) and literature of conflicts between different forms of government and the impact of these conflicts on historical events. Create images and write news articles about Adolph Hitler and the German government.	Several students in the class read and write slightly below their same-age peers. They also have difficulty completing multistep tasks and need specific organizational routines to complete assignments. The teacher provides them with mini-lessons on the use of concept comparison routines (e.g., University of Kansas Center for Research on Learning Concept Comparison Routine) that allows them to list characteristics of different political systems and to identify their sources of power (*Types of extensions: order of learning, procedures and routines, resources and materials, demonstration of knowledge, purpose and appropriateness).*
• investigate governments' responses toward the protection of rights and liberties. Create verbal or written responses of world leaders (e.g., President of the United States, Prime Minister of Great Britain, Premier of China, President of Iraq) to this issue. ***Technology Suggestion:*** *Videotape responses for other classes to view and discuss.* • investigate ways in which stability and peace are pursued in an interdependent world. Examine specific issues being presented to the Organization of American States (e.g., the status of Cuba). Create treaties that would resolve issues. Write editorials describing the U.S. stance on economic sanctions against Cuba. Explain why the U.S. needs to continue or change its policy *(WP-Transactive).*	Students who have participated in honors level social studies classes in middle school will read "On the Governance of Rulers," Chapter VI by St. Thomas Aquinas, They will examine the differences between ancient tyrannies and modern totalitarian governments and debate on of therse resolutions: (a) there are no longer and tyrannies, although there are some totalitarian governments (b) there are no longer and totalitarian governments, although there are still some tyrannies, (c) it is impossible for there to be andy tyrannies in today's world (Types of extensions: prupose and appropriateness, complexity, resoursces and materials, level of support, time, magnitude, routines and procedures).

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High School Social Studies
Model I: World Civilization (1500 to Present)

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Culture and Society (2.16, 2.17)	How have social systems developed and changed, to meet the needs of people of the world? How have the people from many countries, races, ethnic groups, and religious traditions contributed to the growth, development, and culture of the world?	**Students will** · explore ways in which belief systems, knowledge, technology, and behavioral patterns define cultures and help to explain historical perspectives and events. • recognize ways in which social institutions (e.g., family, religion, education, government, economy) influence and respond to human needs in various societies. · examine ways in which cooperation, conflict, and competition occur as cultures interact. • analyze problems of ethnocentrism, stereotyping, and cross-cultural misunderstandings and relate these to prejudice and extreme actions such as genocide. · recognize the role of cross-cultural understanding in working toward world stability and peace. • analyze the origin and migration of cultures. • understand how the activities and beliefs of different cultural and social groups affect the use, form, and characteristics of landscapes. • analyze the impact of movement on people and ideas. • understand how technological advances have impacted cultural assimilation.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine print and electronic primary source documents (e.g., writings, letters, visual images) of everyday life to explain historical perspectives and events. Study primary documents of the Protestant work ethic to determine the reaction toward the early stages of the Industrial Revolution. Write stories describing how life was changing during this period. • examine different interpretations of the same event based on cultural perspectives. Study the creation of Israel from the perspective of the Zionists, the Palestinians, and the British. Participate in mini-dramas that reflect different perspectives. ***Technology suggestion:*** *Consult the American Memory Project on the Internet. See <http://memory. loc.gov>* • analyze the extent to which social institutions meet individual needs and promote society. Assume specific roles so each student will have individual and collective responsibilities. Study the Caste System of India to determine how individual needs (e.g., food, clothing, shelter) are satisfied and how the social structure of India is maintained. Write and perform monologues and dialogues to share information. • examine how questions concerning cooperation, conflict, and competition can lead to ethnocentrism, stereotyping, and cross-cultural misunderstandings. Respond to issues surrounding European colonization of Africa in the late 1800s. Include different perspectives (e.g., native Africans, Europeans) with both sides reflecting positive and negative aspects of colonization. • examine visual images (e.g., slides, pictures, posters) and literature of events that attempt to work toward world stability and peace. Investigate the Middle Eastern conflict and the Camp David Accord. Write essays explaining the conflict and how the Camp David Accord attempt was an attempt to resolve the conflict.	Roberta is working on turning switches on and off to access her equipment needs. She uses communication boards to indicate yes and no responses to questions. She is able to reach and grasp the switch at her teacher's request. She is working on following directions and using the communication board with others besides her teacher and family. During production of the mini-drama, Roberta is responsible for the stage lights, using a switching device. (*Types of extensions: participation, environment, demonstration of knowledge, purpose and appropriateness).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Economics (2.18)	How has economics impacted the development of different peoples, civilizations, and nations in different time periods?	**Students will** • explore ways that different peoples, civilizations, and nations in different time periods dealt with scarcity (imbalance between unlimited wants and limited resources). · understand the forces that caused some economic systems to grow and prosper while others remained stagnant or declined. · examine how people and various civilizations made choices that helped or hindered their economic growth. · analyze how increased productivity resulted in the accumulation of material wealth and changed living standards for various peoples, civilizations, and nations. • understand how geography affects the way nations deal with issues of production, distribution, and consumption.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine how people dealt with scarcity at different times. Study Germany and its land shortage. Write news articles documenting how the German people deal with the issue of land shortage. ***Technology suggestion:*** *Create multimedia presentations to share information on Germany's land shortage.*	
• view visual images (e.g., slides, pictures, posters) that illustrate how economic events or conditions have impacted different economic systems. Create images of the arms race. Investigate the impact of this issue on economic systems. • examine how economic choices help or hinder growth. Develop budgets (e.g., personal, state government, federal government) designed to illustrate changes in economic patterns indicative of the rise of Pacific Rim nations. • examine impact of economic decisions on quality of life. Study impact of the Marshall Plan on Europe. Demonstrate how this plan changed the quality of life in Europe. Create posters, bulletin boards, or collages depicting quality of life in Europe.	Betty and Cheryl need to develop and apply advanced level research skills. They will use the Internet and specialized references to support or refute selected generalizations they have generated related to the impact of economics on peoples, civilizations, and nations. They will prepare a multimedia display of their findings (*Types of extensions: resources and materials, level of support, complexity, demonstration of knowledge, environment, participation, purpose and appropriateness*).

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Geography (2.19)	How has geography affected the development of the world and the lives of its people?	**Students will** • examine how natural resources, resource needs, different perspectives, and trade relationships produce conflict and/or cooperation. • explore how modifications of the physical environment impact human life. • describe the movement of world populations (resulting from "push and pull" factors) and its impact upon events and cultures. • understand that the location and distribution of human features on the Earth's surface change over time due to human needs and events. • understand how factors such as locations of resources and markets, transportation, and technology influence placement, size, and function of human settlements and patterns of movement. • recognize how to locate and gather geographic information using primary and secondary sources. • analyze geographic information to evaluate past events and occurrences. • recognize how attempts to acquire territory and resources have resulted in national and international conflicts. • understand that human and physical features of the Earth's surface can be identified by absolute and relative location. • analyze the distribution of human and physical characteristics on Earth's surface. • understand how political decisions affect political boundaries at local, state, and national levels. • recognize how natural environments and resources are used and controlled by governments. • analyze how governments impact their human and physical geography. • analyze how regions and places can have distinct cultural characteristics.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine ways geographical consequences produce conflict or cooperation among nations. Assume role of British Parliament and discuss major issues concerning development of the empire. Consider issues dealing with geographical consequences that dictate actions taken to preserve the empire. Debate consequences of those actions. • examine different perspectives concerning the use of resources. Study the idea of "white man's burden" and its impact on different groups of people. Write essays explaining this idea and comparing it to other historical philosophies. • investigate how changes in the physical environment can affect life. Create before and after charts of the Berlin Wall to show how it influenced actions between nations. ***Technology suggestion:*** *Research information from the American Memory Project's Web Site. See <http://memory.loc.gov>* • investigate movement of world populations and impact of that movement. Study images and literature concerning the Irish Potato Famine and create poems that reflect the plight of the Irish. ***Technology suggestion:*** *Use word processing programs to write poems.* • investigate the connections between geographical and human locations. Examine period of European exploration of the "New World." Create maps and charts indicating important locations and patterns of settlement.	Samir has fairly good command of oral language and needs only minor assistance in writing. After studying the maps and charts, Samir works with peers to review his conclusions. He visits the writing tutor for reviews of the final draft of his essay *(Types of extensions: purpose and appropriateness, resources and materials, level of support, demonstration of knowledge)*.

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High School Social Studies
Model I: World Civilization (1500 to Present)

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Historical Perspective (2.20)	How has the world been shaped by the events, trends, conditions, issues, and decisions of the past?	**Students will** • understand the interpretive nature of world history. • use a variety of tools (e.g., primary and secondary sources, data, artifacts) to explore world civilizations. • examine significant eras (Renaissance, Reformation, Age of Exploration, Age of Revolution, Nationalism and Imperialism, Technological Age of world civilization) to develop chronological understanding and recognize cause-and-effect relationshipsand multiple causation. • examine the impact of significant individuals and groups. • analyze the social, political, and economic characteristics of various eras and civilizations in world civilization. • recognize the significant impact of geography and natural resources on historical perspectives and events. · trace the impact of advances in research, science, and technology on historical events and human societies. · analyze the challenges and opportunities provided by an increasingly interdependent world. • analyze how regions and places can have distinct cultural characteristics. • understand how technological advances have impacted cultural assimilation.

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High School Social Studies
Model I: World Civilization (1500 to Present)

Sample Activities	Sample Extensions for Diverse Learners
Students will • examine accounts of human events to understand ways history is interpreted. Use primary and secondary source documents concerning the Enlightenment. Create newspaper or magazine articles to illustrate changes in the quality of life during that period. ***Technology suggestion:*** *Use integrated software package to create articles.* • examine visual images and literature about significant eras to understand cause-and-effect relationships. Study the Renaissance and the Reformation. Create a spectrum of events ranging from those that showed major relationships to those that showed minor relationships. ***Technology suggestion:*** *Use software to produce cause-and-effect time lines.* • evaluate historical impact of individuals and groups. Investigate the circumstances leading to the rise of Adolph Hitler in Germany. Create political cartoons to illustrate events. • examine ways people lived during different time periods. Study the Aztec civilization and role-play different groups (e.g., ruling class, religious leaders, warriors, artisans, and farmers). Videotape scenes to share with other schools. • examine ways geographical features have influenced peoples' lifestyles. Create visual images that indicate ways people use the land. • examine ways advancements have resulted in changes in quality of life. Study changing nature of 20th century governments of developing nations in Asia, Africa, and the Middle East. Create articles depicting quality of life in developing nations *(WP-Transactive).* • analyze challenges and opportunities provided in an interdependent world. Review treaties and alliances that have led to greater interdependence. Conduct panel discussions presenting different perspectives of the treaties and alliances.	Loretta, Tina, Leora, and Marlene are gifted students who have a need to develop leadership skills. They will read a detailed, well-documented biography of an individual and analyze their traits and styles . They will examine how and why this person had an impact on history. They will meet with the gifted and talented specialist to assess their own styles and compare them to that of their research subject and discuss ethical issues, They will write self-analysis to submit with research notes (*Types of extensions: purpose and appropriateness, complexity, time, environment, demonstration of knowledge).*

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High School Social Studies
Model I: Government

Course Overview:
This 1/2-credit government course is a comprehensive study of government and provides connections to other areas of the social studies, including history, economics, geography, and culture and society.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Pages of models are arranged in pairs. On the left-hand page of each pair are guiding questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How does government serve its citizens?
- How does government reflect the beliefs, culture, and needs of its citizens?
- How does government affect me and other consumers?
- How does where I live affect local, state, and national government?
- Why have there been different forms of government over time?

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High School Social Studies
Model I: Government

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Government and Civics (2.14, 2.15)	How does government serve its citizens?	**Students will** • understand the purposes of various forms of governments. • recognize that the U.S. Constitution established a government of limited powers that are shared among different levels and branches. • analyze the importance of rights and responsibilities of citizens in a democratic society. • analyze various events to determine how the U.S. Constitution has allowed our government to change over time to meet the changing needs of our society. • understand the democratic principles of liberty, justice, individual human dignity, the rule of law, and how they relate to our society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine the purposes of a democratic government as indicated by American documents. Survey peers, teachers, parents, and community members about the purposes of the Declaration of Independence, the Constitution, and other American documents. Analyze survey data and create multimedia presentations to share findings. Emphasize the importance of citizen knowledge in a democratic government. ***Technology suggestion:*** *E-mail surveys to students throughout Kentucky. Analyze responses and create graphs with integrated software packages.*	Toneka's vocabulary, reading, writing, and math abilities are significantly below her peers. She learns concepts taught in small increments. In the survey assignment, Toneka will work with peers. She will practice reading survey questions prior to interviews. Toneka will ask questions and her peers will write responses (*Types of extensions: order of learning, level of support).*
• examine different levels and branches of government and describe their roles. Create Venn diagrams to explain concepts of federalism and the division of the government into different levels. • recognize role of different branches of government. Study role of different branches and relate to lawmaking. Create murals that depict the lawmaking process. Reflect either effectiveness or ineffectiveness of this process. • investigate the importance of citizen participation in a democratic government. Examine the failure of Americans to vote and consequences of low voter turnout. Write editorials for school newspapers explaining the importance of voting *(WP-Transactive).* • examine visual images (e.g., slides, pictures, posters) and journal articles of changes in power of government as influenced by the "Elastic Clause," amendment process, and constitutional interpretation. Show images of court decisions indicating how power of government has changed. • investigate ways the United States government has attempted to assure liberty, justice, individual human dignity, and the rule of law. Role-play different perspectives (e.g., prosecuting attorneys) and videotape scenes to share with other groups.	Mai is a Vietnamese student who has been in the country for six months and has beginning language skills. She is extremely limited in all types of vocabulary. The teacher will provide her with a list of necessary vocabulary well in advance, giving her enough time to look up the terms in a bilingual dictionary. Working with a group of English-speaking peers, she will be the group secretary, recording what the other group members dictate. Mai's final activity will be to go home and interview family members about Vietnamese government and, on the group's Venn diagram, highlight the similarities in one color and the nonexistent features in another color *(Types of extensions: motivation, participation, procedures and routines, pace, order of learning, level of support).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Culture and Society (2.16, 2.17)	How does government reflect the beliefs, culture, and needs of its citizens?	**Students will** • understand how forms of government view and interact with various cultures. • examine how governments and their societies work together to establish social institutions to address the needs of people. • analyze how cultures and belief systems are reflected in different forms of governments.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine ways government interacts with various cultures. Examine treatment of Native Americans by the federal government in the 19th century. Present findings through storytelling to be videotaped or put on cassette tapes. • examine ways governments and societies have worked together to address the needs of the people. Review ways people have been assisted (e.g., charitable organizations, state government programs, federal government programs). Create illustrated outlines, including important dates of program implementation. • compare world governments and identify ways their cultural perspectives and belief systems are reflected. Write feature articles for current events magazines describing how governments reflect the culture and belief systems of their people *(WP-Transactive).* ***Technology suggestion:*** *Survey government officials via Internet.*	Jean is able to learn at the same pace as her same-age peers. He continues to work on social skills, following rules and cooperating with peers and adults. Provide Jean with a list of behaviors needed for her cooperative learning group. Review her point sheet prior to the assignment (*Types of extensions: resources and materials, procedures and routines, order of learning, motivation).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Economics (2.18)	How does government affect me and other consumers?	**Students will** • understand ways in which the government of the United States is involved in its economy. • recognize various economic systems and institutions in the United States. • understand how the role of the United States government in its economic system has changed over time to meet the needs of the society. • analyze how the United States government deals with questions of production, distribution, and consumption of goods and services. • understand how geography affects the way nations deal with issues of production, distribution, and consumption. • recognize that all nations have to confront the problem of scarcity (imbalance between unlimited wants and limited resources).

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Sample Activities	Sample Extensions for Diverse Learners
Students will • write position papers on the ideal role of a democratic government. Address issues of taxation, government-provided goods and services, education, and welfare. Create multimedia presentations for city councils or county judge executives. • simulate ways services are provided. Create illustrated time lines to show how the role of government in our economy has changed over time. Include important economic laws, treaties, and agreements. • analyze ways changing conditions and needs of society lead to more governmental involvement. Examine local communities and make lists of environmental concerns. Create prioritized action plans for governments to implement, including items for citizens to address. • compare in graphic organizers market economies (e.g., United States) with command economies (e.g., Cuba). Include differences in how each economy deals with issues of production, distribution, and consumption.	Vinh is a Vietnamese student who has been in the country for two months and has rudimentary language with extremely limited vocabulary. The teacher will need to prepare a list of vocabulary terms that he will look for in browsing the newspapers and magazines, also provided by the teacher. After clipping the items that contain terms from his list, he will use a bilingual dictionary to look up the terms and write a brief journal entry about a government agency he has had experience with (e.g., Immigration and Naturalization Service (INS), welfare, unemployment, social security). He will need the assistance of the English as a Second Language (ESL) support staff in writing his entry *(Types of extensions: motivation, participation, level of support, resources and materials).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Geography (2.19)	How does where I live affect local, state, and national government?	**Students will** • understand how the United States government regulates natural and human resources. • recognize various regions in the United States and understand how their local and state governments may operate differently because of regional needs and differences. • analyze how technology has helped or hindered the operation of government.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine effectiveness of government in its ability to regulate different resources. Write essays to "What if?" statements to examine laws and regulations relating to natural and human resources (e.g., What if the United States did not regulate certain activities such as oil production and coal mining?). • write letters to community members asking how their local and state governments operate. Send letters to governmental officials asking them to respond to questions that deal with regional differences. Create multimedia presentations for local civic organizations. ***Technology suggestion:*** *E-mail local and state officials to gather information.* • investigate impact of computers on the dissemination of ideas, information, and services necessary for the smooth functioning of the government. In articles, discuss the negative/positive impact of computers on American society (*WP-Transactive*).	Lan Hsin is a Taiwanese student who has been in this country for nine months, has beginning language abilities with very limited academic vocabulary. She will need a teacher-provided list of essential vocabulary required to perform the task. Using a bilingual dictionary, she will look up the terms, as well as any ideas that occur to her regarding the cause-and-effect situation. She will use the terms generating a simplistic poster showing the cause-and-effects listed in two separate columns, using only key words and sentence fragments *(Types of extensions: resources and materials, order of learning, level of support, procedures and routines)*.

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Historical Perspective (2.20)	Why have there been different forms of government over time?	**Students will** • recognize that different forms of governments have developed over time. • analyze different forms of government to determine their effectiveness. • understand the foundations of the United States democratic form of government • recognize how the United States government has changed over time to meet the needs of the society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate changes in society that necessitate different forms of government. Create illustrated flow charts documenting ways different forms of government have developed over time. • compare in graphic organizers advantages and disadvantages of limited government with advantages and disadvantages of unlimited government. Construct t-charts to analyze effectiveness of different forms of government. • trace development of the United States government into a democratic system. Create presentations to demonstrate different ways philosophies and ideals became incorporated into the government. • create visual images of changing nature of government in response to meeting needs of people. Include images of changing role and growth of government.	Susan was in all general education classes prior to sustaining a traumatic head injury. She now needs multiple exposures to concepts. To recognize change over time, Susan uses cumulative time lines documenting changes in American government and societal needs that caused changes. The teacher uses master time lines, updating them each time there are changes in government. Susan records each change and reason for the change, using her personal time lines (*Type of extension: procedures and routines).*

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High School Social Studies
Model I: Economics

Course Overview:
This 1/2-credit economics course is a comprehensive study of economics with connections to the other areas of social studies, including history, geography, government, civics, culture and society.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Pages of models are arranged in pairs. On the left-hand page of each pair are guiding questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- What role does the government play in a nation's economy?
- As a United States citizen, what role do I play in the economy?
- As a social institution, how does the economy meet the needs of its citizens?
- How do culture and belief systems affect consumers' decisions?
- Why is it important for me to study and understand economics?
- How does geography affect or impact a national and/or global economy?
- How and why has the economy of the United States changed?

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High School Social Studies
Model I: Economics

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Government and Civics (2.14, 2.15)	What role does the government play in a nation's economy? As a United States citizen, what role do I play in the economy?	**Students will** • understand that voters influence economic policy and decision making through representatives they elect. • recognize that the United States has a market economy which is determined by the forces of supply and demand. • explore others economic systems (e.g., command, traditional) to determine the economic forces that control them. • analyze how decisions on the distribution of resources can be made by local, state, and/or federal levels of government.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • review information and events that contribute to election issues and results to determine if there is a correlation. Create illustrated time lines that analyze the influence of economics on elections in the United States. ***Technology suggestion:*** *Use software to create time lines.*	
• select products at grocery stores, preferably perishable items, and chart changing prices throughout the year. Relate changes to concept of supply and demand. Create grocery ads for newspapers demonstrating changing prices over time. • investigate factors that influence consumer decisions. Create diagrams that resemble the spokes of a wheel, with consumers in the middle. Indicate factors (e.g., opportunity costs, prices, incentives) consumers consider when making choices on each spoke. • examine visual images (e.g., slides, pictures, posters) and news articles that reflect different economic systems. Compare command economies (e.g., Cuba) with market economies (e.g., U.S.). Chart differences and discuss findings. Write stories describing life in both systems. • analyze ways decisions on distribution of resources are made by different levels of government. Decide the level of government most effective in dealing with distribution of resources and debate findings. Create multimedia presentations to share information.	Freda works in a grocery story with a job coach. She reads prices and matches pictures to food items. She selects five perishable items and checks the prices daily for two weeks. She uses charts to collect data. The charts are developed for her with pictures of the five items dates for ten days, and boxes large enough for her to record prices. Freda presents information to small groups, who incorporate the information in discussions of supply and demand (*Types of extensions: complexity, environment, purpose and appropriateness, motivation, demonstration of knowledge, resources and materials, participation, procedures and routines).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Culture and Society (2.16, 2.17)	As a social institution, how does the economy meet the needs of its citizens? How do culture and belief systems affect consumers' decisions?	**Students will** • understand how the economic incentives of private ownership of property, business opportunities, and profit motives have attracted people from many nations to the United States. • recognize that the economy of the United States is a social institution that attempts to meet the needs of the citizenry. • analyze the role culture plays in economic issues of production, distribution, and consumption.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate how economic incentives have attracted people from many nations to the United States. Interview business proprietors representing various cultures to ascertain reasons for moving to the United States. Write feature articles on these people that illustrate the incentives people had to come to America (*WP-Transactive).* • investigate impact of Sixteenth Amendment. Create charts showing goods and services provided by the U.S. government to its citizens before and after the Sixteenth Amendment (income tax) was ratified. Debate whether income taxes have been positive or negative. • investigate how culture affects consumer choices and decisions. Create advertisements directed toward certain cultures. • create cartoons reflecting ways different cultures respond to economic issues of production, distribution, and consumption. ***Technology suggestion:*** *Use integrated software packages to create cartoons.*	Fernanda, Anel, Hank, and Fatina are highly creative students with limited English proficiency. Using their first language, they interview their parents, family friends, or others in their ethnic communities on reasons for coming to the U.S. They present their findings to the class in English (*Types of extensions: motivation, purpose and appropriateness).* Charlie learns at the same rate as his same-age peers accept in the area of language. The teacher gives multiple models of choices, prices, and needs connected to the language prior to the assignment (*Types of extensions: order of learning, procedures and routines).*

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High School Social Studies
Model I: Economics

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Economics (2.18)	Why is it important for me to study and understand economics?	**Students will** • understand that the basic economic problem confronting individuals, societies, and nations is scarcity or the imbalance between unlimited wants and limited resources available to satisfy those wants. • recognize that, as a result of scarcity, individuals, societies, and nations must make choices/decisions which result in consequences. • analyze economic concepts and understand their nature and relevance to different economic situations. • analyze how individuals and nations deal with the issues of production, distribution, and consumption. • recognize that markets (e.g., national, international, global) and economic institutions exist to enable buyers and sellers to exchange goods and services. • recognize that economic systems are created by individuals and societies to achieve broad goals (e.g., security, growth, freedom, efficiency, equity).

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Sample Activities	Sample Extensions for Diverse Learners
Students will • explain why scarcity is the basic economic problem. Study problems created when resources (e.g., oil, timber, water) are not available and responses of nations. In feature articles, discuss the impact that the lack of resources has had on communities in Kentucky *(WP-Transactive).* • identify opportunity costs when decisions on major purchases are made. Create contracts for major purchases including information on opportunity costs. • investigate basic economic concepts. Illustrate economic concepts through fables (*WP-Literary).* • examine the human and natural resources of developing countries. Create economic plans that address issues of production, distribution, and consumption. • examine different institutions in competition for services. Compare car loan rates at different banks and credit unions. Write news articles to help others make decisions about the best bank to use for their next car purchase (*WP-Transactive).* ***Technology suggestion:*** *Use desktop publishing software to create bank service brochures.* • investigate individual needs (e.g., housing) and societal goals (e.g., housing for all members). Construct flow charts that demonstrate ways economic systems are created by individuals and societies to achieve broad goals. ***Technology suggestion:*** *Use integrated software to create flow charts.*	Tim and Jesse, both highly creative students, need opportunities to develop entrepreneurial skills. They will research the status of aquaculture experiments in Kenton County as an alternative to raising tobacco. They will consult with the state aquacultural researchers as well as local business persons who can provide guidance in setting up business and marketing plans (*Types of extensions: purpose and appropriateness, complexity, level of support, demonstration of knowledge, participation, resources and materials, motivation, environment).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Geography (2.19)	How does geography affect or impact a national and/or global economy?	**Students will** • understand that the problem of scarcity (unlimited wants and limited resources) must be addressed by all nations. • recognize that nations deal with scarcity by making choices that have consequences. • analyze how nations' wealth and consequent trade potential are tied to their resources. • explore how international trade and multinational corporations have led to the emergence of a global economy. • understand how geography affects the way nations deal with issues of production, distribution, and consumption. • recognize that the location of activities (e.g., agriculture, production, distribution) impact national and international relationships. • recognize that all nations have to confront the problem of scarcity (imbalance between unlimited wants and limited resources).

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine problems of scarcity and responses by different nations. Select a highly industrialized country, a moderately industrialized country, and a third-world country. Compare how the different countries have dealt with scarcity. Evaluate the choices each country has made relative to the issue of scarcity and debate their success. Present findings in oral presentations. • evaluate economic advantages of nations. Simulate nations' wealth by using tokens or money to make purchases, demonstrating differences in economic power. Develop ways to equalize purchasing positions. • explore international trade to examine the creation of a global economy. Hold mock international conferences, role-playing different nations' positions on whether international trade has been good or bad.	Rick acquires information best when provided with memory and organizational devices to support his learning, especially when the tasks require integrating information. To help him organize information for his oral presentation, his teacher provides Rick with a pre-developed matrix that outlines issues and countries to research (*Types of extensions: complexity, magnitude, procedures and routines, level of support, resources and materials).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Historical Perspective (2.20)	How and why has the economy of the United States changed?	**Students will** • understand how the United States economy has changed from a rural economy to an industrial economy to a leader in the global economy. • recognize that the U.S. Constitution contains few economic guidelines; therefore, economic policies are determined by elected officials. • analyze how the number and complexity of economic issues have increased as the United States has entered the global economy.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine ways the U.S. economy has changed over time. Select economic issues from different time periods and assume roles of government officials and consumers. Role-play how different people were affected. • engage in academic scavenger hunts that uncover economic issues discussed in documents of United States history (e.g., governmental response to taxation will be analyzed through existing documents–the Constitution, federal statutes, Supreme Court cases). Create collages with news headlines indicating major economic developments. • identify important economic issues and events in U.S. history. Create multimedia presentations showing how economic issues have changed from internal issues (U.S. only) to those of a global nature.	Charlie learns at the same rate as his same-age peers except in the area of language. The teacher gives multiple examples of economic issues such as choices, prices, and needs prior to the assignment (*Types of extensions: order of learning, procedures and routines).* Luke, Sarah, Tillie, Rina, and Agnes grasp concepts quickly and need opportunities to practice exerting effort in learning. They will research the impact of deregulation on the U.S. and world economy, present their findings, and predict possible effects of further deregulation (*Types of extensions: purpose and appropriateness, complexity, participation, motivation, resources and materials, demonstration of knowledge, level of support).*

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High School Social Studies
Model II: U. S. History (Reconstruction to 1945)

Course Overview:
In this 1/2-credit U.S. history course, students examine the time period from 1865 to 1945. They study the social studies areas of geography, economics, government and civics, and culture and society within the context of U.S. history.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Pages of models are arranged in pairs. On the left-hand page of each pair are guiding and essential questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How have American citizens exercised their rights and assumed their responsibilities as members of a democratic society?

- How has the American political system functioned and affected the course of American history?

- How have America's social systems developed, changed, and met the needs of American citizens?

- How have the people from many countries, races, ethnic groups, and religious traditions contributed to the growth, development, and culture of America?

- How has America's economic system developed, changed, and responded to the needs of American citizens?

- How has geography affected the development of the United States and the lives of its people?

- How has the United States been shaped by the events, trends, conditions, issues, and decisions of the past?

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Government and Civics (2.14, 2.15)	How have American citizens exercised their rights and assumed their responsibilities as members of a democratic society? How has the American political system functioned and affected the course of American history?	**Students will** • trace the political development in the United States including the changing roles of state and federal government and the relationships among the branches of government. • recognize how the U.S. Constitution, significant legislation, and landmark Supreme Count decisions have impacted American society. · analyze roles of political parties and citizen participation in a democratic society. • examine rights and responsibilities of individuals in American society and the development of democratic principles (e.g., liberty, justice, equality, individual human dignity, the rule of law).

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Sample Activities	Sample Extensions for Diverse Learners
Students will • create electronic report cards that pertain to the changing nature of state and federal governments. Present information on the New Deal programs. Complete report cards dealing with effectiveness of programs. ***Technology suggestions:*** *Use integrated software programs to organize information and desktop publishing software to create report cards.* • create Venn diagrams that explain the concept of "checks and balances" in historical settings. Study events surrounding impeachment of President Andrew Johnson and use Venn diagrams to explain role of executive, legislative, and judicial branches in response to events. • analyze the influence of the Constitution, legislation, and court decisions on American society. Review civil rights cases (e.g., Plessy v. Ferguson). Develop legal briefs that outline the case and present arguments. • recognize importance of being able to amend the Constitution. Investigate voting amendments from Reconstruction to 1945 to determine ways "blessings of liberty" have been expanded. Present findings in a multimedia presentation. • role-play to examine changing nature of political parties and impact on American society. Compare party positions of the Reconstruction era compared with party positions of the mid-20th century. Explain reasons for changes in party philosophies.	Parisa is an Iranian student who has been here for a year and has low intermediate language skills. She will use a bilingual dictionary to research the technical government vocabulary from a teacher-provided list. Once she has her bilingual list generated, she will research the current political situation in Iran and computer-generate the components of the structure of government, using them to create a report card that will contrast with one created by an English-speaking student for the U.S. She will then work with this student and they will orally present their facts to the class (*Types of extensions: purpose and appropriateness, demonstration of knowledge, level of support, participation, motivation).*
• discuss the importance of citizen participation in democratic societies with chairpersons of local Democratic and Republican Parties. Conduct "Meet the Press" forum on the importance of civic participation. ***Technology suggestion:*** *Conduct informal student polls via e-mail of students' understanding of citizen responsibilities. Display results in graphs produced by spreadsheet software.* • examine rights and responsibilities of individuals in American society and development of democratic principles. Present information on the rights of the accused and debate from different perspectives. Write editorials defending/not defending the position that the rights of the accused need to be preserved *(WP-Transactive).*	Antonio and Marcella have worked as volunteers in local elections and have a high interest in politics. They will work with the gifted and talented consultant and research federal and state elections which have had high voter turn out and others that have officials elected by only a few votes. They will then compare the attributes of both and write a newspaper article that will encourage citizens to vote *(Types of extensions: purpose and appropriateness of task, complexity of task, size of task, pace, procedures and routines, resources and materials, participation, motivation).*

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High School Social Studies
Model II: U. S. History (Reconstruction to 1945)

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Culture and Society (2.16, 2.17)	How have America's social systems developed, changed, and met the needs of American citizens? How have the people from many countries, races, ethnic groups, and religious traditions contributed to the growth, development, and culture of America?	**Students will** • explore how people and cultures of many countries, races, and religious traditions have contributed to the American experience. • examine ways in which cooperation, conflict, and competition occur as cultures emerge. • analyze origins and consequences of stereotyping, prejudice, and discrimination. • examine the social transformations reflected in the struggles for racial and gender equity and the extension of civil liberties. • recognize the roles social institutions (e.g., family, religion, education, government, economy) have played in American life.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • develop visual illustrations (computer-generated or handmade) that recognize contributions of various groups to the American experience. Examine visual and written information concerning the impact of early immigrants (pre-1945) on society. Write articles indicating degree of impact from "Very Influential" to "Somewhat Influential" *(WP-Transactive).* ***Technology suggestion:*** *Use software to create degree of impact time lines.* • participate in simulations that indicate ways different events and experiences may be interpreted differently. Limit ability of certain people to 'function' within the room and compare to the treatment of Japanese-Americans in World War II. • examine origins and consequences of stereotyping, prejudice, and discrimination (e.g., differing viewpoints of Booker T. Washington and W.E.B. DuBois). Reflect differences of opinions between many different elements of American society. Study ways these differences lead to stereotyping, prejudice, and discrimination. Create written dialogues between Washington and DuBois. • create "mock" radio broadcasts to examine social transformations (pre-1945) reflective in struggles of certain groups in American society. Study the struggle of women to obtain the right to vote. Write personal reflective pieces on how women's right to vote has changed their lives *(WP-Personal).*	Ali is a Saudi Arabian student who has been in the country for two years with high intermediate language skills. Because he needs help with academic language and vocabulary, the teacher will provide a list of essential vocabulary for whatever type of activity she wants Ali to do. He could read documents in his native language in order to be the "resident expert" on the culture and answer any questions his English-speaking counterparts might pose regarding the articles (*Types of extensions: purpose and appropriaten ess, complexity, procedures and routines, resources and materials, level of support).*
• recognize role that social institutions have played in American life. Examine role religion has played in development of American society. Create historical road signs to indicate the impact of religion and other social institutions on American society.	Amanda, Jennifer, and Tyrone have been recognized for their leadership abilities. Justin and Phillip have a high interest in historical events and process information quickly. They have been placed in a cluster group to work with the gifted and talented consultant in future studies. After studying social institutions in the past, they will extend this activity to recognize the role these social institutions will play in the future of American life *(Types of extensions: purpose and appropriateness, complexity, magnitude, time, pace, environment, procedures and routines, resources and materials, demonstration of knowledge, participation, motivation).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Economics (2.18)	How has America's economic system developed, changed, and responded to the needs of American citizens?	**Students will** • examine the transformation of the United States from rural economy to an industrial economy to a leader in the global economy. • trace the economic development of the United States from laissez-faire economy to one with government intervention to a mixed economy. • analyze changing relationships among business, labor, and government. • illustrate how technology has changed and continues to change the United States economy.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • evaluate transformation of the United States from rural, agrarian nation to urban, industrialized nation. Select an entrepreneur from the late 1800s. Create posters highlighting his/her accomplishments. Evaluate this person's impact on a changing America.	
• view visual images (e.g., slides, pictures, posters) and written material of the changing relationship between business, labor, and government. Study labor unrest and the response of business and government during the late 19th and early 20th centuries in the United States. Create reports to the President from labor-relations advisor concerning a specific business, government, or labor event during this time period.	Four students in the class, with high leadership ability, have indicated that they are interested in researching the economic impact of strikes on their community. They will work with the gifted and talented consultant and the classroom teacher to design activities such as interviews with various community members. They will create a visual presentation to be made to local government officials *(Types of extensions: purpose and appropriateness, complexity, magnitude, environment, resources and materials, demonstration of knowledge, participation, motivation).*
• create advertisements for products indicating ways technology changed the United States economy (pre-1945). Research major inventions during the 19th century. Prepare info-commercials to promote and sell the inventions. ***Technology suggestion:*** *Use multimedia software to create advertisements.*	

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Geography (2.19)	How has geography affected the development of the United States and the lives of its people?	**Students will** · understand that regions are areas on the surface of the Earth that are defined by certain unifying characteristics, both physical and human. · use geographic knowledge to analyze the location and distribution of human features in the United States. · understand how factors such as locations of resources and markets, transportation, and technology influence the placement, size, and function of human settlements and patterns of movement. • understand how changing resource needs and international trade relationships produce conflict and cooperation. • explore how modifications of the physical environment have impacted life in the United States. • examine how immigration and the movement of populations within the United States have impacted the culture of the United States.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • create maps to show different regions of the U.S., both human and physical. Explore differences between human/cultural regions (e.g., the Bible Belt, the Wheat Belt, the "South") and physical regions (e.g., Northeastern seaboard). Create bulletin boards, collages, or multimedia presentations to demonstrate differences. • analyze location and distribution of human features in the United States. Study the industrial development of the Northeastern United States and connect physical and human features. Present findings in form of computer analysis of the area indicating reasons for the development. • discuss location of resources and markets, transportation, and technology resulting in human settlement and patterns of movement. Determine how human settlements and movement of people and ideas were affected by the transcontinental railroad. Create multimedia presentations including maps. • create graphs showing impact of the Embargo of 1807 in regard to U.S. trade with European countries. Explain reasons for the Embargo, tensions it created, and resulting trade relationships. • examine modifications of the physical environment that impacted life in the United States (e.g., the changing nature of buildings from one-story to skyscrapers). Illustrate ways American society changed. Create writings from the perspective of the buildings explaining this change. • review visual images (e.g., slides, pictures, posters) and written material that demonstrate movement of certain populations into the United States and degree of assimilation. Research the beginnings of the Hispanic movement into the American Southwest (pre-1945). Create presentations on the contributions and degree of assimilation into American society at that time. • participate in activities to reflect ways immigration and movement of populations in the United States have resulted in assimilation and diffusion over time. Create charts to show the "Melting Pot" concept of American society (pre-1945). ***Technology suggestion:*** *Use software to create time lines that depict immigration shifts over time.*	After researching location of resources, the cluster group working with the gifted and talented consultant will switch their perspective to the future and forecast changes in the community, state, and country (future activities from *Enhancing Thinking and Creativity with Future Studies* by Charles Whaley). The students will create a video newscast to share with the class *(Types of extensions: purpose and appropriateness, complexity, magnitude, time, environment, resources and materials, demonstration of knowledge, participation, motivation).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Historical Perspective (2.20)	How has the United States been shaped by the events, trends, conditions, issues, and decisions of the past?	**Students will** • use a variety of tools (e.g., primary and secondary sources, data, artifacts) to explore the interpretive nature of the history of the United States from Reconstruction to the present. (Note: In this particular model, the time period addressed is Reconstruction to 1945). • examine significant eras of United States history (Reconstruction, Industrialization, Progressive Movement, World War I, Great Depression, New Deal, World War II) to develop chronological understanding and recognize cause-and-effect relationships and multiple causation. · examine the impact of significant individuals and groups. Analyze the social, political, and economic characteristics of various eras in the history of the United States. · recognize the significance of geography and natural resources in historical perspectives and events. · examine the impact of advances in research, science, and technology on historical events and American society. • trace the changing role of the United States in the global community from isolationism to a major world power. *(Continued on page 66)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • explore the interpretive nature of the history of the United States. Use primary and secondary source documents to study Westward Expansion. Investigate wide range of perspectives including the settlers, Native Americans, and Asians. Produce poems, stories, and/or songs that reflect the different perspectives of Westward Expansion *(WP Transactive).* ***Technology suggestion:*** *Create multimedia presentations to share information.*	
• review visual images (e.g., slide, pictures, posters) and written information to examine the impact of significant individuals and groups on American history. Investigate U.S. Presidents and determine their degree of influence on American society. Create top-ten lists of presidents. • role-play significant individuals or groups from various eras of U.S. history to determine social, political, and economic events. Create top ten lists of important people and events that significantly changed America. • role-play situations that deal with impact of people from different eras on overall development of the United States. Study reformers from different time periods comparing their impact on this country. • conduct local studies concerning the impact of geography and natural resources on historical perspectives and events. Investigate how geography and natural resources have impacted their community. ***Technology suggestion:*** *Consult the American Memory project on the Internet for primary source material. See <http://memory.loc.gov>* • analyze how scientific and technological advancements have changed American society. Create illustrated time lines (pre-1945) of advancements in medicine, transportation, and living conditions.	The cluster group will select 10 leaders from the past that have been very successful and examine their leadership styles. Students will then forecast the attributes needed to be a successful leader in the future based on the impact modern technology has had on elections. They will then select one of the leaders they researched and create a campaign speech dealing with future issues *(Types of extensions: purpose and appropriateness, complexity, magnitude, order of learning, procedures and routines, demonstration of knowledge, participation, motivation).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Historical Perspective (2.20)	*(Continued from page 64)* How has the United States been shaped by the events, trends, conditions, issues, and decisions of the past?	**Students will** • use a variety of tools (e.g., primary and secondary sources, data, artifacts) to explore the interpretive nature of the history of the United States from Reconstruction to the present. (Note: In this particular model, the time period addressed is Reconstruction to 1945). • examine significant eras of United States history (Reconstruction, Industrialization, Progressive Movement, World War I, Great Depression, New Deal, World War II) to develop chronological understanding and recognize cause-and-effect relationships and multiple causation. • examine the impact of significant individuals and groups. Analyze the social, political, and economic characteristics of various eras in the history of the United States. • recognize the significance of geography and natural resources in historical perspectives and events. • examine the impact of advances in research, science, and technology on historical events and American society. • trace the changing role of the United States in the global community from isolationism to a major world power.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • review visual images (e.g., slides, pictures, posters) and written material of events that reflect the changing role of the United States in global affairs. Research American expansion during the late 19th and early 20th centuries and create presentations of the emergence (pre-1945) of the United States as a world power.	

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High School Social Studies
Model II: World Civilization (1500 - 1945)

Course Overview:
This 1/2-credit world civilization course covers the time period of 1500 to 1945. Students will study the social studies areas of geography, economics, government and civics, and culture and society within the context of world history.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Pages of models are arranged in pairs. On the left-hand page of each pair are guiding and essential questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How have the democratic principles of justice, equality, responsibility, and freedom impacted the development of the world and its people?

- How and why have governments occurred in different nations and parts of the world?

- In what ways have social systems developed, changed, and met the needs of people of the world?

- How have the people from many countries, races, ethnic groups, and religious traditions contributed to the growth, development, and culture of the world?

- How has economics impacted the development of different peoples, civilizations, and nations in different time periods?

- How has geography affected the development of the world and the lives of its people?

- How has the world been shaped by the events, trends, conditions, issues, and decisions of the past?

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Government and Civics (2.14, 2.15)	How have the democratic principles of justice, equality, responsibility, and freedom impacted the development of the world and its people? How and why have governments occurred in different nations and parts of the world?	**Students will** • compare and contrast different political systems and recognize their sources of power. · analyze causes and consequences of various political revolutions and rebellions. • recognize the political causes and consequences of nationalism, militarism, and imperialism. • analyze conflicts between and among different forms of government and examine the impact of these conflicts on historical events and changes. · examine ways in which modern governments do or do not preserve and protect the rights and liberties of their constituents. • explore ways in which stability and peace are pursued in an interdependent world.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • develop matrices (electronic or handmade) that compare political systems. Include information concerning sources of power, organization and structure, decision-making responsibilities, and the role of the people. • participate in role-playing assignments that analyze causes and consequences of various political revolutions and rebellions. Study the Russian Revolution from the perspective of the Czar and the ruling class, the Bolsheviks, the Mensheviks, and the workers. • investigate causes and consequences of nationalism, militarism, and imperialism. Write letters or diary entries about the planned visit of Archduke Ferdinand to Sarajevo *(WP Transactive).* ***Technology suggestion:*** *Use word processing programs to write letters or diary entries.*	
• create visual images (e.g., slides, pictures, posters) of conflicts between different forms of government and the impact of these conflicts on historical events. • present responses of certain governments toward the protection of rights and liberties. Conduct panel discussions to examine governments' responses to the issue of rights and liberties. Represent a leader of each government, such as the President of the United States, Prime Minister of Great Britain, Premier of China, and President of Iraq. ***Technology Suggestion:*** *Videotape responses for other classes to view and discuss.* • present responses to certain questions concerning ways in which stability and peace are pursued in an interdependent world. Deal with specific issues being presented to the Organization of American States concerning the status of Cuba. Write editorials that discuss the economic sanctions of the U.S. on Cuba. Determine if economic sanctions should be continued or reduced *(WP-Transactive).*	Moyo came from Zimbabwe a year ago. During that time she has acquired some basic English speaking and writing skills. She has difficulty reading and writing beyond using present and future tense in simple sentence form. Over two weeks, Moyo locate in the international news section of the daily newspaper all the articles about events happening outside the United States. Using a bilingual dictionary, she will then select those articles that pertain to political issues, and highlight words that reflect justice/ injustice, equality/inequality, freedom/tyranny, etc. The teacher will provide her with a list of vocabulary necessary to help her identify concepts for this assignment. Moyo's collage of articles will then serve as a basis for a class discussion about implications of the current events and how these can define various political systems and their characteristics *(Types of extensions: participation, resources and materials, complexity).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Culture and Society (2.16, 2.17)	How have social systems developed, changed, and met the needs of people of the world? How have the people from many countries, races, ethnic groups, and religious traditions contributed to the growth, development, and culture of the world?	**Students will** · explore ways in which belief systems, knowledge, technology, and behavioral patterns define cultures and help to explain historical perspectives and events. • recognize ways in which social institutions (e.g., family, religion, education, government, economy) influence and respond to human needs in various societies. · examine ways in which cooperation, conflict, and competition occur as cultures interact. • analyze problems of ethnocentrism, stereotyping, and cross-cultural misunderstandings and relate these to prejudice and extreme actions such as genocide. · recognize the role of cross-cultural understanding in working toward world stability and peace.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • participate in mini-dramas that reflect different interpretations of the same event based on cultural perspectives. Review the Holocaust from the perspective of the Nazis, Jews, and other nations. ***Technology suggestion:*** *Consult the American Memory Project on the Internet. See <http://memory.loc.gov>* • analyze extent to which social institutions meet individual needs and promote stable societies. Research the Caste System of India to determine individual needs (e.g., food, clothing, shelter) and how satisfied. Investigate ways the social structure of India is maintained. Present findings as narrative performances that can be videotaped for use with other groups. • examine cultural interaction as it results in cooperation, conflict, and competition leading to ethnocentrism, stereotyping, and cross-cultural misunderstandings. Create mock journal entries concerning the European colonization of Africa in the late 1800s. Include different perspectives (e.g., native Africans and Europeans with both sides reflective of positive and negative aspects of colonization). • review visual images (e.g., slides, pictures, posters) and written material of events recognizing cross-cultural issues in an attempt to work toward world stability and peace. Research creation, structure, and goals of the United Nations. Present findings in oral presentations.	Roberta is working on turning switches on and off to access her equipment needs. She uses a communication board to indicate yes and no responses. She is able to reach and grasp the switch on request by her teacher. She is working on following directions by others. Roberta is responsible for stage lights using a switching device for the mini-dramas. (*Types of extensions: participation, purpose and appropriateness, environment, demonstration of knowledge).* Alejandro has been in the United States a little less then five months, and, even though he is very sociable, is struggling with reading and writing. The teacher will pair him with a native English speaker who will help develop a survey with three questions pertaining to Americans' knowledge about Hispanics. Alejandro and his partner will go to the school cafeteria and survey at least 30 people. Alejandro will record responses. Once they complete the survey and analyze the answers for absence or presence of stereotyping and cross-cultural misunderstandings, they will give their report in front of the class. As facilitators of a class discussion, they will ask for ways to avoid negative attitudes toward members of other cultures and record the suggestions on the overhead projector *(Types of extensions: purpose and appropriateness, level of support, participation, procedures and routines).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Economics (2.18)	How has economics impacted the development of different peoples, civilizations, and nations in different time periods?	**Students will** • explore ways that different peoples, civilizations, and nations in different time periods dealt with scarcity (imbalance between unlimited wants and limited resources). · understand the forces that caused some economic systems to grow and prosper while others remained stagnant or declined. · examine how people and various civilizations made choices that helped or hindered their economic growth. · analyze how increased productivity resulted in the accumulation of material wealth and changed living standards for various peoples, civilizations, and nations.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • create advertisements (computer-generated or handmade) that illustrate how people and nations have dealt with economic issues of scarcity at different times (e.g., Germany has historically faced a land shortage). Discuss ways in which the German government deals with this issue. ***Technology suggestions:*** *Create multimedia presentations to share information.* • review visual images (e.g., slides, pictures, posters) and written material that illustrate how events or conditions have impacted different economic systems. Create images of the Arms Race. Investigate the impact of this issue on economic systems. • create computer simulations that examine ways economic choices help or hinder growth. Design simulations to illustrate changes in economic patterns resulting in collapse of the Spanish empire. • create images (computer-generated or handmade) that reflect the impact of certain economic decisions on the quality of life. Study impact of the Industrial Revolution on Europe. Demonstrate ways this changed the quality of life in Europe. Present on posterboard or develop multimedia presentations.	Maja has been in the United States for almost two years and has acquired an extensive vocabulary and good listening skills. She feels comfortable writing and reading, but is still struggling with correct use of grammar and idiomatic expressions. The teacher has asked her to watch evening commercials for one week, record advertised products that she liked as a result of watching ads, and then to share her findings with two English-speaking partners. After they find products that were most commonly preferred by the three, they will brainstorm to see who would benefit from their purchases and what would be the economic consequences if people suddenly stopped buying these products altogether. The culminating activity would involve each group sharing their findings and conclusions. *(Types of extensions: purpose and appropriateness, complexity, resources and materials, participation).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Geography (2.19)	How has geography affected the development of the world and the lives of its people?	**Students will** • examine how natural resources, resource needs, different perspectives, and trade relationships produce conflict and/or cooperation. • explore how modifications of the physical environment impact human life. • describe the movement of world populations (resulting from "push and pull" factors) and its impact upon events and cultures. • understand that the location and distribution of human features on the Earth's surface change over time due to human needs and events. • understand how factors such as locations of resources and markets, transportation, and technology influence placement, size, and function of human settlements and patterns of movement.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine ways different perspectives affect use of resources. Research the issue of 'white man's burden' and indicate impact of this issue on different groups of people. Illustrate by completing this statement, "White man's burden could be compared to ….." • examine ways geography (e.g., land, resources, trade) produces conflict or cooperation among nations. Assume role of the British Parliament and discuss major issues concerning development of the British Empire. Research geographical consequences that dictate certain types of action to preserve the empire. Include different perspectives of imperialistic actions. • review visual images (e.g., slides, pictures, posters) and written material that illustrate how changes in the physical environment (e.g., creation of canal systems) can affect life. Create "Before and After" charts illustrating impacts. ***Technology suggestion:*** *Research information from the American Memory Project's Web site. See <http://memory.loc.gov>* • describe movement of world populations and impacts of that movement. Create poems, songs, and/or stories that describe the Irish Potato Famine and the plight of the Irish people *(WP-Literary)*. ***Technology suggestion:*** *Use word processing programs to write poems.* • create maps and charts (computer-generated or handmade) to illustrate the connection between geographical location and human location. Investigate the period of European exploration of the "New World," using geographical features to indicate particular locations and patterns of settlement.	Yoko has been in the United States for a full year and has acquired some basic language skills, even though her writing ability is still extremely low. She needs lots of assistance in forming full sentences and using proper grammar. The teacher asks Yoko to look at two pictures (e.g., one depicting a rural life scene, another showing a busy downtown street in a big city), and, with the help of a bilingual dictionary, to record the feelings inspired by the pictures some favorite activities that could be performed in each environment, and her favorite place and why. Yoko will present her completed assignment in front of the class *(Types of extensions: complexity, resources and materials, demonstration of knowledge).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Historical Perspective (2.20)	How has the world been shaped by the events, trends, conditions, issues, and decisions of the past?	**Students will** • understand the interpretive nature of world history. • use a variety of tools (e.g., primary and secondary sources, data, artifacts) to explore world civilizations. · examine significant eras (Renaissance, Reformation, Age of Exploration, Age of Revolution, Nationalism and Imperialism, Technological Age of world civilization) to develop chronological understanding and recognize cause-and-effect relationships and multiple causation. • examine the impact of significant individuals and groups. · analyze the social, political, and economic characteristics of various eras and civilizations in world civilization. • recognize the significant impact of geography and natural resources on historical perspectives and events. · trace the impact of advances in research, science, and technology on historical events and human societies. · analyze the challenges and opportunities provided by an increasingly interdependent world.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine various accounts of human events to understand how history is interpreted. Study primary and secondary source documents concerning The Enlightenment to illustrate how changes were made in the quality of life. Write newspaper or magazine articles explaining how the quality of life was changed. • research a variety of primary and secondary sources (e.g., books, journals, diaries, magazines, newspapers, computer sources) to understand the social history of various eras. Select a particular civilization or nation and determine the key events that resulted in major cause-and-effect occurrences. Create time lines including key events. ***Technology suggestion:*** *Use software to produce cause-and-effect time lines.* • evaluate the historical impact of individuals and groups. Study circumstances leading to the rise of Adolph Hitler in Germany. Create political cartoons (computer-generated or handmade) to demonstrate his impact. • participate in simulations that demonstrate ways people lived during certain time periods. Study the Aztec civilization and role-play different groups (e.g., ruling class, religious leaders, warriors, artisans, farmers). Videotape the presentation. • review visual images (e.g., slides, pictures, posters) and written information of ways geographical features have influenced people's lives. Research land use and indicate ways different people would use the land. Share findings in oral presentations. • examine ways advancements have resulted in changes in quality of life. Study changing nature of 20th century governments of emerging nations in Asia, Africa, and the Middle East. Create articles depicting quality of life in emerging nations *(WP-Transactive).* • analyze challenges and opportunities provided in an interdependent world. Review important treaties and alliances which have led to greater interdependence. Conduct panel discussions with different perspectives of the treaties and alliances.	

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High School Social Studies
Model II: U. S. & World History (1945 - Present)

Course Overview:
In this 1/2-credit U.S. and world history course, students examine the time period from 1945 to the present. Students study modern America and the world to learn about significant events, people, patterns, and changes during this time period. Historical connections are made to other areas of the social studies including geography, economics, culture and society, and government and civics.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Pages of models are arranged in pairs. On the left-hand page of each pair are guiding and essential questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How have political changes in the U.S. and world affected people and the way they live?
- Have democratic thoughts and ideals (in the U.S. and world) prospered or declined during the period of 1945 - present?
- How do social systems really provide for the wants and needs of people in the U.S. and world?
- How has improved communication and increased technology affected the culture of the U.S. and the world?
- How have economic systems of the U.S. and the world grown and changed during 1945 - present?
- How have economic changes impacted the way people work and live?
- How have people (U.S. and world) modified and used the physical environment since 1945, and what has the impact been?
- How have the U.S. and world changed since 1945, and what does the future hold?

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Academic Expectations	Guiding Questions	Correlations to Program of Studies
Government and Civics (2.14, 2.15)	How have political changes in the U.S. and world affected the people and the way they live? Have democratic thoughts and ideals (in the U.S. and World) prospered or declined during the period of 1945 - present?	**Students will** • compare and contrast different political systems and recognize their sources of power. • analyze causes and consequences of various political revolutions and rebellions. • recognize the political causes and consequences of nationalism, militarism, and imperialism. • analyze conflicts between and among forms of government and examine the impact of these conflicts on historical events and changes. • examine ways in which modern governments do or do not preserve and protect the rights and liberties of their constituents. • explore ways in which stability and peace are pursued in an interdependent world. • trace the political development in the United States (1945 - present) including the changing role of state and federal government and the relationships among the branches of government. • recognize how the U.S. Constitution, significant legislation, and landmark Supreme Court decisions have impacted American Society. • analyze roles of political parties and citizen participation in a democratic society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • complete matrixes (computer-generated or handmade) to compare different political systems. Include information concerning sources of power, organization and structure, decision-making responsibilities, and role of the people. • participate in role-playing assignments to analyze causes and consequences of various political revolutions and rebellions. View independence movement of emerging nations from perspective of native people and other nations. • recognize impact of nationalism, militarism, and imperialism on global affairs. Investigate militarism and ways it led to actions of North Korea against South Korea. Research information on the attitudes of both nations leading to the conflict. Develop recruitment posters and brochures for branches of the military.	
• review visual images (e.g., slides, pictures, posters) and written information of tensions and conflicts among different nations. Role-play tensions between the Shah of Iran and his followers during the Iranian Revolution. Respond to questions concerning the tensions. • give presentations on certain governments and their policies on the protection of rights and liberties. Represent governments by role-playing leaders of that government (e.g., President of the United States, Prime Minister of Great Britain, Premier of China, President of Iraq). • analyze ways stability and peace have been pursued in the world (1945 - present). Investigate role of United Nations in response to various global tensions. Create report cards on the effectiveness of the U.N. in regard to different events. • role-play "meeting of the minds" panel where the U.S. Presidents (1945 to present) assemble to discuss key points of government (e.g., changing role of state and federal government, relationships among branches) during their administrations. Videotape presentations and show on local cable channels. • analyze the influence of judicial branch on government and American society. Review constitutional amendments and create an original amendment to be ratified. • create report cards that reflect the involvement of constituents in their citizenship rights and responsibilities. Research involvement of citizens in voting, jury duty, and payment of taxes. Determine if Americans are adequately involved in these rights and responsibilities. ***Technology suggestion:*** *Use integrated software programs to organize information and desktop publishing software to create report cards.*	Parisa, an Iranian student who has been here for a year has low intermediate language skills. She will use a bilingual dictionary to research technical government vocabulary from a teacher-provided list. Once she has her bilingual list generated, she will research the current political situation in Iran and computer-generate components of the structure of government, using them to create a poster that will contrast with one created by an English-speaking student for the U.S. She will then work with this student to orally present their facts to the class *(Types of extensions: procedures and routines, resources and materials, participation).* A cluster of students who have quickly learned the changing roles of government and relationships among branches during the administration of U.S. Presidents since 1945, will enact a "meeting of the minds" panel among leaders of other countries during the same period. Each leader will incorporate the views of his/her country toward the contemporary U.S. government and leaders at that time (*Types of extensions: complexity, resources and materials, motivation).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Culture and Society (2.16 2.17)	How do social systems really provide for the wants and needs of people in the U.S. and world? How has improved communication and increased technology affected the culture of the U.S. and the world?	**Students will** • explore ways in which belief systems, knowledge, technology, and behavioral patterns define cultures and help to explain historical perspectives and events. • recognize ways in which social institutions (e.g., family, religion, education, government, economy) influence and respond to human needs in various societies including the United States. • examine ways in which cooperation, conflict, and competition occur as cultures emerge and interact. • analyze problems of ethnocentrism, stereotyping, and cross-cultural misunderstandings and relate these to prejudice and extreme actions such as genocide. • recognize the role of cross-cultural understanding in working toward world stability and peace.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine primary source documents (e.g., journals, diaries, letters, visual images) of everyday life to explain cultural beliefs and perspectives on historical events. Determine the influence of traditional Islamic beliefs on governments of Middle Eastern nations. Give presentations on other countries and how culture beliefs have affected events. ***Technology suggestion:*** *Use integrated software to create time lines illustrating cause-and-effect events in history.* • analyze extent social institutions meet individual needs and promote society. Review information concerning the changing nature of the American family. Focus on events within the family structure and activities of the family outside of the home. Present findings in mini-dramas to be videotaped. • participate in role-playing assignments to show ways culture can result in different interpretations of the same event. Show how the creation of Israel could be viewed from perspective of Zionists, Palestinians, and British.	Ali, a Saudi Arabian student who has been in the country for two years, has high intermediate language skills. He needs help with academic language and vocabulary. The teacher will provide a list of essential vocabulary for whatever type of activity she wants Ali to do. He will read documents in his native language in order to be the resident expert on the culture and answer any questions his English-speaking counterparts might pose regarding the documents *(Types of extensions: resources and materials, motivation).*
• examine ways ethnocentrism, stereotyping, and cross-cultural misunderstandings influence historical and contemporary events. In a "60 Minutes" format, role-play the television reporter interviewing South-African officials on Apartaid policies. • review visual images (e.g., slides, pictures, posters) and written material of events and efforts working toward world stability and peace. Evaluate the Camp David Accords and make suggestions for improvements taking into account present-day situations.	Hibo, a Somali student who has been in the country for 18 months, has intermediate language skills, and is especially strong orally. She will orally relate how the group's chosen events would happen in a Somali family situation and bring in props and costumes for the group's mini-dramas. An English-speaking student will record Hibo's comments and Hibo will be given the lead in the "60 Minutes" broadcast *(Types of extensions: demonstration of knowledge, participation).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Economics (2.18)	How have economic systems of the U.S. and the world grown and changed during (1945 - present)? How have economic changes impacted the way people work and live?	**Students will** • explore ways that different peoples, civilizations, and nations in different time periods dealt with scarcity (imbalance between unlimited wants and limited resources). • understand the forces that caused some economic systems to grow and prosper while others remained stagnant or declined. • analyze changing relationships among government, business, and labor. • examine the transformation of the United States from rural economy to an industrial economy to a leader in the global economy. • analyze how increased productivity resulted in the accumulation of material wealth, and changed living standards for various peoples, civilizations, and nations. • illustrate how technology has changed and continues to change the United States economy. • examine how people and various civilizations made choices that helped or hindered their economic growth.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • create advertisements (computer-generated or handmade) to illustrate how people have dealt with economic issues at different times. Investigate response of global community to destruction of the rain forests. Reflect degree of commitment of other nations to this issue. ***Technology suggestion:*** *Use multimedia software to create advertisements.* • review visual images (e.g., slides, pictures, posters) and written material that illustrate ways economic events or conditions have impacted different economic systems. Give multimedia presentations on the fall of the Soviet Union and the resulting impact on economic factors. • evaluate factors that have led to changing economy of the United States. Study the impact of immigration on development of the United States. Present findings from perspective of immigrants, businessmen, and American citizens to demonstrate the issues faced by immigrants. • review visual images (e.g., slides, pictures, posters) and written material of changing relationships between business, labor, and government. Review labor management changes since World War II. Create job descriptions reflecting working conditions of today. • create images to reflect impact of certain economic decisions on quality of life. Study changing relationship between United States and nations of the Pacific Rim and the impact. Present findings on posterboard. • create economic "State of the Union" speeches for the years 1945, 1960, 1975, and 1990. Include information in each speech on how technology improved the economy of the United States. • participate in simulations to examine ways economic choices result in positive or negative consequences. Participate in scenarios leading to financial success or ruin. Transfer to national economies. Develop into computer simulation games.	Jan plans a career in medicine. She will research issues related to healthcare and the economy. She will analyze the data she has gathered and prepare a presentation on the impact of current trends and proposed legislation on the qualtiy of patient care and resulting quality of life (*Types of extensions: purpose and appropriateness, complexity, magnitude, time, resources and materials, participation, level of support, environment, procedures and routines, motivation, order of learning, demonstration of learning).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Geography (2.19)	How have people (U.S. and world) modified and used the physical environment since 1945, and what has the impact been?	**Students will** • examine how natural resources, resource needs, different perspectives, and trade relationships produce conflict and/or cooperation. • understand how changing resource needs and international trade relationships produce conflict and cooperation? • explore how modifications of the physical environment impact human life. • understand that regions are areas on the surface of the Earth that are defined by certain unifying characteristics, both physical and human. • understand how factors such as location of resources and markets, transportation, and technology influence placement, size, and function of human settlements and patterns of movement. • describe the movement of world populations (resulting from "push and pull" factors) and its impact upon events and cultures. • examine how immigration and movement of populations within the United States have impacted the culture of the United States. • understand that the location and distribution of human features on the Earth's surface change over time due to human needs and events.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine ways geography (including productive resources, and changing resource needs) can produce conflict or cooperation between nations. Investigate controversial elements of the North American Free Trade Agreement (NAFTA). Write editorials that represent different perspectives, including those of nations, management, labor, and consumers *(WP-Transactive).*	
• review visual images (e.g., slides, pictures, posters) and written information to understand ways changes in the physical environment can affect life. Explore impact of creation of the Interstate Highway System in the United States. Complete written reports on the social and economic impacts.	
• create maps (computer-generated or handmade) to show different regions of world both human and physical. Explain differences between human/cultural region (e.g., the "South," the Bible-Belt) or physical regions (e.g., North America, Asia). Display in school lobby or in classrooms. • describe reasons world populations move and impact of that movement. Research ethnic neighborhoods of major cities. Write articles about the contributions of ethnic groups/or individuals to the cultures of cities and towns *(WP-Transactive).* ***Technology suggestion:*** *Use software programs to create time lines depicting immigration shifts.*	Joe sustained a spinal cord injury that has left him with limited use of his hands and arms. He requires additional time to complete assignments. He includes two regions (other classmates include four or more regions) in his map. Joe uses his head pointer when using a computer. He uses extended time to complete the map and research *(Types of extensions: magnitude, time, resources and materials, level of support).*
• analyze location and distribution of humans in the world. Study geographical factors and urbanization to explain why people are "pushed" from a location and/or "pulled" to another. Present written analyses. • create maps to show changing patterns of human features on the Earth's surface (e.g., buildings, settlements, dams, roads). Choose a continent or country and create three different maps representing conditions in 1945, 1970, and today. Present findings to the class.	Yadira came from Mexico six months ago and has beginning language skills. With an English-speaking partner, she will research news magazines, Internet, and newspapers for images of Hispanic barrios (neighborhoods). She will tell her partner why her family emigrated to the United States, and the two will then compare images they found with images of neighborhoods in their town where Mexicans live. They will share their findings. Yadira's final activity will be to write an article about her emigration experiences, using a bilingual dictionary *(Types of extensions: resources and materials, level of support, motivation).*

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High School Social Studies
Model II: U. S. & World History (1945 - Present)

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Historical Perspective (2.20)	How have the U.S. and world changed since 1945, and what does the future hold?	**Students will** • understand the interpretive nature of world history (1945 - present). • use a variety of tools (e.g., primary and secondary sources, data, artifacts) to explore the interpretive nature of the history of the United States (1945 - present). • use a variety of tools (e.g., primary and secondary sources, data, artifacts) to explore world civilizations. • examine significant eras, trends, patterns, and events (U.S. and world history during 1945 - present). • examine the impact of significant individuals and groups (in U.S. and world history from 1945 - present). • analyze the social, political, and economic characteristics in the United States and world (1945 - present). • recognize the significant impact of geography and natural resources on historical perspectives and events in the U.S. and world (1945 - present). • examine the impact of advances in research, science, and technology on events in the U.S. and world (1945 - present). • trace the changing role of the United States in the global community from isolationism to a major world power (1945 - present). • analyze the challenges and opportunities provided by an increasingly interdependent world.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine various accounts of U.S. and world events to understand ways history is interpreted. Research primary source documents concerning the Civil Rights Movement to illustrate different perspectives of the issue. Develop protest poems, stories, or songs representing different perspectives. • examine visual and written information about significant events, trends, and patterns to understand cause-and-effect relationships. Use events of the Space Race to explore the competitive nature between the Unites States and the former Soviet Union during the Cold War. Create time lines showing the space race with U.S. and Soviet initiatives. • evaluate the historical impact of individuals and groups. Investigate the rise of fundamentalist religious nations. Create political cartoons (computer-generated or handmade) to demonstrate their impact on the world. • participate in simulations to demonstrate ways people have adapted to social, political, and economic situations. Restrict ability of certain students to move about the school and/or room. Write articles about restrictions that certain governments have on their people, the reasons why governments have these restrictions, and people's reactions *(WP-Transactive).* • review visual images (e.g., slides, picture, posters) and written information of ways geographical features have influenced people's lives. Investigate multinational corporations and their use of resources. Write newspaper articles, both pro and con, on multinational corporations' use of resources *(WP-Transactive).* • evaluate how technological advancements have resulted in changes. Research elimination of certain diseases that have altered world populations, creating both positive benefits and concerns. Write articles indicating the nature of the disease, status, implications, and predictions *(WP-Transactive).* • review visual images (e.g., slides, picture, posters) and written information of events that reflect changing roles of the United States in the global community. Investigate changing, controversial nature of U.S. involvement in military alliances (e.g., North Atlantic Treaty Organization (NATO), Southeast Asia Treaty Organization (SEATO), Australia, New Zealand, and the United States (ANZUS) Pact). Create mock military briefings for the President on the positive and negative aspects of alliances. • analyze challenges and opportunities provided in interdependent world. Review important aspects of the human-rights movement. Analyze the U.N.'s Universal Declaration of Human Rights for important elements. Create a "Universal Declaration of Student Rights" reflecting similar important elements.	Yuseyt, who came from Cuba 13 months ago, has beginning language abilities. She needs assistance with scientific terminology. She and a peer tutor will research the elimination of smallpox from Cuba and present their findings in poster form. Yuseyt's final assignment will be to write a journal entry about the project, using as much of the newly acquired vocabulary as possible *(Types of extensions: purpose and appropriateness, level of support, demonstration of knowledge).*

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High School Social Studies
Model II: World Geography

Course Overview:
This world geography course is designed as a 1/2-credit course. Although much of the course content is set in a contemporary context, there is a historical strand to make the course more comprehensive. Other connecting strands of social studies are also in the course. These include government and civics, culture and society, and economics.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Pages of models are arranged in pairs. On the left-hand page of each pair are guiding and essential questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How does geography impact government at the local, national, and global levels?
- How are culture and belief systems reflected in human and physical geography?
- What is the relationship between geography and economics?
- How does geography affect the way people live?
- How has geography impacted the development of the world and its peoples?

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Government and Civics (2.14, 2.15)	How does geography impact government at the local, national, and global levels?	**Students will** • understand how political decisions affect political boundaries at local, state, and national levels. • recognize how natural environments and resources are used and controlled by governments. • analyze how governments impact their human and physical geography.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • participate in activities indicating how political boundaries are human-made boundaries. Divide room into smaller areas in order to create "nations." Create maps of the room indicating the new boundaries and discuss how they might impact movement and communication. • examine visual and written information that illustrates ways governments have tried to use and control environments. Study reclaiming of land from the sea or marshlands to demonstrate consequences of that action. Write articles about specific reclamation efforts in the U.S. and explore its pros and cons. Use this activity to develop possible writing portfolio entries *(WP-Transactive).* ***Technology suggestion:*** *Use word processing programs to write articles.* • analyze ways governments have made decisions that have impacted both their human and physical geography. Investigate the suggestion that the United States should use its national parks to obtain natural resources such as oil and minerals. Conduct panel discussions with both sides of the argument presented. Write articles that present both sides of the argument, including conclusions about the best approach *(WP-Transactive).*	Evgeniya has been in the United States for less than a year, but studied English before she came here, so she is comfortable expressing some basic ideas; she can read and write at the intermediate level. The teacher wants her to watch other students negotiate their way from one nation (part of the room) to another without resorting to violent behavior. She will then have to do the same, trying to use the same or similar strategies and vocabulary that she observed from her classmates. The teacher will ask the class as a whole to share their feelings and impressions of the experience, and relate them to the impact of political boundaries on human life *(Types of extensions: participation, pace).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Culture and Society (2.16, 2.17)	How are culture and belief systems reflected in human and physical geography?	**Students will** • analyze the origin and migration of cultures. • understand how the activities and beliefs of different cultural and social groups affect the use, form, and characteristics of landscapes. • analyze the impact of movement on people and ideas. • analyze how regions and places can have distinct cultural characteristics. • understand how technological advances have impacted cultural assimilation.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • create world maps representing the early 1900s. Highlight the origin and destination of immigrants coming to the United States. Present information on the reasons immigrants came to the United States. • create visual images (e.g., slides, pictures, posters) of landscapes of different people reflecting certain cultural traits (e.g., religious shrines, housing, recreational areas). • create maps of Europe during the mid-fourteenth century. Show how the Black Death spread throughout Europe and create accompanying time lines to show the amount of time it took for the disease to spread. Compare to the AIDS virus in regard to areas affected and amount of time. ***Technology suggestion:*** *Use software to create time lines.*	Marty needs concrete presentations and directions for assignments. A study guide is developed for her so that she knows the ideas to investigate for this activity (*Types of extensions: resources and materials, procedures and routines).*
• create annotated maps to examine ways different regions have distinct cultural traits. Provide information about different regions and places of the world, indicating cultural traits. • evaluate the impact of technology (e.g., radio, television, Internet) on the assimilation of cultures. Write articles for school newspapers or community newsletters on the impact technology has had on the assimilation of different cultures *(WP-Transactive).*	Jessica is a Braille reader She creates raised-line maps using yarn or a tactile image enhancer to outline different regions. She uses a variety of objects and or textures to symbolize distinct cultural traits. She will need extra time (*Types of extensions: purpose and appropriateness, time, resources and materia*ls).

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Economics (2.18)	What is the relationship between geography and economics?	**Students will** • understand how geography affects the way nations deal with issues of production, distribution, and consumption. • recognize that the location of activities (e.g., agriculture, production, distribution) impact national and international relationships. • analyze how markets are affected by location and movement. • recognize that all nations have to confront the problem of scarcity (imbalance between unlimited wants and limited resources).

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Sample Activities	Sample Extensions for Diverse Learners
Students will • create charts reflective of different nations and the availability of resources and how they deal with issues such as production, distribution, and consumption. Make comparisons between a nation's availability of resources and its ability to produce, distribute, and consume. • create visual images (e.g., slides, pictures, posters) of global economic activities. Develop charts indicating how the location of these activities have affected national and international relationships (e.g., multinational corporations, trade agreements, economic sanctions, foreign investment). • study different economic markets and alliances (e.g., E.E.C., O.P.E.C.) to examine impact on the global economy. Create commercials for the economic alliance. • discuss different national decisions concerning production of either consumer goods or military weapons. Create written analyses of how different nations, during different time periods, have made decisions regarding scarcity (e.g., the Arms Race, foreign aid versus investment at "home," the Space Race, "Butter v Bullets"). Write editorials that take a stand for or against foreign aid *(WP-Transactive).* ***Technology suggestion:*** *Use word processing programs to write editorials.*	Hibo has been in the United States for less than two years and has good verbal skills. She is still struggling with reading and writing, but can accomplish a lot when prompted and given personal assistance. The teacher will pair her with a native English speaker and ask them to record on a chart all instances in which they had to use electricity over an entire day. After they compare their charts and compile a new one to share, they will brainstorm together to determine ways they could have performed activities without electrical power. They will make a separate list of those activities that could not be replicated without electricity use. Their final report will describe how much they could maintain and how much they would have to modify their lifestyle if there was a scarcity of electricity *(Types of extensions: level of support, purpose and appropriateness, demonstration of knowledge).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Geography (2.19)	How does geography affect the way people live?	**Students will** • understand that human and physical features of the Earth's surface can be identified by absolute and relative location. • analyze the distribution of human and physical characteristics on Earth's surface. • use geographic tools to analyze patterns resulting from the movement of people on Earth's surface. • understand how and why people interact with and change their environments.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • create maps that show physical features of the Earth and also create maps that show human features of the Earth. Use absolute and relative location to identify both kinds of features. • create geographic models reflective of ways Earth includes both human and physical features. Choose one specific civilization or nation and create maps showing human and physical features. Show the relationship between the two types of features. ***Technology suggestion:*** *Use software to create three dimensional models.* • use geographical tools (e.g., maps, globes, charts) to create visual images showing patterns resulting from the movement of people. Use tools with coloring agents that visually show patterns of movement. Formulate conclusions on why people move. • compare historical and present-day reasons on why and how people change their environments. Prepare written reports comparing why people changed their environment in the past and why they do so now. Include information on methods used to alter environments. Prepare multimedia presentations for local environmental clubs.	As Bill and Holly learn new vocabulary, they need direct instruction and connecting to real life, Multiple meanings of words often cause them to misunderstand content. They receive instruction on the use of the Concept Comparison routine (University Center of Research on Learning) to complete maps and make comparisons, To develop their vocabulary and concept knowledge, they are taught mnemonic strategies and the Clarifying Routine (University of Kansas Center for Research on Learning) (*Types of extensions; resources and materials, procedures and routines, purpose and appropriateness).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Historical Perspective (2.20)	How has geography impacted the development of the world and its peoples?	**Students will** • understand historical changes in geographical patterns. • recognize how to locate and gather geographic information using primary and secondary sources. • analyze geographic information to evaluate past events and occurrences. • recognize how attempts to acquire territory and resources have resulted in national and international conflicts.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • create books showing different geographic patterns at different times in history (e.g., weather, population, agriculture, political boundaries). All patterns will be the same size (e.g., 6“ x 6”), and can be put together at the end of the activity to form a geographic patterned quilt. • create annotated books that show how to use primary and secondary sources in locating and gathering geographic information. Give presentations to other classes or schools on how to use the book. • create visual images (e.g., slides, pictures, posters) of past events and occurrences showing the role that geography played. Research outbreaks of major diseases to show how geography played a role in either spreading or limiting the spread of disease. • create illustrated time lines showing different wars and conflicts that were the result of attempts to acquire land or resources. Extend time lines into the future to predict similar conflicts. ***Technology suggestion:*** *Use software to create time lines.*	Abdulaziz can be labeled as an upper intermediate student because he is able to speak, read, and write English with minor difficulties. He needs assistance with more complicated grammatical forms, but makes extensive use of a bilingual dictionary whenever he does not understand a word or expression. The teacher will pair Abdulaziz with a native-English speaker to research information about weather changes. Making use of the daily newspaper, television, Internet, weather almanac, and talking to people over several days, they will report their findings in an annotated book. They may use newspaper clippings, TV forecasts, and notes from personal interviews, specifying whether they were primary or secondary sources in order to compare them for accuracy and reliability of weather forecasting *(Types of extensions: complexity, procedures and routines, resources and materials, demonstration of knowledge, level of support).*

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High School Social Studies
Model II: Government

Course Overview:
This 1/2-credit government course is a comprehensive study of government and provides connections to other areas of the social studies, including history, economics, geography, and culture and society.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Pages of models are arranged in pairs. On the left-hand page of each pair are guiding and essential questions along with related academic expectations and correlations to the *Program of Studies.* Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How does government serve its citizens?
- How does government reflect the beliefs, culture, and needs of its citizens?
- How does government affect me and other consumers?
- How does where I live affect local, state, and national government?
- Why have there been different forms of government over time?

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High School Social Studies
Model II: Government

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Government and Civics (2.14, 2.15)	How does government serve its citizens?	**Students will** • understand the purposes of various forms of governments. • recognize that the U.S. Constitution established a government of limited powers that are shared among different levels and branches. • analyze the importance of rights and responsibilities of citizens in a democratic society. • analyze various events to determine how the U.S. Constitution has allowed our government to change over time to meet the changing needs of our society. • understand the democratic principles of liberty, justice, individual human dignity, the rule of law, and how they relate to our society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine the purposes of a democratic government as indicated by American documents. Survey peers, teachers, parents, and community members about the purposes of the Declaration of Independence, the Constitution, and other American documents. Analyze survey data and create multimedia presentations to share findings. Emphasize the importance of citizen knowledge in a democratic government. ***Technology suggestion:*** *E-mail surveys to students throughout Kentucky. Analyze responses and create graphs with integrated software packages.*	Toneka's vocabulary, reading and writing, and math abilities are significantly below that of her peers. She learns concepts taught in small increments. In the survey assignment, Toneka will work with a peer. She will practice reading the survey questions prior to the interview. Toneka will ask the questions and her peer will write the responses (*Types of extensions: order of learning, level of support).*
• examine different levels and branches of government and describe their roles. Create Venn diagrams to explain concepts of federalism the division of the government into different levels. • recognize role of different branches of government. Study role of different branches and relate to lawmaking. Create murals that depict the lawmaking process. Reflect either effectiveness or ineffectiveness of this process. • investigate the importance of citizen participation in a democratic government. Examine the failure of Americans to vote and consequences of low voter turnout. Write editorials for school newspapers explaining the importance of voting *(WP-Transactive).* • examine visual images (e.g., slides, pictures, posters) and journal articles of changes in power of government as influenced by the "Elastic Clause," amendment process, and constitutional interpretation. Show images of court decisions indicating how power of government has changed. • investigate ways the United States government has attempted to assure liberty, justice, individual human dignity, and the rule of law. Role-play different perspectives (e.g., prosecuting attorneys) and videotape scenes to share with other groups.	Mai is a Vietnamese student who has been in the country for six months and has beginning language skills. She is extremely limited in all types of vocabulary. The teacher will provide her with a list of necessary vocabulary well in advance, giving her enough time to look up the terms in a bilingual dictionary. Working with a group of English-speaking peers, she will be the group secretary, recording what the other group members dictate. Mai's final activity will be to go home and interview family members about Vietnamese government and, on the group's Venn diagram, highlight the similarities in one color and the nonexistent features in another color *(Types of extensions: motivation, participation, procedures and routines, pace, order of learning, level of support).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Culture and Society (2.16, 2.17)	How does government reflect the beliefs, culture, and needs of its citizens?	**Students will** • understand how forms of government view and interact with various cultures. • examine how governments and their societies work together to establish social institutions to address the needs of people. • analyze how cultures and belief systems are reflected in different forms of governments.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine ways government interacts with various cultures. Examine treatment of Native Americans by the federal government in the 19th century. Present findings through storytelling to be videotaped or put on cassette tapes. • examine ways governments and societies have worked together to address the needs of the people. Review ways people have been assisted (e.g., charitable organizations, state government programs, federal government programs). Create illustrated outlines including important dates of program implementation. • compare world governments and identify ways their cultural perspectives and belief systems are reflected. Write feature articles for current events magazines describing how governments reflect the culture and belief systems of their people. ***Technology suggestion:*** *Survey government officials via Internet.*	Doralyn and Joyce need opportunities to develop their creative writing talent. They will interview local nursing home residents to gather information about their birthplaces and various locations they have lived at different periods of their lives. They will look for patterns and geographic and cultural influences on their decisions to live in these locations. Each student will select one resident as the subject of a biography. They will include an epilogue, discussing how geography and culture influenced her subject's life (*Types of extensions: purpose and appropriateness, magnitude, time, level of support, participation, environment, demonstration of knowledge).*

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High School Social Studies
Model II: Government

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Economics (2.18)	How does government affect me and other consumers?	**Students will** • understand ways in which the government of the United States is involved in its economy. • recognize various economic systems and institutions in the United States. • understand how the role of the United States government in its economic system has changed over time to meet the needs of the society. • analyze how the United States government deals with questions of production, distribution, and consumption of goods and services.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • write position papers on the ideal role of a democratic government. Address issues of taxation, government-provided goods and services, education, and welfare. Create multimedia presentations for city councils or county judge executives. • simulate ways services are provided. Create illustrated time lines to show how the role of government in our economy has changed over time. Include important economic laws, treaties, and agreements. • analyze ways changing conditions and needs of society lead to more governmental involvement. Examine local communities and make lists of environmental concerns. Create prioritized action plans for governments to implement, including items for citizens to address. • compare a market economy (e.g., United States) with a command economy (e.g., Cuba) in graphic organizers. Include differences in how each economy deals with issues of production, distribution, and consumption.	Edie, Suzanne, and LeRoy have a high level of ability and interest in math, They will research how exchange rates are determined, plot the value of the U.S. dollar in relationship to other world currencies over the past five years, and relate significant changes to world events. They will also determine which countries, based on the value so the U.S. dollar, might be good vacation destinations and calculate the expenses for a three-week family vacation in each country (T*ypes of extensions: purpose and appropriateness, complexity, time, resources and materials, procedures and routines, demonstration of knowledge, level of support, participation).*

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High School Social Studies
Model II: Government

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Geography (2.19)	How does where I live affect local, state, and national government?	**Students will** • understand how the United States government regulates natural and human resources. • recognize various regions in the United States and understand how their local and state governments may operate differently because of regional needs and differences. • analyze how technology has helped or hindered the operation of government. • understand how political decisions affect political boundaries at local, state, and national levels. • recognize how natural environments and resources are used and controlled by governments. • analyze how governments impact their human and physical geography.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine effectiveness of government in its ability to regulate different resources. Write essays to "What if?" statements to examine laws and regulations relating to natural and human resources (e.g., What if the United States did not regulate certain activities such as oil production and coal mining?). • write letters to community members asking how their local and state governments operate. Send letters to governmental officials asking them to respond to questions that deal with regional differences. Create multimedia presentations for local civic organizations. ***Technology suggestion:*** *E-mail local and state officials to gather information.* • investigate impact of computers on the dissemination of ideas, information, and services necessary for the smooth functioning of the government. Write editorials explaining advantages and disadvantages of computer use (*WP-Transactive*).	Lan Hsin is a Taiwanese student who has been in this country for nine months, has beginning language abilities with very limited academic vocabulary. She will need a teacher-provided list of essential vocabulary required to perform the task. Using a bilingual dictionary, she will look up the terms, as well as any ideas that occur to her regarding the cause/effect situation. She will use the terms generating a simplistic poster showing the cause and effects listed in two separate columns, using only key words and sentence fragments *(Types of extensions: resources and materials, order of learning, level of support, procedures and routines)*.

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Historical Perspective (2.20)	Why have there been different forms of government over time?	**Students will** • recognize that different forms of governments have developed over time. • analyze different forms of government to determine their effectiveness. • understand the foundations of the United States democratic form of government • recognize how the United States government has changed over time to meet the needs of the society.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate changes in society that necessitate different forms of government. Create illustrated flow charts documenting ways different forms of government have developed over time. • compare in graphic organizers advantages and disadvantages of limited government with advantages and disadvantages of unlimited government. Construct t-charts to analyze effectiveness of different forms of government. • trace development of the United States government into a democratic system. Create presentations to demonstrate different ways philosophies and ideals became incorporated into the government. • create visual images of changing nature of government in response to meeting needs of people. Include images of changing role and growth of government.	Susan was in all general education classes prior to sustaining a traumatic head injury. She now needs multiple exposures to concepts. To recognize change over time, Susan uses a cumulative time line documenting changes in American government and the societal needs that caused changes. The teacher uses a master time line, updating it each time there is a change in government. Susan records each change and reason for the change, using her personal time line (*Type of extension: procedures and routines).*

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High School Social Studies
Model II: Economics

Course Overview:
This 1/2-credit economics course is a comprehensive study of economics with connections to the other areas of social studies, including history, geography, government, civics, culture and society.

Models are organized around guiding questions. Guiding questions direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Pages of models are arranged in pairs. On the left-hand page of each pair are guiding and essential questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- What role does the government play in a nation's economy?
- As a United States citizen, what role do I play in the economy?
- As a social institution, how does the economy meet the needs of its citizens?
- How do culture and belief systems affect consumers' decisions?
- Why is it important for me to study and understand economics?
- How does geography affect or impact a national and/or global economy?
- How and why has the economy of the United States changed?

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Government and Civics (2.14, 2.15)	What role does the government play in a nation's economy? As a United States citizen, what role do I play in the economy?	**Students will** • understand that voters influence economic policy and decision making through representatives they elect. • recognize that the United States has a market economy which is determined by the forces of supply and demand. • explore others economic systems (e.g., command, traditional) to determine the economic forces that control them. • analyze how decisions on the distribution of resources can be made by local, state, and/or federal levels of government.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • review information and events that contribute to election issues and results to determine if there is a correlation. Create illustrated time lines that analyze the influence of economics on elections in the United States. ***Technology suggestion:*** *Use software to create time lines.*	
• select products at grocery stores, preferably perishable items, and chart changing prices throughout the year. Relate changes to concept of supply and demand. Create grocery ads for newspapers demonstrating changing prices over time. • investigate factors that influence consumer decisions. Create diagrams that resemble the spokes of a wheel, with consumers in the middle. Indicate factors (e.g., opportunity costs, prices, incentives) consumers consider when making choices on each spoke. • examine visual images (e.g., slides, pictures, posters) and news articles that reflect different economic systems. Compare a command economy (e.g., Cuba) with a market economy (e.g., U.S.). Chart differences and discuss findings. Write stories describing life in both systems. • analyze ways decisions on distribution of resources are made by different levels of government. Decide the level of government most effective in dealing with distribution of resources and debate findings. Create multimedia presentations to share information.	Freda works in a grocery story with a job coach. She reads prices and matches pictures to food items. She selects five perishable items and checks the prices daily for two weeks. She uses a chart to collect data. The chart is developed for her with pictures of the five items she chose, the dates for ten days, and boxes large enough for her to record prices. Freda presents the information to a small group who incorporate the information in the discussion of supply and demand. (*Types of extension: complexity, environment, purpose and appropriateness, motivation, demonstration of knowledge, resources and materials, participation, procedures and routines).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Culture and Society (2.16, 2.17)	As a social institution, how does the economy meet the needs of its citizens? How do culture and belief systems affect consumers' decisions?	**Students will** • understand how the economic incentives of private ownership of property, business opportunities, and profit motives have attracted people from many nations to the United States. • recognize that the economy of the United States is a social institution that attempts to meet the needs of the citizenry. • analyze the role culture plays in economic issues of production, distribution, and consumption.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate how economic incentives have attracted people from many nations to the United States. Interview business proprietors representing various cultures to ascertain reasons for moving to the United States. Write news articles explaining incentives. • investigate impact of Sixteenth Amendment. Create charts showing goods and services provided by the U.S. government to its citizens before and after the Sixteenth Amendment (income tax) was ratified. Evaluate and debate whether income taxes have been positive or negative. • investigate how culture affects consumer choices and decisions. Create cartoons reflecting ways different cultures respond to economic issues of production, distribution, and consumption. ***Technology suggestion:*** *Use integrated software packages to create cartoons.*	Fernanda, Anel, Hank, and Fatina are highly creative students with limited English proficiency. Using their first language, they interview their parents, family friends, or others in their ethnic communities on reasons for coming to the U.S. They present their findings to the class in English (*Types of extensions: motivation, purpose and appropriateness).* Cameron has rheumatoid arthritis that significantly impacts his ability to participate in sustained writing activities. Gayla is a quadriplegic. To create cartoons, they will work with an assistant, multimedia technology, and peers. On days that Cameron's arthritis is under control, he works independently (*Types of extensions: level of support, procedure and routines, time, resources and materials).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Economics (2.18)	Why is it important for me to study and understand economics?	**Students will** • understand that the basic economic problem confronting individuals, societies, and nations is scarcity or the imbalance between unlimited wants and limited resources available to satisfy those wants. • recognize that, as a result of scarcity, individuals, societies, and nations must make choices/decisions which result in consequences. • analyze economic concepts and understand their nature and relevance to different economic situations. • analyze how individuals and nations deal with the issues of production, distribution and consumption. • recognize that markets (e.g., national, international, global) and economic institutions exist to enable buyers and sellers to exchange goods and services. • recognize that economic systems are created by individuals and societies to achieve broad goals (e.g., security, growth, freedom, efficiency, equity).

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Sample Activities	Sample Extensions for Diverse Learners
Students will • explain why scarcity is the basic economic problem. Study problems created when resources (e.g., oil, timber, water) are not available and responses of nations. In feature articles, discuss the impact that the lack of resources has had on communities in Kentucky *(WP-Transactive).* • identify opportunity costs when decisions on major purchases are made. Create contracts for major purchases including information on opportunity costs. • investigate basic economic concepts. Illustrate economic concepts through fables *(WP-Literary).* • examine the human and natural resources of developing countries. Create economic plans that address issues of production, distribution, and consumption. • examine different institutions in competition for services. Compare car loan rates at different banks and credit unions. Write news articles to help others make decisions about the best bank to use for their next car purchase (*WP-Transactive).* ***Technology suggestion:*** *Use word processor to create bank service brochures.*	Tim and Jesse, both highly creative students, need opportunities to develop entrepreneurial skills. They will research the status of aquaculture experiments in Kenton County as an alternative to raising tobacco. They will consult with the state aquacultural researchers as well as local business persons who can provide guidance in setting up business and marketing plans (*Types of extensions: purpose and appropriateness, complexity, level of support, demonstration of knowledge, participation, resources and materials, motivation, environment).*
• investigate individual needs (e.g., housing) and societal goals (e.g., housing for all members). Construct flow charts that demonstrate ways economic systems are created by individuals and societies to achieve broad goals. ***Technology suggestion:*** *Use integrated software packages to create flow charts.*	Melinda has a personal goal to develop self-advocacy strategies that will assist her in the future with accessing resources. She volunteers for the Legal Aid Society and is a mentor for younger students. She makes an oral presentation for the Legal Aid Society and for the students she mentors that illustrates the critical knowledge they need to be self-advocates. The presentation is videotaped and the tape is placed in the school library (*Types of extensions: purpose and appropriateness, demonstration of knowledge, motivation, environment).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Geography (2.19)	How does geography affect or impact a national and/or global economy?	**Students will** • understand that the problem of scarcity (unlimited wants and limited resources) must be addressed by all nations. • recognize that nations deal with scarcity by making choices that have consequences. • analyze how nations' wealth and consequent trade potential are tied to their resources. • explore how international trade and multinational corporations have led to the emergence of a global economy.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine problems of scarcity and responses by different nations. Select a highly industrialized country, a moderately industrialized country, and a third-world country. Compare how the different countries have dealt with scarcity. Evaluate the choices each country has made relative to the issue of scarcity and debate their success. Present findings in oral presentations. • evaluate economic advantages of nations. Simulate nations' wealth by using tokens or money to make purchases, demonstrating differences in economic power. Develop ways to equalize purchasing positions. • explore international trade to examine the creation of a global economy. Hold mock international conferences, role-playing different nations' positions on whether international trade has been good or bad.	Rick acquires information best when provided with memory and organizational devices to support his learning, especially when the tasks require integrating information. To help him organize information for his oral presentation, his teacher provides Rick with a pre-developed matrix that outlines issues and countries to research (*Types of extensions: complexity, magnitude, procedures and routines, level of support, resources and materials).*

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Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Historical Perspective (2.20)	How and why has the economy of the United States changed?	**Students will** • understand how the United States economy has changed from a rural economy to an industrial economy to a leader in the global economy. • recognize that the U.S. Constitution contains few economic guidelines; therefore, economic policies are determined by elected officials. • analyze how the number and complexity of economic issues have increased as the United States has entered the global economy.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine ways the U.S. economy has changed over time. Select economic issues from different time periods and assume roles of government officials and consumers. Role-play how different people were affected. • engage in academic scavenger hunts that uncover economic issues discussed in documents of United States history (e.g., governmental response to taxation will be analyzed through existing documents–the Constitution, federal statutes, Supreme Court cases). Create collages composed of news headlines indicating major economic developments. • identify important economic issues and events in U.S. history. Create multimedia presentations showing how economic issues have changed from internal issues (U.S. only) to those of a global nature.	Charlie learns at the same rate as his same-age peers except in the area of language. The teacher gives multiple examples of economic issues such as choices, prices, and needs prior to the assignment (*Types of extensions: order of learning, procedures and routines).* Luke, Sarah, Tillie, Rina and Agnes grasp concepts quickly and need opportunities to practice exerting effort in learning. They will research the impact of deregulation on the U.S. and world economy, present their findings, and predict the possible effects of further deregulation (*Types of extensions: purpose and appropriateness, complexity, participation, motivation, resources and materials, demonstration of knowledge, level of support).*

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High School English/Language Arts and Social Studies
Interdisciplinary World Studies

Content Areas: English II and World Civilization
Prerequisite: English I
Credit: 2 (1 English, 1 Social Studies)

Course Overview:
This world studies course is a chronological, interdisciplinary survey of the history, culture, sociology, literature, art, music, and philosophies of cultures around the world. Students are engaged in critical inquiry throughout the course. They investigate historical and literary periods, gaining a better perspective of the universal human condition and man's role in the world. Students build communication and inquiry skills by focusing on the development of longer written compositions and oral presentations. In addition to reading and writing activities, students prepare a variety of creative projects, based on individual interests.

Models are organized around guiding questions. Guiding questions (in bold print) direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Essential questions, listed below the guiding questions, are included to further focus student learning.

Pages of models are arranged in pairs. On the left-hand page of each pair, are guiding and essential questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the needs of all their students

Guiding and Essential Questions:
How have historical events influenced our understanding of the modern world?

• How did Revolutions advance or stagnate the human experience?

• How did Industrialization bring about changes in the traditional European social structure?

• How do the effects of Colonialism cause tension for us today?

• How do wars reflect winners and losers?

How do forms of expressions and communications (e.g., literature, art, music, dance, drama, philosophy, technology) reflect the human experience of a given period in world history?

• How was Romanticism a reaction to Industrialization and the Enlightenment?

• How did technological advances impact the human experience?

• What are some experiences common to people over time?

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World Studies

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.24, 2.25)** **Writing (1.11)** **Speaking/ Listening/ Observing (1.3, 1.4, 1.12)** **Historical Perspective (2.20)** **Government and Civics (2.14, 2.15)** **Culture and Society (2.16, 2.17)**	**Renaissance, Reformation, Exploration** **How have historical events influenced our understanding of the modern world?** **How do the humanities (e.g., literature, art, music, dance, drama, philosophy) reflect the human experience of a given period in world history?**	**Students will** **English II** • respond critically and analyze literary genres. • apply writing-to-demonstrate-learning strategies. • write transactive pieces. • develop and apply verbal and nonverbal elements of delivery. • apply language structure and conventions when speaking. • interpret structure and organization from selected readings. **World Civilization** • understand the interpretive nature of world history. • use tools to explore world civilizations. • examine significant eras to develop chronological understanding. • examine the significance of individuals and groups. • analyze social, political, and economics characteristics of eras. • analyze causes and consequences of revolutions and rebellions. • explore ways in which cultures are defined.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • read and analyze Renaissance literature (e.g., Petrarch, Rostand, Shakespeare, de Cervantes, Marlowe, Machiavelli, Montaigne (essays), Erasmus, Luther, Boccaccio), including primary sources to identify ideas of humanistic thought. • research reforms of the Renaissance. Write letters from a period perspective describing how societal, economic, and technological changes (e.g., moveable type, partnerships, new types of food, new manufactured products) impacted life during the Renaissance. • write and deliver speeches that church reformers might have given in support of reform.	Claude uses an interpreter to understand information presented orally. For this assignment, Claude will use the Internet to gather information on religious movements. Claude's interpreter voices his responses *(Types of extension: demonstration of knowledge).*
• read about changes (e.g., political, social, scientific, economic) that occurred during the Reformation as reflected by writers (e.g., Swift, Dickens, Orwell, Shelley, Blake, de Maupassant, Pope). Discuss findings and record information in learning logs. • develop graphic organizers to compare the three religious movements (Lutheran, Calvinism, Anglican). Identify leaders, main beliefs, and geographical areas. Compare these movements to establishment of other religions (e.g., Buddhism, Hinduism). Write articles for social studies journals discussing one religion including how geography influenced its development. *Use this activity to develop possible writing portfolio entries (WP - Transactive).* • demonstrate how art helps define cultures. Create mini-museums displaying works of Renaissance visual artists (e.g., DaVinci, Michaelangelo, Raphael, Titan, Durer, Jan Van Eyck). • examine the Harlem Renaissance in America and compare it to the European Renaissance. Explore how differences in perception are tied to the development of nations' religious background and political struggles. Create dialogues between leaders of each period. • research important women of the Renaissance and examine their roles within society. Compare their lives with the lives of their male counterparts. Create visual images (e.g., collages, mobiles) illustrating differences in lifestyle.	Robin, Nevel, and Cole enjoy books. However, they have difficulty remembering what they have read and analyzing complex text to understand main ideas. They need multiple opportunities to learn new language and understand new concepts. To assist the students with their reading assignments, they are taught some strategies for reading (e.g., developing guided reading questions, graphic organizers, story mapping, retrieval strategies, context clues, familiar expression clues, synonym clues, example clues and definition clues, mnemonics, story grammar techniques and visual imagery). They will select works by two writers written to match their reading level. Prior to the assignment, they receive instructions on complex vocabulary that is paired with examples. They also receive instruction on the process of analyzing changes using graphic organizers *(Types of extensions: order of learning, complexity, magnitude, procedures and routines, resources and materials, level of support).*

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World Studies

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.24, 2.25)** **Writing (1.11)** **Speaking/ Listening/ Observing (1.3, 1.4, 1.12)** **Technology as Communication (1.16)** **Historical Perspective (2.20)** **Government and Civics (2.14, 2.15)**	**Revolutions** **How have historical events influenced our understanding of the modern world?** **How do the humanities (e.g., literature, art, music, dance, drama, philosophy) reflect the human experience of a given period in world history?** How did Revolutions advance or stagnate the human experience?	**Students will** **English II** • read and analyze persuasive materials. • apply writing-to-demonstrate-learning strategies. • write transactive pieces. • use organizational signals. • analyze persuasive techniques when listening and observing. • practice critical listening, observing, and thinking. • identify authors' point of view, persuasive, and propaganda techniques, and facts/opinions, especially in persuasive passages. • understand vocabulary in context. • apply appropriate source documentation. • use appropriate practices to access technology. • use technology to present information. **World Civilization** • understand the interpretive nature of world history. • use tools to explore world civilizations. • examine significant eras to develop chronological understanding. • examine the significance of individuals and groups. • analyze social, political, and economics characteristics of eras. • analyze causes and consequences of revolutions and rebellions. • recognize causes and consequences of nationalism, militarism, and imperialism. • analyze conflicts between different forms of government and examine the impact of these conflicts on historical events and changes.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • research the four major militaristic revolutions (e.g., American, British, French, Russian) to understand their causes and impact on societies, cultures, and governments. Compare to revolutions in other countries (e.g., Puerto Rico, Cuba). Work in collaborative groups to create illustrated books about one of the revolutions. ***Technology suggestions****: Use online research tools to research revolutions. Use desktop publishing programs to create books.* • analyze the rise of democracy. Read and evaluate persuasive primary documents (e.g., Declaration of the Rights of Man and Citizen, English Bill of Rights, Emancipation Proclamation, selections from Hobbes, Locke, Montesquieu, Voltaire, Rousseau, Marx, Engels). Create informative articles describing one of the philosophers and his beliefs *(WP-Transactive).* • compare primary documents (e.g., Declaration of the Rights of Man and Citizen, English Bill of Rights, *Declaration of Independence*). Create Venn diagrams to illustrate similarities and differences of primary sources. • read *A Tale of Two Cities*. Investigate Dicken's point of view, specialized vocabulary, and historical portrayal of the French Revolution. Compare book to movie version. Write movie reviews for school newspapers *(WP-Transactive).* • prepare debates based on the statement, "Revolutions are justifiable." Write persuasive letters to future generations explaining why (or why not) revolutions are justifiable and read to class. Critique each others' letters (*WP-Transactive*).	Don uses low vision devices to obtain visual information. In order to explain his need to see information used in classroom discussions and demonstrations, he is taught self-advocacy skills and independence, which are part of his transition goals. He uses a monocle to read primary documents in text and chart form and accesses voice text to read information from computers. He previews visual information prior to class allowing him to follow the discussion *(Types of extensions: resources and materials, procedures and routines, level of support).*

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World Studies

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.24, 2.25)** **Writing (1.11)** **Speaking/ Listening/ Observing (1.3, 1.4, 1.12)** **Historical Perspective (2.20)** **Economics (2.18)** **Culture and Society (2.16, 2.17)**	**Industrialization** **How have historical events influenced our understanding of the modern world?** **How do the humanities (e.g., literature, art, music, dance, drama, philosophy) reflect the human experience of a given period in world history?** How did Industrialization bring about changes in the traditional European social structure? How was Romanticism a reaction to Industrialization and the Enlightenment?	**Students will** **English II** • read and analyze persuasive materials. • respond critically and analyze literary genres. • apply writing-to-demonstrate-learning strategies. • write transactive pieces. • develop and apply verbal and nonverbal elements of delivery. • practice critical listening, observing, and thinking. • apply language structure and conventions when speaking. • read and analyze practical/workplace materials. **World Civilization** • understand the interpretive nature of world history. • use tools to explore world civilizations. • examine significant eras to develop chronological understanding. • examine the significance of individuals and groups. • analyze social, political, and economics characteristics of eras. • trace the impact of advances in research, science, and technology. • analyze the challenges and opportunities of an interdependent world. • understand the forces that affect economic systems. • examine how people in various civilizations made choices relating to economic growth. • analyze how increased productivity resulted in the accumulation of wealth. • explore ways in which cultures are defined.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate ways governments encourage research and development in the private and public sectors. Research copyright and patent laws of different countries governing new inventions, products, and ideas. Write editorials proposing incentives governments may implement to encourage innovation in individuals or groups. Support editorial positions with research data *(WP-Transactive).* • research how specialization, division of labor, and improvements in capital goals increase productivity. Investigate examples of different ways to increase productivity (e.g., Joseph Wedgewood and pottery industry, Eli Whitney and the cotton gin). Explore how one new technology led to development of others. Create illustrated time lines that trace history of technological developments. Read literature selections that illustrate how technology impacted quality of life for society. • design and create museum exhibits titled "The Industrial Revolution." Include technological advancements, political leaders, and prominent people in arts and sciences. • examine the treatment and contributions of immigrants (e.g., Chinese work on the railroad system). Write feature articles detailing findings *(WP-Transactive).* • compare European social structure to that of other areas (e.g., America, Africa, Asia). Create graphic organizers to compare European social structure before and after the Industrial Revolution.	
• listen and respond to music of the Romantic period and narrate audiotapes that compare music of the Classical to Romantic periods (e.g., Classical: Mozart, Hayden; Romantic: Beethoven, Tchaikovsky, Wagner). Compare in graphic organizers European music of this time period to music from other continents. • examine changes in different cultures as a result of the Industrial Revolution. Investigate forerunners of labor unions (e.g., Hui Kuan). Investigate workplace rules and regulations, past and present. Explore concepts of child labor and education for children in different cultures. Write articles comparing children's living conditions in different cultures, then and now. • read selections of Romantic literature (e.g., Goethe, Wordsworth, Heine, Keats, Whitman, Hugo). Craft encyclopedia articles explaining Romanticism in historical and cultural contexts.	Geneva is deaf. She can not hear sound, but she can feel vibrations. She watches dance videos set to music of the romantic and classical periods to show tempo and mood. Peers work with her to provide assistance with explanations during the video pieces. She uses a computer with voice text to write her presentation. The computer voices her presentation to the class. Her computer presentation is given to the local library and school library to benefit other individuals who are deaf *(Types of extensions: purpose and appropriateness, resources and materials, demonstration of knowledge, level of support).*

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World Studies

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.24, 2.25)** **Writing (1.11)** **Speaking/ Listening/ Observing (1.3, 1.4, 1.12)** **Technology as Communication (1.16)** **Historical Perspective (2.20)** **Geography (2.19)** **Government and Civics (2.14, 2.15)** **Culture and Society (2.16, 2.17)**	**Imperialism** **How have historical events influenced our understanding of the modern world?** **How do the humanities (e.g., literature, art, music, dance, drama, philosophy) reflect the human experience of a given period in world history?** How do the effects of colonialism cause tension for us today?	**Students will** **English II** • respond critically and analyze literary genres. • select and read materials for enjoyment. • write personal pieces. • critique own and others' writing. • develop and apply verbal and nonverbal elements of delivery. • practice critical listening, observing, and thinking. • apply language structure and conventions when speaking. • use technology to present information. **World Civilization** • understand the interpretive nature of world history. • use tools to explore world civilizations. • examine significant eras to develop chronological understanding. • examine the significance of individuals and groups. • recognize the significance of geography and natural resources. • analyze the challenges and opportunities of an interdependent world. • examine how natural resources, perspectives, and relationships produce conflict and/or cooperation. • describe the movement of populations and its impact. • understand location and distribution of human features of the Earth. • understand how factors influence settlements and movement. • examine ways in which cooperation, conflict, and competition occur. • analyze problems of ethnocentrism, stereotyping, and cross-cultural misunderstandings. • recognize the role of cross-cultural understanding. • examine ways in which modern governments do or do not preserve and protect the rights and liberties of their constituents.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • make generalizations about the culture and civilization of Africa before colonization based on passages from *Out of Africa*. View portions of the film. Respond in learning logs to the idea of "white man's burden". • read portions of *Cry, the Beloved Country* and view the film *Cry, Freedom* to gain an understanding of racial oppression in Africa. Investigate national and international laws written to protect citizens from discrimination and oppression. • work in pairs to create maps of Africa showing various stages of conquest by western powers. • research the development, history, and ownership of the Suez Canal. Prepare maps of the Eastern Hemisphere, using the Suez Canal as the central focus of the map. Prepare charts depicting statistical information on the impact of the canal on world trade. Debate which canal, Suez or Panama, is more important in terms of worldwide economy and strategic location. • investigate colonial rule under specific nations (e.g., Great Britain, France, Italy, Belgium, United States, Portugal, Cuba, Puerto Rico). Create bulletin boards of the world in 1914 showing European colonies, trade routes, and trade goods. • research influential persons in an era (e.g., Kaiser Wilhelm II, Tsar Nicholas II, General Erich Ludendorff, Georges Clemenceau, Woodrow Wilson, Vladimir Lenin). ***Technology suggestion**: After researching significant individuals, videotape round table interview segments with students answering questions in the role of their assigned individual.* • read selections from *Nectar in a Sieve* to make connections between personal experiences and historical events in India under British rule. Read other literary selections about Indian history and make comparisons. • read selections from *Things Fall Apart* and *Kaffir Boy* to gain an understanding of the effects of colonialism on African cultures and individual Africans.	Abini recently moved to this country from South Africa. She loves to write stories and poetry. Abini will read her poetry to the class and ask them to critique her work *(Types of extensions: motivation, participation, purpose and appropriateness).*

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World Studies

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.24, 2.25)** **Writing (1.11)** **Inquiry (1.1)** **Technology as Communication (1.16)** **Historical Perspective (2.20)** **Geography (2.19)** **Culture and Society (2.16, 2.17)**	**Defense of Democracy (1910 - 1945)** **How have historical events influenced our understanding of the modern world?** **How do the humanities (e.g., literature, art, music, dance, drama, philosophy) reflect the human experience of a given period in world history?** How do wars reflect winners and losers? How did technological advances impact the human experience?	**Students will** **English II** • respond critically and analyze literary genres. • select and read materials for enjoyment. • use writing-to-learn strategies. • apply writing-to-demonstrate-learning strategies. • write personal pieces. • use organizational signals. • use practices, skills, and strategies to access technology. • use technology to present information. • evaluate credibility of sources. • access, compare, and document multiple sources of print and nonprint resources for group, collaborative, and/or independent inquiry projects. **World Civilization** • understand the interpretive nature of world history. • use tools to explore world civilizations. • examine significant eras to develop chronological understanding. • examine the significance of individuals and groups. • analyze social, political, and economics characteristics of eras. • trace the impact of advances in research, science, and technology. • examine how natural resources, perspectives, and relationships produce conflict and/or cooperation. • explore how modifications of the environment affect life. • examine ways in which cooperation, conflict, and competition occur. • recognize the role of cross-cultural understanding.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • read and analyze Russian literature (e.g., "The Death of Ivan Ilyich," *The Cherry Orchard*) to understand plight of Russian people during Stalin's rule. Write articles about social, political, and economic impact of Stalin's rule. Share with local historical society (*WP-Transactive*). • research the Holocaust. Read firsthand accounts (e.g., *Night, The Diary of Anne Frank*). Compare different accounts of the Holocaust in both print and nonprint sources (e.g., Internet, magazines, books). Investigate ways to determine credibility of different accounts.	Felix is an outstanding artist. He is responsible for tutoring his peers in the use of the elements of art to create their illustrations *(Types of extensions: purpose and appropriateness, motivation, complexity).*
***Technology suggestion**: Prepare multimedia presentations depicting personal experiences of those impacted by the Holocaust.*	Colleen sustained a spinal cord injury which has left her with limited use of her hands. She uses clip art and computer to complete her political cartoons. She is given extra time to complete her assignment and uses an adaptive device in place of the traditional mouse *(Types of extensions: resources and materials, time).*
• choose European countries involved in WWII and produce political cartoons expressing that country's rationale for entering the war. • investigate literature to discover propaganda and persuasive techniques used during WWII. Create bulletin boards of posters, cartoons, and other visuals used during WWII. • read literature about nuclear bombing of Japan (e.g., *Hiroshima, No Pika*) to gain an understanding of devastation from victims' points of view. Write persuasive letters to future generations about wars from the perspective of individuals who experienced the bombing of Japan. • produce fictional journals of civilian victims made homeless by WWII bombing based on written or photographic documentation. • view *All Quiet on the Western Front*. Write letters to French soldiers' families from German soldiers' point of view. • research technologies created for the war effort. Investigate impact of these on the war effort and society. Create catalogs of technological advances of WWI and WWII including illustrations and descriptions. • examine changes in civil rights in America after WW II. Investigate important events (e.g., Japanese internment), people (e.g., Tuskeegee Airmen), and legislation (e.g., Johnson Reed National Origin and Immigration Act of 1924). Research media coverage of these events and people. Write time period news articles to describe events.	

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.24, 2.25)** **Writing (1.11)** **Historical Perspective (2.20)** **Government and Civics (2.14, 2.15)** **Culture and Society (2.16, 2.17)**	**Contemporary World** **How have historical events influenced our understanding of the modern world?** **How do the humanities (e.g., literature, art, music, dance, drama, philosophy) reflect the human experience of a given period in world history?** How has the human experience redesigned the modern world?	**Students will** **English II** • respond critically and analyze literary genres. • select and read materials for enjoyment. • use writing-to-learn strategies. • apply writing-to-demonstrate-learning strategies. • write transactive pieces. • use organizational signals. **World Civilization** • understand the interpretive nature of world history. • use tools to explore world civilizations. • examine significant eras to develop chronological understanding. • examine the significance of individuals and groups. • analyze social, political, and economics characteristics of eras. • examine ways in which cooperation, conflict, and competition occur. • recognize the role of cross-cultural understanding. • compare and contrast different political systems and recognize their sources of power. • explore ways in which stability and peace are pursued in an interdependent world. • recognize ways in which social institutions influence and respond to human needs in various societies. *(Continued on page 142)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • interview relatives or acquaintances about life in the 1950s or 1960s (e.g., events, styles, music, technology, jobs, entertainment, civil rights, education, attitudes). Write articles for school newspapers discussing similarities and differences between life in the present decade and life in the 1950s or 1960s *(WP-Transactive).* • conduct mock United Nations meetings with representatives from the five permanent members: United States, France, Great Britain, Commonwealth of Independent States, and China. Divide into small teams, one for each nation. Choose current world problems to debate from their nation's perspective. Use non-fiction reading skills to research and prepare their nation's view. Use effective persuasive strategies to present their nation's perspective.	
• read literature selections from 1940 to present. Present literature selection to class to convince students that this piece should be included in an anthology to depict the time period. Research events and attitudes of the time period and write introductions for selections to explain how their chosen piece of literature reflects the time period. • plan postwar West European art festivals to illustrate art of period. Represent Great Britian, France, and West Germany. Use research skills to determine which music, theatre, literature, films, dance, and art of the 1950s and 1960s to include. Write reviews of the pieces chosen, present oral explanations to class, and construct displays.	Lula is a creative performer, but has difficulty organizing and communicating her ideas in written form. She researches the 50s and 60s using multimedia reference tools. She is provided models of various types of questions from which she selects and expands her set of questions for her interview. Instead of taking notes during the interview, she videotapes it. She works in a group to develop a living portrait as a vehicle for sharing her information. She does a "time and again" segment showing the influences between experiences of the 50s and 60s and those of today. Because there are other students with learning needs, the teacher develops a scoring guide that includes criteria for presenting information *(Types of extensions: purpose and appropriateness, complexity, magnitude, order of learning, procedures and routines, resources and materials, demonstration of knowledge, levels of support, participation, motivation).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.24, 2.25)** **Writing (1.11)** **Technology as Communication (1.16)** **Historical Perspective (2.20)** **Economics (2.18)**	*(Continued from page 140)* **Contemporary World** **How have historical events influenced our understanding of the modern world?** **How do the humanities (e.g., literature, art, music, dance, drama, philosophy) reflect the human experience of a given period in world history?** What are some experiences common to people over time?	**Students will** **English II** • select and read materials for enjoyment. • use writing-to-learn strategies. • apply writing-to-demonstrate-learning strategies. • write transactive pieces. • use organizational signals. • use practices, skills, and strategies to access technology. • use technology to present information. **World Civilization** • understand the interpretive nature of world history. • use tools to explore world civilizations. • examine significant eras to develop chronological understanding. • examine the significance of individuals and groups. • trace the impact of advances in research. science, and technology. • explore ways that different peoples, civilizations, and nations in different time periods dealt with scarcity.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • construct illustrated time lines of important events in each country's history between WWI and the present. Include political, religious, economic, and cultural events. ***Technology suggestions****: Work in groups to prepare video presentations on countries and/or regions studied. Use research sources, including library, Internet, textbooks, and class notes to prepare comprehensive videos. Collaborate to write scripts and film videos. Videotape role-playing interviews on the Cold War with Harry Truman, Dwight Eisenhower, John Kennedy, Richard Nixon, Joseph Stalin, Nikita Khruschev, and Leonid Brezhnez. Produce and videotape mock news stories on the Arab-Israeli conflict.* • research problems and challenges of 21st century. Construct collages to represent the 21st century focusing on modern problems and challenges. Develop and discuss possible solutions. • write feature articles to submit to popular news magazines (e.g., *Newsweek, Time*) about current events or individuals. Write for specific audiences and purposes *(WP-Transactive).* • prepare prospectuses for movie scripts. Choose topics studied during the course and develop movie plots. Base movie ideas on information studied in the course *(WP-Transactive).* • read materials to compare current world instability to similar historical problems. Respond to open-response questions on this topic. • investigate measures used by different types of governments to create products needed in times of war. Identify appropriate literature to portray examples of such efforts.	Jorge has only been in the U.S. for a few months and has limited English language skills and vocabulary. The teacher will provide Jorge with a list of essential vocabulary. He will work with a group of English-speaking students to create time lines, but he will be responsible for illustrations *(Types of extensions: level of support, resources and materials, order of learning).*

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NOTES

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World Studies Student Resources

Achebe, Chinua. *Things Fall Apart*
Alighieri, Dante. *The Divine Comedy*
The Arthur Legend
The Awakening of Osiris
Bhagavad Gita
Boccaccio, Giovanni. *Decameron*
The Book of the Dead
The Book of Ruth
The Book of Songs
Brancato, Robin. *Fourth of July*
Brancato, Robin. *Furlough 1944*
Chekhov, Anton. "The Bet"
Chekhov, Anton. *The Cherry Orchard*
Chief Seattle. *American Indian Stories*
Confucius, *The Analects*
Crane, Stephen. *The Red Badge of Courage*
de Maupassant, Guy. "The Necklace"
Dickens, Charles. *A Tale of Two Cities*
Dinesen, Isak. *Out of Africa*
The Epic of Gilgamesh
Euripedes. *Medea*
Frank, Anne. *The Diary of Anne Frank*
Genesis 1-3 (The Creation and the Fall)
Genesis 6-9 (The Story of the Flood)
Greene, Bette. *An Ordinary Woman*
Helgi, Ursula. *Stones from the River*
Hoff, Benjamin. *The Tao of Pooh*
Homer. *The Iliad*
"I Think I'll Go Home and Lie Very Still"
*I Samue*l 17 (David and Goliath)
Kenko. "Essays in Idleness"
Knowles, *John. A Separate Peace*
The Koran ("The Opening," "Power," "Daybreak")
Lee, Harper. *To Kill a Mockingbird*
Machiavelli , Niccolo. *The Prince*
Mahabharata ("Sibi")
Markandaya, Kamala. *Nectar in a Sieve*
Marvki, Toshi. *Hiroshima, No Pika*
Mason, Bobbie Ann. *In Country*
Mathabane, M. Kaffic Boy: *The Story of a Black Youth's Coming of Age in Apartheid South Africa*
Milosz, Czeslaw. *A Song on the End of the World*
New Testament parables
Ovid. *Metamorphosis*
Paton, Alan. *Cry, The Beloved Country*
Peck, Richard. *Priscilla and the Wimp*

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World Studies Student Resources

Plato. *The Apology*
Poe, Edgar. "The Tell Tale Heart"
Remarque, Eric. *All Quiet on The Western Front*
The Rig Veda
Rojas, Manuel. "The Glass of Milk"
Shakespeare, William. *Julius Caesar*
Shakespear, William. *The Taming of the Shrew*
The Siegfreid Legend
The Song of Roland
Sophocles. *Antigone*
Sophocles. *Odeipus Rex*
Steinbeck, John. *Of Mice and Men*
Strasser, Todd. *On The Bridge*
Strasser, Todd. *The Wave*
Tacitus. Annals
T'ao Ch'en. *Book of Songs*
Thucydides. *History of the Peloponnesian*
Tolstoy, Leo. *Death of Ivan IIyich*
Tolstoy, Leo. "How Much Land Does a Man Need?"
Upanishad
Virgil. *Aeneid*
"The Voice of the Swallow, Flittering, Calls to Me"
Well, Simone. *What's So Amazing About Grace*
Whitman, Walt. *Leaves of Grass*
Wiesel, Elie. *Night*
Wordsworth, William. "Ode: Intimations on Immortality"
"Your Love, Dear Man, Is As Lovely to Me"
Zeami. *The Deserted Crone*

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NOTES

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High School English/Language Arts and Social Studies
Interdisciplinary American Studies

Content Areas: English III, U.S. History, Government
Prerequisite: English II
Credit: 2 (one English, one Social Studies)

Course Overview:
This American studies course is a chronological, interdisciplinary survey of the history, government, culture, sociology, literature, art, music, and of America. Students study each historical and literary period, gaining a better perspective of the universal human condition and an understanding of citizens' responsibilities to society. Students build inquiry and communication skills, focusing on the development of written compositions, oral presentations, and projects. Using a variety of print and nonprint materials, students research and evaluate issues related to the development of American culture.

In order to award two credits for this American studies, all content for English III and the content for two social studies strands, government and U.S. history (Reconstruction to the present), must be included. Additional social studies content is included to help students develop an understanding of trends, attitudes, and literature from different periods of American history.

Models are organized around guiding questions. Guiding questions (in bold print) direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Essential questions, listed below guiding questions, are included to further focus student learning. Pages of models are arranged in pairs. On the left-hand page of each pair are guiding and essential questions along with related academic expectations and correlations to the *Program of Studies*. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address *Program of Studies* content, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding and Essential Questions:
How do forms of expression and communication (e.g., literature, art, music, dance, drama, media) reflect the human experience of a given period of American history?

- To what degree does the media shape our social values?

How have historical events influenced our understanding of modern America?

- Why did Europeans assume superiority over Native Americans? What could Europeans have learned had they been open to another culture?

- Do the economic, social, and political issues that split the country during the Civil War still exist today?

- What impact did Industrialization have on America?

- Was the Civil Rights Movement a success?

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- How did the social and economic changes of the Roaring Twenties create tensions in America?

How has our government reflected the needs and concerns of its people throughout history?

- How did the formation of our government reflect the values of its citizenry?
- Do our Constitution and Bill of Rights serve the people?
- How do democratic principles of government and political thought, which are reflected in American culture, shape an American identify?
- How has the role of the United States in world affairs changed?
- Should the federal government provide more assistance to special groups?
- Did the U.S. make appropriate decisions during WW II?
- Should the United States be praised or condemned for its efforts in the Cold War?

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American Studies

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.22, 2.24, 2.25)** **Writing (1.11)** **Inquiry (1.1)** **Historical Perspective (2.20)** **Culture and Society (2.16, 2.17)**	**Birth of a Nation (Beginnings to 1800)** **How do forms of expression and communication (e.g., literature, art, music, dance, drama, media) reflect the human experience of a given period of American history?** **How have historical events influenced our understanding of modern America?** Why did Europeans assume superiority over Native Americans? What could Europeans have learned had they been open to another culture?	**Students will** **English III** • analyze print and nonprint reading materials. • read and analyze literature. • use writing-to-learn activities. • use writing-to-demonstrate-learning strategies. • develop personal and literary writing. • locate and analyze sources to obtain information. **U.S. History** • explore how people and cultures have contributed to the American experience. • analyze origins and consequences of stereotyping, prejudice, and discrimination. • examine impact of research, science, and technology on historical events.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • compare creation stories from Native American and European cultures. Construct Venn diagrams to illustrate similarities and differences in structure and culture. Write their own creation stories. • research technological advances of Native Americans at the time of European Exploration and compare them to those of the Europeans. Create collages, bulletin boards, or multimedia presentations comparing technologies. • analyze excerpts from Columbus's journal. Identify his attitudes toward natives he encountered. Write new journal entries from the perspective of a more open-minded Columbus describing what he saw and people encountered.	

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Writing (1.11)** **Speaking/ Listening/ Observing (1.3, 1.4, 1.12)** **Inquiry (1.1)** **Technology as Communication (1.16)** **Historical Perspective (2.20)** **Government and Civics (2.14, 2.15)** **Culture and Society (2.16, 2.17)**	**Birth of a Nation (Beginnings to 1800)** **How do forms of expression and communication (e.g., literature, art, music, dance, drama, media) reflect the human experience of a given period of American history?** **How have historical events influenced our understanding of modern America?** **How has our government reflected the needs and concerns of its people throughout history?** How did the formation of our government reflect the values of its citizenry?	**Students will** **English III** • analyze print and nonprint reading materials. • read and analyze literature. • apply analytical reading skills to make connections. • use writing-to-learn activities. • use writing-to-demonstrate-learning strategies. • develop transactive writing. • develop personal and literary writing. • use effective speaking skills. • paraphrase and adapt information for specific purposes. • use a variety of multimedia tools to enhance presentations. **Government** • analyze different forms of government. • understand the foundations of democracy in the U.S. • understand the changing role of government. • understand the purposes of various forms of government. • analyze the importance of civic rights and responsibilities. • understand democratic principles. • analyze how cultures and belief systems are reflected in governments. **U.S. History** • trace the political development of the U.S. • examine rights and responsibilities of individuals. *(Continued on page 154)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • prepare and deliver speeches to prospective citizens that explain democracy as America's form of government and distinguish it from other forms of government. Incorporate visual aids *(WP-Transactive).* • research the role of the church as a form of government (theocracy) in colonial America. Read sermons of the time period (e.g., "Sinners in the Hands of an Angry God"). Use sermon as a model to write persuasive speeches about time period issues. • write analytical essays to compare persuasive techniques (e.g., tone, propaganda, bias) in *Crisis #1* and "Speech in the Virginia Convention." • research how writing, art, and music incited revolutionary fervor. Create multimedia presentations to demonstrate findings. • compare colonial America's and today's court systems. Read *The Crucible,* then analyze court documents from Salem witch trials and documents from contemporary court cases. Compare findings in graphic organizers. Explain why the accused were singled out in the Salem witch trials. Write opening arguments defense attorneys would deliver today if the same trial were to occur. Remember to include references to the Bill of Rights. • examine economic impacts of the American Revolution on colonial society by creating cause-and-effect charts.	Reanna understands information presented visually; however, she sometimes has difficulty with understanding vocabulary. She uses an interpreter if information is presented orally. Directions for the speech is provided in writing to Reanna with the date due, components required, and rubric. The written information is reviewed with her by her interpreter to ensure that she understands the vocabulary and the directions *(Types of extensions: resources and materials, level of support).*
• examine how the *Crisis #1* and "Speech in the Virginia Convention" led to America's *Declaration of Independence.* Participate in class discussions to analyze impact. Use "Speech in the Virginia Convention" as a model to compose and deliver persuasive speeches on controversial topics (*WP-Transactive*). • examine connections between democracy as a political philosophy and capitalism as an economic philosophy. Explain how the introduction of capitalist economic systems are affecting communist systems around the world. Role-play an economic summit between government financial officers from a capitalist country and a communist country. • analyze parts of the *Declaration of Independence*. Explain democratic principles present in the document. Write personal essays, explaining their beliefs about personal independence *(WP-Personal).* • investigate motives (e.g., economic, religious) for founding American colonies. Compare forms of government that resulted from those motives. Create persuasive pieces convincing Europeans to follow them to the colonies.	A cluster of students read and analyzed Franklin's *Autobiography*, Paine's *Common Sense, The Red Badge of Courage*, and *The Crucible* in their eighth-grade honors level social studies class. These students are outstanding writers and prepare entries for the Veterans of Foreign Wars Voice of Democracy Program Content or the Emerson History Essay Contest (*Types of extensions: purpose and appropriateness, participation, order of learning, motivation, demonstration of knowledge).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.22, 2.24, 2.25)** **Writing (1.11)** **Historical Perspective (2.20)** **Government and Civics (2.14, 2.15)** **Culture and Society (2.16, 2.17)**	*(Continued from page 152)* **Birth of a Nation (Beginnings to 1800)** **How have historical events influenced our understanding of modern America?** **How has our government reflected the needs and concerns of its people throughout history?** How did the formation of our government reflect the values of its citizenry?	**Students will** **English III** • analyze print and nonprint reading materials. • read and analyze literature. • apply analytical reading skills to make connections. • use writing-to-learn activities. • use writing-to-demonstrate-learning strategies. • develop transactive writing. • develop personal and literary writing. **Government** • analyze different forms of government. • understand the foundations of democracy in the U.S. • understand the changing role of government. • understand the purposes of various forms of government. • analyze the importance of civic rights and responsibilities. • understand democratic principles. • analyze how cultures and belief systems are reflected in governments. • recognize how the United States government has changed over time to meet the needs of the society. **U.S. History** • trace the political development of the U.S. • examine rights and responsibilities of individuals.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • evaluate who was included in the drafting of the *Declaration of Independence*. Identify the audience and groups excluded. Read and analyze letters Abigail Adams wrote to her husband, John. Explain her perspective concerning the inclusion of women's voices in the Declaration and later the Constitution. • research issues advocated by first ladies throughout American history. Create illustrated time lines that demonstrate how issues have evolved over time. • videotape newscasts representative of the Revolutionary period reflecting values and issues of the time. ***Technology suggestion:*** *Use computer simulations to explore Revolutionary issues.*	

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American Studies

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.22, 2.24, 2.25)** **Writing (1.11)** **Speaking/ Listening/ Observing (1.3, 1.4, 1.12)** **Inquiry (1.1)** **Technology as Communication (1.16)** **Historical Perspective (2.20)** **Economics (2.18)** **Government and Civics (2.14, 2.15)** **Culture and Society (2.16, 2.17)**	**Birth of a Nation (Beginnings to 1800)** **How do forms of expression and communication (e.g., literature, art, music, dance, drama, media) reflect the human experience of a given period of American history?** **How have historical events influenced our understanding of modern America?** **How has our government reflected the needs and concerns of its people throughout history?** Do our Constitution and Bill of Rights serve the people?	**Students will** **English III** • analyze print and nonprint reading materials. • apply analytical reading skills to make connections. • use writing-to-demonstrate-learning strategies. • use effective speaking skills and techniques. • locate and analyze sources. • collaborate to solve problems. • use multimedia tools to enhance presentations. **Government** • understand the changing role of government. • understand the purposes of various forms of government. • recognize the establishment of government by the U.S. Constitution. • analyze the importance of civic rights and responsibilities. • analyze events to determine how the Constitution allows change over time. • understand democratic principles. • analyze how cultures and belief systems are reflected in governments. • recognize different forms of government. • analyze different forms of government. **U.S. History** • trace the political development of the U.S. • recognize how the Constitution has impacted society. • analyze roles of political parties. • examine rights and responsibilities of individuals.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • identify purposes of various constitutions (e.g., U.S., KY, club, Native American) and analyze their impact on their constituents. Examine how cultures and beliefs are reflected in constitutions. Respond to open-response questions about how constitutions reflect cultures. Work in cooperative groups to compose model constitutions. • analyze U.S. Constitution to explain its impact on American society. Participate in mock trials to demonstrate understanding of the judicial process as outlined in the Constitution. Use Watergate scandal to illustrate recursive nature of "checks and balances" in federal government. Create flow chart to demonstrate analysis. • evaluate how Constitution prevents one group from usurping rights of others. Identify real-life situations in which the Constitution protected individual rights (e.g., Watergate). Write editorials about current individual rights, issues, using historical cases as basis for arguments *(WP-Transactive).* • research motives of the writers of the Constitution. List groups (e.g., political parties, minorities) who were not included in the process or protected by the document. Explain changes made later in the document to include these groups. Make cause-and-effect charts to explain how and why these amendments came about. ***Technology suggestion**: Create photo essays illustrating how the Constitution affects their everyday lives.*	Karen and Dan, who are interested in pursuing law careers, interview a university law professor with expertise in constitutional law to find out about career preparation and opportunities in the field. They also interview the law professor about resources useful in investigating issues of their choice. They present their findings to their class and other students in the school interested in a law career (*Types of extensions: purpose and appropriateness, complexity, level of support, magnitude, resources and materials, motivation, demonstration of knowledge, environment, procedures and routines).*

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American Studies

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.22, 2.24, 2.25)** **Writing (1.11)** **Speaking/ Listening/ Observing (1.3, 1.4, 1.12)** **Inquiry (1.1)** **Technology as Communication (1.16)** **Geography (2.19)** **Government and Civics (2.14, 2.15)** **Culture and Society (2.16, 2.17)**	**What is an American? (1790 - 1860)** **How do the humanities (e.g., literature, art, music, dance, drama, philosophy) reflect the human experience of a given period of American history?** **How have historical events influenced our understanding of modern America?** **How has our government reflected the needs and concerns of its people throughout history?** How do democratic principles of government and political thought, which are reflected in American culture, shape an American identify?	**Students will** **English III** • analyze print and nonprint reading materials. • read and analyze literature. • respond critically to literary genres. • apply knowledge of literary terms and concepts. • use writing-to-demonstrate-learning strategies. • develop transactive writing. • critique own and others' works. • locate and analyze sources. • use effective speaking skills and techniques. • develop personal and literary writing. • use multimedia tools to enhance presentations. **Government** • analyze the importance of civic rights and responsibilities. • understand how government interacts with cultures. • examine how governments establish social institutions. • analyze how cultures and belief systems are reflected in governments. • analyze how cultures and belief systems are reflected in governments. **U.S. History** • understand physical and human characteristics of regions. • analyze roles of political parties and civic participation. • recognize the roles of social institutions.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • create mini-museum displays for school or community libraries depicting how America's identity emerged and is reflected by American writers and artists (e.g., Irving, Longfellow, Poe, Whitman, Audubon). ***Technology suggestions:*** *Create video documentaries using still pictures, music, and voice-over that explain how the five themes of geography (location, place, region, movement, relationships) helped to shape American identity. Broadcast documentaries on community access channel.*	
• read and analyze selections written by American Transcendentalists (e.g., Fuller, Emerson, Thoreau). Compare their themes to alternative American viewpoints. Create songs or poems that illustrate these themes. • read, listen to, and view American Romantic art (e.g., literature, paintings, music). Identify Romantic characteristics (e.g., love of nature, individualism, emotion over reason) of each piece. Create collages or posters that illustrate these themes in other ways. • research significance of early social reform efforts (e.g., schools, hospitals, prisons). Compare early efforts to today's efforts. Compose editorials to support or refute implementation of one of these institutions *(WP-Transactive).* • read and analyze literary selections of the Anti-Transcendentalists (e.g., Hawthorne, Melville). Compare beliefs of the Anti-Transcendentalists with Transcendentalists in relation to man's role in society. Record findings in graphic organizers. Use knowledge of literary devices and techniques to compose articles for school literary magazines that analyze Transcendental or Anti-Transcendental literary selections *(WP-Transactive).* • create annotated time lines that trace development of political parties in America and identify their major beliefs. Explain in annotations how political parties affected government policies. • read and analyze poetry of the Fireside poets (e.g., Longfellow, Lowell, Holmes, Whittier). Perform taped or live dramatic readings that convey poets' meanings. • research founders of the women's rights movement (e.g., Anthony, Stanton, Blackwell). Compare Declaration of Sentiments from the 1848 Seneca Falls Convention to Declaration of Independence of 1776. Write editorials or news articles comparing demands of women at the 1848 convention to those of women today *(WP-Transactive).* • read the poem "I too… ." Explain what it means to be American according to Hughes. Write their own poems about what it means to be American *(WP-Literary).*	Since Jackie's car accident, she struggles with reading fluency problems, short-term memory loss, and ability to integrate information. In the assignment to examine alternatives in American political thought expressed by American Transcendentalists, Jackie reads only one author, identifies her version of political thought, and has extended time on the reading assignment. Highlighting important information while reading is taught before the assignment so she can identify examples of political thought *(Types of extensions: magnitude, time, order of learning, procedures and routine, resources and materials).*

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American Studies

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.22, 2.24, 2.25)** **Writing (1.11)** **Speaking/ Listening/ Observing (1.3, 1.4, 1.12)** **Technology as Communication (1.16)** **Historical Perspective (2.20)** **Geography (2.19)** **Economics (2.18)** **Culture and Society (2.16, 2.17)**	**A Nation Divided (1848-1876)** **How do forms of expression and communication (e.g., literature, art, music, dance, drama, media) reflect the human experience of a given period of American history?** **How have historical events influenced our understanding of modern America?** **How has our government reflected the needs and concerns of its people throughout history?** Do the economic, social, and political issues that split the country during the Civil War still exist today?	**Students will** **English III** • analyze print and nonprint reading materials. • read and analyze literature. • apply analytical reading skills to make connections. • use writing-to-learn activities. • tailor use of conventions. • critique own and others' works. • use effective speaking skills and techniques. • use multimedia tools to enhance presentations. **Government** • understand the role of the U.S. government in the economy. • understand government regulation of resources. **U.S. History** • use tools to explore interpretive nature of history. • examine impact of individuals and groups. • analyze the social, political, and economic characteristics of various eras. • recognize the impact of geography and natural resources. • examine the economic transformation of the U.S. • explore contributions of peoples and cultures. • understand resource needs and trade relationships.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • prepare charts and graphs that explore economic, social, and political differences between the North and South prior to the Civil War. ***Technology suggestions:*** *Use spreadsheet programs to chart or graph economic, social, and political differences.* • explore how economies of the North and South changed after the Civil War. Create annotated maps of each region showing natural resources, economic centers, types of industries, goods and services provided, and distribution routes before and after the war. Write time-period news articles explaining the distribution of resources among regions (*WP-Transactive*). Explore economic differences that exist today. Investigate how local, state, and national governments influence economic changes. • read and analyze diaries (e.g., Mary Chestnut), journals, historical documents, and slave narratives (e.g., Sojourner Truth, Frederick Douglas) from the Civil War period. Compare how various groups experienced the Civil War period. Use selections as models to write personal pieces, tailoring use of language and style to reflect chosen models. • read and analyze impact of the 13th, 14th, and 15th Amendments of the Constitution on American economics, politics, and culture. Evaluate whether those amendments improved the position of African-Americans in this country. Debate impact of these Amendments on minorities. • compare writings of Frederick Douglas, Sojourner Truth, James Baldwin, Langston Hughes, Alice Walker, and Ralph Ellison and discuss experiences of African-Americans in this country since the Civil War. Write commentaries or editorials defending or refuting the statement that life is significantly better for African-Americans since the Civil War *(WP-Transactive)*. Critique their own and others' work. ***Technology suggestion:*** *Create multimedia presentations that reflect human experiences during the Civil War.* • read and analyze *The Red Badge of Courag*e. Create collages or mobiles that depict students' interpretation of the theme of courage.	Alex uses Braille to read and Braille-n-speak to take notes. In preparation for any class involving visuals (e.g., reading, charts, diagrams), the teachers will make prior arrangements to have a Braille copy provided. Alex will use a Braille-n-speak to take notes *(Types of extensions: procedures and routines, resources and materials).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.22, 2.24, 2.25)** **Writing (1.11)** **Speaking/ Listening/ Observing (1.3, 1.4, 1.12)** **Inquiry (1.1)** **Technology as Communication (1.16)** **Historical Perspective (2.20)** **Geography (2.19)** **Economics (2.18)** **Government and Civics (2.14, 2.15)** **Culture and Society (2.16, 2.17)**	**The American Dream (1890 - 1920)** **How do forms of expression and communication (e.g., literature, art, music, dance, drama, media) reflect the human experience of a given period of American history?** **How have historical events influenced our understanding of modern America?** **How has our government reflected the needs and concerns of its people throughout history?** What impact did Industrialization have on America?	**Students will** **English III** • read and analyze literature. • apply knowledge of literary terms and concepts. • apply analytical reading skills to make connections. • use writing-to-learn activities. • develop transactive writing. • develop personal and literary writing. • paraphrase and summarize information. • collaborate to solve problems. • use multimedia tools to enhance presentations. **Government** • analyze how Constitution has allowed government to change. • understand democratic principles. **U.S. History** • use tools to explore interpretive nature of history. • examine significant eras of U.S. History to develop chronological understanding. • examine impact of individuals and groups. • analyze the social, political, and economic characteristics of various eras. • examine the impact of advances in research, science, and technology. • understand physical and human characteristics of regions. • analyze the location and distribution of human features. • understand human settlements and patterns of movement. • examine the impact of immigration and movement. • examine the economic transformation of the U.S. • analyze the relationships among business, labor, and government. • illustrate how technology has changed the economy. • explore contributions of peoples and cultures. • examine cooperation, conflict and competition. • analyze stereotyping, prejudice, and discrimination. (*Continued on page 164)*

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Sample Activities	Sample Extensions for Diverse Learners
Students will • examine immigration trends (e.g., reasons for immigration and movement of immigrants, Westward Expansion, rural to urban) and their impact on cultural, political, and economic developments. Summarize findings in notes. Research current information immigration data and predict future trends. Write proposals to President and Congress incorporating findings. ***Technology suggestion:*** *Use computer simulations to explore immigration issues.* • read and analyze late 19th century literature by American authors (e.g., Twain, Bierce, London, Cather). Identify characteristics of Realism and Naturalism. Use selections as models to write realistic and/or naturalistic short stories incorporating appropriate literary elements *(WP-Literary).* • examine how artists reflected their times in art. Read and/or view *Our Town*, then view art of George Bellows and Grant Wood. Read or listen to poetry of Robinson and Masters. Write reviews for class or school magazines *(WP-Transactive).* • explore immigration issues of the late 1800s and early 1900s. Debate whether U.S. is a melting pot or salad bowl. Create visual displays (e.g., collages, mobiles, bulletin boards) depicting America as one or the other. • read literature from immigrants' perspectives. Write personal narratives about their own experiences with new or different situations (*WP-Personal*). • read historical documents (e.g., 19th Amendment, speeches, songs) and works by American writers (e.g., Hurston, Hughes, Welty, O'Connor) to identify women's and African- American issues. Participate in round-table discussions comparing themes of minority groups. • read and analyze imagist poetry by Americans (e.g., Pound, Williams, Stein). Identify themes. Create or choose illustrations to accompany these poems in anthologies.	

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.22, 2.24, 2.25)** **Writing (1.11)** **Speaking/ Listening/ Observing (1.3, 1.4, 1.12)** **Technology as Communication (1.16)** **Historical Perspective (2.20)** **Geography (2.19)** **Economics (2.18)** **Culture and Society (2.16, 2.17)**	*(Continued from page 162)* **The American Dream (1890 - 1920)** **How do the humanities (e.g., literature, art, music, dance, drama, philosophy) reflect the human experience of a given period of American history?** **How have historical events influenced our understanding of modern America?** **How has our government reflected the needs and concerns of its people throughout history?** What impact did Industrialization have on America?	**Students will** **English III** • read and analyze literature. • apply knowledge of literary terms and concepts. • apply analytical reading skills to make connections. • use writing-to-learn activities. • develop transactive writing. • develop personal and literary writing. • paraphrase and summarize information. • collaborate to solve problems. **Government** • analyze how Constitution has allowed government to change. • understand democratic principles. • analyze how the United States government deals with questions of production, distribution, and consumption of goods and services. **U.S. History** • use tools to explore interpretive nature of history. • examine significant eras of U.S. History to develop chronological understanding. • examine impact of individuals and groups. • analyze the social, political, and economic characteristics of various eras. • examine the impact of advances in research, science, and technology. • understand physical and human characteristics of regions. • analyze the location and distribution of human features. • understand human settlements and patterns of movement. • examine the impact of immigration and movement. • examine the economic transformation of the U.S. • analyze the relationships among business, labor, and government. • illustrate how technology has changed the economy. • examine cooperation, conflict and competition.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • create recruitment brochures for labor unions explaining how labor reform has improved the workplace. • examine the impact of inventors (e.g., Bell, Edison, Wright Brothers, Ford) and their technological inventions on economic and cultural development. Create catalogs complete with descriptions and illustrations of technological inventions of the time. ***Technology suggestion:*** *Use desktop publishing programs to design magazine layouts and set up art exhibit reflecting effects of Industrialization on America.* • investigate effects of big business on the quality of life in America (e.g., class system, environment). Compare effects of Industrialization on life in America to life in its neighbors and territories. Role-play meetings between management and labor. • investigate impact of government on big business by reading and analyzing antitrust acts (e.g., Sherman, Clayton) and political cartoons. Write summaries of each act and interpretations of cartoons in learning logs. • identify technological advances made in WW I weaponry (e.g., submarines, machine guns, tanks, airplanes). Conduct debates on whether or not these were true advances.	Matt, Jan, Teri, and Nabil need opportunities to apply their advanced level reasoning ability to real and complex problems. Using multiple research strategies and resources, they prepare and present a formal debate on whether the U.S. government should be involved in the Microsoft controversy *(Types of extensions: purpose, appropriateness, complexity, motivation, resources and materials, demonstration of knowledge, time, magnitude, level of support, participation, procedures and routines).*

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American Studies

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.22, 2.24, 2.25)** **Writing (1.11)** **Speaking/ Listening/ Observing (1.3, 1.4, 1.12)** **Inquiry (1.1)** **Historical Perspective (2.20)** **Economics (2.18)** **Culture and Society (2.16, 2.17)**	**The American Dream (1890 - 1920)** **How do forms of expression and communication (e.g., literature, art, music, dance, drama, media) reflect the human experience of a given period of American history?** **How have historical events influenced our understanding of modern America?** **How has our government reflected the needs and concerns of its people throughout history?** How has the role of the United States in world affairs changed?	**Students will** **English III** • apply analytical reading skills to make connections. • analyze print and nonprint reading materials. • use writing-to-demonstrate-learning. • develop transactive writing. • develop literary writing. • use effective speaking skills. • locate and analyze sources. **Government** • understand how governments interact with cultures. • analyze how cultures and belief systems are reflected in governments. **U.S. History** • examine significant eras of U.S. history to develop chronological understanding. • examine impact of individuals and groups. • analyze the social, political, and economic characteristics of various eras. • trace the changing role of the U.S. in world affairs. • examine the economic transformation of the U.S. • trace the economic development of the U.S. • explore contributions of peoples and cultures.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • read and analyze Wilson's Fourteen Points and the Treaty of Versailles. Create newspapers of that time with articles about how the Treaty of Versailles impacted America, its allies, and defeated countries. Include explanations on why the Treaty was written the way it was. • research isolationist policies of the U.S. government. Explain in learning logs how isolationist views were reflected in government and by American writers (e.g., Eliot, Pound, Hemingway). Compare views in graphic organizers. • analyze propaganda posters of WW I. Explain and compare the goals of each country as reflected in the posters. Prepare and deliver speeches that are either in favor of or against the war movement and create propaganda posters supporting their views. • examine how the economies of the U.S. and other countries around the world were affected by WW I. Create lists of products that were available before, during, and after the war. Compare costs. Identify possible economic impacts and personal conflicts that resulted from product development. Write short stories from an "I was there" perspective. Build story plots around one of the identified economic impacts (*WP-Literary*). • do cost analysis of WW I. Reflect on whether the achieved goals were worth the costs.	

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Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.22, 2.24, 2.25)** **Writing (1.11)** **Speaking/ Listening/ Observing (1.3, 1.4, 1.12)** **Technology as Communication (1.16)** **Historical Perspective (2.20)** **Economics (2.18)** **Culture and Society (2.16, 2.17)**	**Defense of Democracy (1910 - 1945)** **How do forms of expression and communication (e.g., literature, art, music, dance, drama, media) reflect the human experience of a given period of American history?** **How have historical events influenced our understanding of modern America?** **How has our government reflected the needs and concerns of its people throughout history?** How did the social and economic changes of the Roaring Twenties create tensions in America?	**Students will** **English III** • apply analytical reading skills to make connections. • apply critical listening/observing skills. • use writing-to-demonstrate learning strategies. • analyze print and nonprint reading material. • develop transactive writing. • use multimedia tools to enhance multimedia presentations. **Government** • understand how governments interact with cultures. • recognize various regions in the United States and understand how their local and state governments may operate differently because of regional needs and differences. **U.S. History** • examine significant eras of U.S. history to develop chronological understanding. • examine impact of individuals and groups. • analyze the social, political, and economic characteristics of various eras. • examine the economic transformation of the U.S. • trace the economic development of the U.S. • analyze the relationships among business, labor, and government. • explore contributions of peoples and cultures. • analyze stereotyping, prejudice, and discrimination.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • trace contributions and impact of the Harlem Renaissance by listening to jazz, reading poetry, and viewing pieces of visual art by African-American artists (e.g., Ellington, Holiday, Fitzgerald, Huston, Lawrence, Bearden). Create museum display highlighting Harlem Renaissance artists. Prepare supporting materials (e.g., scripts, brochures). ***Technology suggestions:*** *Create multimedia presentations that incorporate dramatic reading, visual arts, voice-over, and music.* • read and analyze *The Great Gatsby*, identifying similarities between the novel and culture and society of the 20s. Identify various stereotypes and prejudices shown in the novel. Write letters to characters suggesting changes in their attitudes. • identify cultural, social, political, and economic implications of the 1929 stock market crash. Explore relationship among business, labor, and government. Role-play business leaders, investors, and laborers explaining how the crash affected them. Create T-charts to show regional differences. • read and analyze *Grapes of Wrath.* Draw parallels between narrative and historical events. View photographs by Dorothea Lange. Create scripts to accompany her photographs about the Depression. • research intolerance of the 1920s (e.g., Palmer Raids, evolution of the Klan, Scopes' Trial) and explain how events created tensions. Write journal entries as observers of events. • research the 19th Amendment. Compare ideas of those in favor of or opposed to women's suffrage. Discuss implications of 19th Amendment. Write prediction essays of what today's society would be like without the 19th Amendment. ***Technology suggestion:*** *Create media campaigns in favor of 19th Amendment.* • research the Prohibition Amendment. Explore political, economic, and social motives for its passage. Explain social impacts of the amendment on America. Survey people today on opinions toward cigarettes. Create cartoons comparing attitudes. Write editorials for or against banning cigarettes *(WP-Transactive).*	

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American Studies

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.22, 2.24, 2.25)** **Writing (1.11)** **Speaking/ Listening/ Observing (1.3, 1.4, 1.12)** **Inquiry (1.1)** **Technology as Communication (1.16)** **Historical Perspective (2.20)** **Geography (2.19)** **Economics (2.18)** **Culture and Society (2.16, 2.17)**	**Defense of Democracy (1910 - 1945)** **How do forms of expression and communication (e.g., literature, art, music, dance, drama, media) reflect the human experience of a given period of American history?** **How have historical events influenced our understanding of modern America?** **How has our government reflected the needs and concerns of its people throughout history?** Should the federal government provide more assistance to special groups?	**Students will** **English III** • locate and analyze sources. • apply analytical reading skills to make connections. • apply critical listening/observing skills. • use effective speaking skills and techniques. • use multimedia tools to enhance presentations. • evaluate appropriateness of material. **Government** • understand how governments interact with cultures. • understand how cultures and belief systems are reflected in governments. **U.S. History** • examine significant eras of U.S. history to develop chronological understanding. • examine impact of individuals and groups. • analyze the social, political, and economic characteristics of various eras. • trace the changing role of the U.S. in world affairs. • examine the economic transformation of the U.S. • trace the economic development of the U.S. • understand how factors influence settlements and patterns of movements. • understand how changing resource needs and trade relationships produce conflict and cooperation. • explore how modifications of the physical environment have impacted life in the United States.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • use Internet and electronic archives to access writings developed by environmental groups (e.g., Sierra Club, Audubon Society) to prepare and conduct debates related to issues of conservation and preservation. Include government, special interest groups, and individual perspectives. Evaluate reliability of documents produced by special interest groups. Consider technological advances (e.g., Tennessee Valley Authority projects, Hoover Dam) and their environmental impacts. • listen to recordings of F. D. Roosevelt's "Fireside chats", identifying ideas on how to bring the country out of the Great Depression. Critique speeches in learning logs. • read works by American writers (e.g., Faulkner, Warren, Jarrell) of the era. Identify universal themes of personal relationships. Research art and music of the era that could accompany each selection. Prepare multimedia presentations that connect different artistic media. • compare programs of the New Deal. Chart relief, recovery, and reform programs. Evaluate success of programs. Write critiques of programs still in existence today. • compare goals and intent of welfare programs of Depression era with today's welfare programs. Research and explain new welfare reforms. Write editorials to local papers concerning welfare reform and its impact on their communities *(WP-Transactive).* • explore how the Great Depression was a worldwide phenomenon. Compare life in the U.S. during the Depression to life in other countries. Create collages comparing conditions.	

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American Studies

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.22, 2.24, 2.25)** **Writing (1.11)** **Inquiry (1.1)** **Technology as Communication (1.16)** **Historical Perspective (2.20)** **Economics (2.18)** **Culture and Society (2.16, 2.17)**	**Defense of Democracy (1910 - 1945)** **How do forms of expression and communication (e.g., literature, art, music, dance, drama, media) reflect the human experience of a given period of American history?** **How have historical events influenced our understanding of modern America?** **How has our government reflected the needs and concerns of its people throughout history?** Did the U.S. make appropriate decisions during WW II?	**Students will** **English III** • respond critically to literary genres. • interpret vocabulary. • develop transactive writing. • develop literary writing. • locate and analyze sources. • evaluate appropriateness of materials accessed through technology. • use multimedia tools for presentation. **Government** • recognize different forms of government over time. • understand the changing role of government. • understand how cultures and belief systems are reflected in governments. **U.S. History** • examine significant eras of U.S. History to develop chronological understanding. • examine impact of individuals and groups. • analyze the social, political, and economic characteristics of various eras. • trace the changing role of the U.S. in world affairs. • explore contributions of peoples and cultures. • use tools to explore interpretive nature of history.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • research relationships between philosophies and leadership styles of various world leaders (e.g., Hitler, Stalin, Churchill, Roosevelt, Truman, Mussolini). Prepare inquiry papers with source documentation on philosophies and leadership style of leaders. • critique persuasive and propaganda techniques used by periodicals to influence American society. Use these techniques to prepare bulletin boards or propaganda posters. • research internment camp conditions in the U.S. during WW II. Write journal entries as if they were someone living in the camp. Incorporate colloquial language. Write editorials arguing for or against America's use of internment camps or research accounts of Holocaust victims and survivors. • critically assess advice Truman received on whether or not to use the atomic bomb. Use graphic organizers to record findings. Use findings to role-play mock trial of Truman. • examine objective and subjective reporting of WW II through literature (e.g., *Hiroshima*), poetry, and primary sources (e.g., oral histories, journals). Create children's storybooks based on WW II events. • create multimedia presentations depicting their experiences. ***Technology suggestion**: Use desktop publishing programs to create books.* • research contributions of women during WW II. Evaluate their roles in the war effort. Write articles for popular women's magazines explaining how changes brought about during the war have affected the lives of women today *(WP-Transactive)*. • read Truman's Executive Order desegregating the military. Explain factors that prompted the order and the impact on the U.S. military. Evaluate and debate impact of the decision. • compare gains of D-Day invasion with losses. Respond to open-response questions, analyzing benefits and losses.	Angie, Billie, Gary, Brad, Justin, and Sarah address their leadership styles by analyzing the personality, attitudes, and decision-making patterns of Hilter, Stalin, Churchill, Roosevelt, Truman and Mussolini, respectively. They assume the roles of their assigned leaders and participate in round-table discussions. They respond to questions and issues, presenting opinions congruent with documented data. Tyrone, who exhibits strong leadership characteristics, serves as moderator *(Types of extensions: purpose and appropriateness, complexity, motivation, magnitude, participation, resources and materials, demonstration of knowledge, level of support, procedures and routines).*

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American Studies

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.22, 2.24, 2.25)** **Writing (1.11)** **Inquiry (1.1)** **Historical Perspective (2.20)** **Geography (2.19)** **Economics (2.18)** **Government and Civics (2.14, 2.15)** **Culture and Society (2.16, 2.17)**	**Faces of America (1945 - Present)** **How do forms of expression and communication (e.g., literature, art, music, dance, drama, media) reflect the human experience of a given period of American history?** **How have historical events influenced our understanding of modern America?** **How has our government reflected the needs and concerns of its people throughout history?** Should the United States be praised or condemned for its efforts in the Cold War?	**Students will** **English III** • analyze print and nonprint reading materials. • apply analytical reading skills to make connections. • develop transactive writing. • locate and analyze sources. **Government** • understand how the U.S. government has changed to meet needs. • analyze how technology influenced the operation of government. • understand democratic principles. • recognize economic systems and institutions. **U.S. History** • use tools to explore interpretive nature of history. • examine significant eras of U.S. history to develop chronological understanding. • examine impact of individuals and groups. • examine the impact of advances in research, science, and technology. • trace the changing role of the U.S. in world affairs. • illustrate how technology has changed the economy. • analyze roles of political parties and civic participation. • examine rights and responsibilities of individuals. • explore contributions of peoples and cultures. • examine social transformation toward equity. • understand resource needs and trade relationships.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • research causes of the Cold War. Develop time line of Cold War events. • examine United States' need to be superior by focusing on the former U.S.S.R.1 vs. U.S. Arms and Space Races. Investigate how these races disguised true battles of ideologies. Explore how the Arms and Space Races affected world economies. Create parallel time lines depicting U.S. and U.S.S.R. climb to superpower status. • examine United States involvement in Korea and Vietnam by developing outlines of key military events, and policies of the Korean conflict. Write editorials relating lessons learned from U.S. involvement in Korea and Vietnam conflict to current foreign policies. • research factors that led to McCarthy hearings. Compare to earlier witch hunts. Create mock trials based on hysteria and anticommunist sentiments of McCarthy Era. • research views of different segments of American society during Vietnam War. Investigate different positions taken by governments around the world. Examine U.S. government policies as they reflect differing views. Listen to protest music from Vietnam War. Discuss attitudes of anti-war movement as reflected in songs. Write songs or poems protesting current government policy. • explore leadership role of U.S. in bringing down communism. Identify impact of each U.S. President since Eisenhower on fall of communism. Select one President who made significant strides toward eliminating communism in Soviet Union. Write articles focusing on the selected President and his contributions toward eliminating communism. Publish articles in class magazines to be placed in school media centers (*WP-Transactive*). • evaluate role of United States in post-Cold War world. Research and trace relations between former Soviet Union, China, and United States. Outline and compare foreign policies of United States concerning these nations. Debate usefulness of giving countries Most Favored Nation trading status.	

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American Studies

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Arts and Humanities (2.22, 2.24, 2.25)** **Writing (1.11)** **Speaking/ Listening/ Observing (1.3, 1.4, 1.12)** **Inquiry (1.1)** **Technology as Communication (1.16)** **Historical Perspective (2.20)** **Economics (2.18)** **Government and Civics (2.14, 2.15)** **Culture and Society (2.16, 2.17)**	**Faces of America (1945 - Present)** **How do forms of expression and communication (e.g., literature, art, music, dance, drama, media) reflect the human experience of a given period of American history?** **How have historical events influenced our understanding of modern America?** **How has our government reflected the needs and concerns of its people throughout history?** Was the Civil Rights Movement a success?	**Students will** **English III** • analyze print and nonprint reading materials. • read and analyze literature. • select and read for enjoyment. • apply analytical reading skills to make connections. • develop transactive writing. • use writing-to-demonstrate-learning strategies. • tailor use of language and conventions. • use multimedia tools for presentations. • use effective speaking skills and techniques. • locate and analyze sources. • apply critical listening/observing skills. • paraphrase and summarize. • use criteria to evaluate appropriateness. **Government** • recognize how the U.S. government has changed to meet needs. • understand democratic principles. **U.S. History** • use tools to explore interpretive nature of history. • examine significant eras of U.S. history to develop chronological understanding. • examine impact of individuals and groups. • trace the changing role of the U.S. in world affairs. • analyze roles of political parties and civic participation. • examine rights and responsibilities of individuals. • explore contributions of peoples and cultures. • examine social transformation toward equity.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • research development and current practices of National Association for the Advancement of Colored People (NAACP). Create multimedia presentations to illustrate history, philosophy, and initiatives of the organization. Compare what others say about organization to what the organization says. Write journal reflections on source credibility. • research leaders of the Civic Rights Movement (e.g., Martin Luther King Jr., Malcolm X, Rosa Parks). Summarize and paraphrase research to prepare biographical sketches to use as a quick-facts reference file. • read and listen to speeches from Martin Luther King Jr., and Malcolm X. Analyze effectiveness of persuasive techniques. Compare power of written and oral persuasion. • research Civil Rights Act of 1964. Create posters to depict atmosphere of the time. Debate merits of results of the legislation. • discuss effectiveness of nonviolent confrontation during early Civil Rights Movement. Compare confrontations to those that occurred in other parts of the world (e.g., India). Write feature articles comparing styles and results of conflicts and lessons for future protests (*WP-Transactive*). ***Technology suggestion:*** *Use film clips to create presentation on the Civil Rights Movement.* • analyze *A Raisin in the Sun* to examine society's treatment of minorities. Write TV scripts based on similar themes in contemporary society. • read *Neighbors*. Evaluate local schools' compliance with the intent of *Brown v. Board of Education* decision of 1954. Prepare presentation to local board of education evaluating programs and recommending any needed changes. • read "In the Kitchen" from *Colored People: A Memoir* and "Shades of Black." Compare authors' perspectives on race. Write dialogues between the two authors illustrating differing viewpoints. • research affirmative action legislation and evaluate its impact on African-Americans. Discuss how current negative attitudes toward affirmative action may affect opportunities for minorities. Write letters to appropriate national leaders expressing their opinions on affirmative action programs. Select language to suit audience *(WP-Transactive).* • select modern writings (e.g., novels, short stories, magazine articles) to read for additional insight into world community.	

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American Studies

Academic Expectations	Guiding and Essential Questions	Correlations to the Program of Studies
Reading (1.2) **Writing (1.11)** **Speaking/ Listening/ Observing (1.3, 1.4, 1.12)** **Inquiry (1.1)** **Technology as Communication (1.16)** **Historical Perspective (2.20)** **Geography (2.19)** **Economics (2.18)** **Government and Civics (2.14, 2.15)**	**Faces of America (1945 - Present)** **How do forms of expression and communication (e.g., literature, art, music, dance, drama, media) reflect the human experience of a given period of American history?** **How have historical events influenced our understanding of modern America?** **How has our government reflected the needs and concerns of its people throughout history?** To what degree does the media shape our social values?	**Students will** **English III** • analyze print and nonprint reading materials. • apply analytical reading skills to make connections. • develop transactive writing. • interpret vocabulary. • use writing-to-demonstrate-learning strategies. • use effective speaking skills. • apply critical listening/observing skills. • locate and analyze appropriate sources. • use criteria to evaluate appropriateness of material. • use multimedia tools to enhance presentations. **Government** • recognize how the U.S. government has changed to meet needs. • analyze how technology influenced the operation of government. **U.S. History** • use tools to explore interpretive nature of history. • examine impact of individuals and groups. • examine the impact of advances in research, science, and technology. • illustrate how technology has changed the economy. • examine rights and responsibilities of individuals.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • view news footage of Vietnam War. Discuss how this footage helped fuel the anti-war movement at home. Write entries for class essay. • research Kennedy/Nixon debates. Write how-to guides for political candidates for successful TV debates. Use historical references to document guidelines. Prepare video teaching guides to demonstrate principles. • view printed ads for products targeted for teenagers. Survey teens to discover reasons they purchase particular brands or products. Discuss strategies advertisers use to entice teenagers to buy their products. Discuss ramifications of using these techniques. Write articles for school newspaper analyzing purchasing habits of young people (*WP-Transactive*). • identify candidates or issues and create political campaigns with brochures, posters, and commercials. Track campaign results including how people learned of candidates. Discuss how media coverage can affect outcome of campaigns. Write proposals for other candidates' use of various media outlets, based on success of this campaign. • research media coverage of government reform initiatives (e.g., health care, education, welfare). Debate outcome of initiatives if media had provided different or more balanced views. • explore use of photographs, videos, and newsclips to influence public sentiments about global events (e.g., Bosnian War, conflict in Somalia, natural catastrophes in China). Cover local events and alter visual images. Survey viewers about perceptions. Compare responses in graphic organizers or learning logs. Write textbook chapter on choosing visuals for news coverage for student journalists. • explore how economies have been affected by globalization and computerization of stock markets. Create flow chart of stock from issue to international purchase. Attach glossary of technical language.	

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NOTES

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American Studies Student Resources

Benet, Stephen. "We Aren't Superstitious"
Chopin, Kate. *The Awakening*
Crane, Stephen. *The Red Badge of Courage*
Crane, Stephen. *War Is Kind.*
Crisis #1
Cooper, James. *Leatherstocking Tales*
Declaration of Independence
Earle, Alice Morse. *Life in Colonial New England*
Edwards, Jonathan. "Sinners in the Hands of an Angry God"
Fitzgerald, F. Scott. *The Great Gatsby*
Fleischer, Jane. *Pontiac: Chief of the Ottawas*
Fleischer, Jane. *Tecumseh: Shawnee War Chief*
Franklin, Benjamin. *The Autobiography*
Franklin, Benjamin. *Poor Richard's Almanac*
Frazier, Charles. *Cold Mountain*
Gates, Jr., Henry Louis. *Colored People: A Memior*
Hamsberry, Lorraine. *A Raisin in the Sun*
Hawthorne, Nathaniel. *The House of Seven Gables*
Hawthorne, Nathaniel. "The Minister's Black Veil"
Hawthorne, Nathaniel. *The Scarlet Letter*
Hawthorne, Nathaniel. "Young Goodman Brown"
Hemingway, Ernest. *The Old Man and the Sea*
Henry, Patrick. "Speech to the Virginia Convention"
Hersey, John, *Hiroshima*
Hughes, Lanston. "I too..."
Hunt, Irene. *Across Five Aprils*
Irving, Washington. "The Devil and Tom Walker"
Jassem, Kate. *Chief Joseph: Leader of Destiny*
Joseph, Chief. "I Will Fight No More"
Kantor, MacKinley. *Andersonville*
Kennedy, John F. *A Nation of Immigrants*
Lincoln, Abraham. "Gettysburg Address"
Mibrane, Mary. "Shades of Black"
Michener, James. *Hawaii*
Miller, Arthur. *The Crucible*
Mitchell, Margaret. *Gone with the Wind*
Oliver, Diane. "Neighbors"
Poe, Edgar. "The Bells"
Poe, Edgar. "Annabelle Lee"
Poe, Edgar, "The Raven"
Santoli, Al. *Everything We Had: An Oral History of the Vietnam War by Thirty-Three American Soldiers*
Seattle, Chief. "This We Know"
Steinbeck, John. *The Grapes of Wrath*
Steinbeck, John. *Of Mice and Men*
Stowe, Harriet. *Uncle Tom's Cabin*
Tunis, Edsin. *Indians*
Twain, Mark. *Adventures of Huckleberry Finn*

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Social Studies Glossary
Geography

Absolute location: The location of a point on Earth's surface that can be expressed by a grid reference (e.g., latitude and longitude).

Accessibility: The relative ease with which places can be reached from other places.

Acculturation: The process of adopting traits of cultural groups.

Aerial photograph: A photograph of part of Earth's surface usually taken from airplanes.

Aquifer: An underground permeable rock layer within which water is stored and can flow and from which water can be extracted for use at the surface.

Artifacts: The material manifestations of a culture such as tools, clothing, and foods.

Assimilation: The acceptance, by one culture group or community, of cultural traits normally associated with another.

Biomes: Very large ecosystems made up of specific plant and animal communities interacting with the physical environment (e.g., tropical rain forest).

Cardinal Directions: The four main points of the compass - north, east, west, and south.

Cartographer: A person who designs and creates maps and other geographic representations.

Cultural landscape: The human imprint on the physical environment; the humanized landscape as created or modified by people.

Demography: The study of population statistics, changes, and trends.

Developed country: an area of the world that is technologically advanced, highly urbanized, and wealthy.

Diffusion: The spread of people, ideas, technology, and products among places.

Elevation: The height of points or places above sea level.

Formal region: A region defined by the uniformity of certain characteristics such as precipitation, landforms, subculture, or type of economic production.

Globe: A scale model of Earth that correctly represents area, relative size and shape of physical features, distance between points, and true compass directions.

Grid: A pattern of lines on charts or maps, such as those representing latitude and longitude, that help determine absolute location.

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Social Studies Glossary
Geography

Hemisphere: Half a sphere. Cartographers and geographers divide Earth into the Northern and Southern Hemispheres at the Equator, and the Eastern and Western hemispheres at the prime meridian.

Interdependence: People relying on each other in different places or in the same place for ideas, goods, and/or services.

Intermediate directions: The points of the compass that fall between cardinal directions (e.g., NE, SW, NW).

Landform: The shape, form, or nature of specific physical features of Earth's surface (e.g., hill, mountain, plateau).

Latitude: Angular distance, measured in degrees, north or south from the equator.

Legend: An explanatory description or key to features on maps or charts.

Location: The position of a point on Earth's surface expressed by means of grids (absolute location) or in relation (relative location) to the position of other places.

Longitude: The position of a point on Earth's surface expressed as its angular distance, east to west, from the prime meridian to 180 degrees.

Map: A graphic representation of a portion of Earth that is usually drawn to scale on a flat surface.

Mental map: A map that represents mental images people have of areas, including knowledge of features and spatial relationships. Mental maps are also called cognitive maps.

Migration: The act of people moving from one place to another with the intent of staying at the destination permanently or for a relatively long period of time.

Nonrenewable resource: A finite resource that cannot be replaced once it is used (e.g., petroleum, minerals).

Physical feature: An aspect of places or areas that derive from the physical environment.

Places: Locations having distinctive characteristics that give them meaning and character and distinguish them from other locations.

Pull factors: In migration theory, the social, political, economic, and environmental attractions of new areas that draw people away from their previous locations.

Push factors: In migration theory, the social, political, economic, and environmental forces that drive people from their previous locations to search for new ones.

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Social Studies Glossary
Geography

Region: An area with one or more common characteristics or features that give it a measure of homogeneity and make it different from surrounding areas.

Relative location: The location of places or region s in relation to other places or regions (e.g., northwest of downtown Louisville, downstream from the dam).

Renewable Resource: A resource that can be regenerated if used carefully (e.g., timber).

Resource: An aspect of the physical environment that people value and use to meet needs for fuel, food, industrial products, or something else of value.

Spatial: Pertains to space on Earth's surface.

Thematic map: A map representing specific spatial distributions, themes, or topics (e.g., population density, cattle production, climates of the world).

Topographic map: A detailed map illustrating selected physical and human features of places.

Topography: The shape of Earth's surface.

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Social Studies Glossary
Government and Civics

Amendment (constitutional): Changes in, or additions to, a constitution.

Anarchy: Absence of formal legal order; also the social context in which legitimate political authority does not exist.

Authority: Right to control or direct the actions of others, legitimized by law, morality, custom, or consent.

Bureaucracy: Organizations that implement government policies.

Cabinet: Secretaries or chief administrators of the major departments of the federal government.

Checks and Balances: Constitutional mechanisms that authorize each branch of government to share powers with the other branches and thereby check their activities.

Citizen: Member of a political society who therefore owes allegiance to and is entitled to protection by and from the government.

Civil law: Body of law that deals with private rights of individuals as distinguished from criminal law.

Civil liberties: Areas of personal freedom with which governments are constrained from interfering.

Civil rights: Protections and privileges given to all U.S. citizens by the Constitution, and Bill of Rights.

Class system: System in which members of social classes are prevented from moving into other classes.

Common good: Benefit or interest of politically organized societies as a whole.

Common law: Body of unwritten law developed in England from judicial decisions based on customs and earlier judicial decisions.

Concurrent powers: Powers that may be exercised by both the federal government and state governments (e.g., taxes, borrowing money).

Criminal law: Branch of law that deals with disputes or actions involving criminal penalties.

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Social Studies Glossary
Government and Civics

Democracy: Form of government in which political control is exercised by all people, either directly or through elected representatives.

Divine Right: Theory of government that holds that a monarch receives the right to rule directly from God and not from the people.

Executive Power: Power of the president to implement and enforce laws.

Federalists: Advocates of a strong national government and supporters of adoption of the U.S. Constitution.

Feudalism: Political and economic system in which kings or queens shared power with the nobility who required services from the common people in return for allowing them to use the noble's land.

Founders or Founding Fathers: People who played important roles in the development of the national government of the United States.

Framers: Delegates to the Philadelphia Convention held in 1787 and those who wrote and ratified the Bill of Rights.

Freedom of Assembly: Freedom of people to gather together in public.

Freedom of Expression: Refers to the freedoms of speech, press, assembly, and petition that are protected by the First Amendment.

Fundamental Rights: Rights considered to be essential.

General Welfare: Good of society as a whole; common or public good.

Government: Institutions and procedures through which territories and their people are ruled.

Higher Law: When describing legal systems, refers to the superiority of one set of laws over another. For example, the U.S. Constitution is a higher law than any federal or state law.

Judicial Power: Power to manage conflicts about the interpretation and application of the law.

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Social Studies Glossary
Government and Civics

Judicial Review: Doctrine that permits the federal courts to declare unconstitutional, and thus null and void, acts of the Congress, the executive, and the states.

Legislative Power: Power to make laws.

Majority Rule: Rule by more than half of those participating in a decision.

Monarchy: Government in which political power is exercised by a single ruler under the claim of divine or hereditary right.

Natural Law (or law of nature): As used by natural rights philosophers, a moral rule discovered by the use of reason that everyone should obey at all times and places.

Political party: Any group, however loosely organized, that seeks to elect government officials under a given label.

Preamble: Introduction to a formal document that explains its purpose.

Private Domain: Areas of an individual's life that are not subject to governmental control.

Representative Democracy: Form of government in which power is held by the people and exercised indirectly through elected representatives who make decisions.

Republican Government: System of government in which power is held by the voters and is exercised by elected representatives responsible for promoting the common welfare.

Rule of Law: Principle that every member of a society, even rulers, must follow the law.

Separation of Powers: Division of governmental power among several institutions that must cooperate in decision making.

Social contract: Agreement among all the people in a society to give up part of their freedom to a government in return for protection of their natural rights. A theory developed by Locke to explain the origin of legitimate government.

Sovereignty: Ultimate, supreme power in a state; in the United States, sovereignty rests with the people.

Suffrage: Right to vote.

Treaty: Formal agreement between sovereign nations to create or restrict rights and responsibilities.

"Unalienable" Rights: Fundamental rights of the people that may not be taken away.

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Social Studies Glossary
Government and Civics

Unenumerated Rights: Rights that are not specifically listed in the Constitution or the Bill of Rights, but which have been recognized and protected by the courts.

Veto: Constitutional power of the president to refuse to sign bills passed by Congress, thereby preventing them from becoming law. The president's veto may be overridden by a two-thirds vote of both the Senate and House of Representatives.

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Social Studies Glossary
History

Artifacts: The material manifestations of a culture such as tools, clothing, and foods.

Cultural assimilation: Process by which people of one culture merge into and become indistinguishable from the people of another culture.

Cultural diffusion: Process by which people of one culture spread to other places.

Data: Facts or figures from which inferences can be made.

Economic characteristics: Characteristics of different economies, people, and places relating to the economy.

Eras: An event or date marking the beginning of important or new periods of history.

Ethnocentrism: The belief in the inherent superiority of one's own group and culture; a tendency to view all other groups or cultures in terms of one's own.

Historical perspective: Historical perspective involves different interpretations by those who have experienced, observed, or studied various aspects of history. These interpretations may reflect intended or unintended bias. Sometimes thinking about historical events and persons will change as new information is discovered or revealed.

Human characteristics: Human activities help shape Earth's surface, human settlements, and structures. Human characteristics of places also includes language, religion, political systems, economic systems, population distribution, and quality of life.

Interdependence: People relying on each other in different places or in the same place for ideas, goods, and services.

Multiple causation: A term used in history to suggest that most events are the result of several factors (multiple causes).

Natural resources: Any physical material that constitutes part of the Earth and which people need and value.

Physical characteristics: Physical characteristics of places include climate, landforms, soils, hydrology, vegetation, and animal life.

Primary sources: First-hand, original information such as letters, autobiographies, interviews with people who experienced events first-hand, or diary entries.

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Social Studies Glossary
History

Secondary sources: Information derived from or about primary sources such as encyclopedias, documentary films, biographies, history books, or interviews with historians.

Social Institutions: Forms and organizations of society designed to meet the needs of different people and groups. The five most common social institutions are family, education, government, religion, and economics.

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Social Studies Glossary
Economics

Absolute Advantage: This occurs when one nation can produce items with fewer resources or more efficiently than another nation can.

Aggregate Demand: The total quantity of goods and services people are willing and able to buy at different possible price levels.

Aggregate Supply: The total quantity of goods and services produced at different possible price levels.

Assembly Line: A manufacturing system in which products are assembled by moving them from one worker or machine to another.

Asset: Something of value owned by firms, households, or individuals; what companies own after debts are paid.

Balance of Trade: The difference between the export and import of merchandise.

Barter: A money-less exchange of goods or services.

Budget: A financial plan that summarizes income and expenditures over a period of time.

Capital Resources: Buildings, tools, and machines people use to create goods and services; one of the factors of production.

Capitalism: Another term for market economy or free enterprise system. In Capitalist economies, private individuals own productive resources.

Command Economy: A system in which the basic economic questions of what to produce, how to produce, and who should receive what is produced are generally answered by the government.

Comparative Advantage: The ability to produce items at lower opportunity costs.

Competition: The rivalry among buyers and sellers in the purchase and sale of resources and products.

Consumers: People who buy goods and/or services for personal use.

Credit: A debt system enabling people to acquire goods and/or services before fully paying for them.

Currency: Paper money and coins issued by the federal government.

Deficit: When expenditures exceed income.

Deflation: The opposite of inflation; a period of falling prices when the purchasing power of the dollar is rising.

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Social Studies Glossary
Economics

Demand: The quantities of particular goods or services consumers are willing and able to buy at different possible prices at a particular time.

Economic Growth: Increases in an economy's total output over a period of time.

Economics: The study of people producing and exchanging to get the goods and services they want.

Economy: The system that results from choices we make as consumers, workers, business owners and managers, and government officials.

Entrepreneur: A person who takes risks to create new products or to develop better ways of operating businesses.

Entrepreneurship: Imaginative, innovative thinking, and management skills needed to start and operate businesses.

Exchange rate: The price of one currency in terms of another.

Factors of Production: The natural, human, and capital resources required to produce any good or service. These factors are sometimes called land, labor, and capital.

Federal Reserve System: The nation's banking system.

Free Enterprise: Another term for market economy or Capitalism.

Goods: Physical products businesses produce; tangible items of value.

Gross Domestic Product (GDP): The market value of goods and services produced within a country during a given time.

Gross national product (GNP): A measure of the nation's total output of goods and services produced within a country during a given time.

Human resources: Labor or the physical and mental efforts people use to create goods and services.

Import: A good or service purchased from a seller in another country.

Incentive: A reason for doing something. In market economies, profit, interest, wages, and rents provide economic incentives.

Inflation: A period of rising prices when the purchasing power of the dollar is falling.

Interest: Payment for using someone else's money; income from allowing someone else to use one's capital.

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Social Studies Glossary
Economics

Investment: The purchase of capital resources used to produce goods and services.

Labor: Human resources or the physical and mental efforts people use to create goods and services.

Macroeconomics: The study of the economy as a whole.

Market: Whenever and wherever people voluntarily make exchanges with one another.

Market Economy: Using markets as the primary means of organizing and coordinating production; also called Capitalism or Free Enterprise.

Microeconomics: The study of individual consumers and businesses.

Mixed Economy: An economic system in which the basic economic questions are answered by a mixture of market, command, and traditional approaches.

Money: Anything that is generally accepted as payment for goods and services; legal tender.

Monopoly: A market in which there is only one seller.

Nationalization: Government takeover of a privately owned industry.

Natural Resources: A natural resource is any physical material that constitutes part of the Earth and which people need and value.

Opportunity Cost: The best alternative given up when making choices.

Profit: What remains after the costs of doing business have been met; the difference between a firm's total revenues and its total costs.

Recession: Two quarters of a fiscal year with a decline of real gross domestic product.

Revenue: Sales income.

Scarcity: The basic economic problem of unlimited wants and limited resources to satisfy those wants.

Specialization: Production of a limited variety of products by businesses, regions, or countries.

Standard of Living: A measure of the amount of goods and services available to citizens.

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Social Studies Glossary
Economics

Supply: The various amounts of something a producer is willing and able to sell at different possible prices at a particular time.

Tariff: A tax or duty on imports.

Tax: A payment to the government.

Trade barrier: A measure designed to slow or prevent trading between countries.

Trade deficit: Occurs when imports are greater than exports.

Trade-off: A choice that involves giving up some of one thing to have more of another.

Traditional Economy: A system in which the basic economic questions are generally answered by traditions and customs.

Unemployment Rate: The percentage of those in the labor force, over the age of 16, actively seeking jobs but unable to find work.

Wages: The earnings of workers paid by the hour or unit of production.

Wealth: The total value of one's tangible assets.

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Social Studies Glossary
Culture and Society

Acculturation: The process of adopting traits of cultural groups.

Cultural assimilation: Process by which people of one culture merge into and become indistinguishable from people of another culture.

Cultural diffusion: Process by which people of one culture spread to other places.

Cultural landscape: The human imprint on the physical environment; the humanized landscape as created or modified by people.

Discrimination: Treatment or consideration of a person or thing based on the group, class, or category to which that person or thing belongs rather than on individual merit.

Ethnocentrism: The belief in the inherent superiority of one's own group and culture; a tendency to view all other groups or cultures in terms of one's own.

Interdependence: People relying on each other in different places or in the same place for ideas, goods, and services.

Prejudice: Unreasonable feelings, opinions, or attitudes regarding racial, national, or religious groups.

Social Institutions: Forms and organizations of society designed to meet the needs of different people and groups. The five most common social institutions are family, education, government, religion, and economics.

Stereotype: An oversimplified view, usually negative, of people or group.

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Social Studies Teacher Resources
Programs

Geography Bee
Kate Fischer, Coordinator, 2819 Eleanor Avenue, Louisville, KY 40205, (502) 454-4733.

Kentucky Mock Trial Competition
Chris Cecil, Coordinator, Administrative Office of the Courts, Frankfort, KY 40601.

Kentucky United Nations Assembly (KUNA)
State YMCA, 402 Broadway, Frankfort, KY 40601.

The Stock Market Game
EconomicsAmerica in Kentucky, 203 East Jefferson Street, Louisville, KY 40202.

Publications: Books

National Standards For Social Studies

Integrated Social Studies K-12:
National Council for the Social Studies. *Expectations of Excellence*. Washington, DC: Author, 1994.
3501 Newark St., NW
Washington, DC 20016
Telephone: 1-800-683-0812
Cost: $15.00 plus $4.00 shipping and handling
Web site: www.ncss.org

Geography Standards:
National Geographic Research and Exploration. *Geography for Life*. Indiana, PA: Author, 1994.
16A Leonard Hall, IUP
Indiana, PA 15705
Telephone: 412-357-6290 Fax: 412-357-7708
Cost: $7.00 plus shipping and handling
Web site: www.ncge.org

History Standards:
National Center for History in the Schools. *Expanding Children's World in Time and Space (K-4).* University of California: Author, 1994.
1100 Glendon Ave., Suite 927
Box 951588
Los Angeles, CA 90095-1588
Telephone: 310-206-0788
Cost: $15.95 per copy plus $5.00 shipping and handling

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Social Studies Teacher Resources

National Center for History in the Schools. *U.S. History: Exploring the American Experience (5-12)*. University of California: Author, 1994.
1100 Glendon Ave., Suite 927
Box 951588
Los Angeles, CA 90095-1588
Telephone: 310-206-0788
Cost: $15.95 per copy plus $5.00 shipping and handling

National Center for History in the Schools. *World History: Exploring Paths to the Present (5-12).* University of California: Author, 1994.
1100 Glendon Ave., Suite 927
Box 951588
Los Angeles, CA 90095-1588
Telephone: 310-206-0788
Cost: $15.95 per copy plus $5.00 shipping and handling

Economics Standards:
National Council on Economic Education. *Vountary National Content Standards in Economics*. New York: Author, 1997.
Contact: National Council on Economic Education
Telephone: 1-800-338-1192 Fax: 212-730-1793
Cost: $19.95
Web site: www.economicsamerica.org

Civics/Government Standards:
Contact: Center for Civic Education
5146 Calabasas, CA 91302-1467
Telephone: 818-591-9321
Cost: $13.20 (includes shipping and handling)
Web site: www.civiced.org

Publications: Periodicals

Multicultural Review
Greenwood Publishing Group, Inc., 88 Post Road West, P.O. Box 5007,
Westport, CT 06881-5007

Social Education
National Council for the Social Studies, 3501 Newark Street NW,
Washington, D.C. 20016, (202)-966-7840

Social Studies and the Young Learner
National Council for the Social Studies 3501 Newark Street NW,
Washington, D.C. 20016, (202)-966-7840

Southern Social Studies Journal
Kentucky Council for the Social Studies, PO Box 1604,
Frankfort, KY 40601

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Social Studies Teacher Resources
Professional Organizations

Kentucky Council for the Social Studies
Marsha Hurt, President
Livingston County Schools
PO Box 219
Smithland, KY 42081
Phone: 502-928-2111 FAX: 502-928-2112
E-Mail: mhurt@livingston.k12.ky.us
Membership: $10.00 per year (includes newsletter and Southern Social Studies Journal)
To join KCSS, send a check for $10.00 to KCSS, P.O. Box 1604, Frankfort, KY 40602.

EconomicsAmerica in Kentucky
(Formerly known as the Kentucky Council for Economic Education)
Dr. Jack Morgan, Executive Director
Jan Mester, Associate Executive Director
203 E. Jefferson Street
Louisville, KY 40202
(office) 1-800-IDO-ECON (fax) 502-584-2106
E-Mail: info@econky.win.net
(Contact above address to receive newsletter and information on other opportunities)

Kentucky Geographic Alliance (KGA)
Dr. Keith Mountain, Coordinator
University of Louisville
Department of Geography
Louisville, KY 40292
502-852-6844 (office) 502-852-4560 (fax)
E-Mail: KRMOUN01@ulkyvm.louisville.edu
(KGA publishes a free newsletter. For information, contact Dr. Mountain)

Kentucky Association for Teachers of History (KATH)
Kevin Simons
Sayre School
194 N. Limestone St.
Lexington, KY 40507
Telephone: 606-254-1361 Fax: 606-231-0508
Membership: $25.00 per year (includes annual conference)

National Council for the Social Studies (NCSS)
3501 Newark Street, NW
Washington, DC 20016
202-966-7840
202-966-2061 (fax)
Web site: www.ncss.org

For additional resources, see the Kentucky Department of Education's Web Site at <www.kde.state.ky.us> and the *State Multiple List of Textbooks and Instructional Materials, Adoption Groups I - VI, Grades Primary through 12.*

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ELECTIVE CONTENT AREAS

World Languages

High School World Languages

Program Overview:
The guiding principles for world language instruction are five interwoven goals that are based on Kentucky academic expectations and the national standards for world languages The five national goals are to

- **communicate** in languages other than English;
- gain knowledge and understanding of other **cultures**;
- **connect** with and acquire information from other disciplines;
- develop insight into the nature of language and culture through **comparisons**; and
- participate in multilingual **communities** at home and around the world.

According to Kentucky's learner goals and academic expectations, all students must demonstrate competency in foreign languages. The five goals of communication, culture, connections, comparisons, and communities support this vision and reinforce the following academic expectations:

2.17 students interact effectively and work cooperatively with the diverse ethnic and cultural groups of our nation and world;
2.27 students complete tasks, make presentations, and create models that demonstrate awareness of the diversity of forms, structures, and concepts across languages and how they may interrelate; and
2.28 students understand and communicate in a second language.

Content Charts:
The world languages content charts outline minimum content and process skills expected for all languages, both modern and classical. These charts guide curriculum development. They are a resource that can have a far reaching impact on Kentucky students. The charts provide consistent, minimum content for students studying world languages and help ensure that all world language students have opportunities to learn at high levels.

The content charts are organized around the five world language national goals and Kentucky's academic expectations. Under each goal, content knowledge and process skills are outlined according to stages of student knowledge and ability. Knowledge and abilities acquired by students at the entry stage are built upon and extended in subsequent stages. Thus, what was learned in one stage forms the foundation for what will be learned in the next. During the entry stage, students have no proficiency in foreign language skills. The next stages represent increasing proficiency in the four language skills of listening, speaking, reading, and writing. As students proceed through the stages, they become more fluent, internalizing the language until they achieve mastery at the exit stage.

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High School World Languages

GOAL ONE: Communicate in Languages Other Than English

Standard 1.1 Students engage in conversations, provide and obtain information, express feelings and emotions, and exchange opinions.

Academic Expectations	Content/Process	
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Entry Stage**	**Students will** • express basic needs, basic courtesies, states of being, likes and dislikes, and agreements and disagreements. • respond to one-on-one interactions, simple questions, and simple requests. • ask simple questions and make simple requests.
	Stage Two	**Students will** • elaborate on needs. • interact in basic survival situations. • incorporate appropriate gestures into conversations. • create simple descriptions within contexts. • exchange information with peers and others. • give and follow directions in familiar contexts.
	Stage Three	**Students will** • qualify likes and dislikes. • support opinions. • provide and request clarifications. • use different ways to express the same idea (circumlocution).
	Stage Four	**Students will** • create detailed oral descriptions within contexts. • ask and respond to open-ended questions in target language. • give and follow directions in unfamiliar situations.
	Stage Five	**Students will** • attempt to persuade others through exchanging personal feelings and ideas. • express individual perspectives and defend opinions. • negotiate compromises (e.g., curfews) with families and friends. • initiate, sustain, and conclude conversations on a variety of topics.
	Exit Stage	**Students will** • manage unforeseen circumstances and complicated situations. • converse using language and behaviors that are appropriate to particular settings. • collaborate to develop and propose solutions to problems. • use a variety of language strategies to convey meaning (e.g., short responses, pause fillers, circumlocution).

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High School World Languages

Standard 1.2 Students understand and interpret written and spoken language on a variety of topics.

Academic Expectations	Content/Process	
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Entry Stage**	**Students will** • respond appropriately to directions, instructions, and commands. • make identifications based on oral and/or written descriptors. • read and respond to developmentally appropriate material. • demonstrate listening comprehension. • identify aural, visual, and contextual clues. • comprehend and respond to simple written communications (e.g., notes, invitations). • identify main ideas and key words in oral and print material.
	Stage Two	**Students will** • respond appropriately to series of directions, instructions, and commands. • derive meaning from selected authentic materials. • respond to language of persons sympathetic to second-language learners. • use aural, visual, and contextual clues to derive meaning. • comprehend language on familiar topics.
	Stage Three	**Students will** • respond appropriately to complex oral and/or written descriptors. • comprehend and respond to formal written communications (e.g., want ads, job applications). • identify main ideas and supporting details in print materials.
	Stage Four	**Students will** • respond appropriately to directions, instructions, and commands intended for native speakers. • analyze information based on complex oral and/or written descriptors. • respond to language of native speakers who are not accustomed to communicating with second-language learners. • apply diverse strategies to derive meaning and detail from unfamiliar material (e.g., signs, magazines, guides, maps). • interpret and analyze main ideas and significant details from authentic materials (e.g., magazines, radio broadcasts) and literary samples.
	Stage Five	**Students will** • summarize or restate conversations.
	Exit Stage	**Students will** • interpret and analyze cause and effect relationships and sequences in authentic materials. • respond appropriately to mood and implied meaning (e.g., sarcasm, humor, irony) of written communication. • research and synthesize information from a variety of authentic sources.

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High School World Languages

Standard 1.3 Students present information, concepts, and ideas to an audience of listeners or readers on a variety of topics.		
Academic Expectations	**Content/Process**	
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Entry Stage**	**Students will** • give directions, commands, and instructions. • give descriptions orally and in writing. • write personal communications (e.g., notes, letters, invitations). • summarize main ideas of selected authentic and/or contextualized material (e.g., weather reports, TV commercials). • present prepared material (e.g., poems, dialogues, songs) to audiences.
	Stage Two	**Students will** • produce informal written communications (e.g., letters to pen pals). • speak or write spontaneously.
	Stage Three	**Students will** • explain processes based on prior knowledge and/or experiences. • give descriptions, using complex sentences, orally and/or in writing. • produce formal written communications (e.g., business letters). • interpret and present information from authentic material to audiences. • narrate present, past, and future events.
	Stage Four & Stage Five	**Students will** • explain complex processes incorporating detailed instruction. • give descriptions, using complex, detailed paragraphs, orally and/or in writing. • produce written samples (e.g., editorials) to convey moods, imply meaning, and/or abstract ideas.
	Exit Stage	**Students will** • create analyses of authentic media (e.g., film) or literary samples and present to audiences. • formulate and defend positions on research topics. • elaborate on present, past, and future events.

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GOAL TWO: Gain Knowledge and Understanding of Other Cultures

Standard 2.1 Students demonstrate an understanding of the relationship between practices and perspectives of cultures studied.

Academic Expectations	Content/Process	
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Entry Stage**	**Students will** • identify and react to cultural perspectives and practices in target cultures. • recognize and interpret language and behaviors (e.g., signs of greeting, body language) appropriate to target cultures. • identify some commonly held generalizations about target cultures. • identify social, geographic, and political factors that impact cultural practices. • identify common words, phrases, and idioms that reflect target cultures.
	Stage Two	**Students will** • identify differences in cultural practices among same-language cultures. • produce language and behaviors appropriate to target cultures. • discuss social (e.g., dating) and geographic (e.g., climate) factors that impact cultural practices.
	Stage Three	**Students will** • describe and analyze cultural characteristics and behaviors of everyday life. • analyze some commonly held generalizations about target cultures. • compare and contrast cultural practices among same-language cultures.
	Stage Four	**Students will** • interpret cultural connotations of common words, phrases, and idioms. • analyze development of different cultural practices. • evaluate some commonly held generalizations about target cultures. • analyze social, geographic, and political factors that impact cultural practices.
	Stage Five	**Students will** • apply language and behaviors appropriate to target cultures in authentic situations.
	Exit Stage	**Students will** • integrate culturally embedded words, phrases, and idioms into everyday communication.

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Standard 2.2 Students demonstrate an understanding of the relationships between products and perspectives of culture studied.

Academic Expectations		Content/Process
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Entry Stage**	**Students will** • identify products (e.g., artwork) of target cultures. • identify expressive forms of target cultures. • identify objects, images, and symbols of target cultures. • recognize contributions of target cultures. • identify relationships between cultural perspectives and products as represented in target cultures' expressive forms (e.g., art, literature, music, dance, drama).
	Stage Two	**Students will** • identify and explain needs, behaviors, and beliefs as reflected in products and contributions of target cultures. • explain objects, images, and symbols of target cultures. • identify contributions of target cultures. • identify economic and social impact of products (e.g., music, soccer) on world markets.
	Stage Three	**Students will** • discuss and explain external factors that impact products and contributions. • describe expressive forms of culture (e.g., art, literature, music, dance, drama).
	Stage Four	**Students will** • analyze relationships between cultural perspectives and products as represented in expressive forms (e.g., art, literature, music, dance, drama). • analyze contributions of diverse groups within target cultures.
	Stage Five	**Students will** • use target language to describe cultures through their visual arts, architecture, literature, music, and drama. • evaluate expressive forms of cultures (e.g., art, literature, music, dance, drama). • analyze significance of objects, images, and symbols of cultures. • evaluate effects of cultures' contributions on other societies.
	Exit Stage	**Students will** • assess economic and social impacts of products on world market.

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GOAL THREE: Connect with Other Disciplines and Acquire Information

Standard 3.1 Students reinforce and further their knowledge of other disciplines through the target language.

Academic Expectations	Content/Process	
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Entry Stage**	**Students will** • identify information and skills acquired from other disciplines and apply them in language classrooms to reinforce and further their knowledge. • identify, through target language resources, information for use in other disciplines.
	Stage Two	**Students will** • transfer and apply, within limited contexts, information and skills common to world language classrooms and other disciplines.
	Stage Three	**Students will** • analyze information gathered through target language resources for use in other disciplines.
	Stage Four & Stage Five	**Students will** • apply, within unfamiliar contexts, information and skills common to world language classrooms and other disciplines.
	Exit Stage	**Students will** • locate target language resources and synthesize information for use in other disciplines.

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Standard 3.2 Students acquire information and recognize distinctive viewpoints only available through target language and its cultures.

Academic Expectations	Content/Process	
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Entry Stage**	**Students will** • extract information from sources intended for native speakers. • use authentic sources (e.g., newspapers, magazines, TV programs) to identify perspectives of target cultures.
	Stage Two	**Students will** • analyze and apply information from sources intended for native speakers.
	Stage Three	**Students will** • acquire and synthesize information from sources intended for native speakers.
	Stage Four & Stage Five	**Students will** • use authentic sources to analyze perspectives of different cultures.
	Exit Stage	**Students will** • use authentic sources to synthesize perspectives of different cultures.

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GOAL FOUR: Develop Insight into Own Language and Culture

Standard 4.1 Students demonstrate understanding of nature of language through comparisons of language studied and their own.

Academic Expectations	Content/Process	
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Entry Stage**	**Students will** • identify sound patterns of target language and compare them to students' own languages. • identify structural patterns of target language and compare them to students' own languages. • identify idiomatic expressions of language. • identify linguistic connections among languages.
	Stage Two	**Students will** • apply, within limited contexts, sound patterns of target language. • apply, within limited contexts, structural patterns of target language.
	Stage Three	**Students will** • compare and contrast idiomatic expressions of target language and students' own languages.
	Stage Four	**Students will** • explain changing nature of languages. • apply, in a variety of contexts, sound patterns of target language. • use knowledge of structural patterns in both target language and students' own languages. • describe how languages influence each other.
	Stage Five	**Students will** • identify and explain historical connections among languages.
	Exit Stage	**Students will** • use figurative expressions (e.g., poetry) of target language in correct contexts.

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Standard 4.2 Students demonstrate understanding of concept of culture through comparisons of cultures studied and their own.

Academic Expectations	Content/Process	
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Entry Stage**	**Students will** • use evidence from authentic sources to identify similarities and differences between target cultures and students' own cultures. • identify similar and different behavioral patterns between target cultures and students' own cultures. • identify contributions of target cultures to students' own cultures. • identify signs (e.g., road signs) and symbols of target cultures.
	Stage Two	**Students will** • compare and contrast target cultures and students' own cultures using evidence from authentic sources. • compare behavioral patterns between target cultures and students' own cultures. • identify impacts of contributions from target cultures on students' own cultures.
	Stage Three	**Students will** • compare signs and symbols of other cultures and students' own cultures.
	Stage Four	**Students will** • analyze impacts of contributions from other cultures on students' own cultures.
	Stage Five	**Students will** • use signs of target cultures and students' cultures appropriately.
	Exit Stage	**Students will** • use evidence from authentic sources to explain significance of similarities and differences between target cultures and students' own cultures. • use knowledge of language and behavioral patterns to interact in a variety of social and cultural contexts (e.g., welcoming parties for exchange students) in target cultures and students' own cultures. • analyze how cultural patterns of interaction are reflected in products (e.g., film, TV programs) of target cultures and students' own cultures.

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GOAL FIVE: Participate in Multilingual Communities at Home and Around the World *Standard 5.1 Students use the language both within and beyond the school setting.*		
Academic Expectations	**Content/Process**	
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Entry Stage**	**Students will** • identify target language in students' lives. • share knowledge of target language with others. • locate connections with target cultures through technology, media, and authentic sources. • locate community resources to research target cultures.
	Stage Two	**Students will** • respond to target language encountered in students' lives. • establish connections with target cultures through technology, media, and other authentic sources. • use community resources to research target cultures.
	Stage Three	**Students will** • maintain connections with target culture through technology, media, and authentic sources. • collaborate with community members.
	Stage Four	**Students will** • analyze interdependence that exists between students' own cultures and the world.
	Stage Five	**Students will** • use target language in real-life situations.
	Exit Stage	**Students will** • use authentic sources (e.g., newspapers, web sites) to analyze U.S. role in world as viewed by other cultures.

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GOAL FIVE: Participate in Multilingual Communities at Home and Around the World

Standard 5.2 Students show evidence of becoming lifelong learners by using the language for personal enjoyment and enrichment.

Academic Expectations	Content/Process	
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Entry through Exit Stages**	**Students will** • host foreign exchange students. • view films in target language. • read magazines, short stories, or novels in target language. • travel to target country. • use target language search engine or chat room. • perform community service with people from target culture.

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High School World Languages
Beginning Language Course

Course Overview:
In this one-credit, beginning world language course, students gain a fundamental understanding of language functions, communicative tasks, and the culture of their target-language peers. Sample activities were designed to promote student learning of all entry-stage bullets outlined in the World Languages content chart. The activities are embedded within real-life contexts and address national standards. They can be used in any beginning language course including French, Spanish, German, or Russian.

Although seven units were designed to organize student learning, neither they nor suggested activities are comprehensive; that is they are starting points to plan instruction for content outlined in the world languages content chart and may be adjusted for individual student needs and school situations. The seven units include foods, shopping and communities, transportation, families, leisure activities, clothes, and daily routines.

Models are organized around guiding questions. Guiding questions (in bold print) direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Essential questions may be included to further focus student learning.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding and essential questions along with related academic expectations and correlations to the world languages content charts. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address content from the world languages content chart, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding Questions:
- How can I effectively communicate using language?
- How are the target cultures' practices and products reflective of their life-styles and philosophies?
- How can I use foreign languages to enhance, reinforce, and further my knowledge of other disciplines?
- What is the nature of language? What is the concept of culture? How do languages and cultures compare?
- How can I use foreign languages to participate in multilingual communities?

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Academic Expectations	Guiding and Essential Questions	Correlations to the World Languages Content Chart
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Unit: Foods** **How can I effectively communicate using a foreign language?** **How are the target cultures' practices and products reflective of their life-styles and philosophies?** **How can I use foreign languages to enhance, reinforce, and further my knowledge of other disciplines?** **What is the nature of language? What is the concept of culture? How do languages and cultures compare?** **How can I use foreign languages to participate in multilingual communities?** What are the practices and products associated with food in different cultures?	**Students will** **Standard 1.1** • express basic needs, basic courtesies, states of being, likes and dislikes, and agreements and disagreements. • respond to one-on-one interactions, simple questions, and simple requests. • ask simple questions and make simple requests. **Standard 1.2** • respond appropriately to directions, instructions, and commands. • read and respond to developmentally appropriate material. • demonstrate listening comprehension. • identify aural, visual, and contextual clues. • identify main ideas and key words in oral and print material. **Standard 2.1** • identify and react to cultural perspectives and practices in target cultures. • recognize and interpret language and behaviors (e.g., signs of greeting, body language) that are appropriate to target cultures. • identify some commonly-held generalizations about target cultures. • identify common words, phrases, and idioms that reflect target cultures. **Standard 2.2** • identify products (e.g., artwork) of target cultures. • identify objects, images, and symbols of target cultures. **Standard 4.2** • use evidence from authentic sources to identify similarities and differences between target cultures and students' own cultures. • identify similar and different behavioral patterns between target cultures and the students' own cultures.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • use authentic recipes from target language to identify ingredients and write shopping lists. Prepare recipes for class. • use food guide pyramids to categorize ingredients of authentic recipes. • plan menus in target language for authentic celebrations. • use food guide pyramid to compare one day's meals in own culture and target culture. • present skits depicting restaurant scenes. • identify food practices and products that appear in art works from target cultures. • conduct interviews with peers and community resource people to explore and compare food practices and products. • visit authentic restaurants and order in target language. Write reviews for school newspapers describing restaurants' use of art and materials to create an atmosphere representative of the target culture. Include descriptions of foods and trace the origin of recipes. *Use this activity to develop possible writing portfolio entries (WP - Transactive).*	Patty learns best when provided with organizational devices. When preparing recipes, provide Patty with numbered cards that clearly illustrate procedures. She needs to prepare recipes that require few steps (*Types of extensions: complexity, magnitude, resources and materials).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the World Languages Content Chart
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language**	**Unit: Shopping and Communities** **How can I effectively communicate using a foreign language?** **How are the target cultures' practices and products reflective of their life-styles and philosophies?** **How can I use foreign languages to enhance, reinforce, and further my knowledge of other disciplines?** **What is the nature of language? What is the concept of culture? How do languages and cultures compare?** **How can I use foreign languages to participate in multilingual communities?** How do buyers and sellers exchange goods and services in different cultures?	**Students will** **Standard 1.1** • express basic needs, basic courtesies, states of being, likes and dislikes, and agreements and disagreements. • respond to one-on-one interactions, simple questions, and simple requests. • ask simple questions and make simple requests. **Standard 1.2** • make identifications based on oral and/or written descriptors. • demonstrate listening comprehension. **Standard 1.3** • give directions, commands, and instructions. • write personal communications (e.g., notes, letters, invitations). • present prepared material (e.g., poems, dialogues, songs) to audiences. **Standard 2.1** • identify and react to cultural perspectives and practices in target cultures. • recognize and interpret language and behaviors (e.g., signs of greeting, body language) that are appropriate to target cultures. • identify some commonly held generalizations about target cultures. • identify common words, phrases, and idioms that reflect target cultures. **Standard 2.2** • identify products (e.g., artwork) of target cultures. **Standard 3.2** • use authentic sources (e.g., newspapers, magazines, TV programs) to identify perspectives of target cultures. **Standard 4.2** • identify similar and different behavioral patterns between target cultures and the students' own cultures.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • write and publish community shopping guides for target-language visitors. Distribute through appropriate community center *(WP-Transactive).* • choose favorite cars. Research costs and mileage statistics in their own and target culture. • identify and react to cultural perspectives and practices in target cultures by forming small groups that produce, advertise, and sell goods and services in a class market day. • conduct interviews with peers and community resource people to identify and compare practices regarding the exchange of goods and services in target cultures. ***Technology suggestion****: Audiotape or videotape interviews.* • create lists of school supplies, including snack foods and clothing. Describe stores where items can be purchased.	Fran has taken a newspaper class in which she developed advanced publishing skills. Fran will be the team leader of a group that develops an illustrated shopping guide, complete with maps and description of goods and services (*Types of extensions: motivation, complexity, purpose and appropriateness).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the World Languages Content Chart
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Unit: Transportation** **How can I effectively communicate using a foreign language?** **How are the target cultures' practices and products reflective of their life-styles and philosophies?** **What is the nature of language? What is the concept of culture? How do languages and cultures compare?** How are people and products transported in different countries? How do various factors influence	**Students will** **Standard 1.2** • make identifications based on oral and/ or written descriptors. • read and respond to developmentally appropriate material. • identify aural, visual, and contextual clues. • identify main ideas and key words in oral and print material. **Standard 1.3** • give directions, commands, and instructions. • write personal communications (e.g., notes, letters, invitations). • present prepared material (e.g., poems, dialogues, songs) to audiences. **Standard 2.1** • identify and react to cultural perspectives and practices in target cultures. • identify social, geographic, and political factors that impact cultural practices. • identify common words, phrases, and idioms that reflect target cultures. **Standard 3.2** • extract information from sources intended for native speakers.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • write directions, using local maps, to guide visitors to points of interest in their city, region, or country. Publish and distribute through chamber of commerce or visitors centers *(WP-Transactive).* ***Technology suggestion****: Use desktop publishing software to create guides.*	
• identify key words and visual clues necessary for reading maps from target cultures. Plan trips to visit major points of interest and identify modes of transportation. • track transportation route of products not produced in the U.S. and identify various factors (e.g., social, geographic, and political) that influence modes of transportation. • create target language coloring pictionary of modes of transportation in target cultures to be shared with day care centers that service the needs of children from target cultures *(WP-Transactive).*	Sasha has traveled extensively with her family and is accustomed to planning itineraries. She will contact friends in other countries and compile a booklet of itineraries for the cities she has visited *(Types of extensions: complexity, magnitude, motivation, resources and materials).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the World Languages Content Chart
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Unit: Families** **How can I effectively communicate using a foreign language?** **How are the target cultures' practices and products reflective of their life-styles and philosophies?** **What is the nature of language? What is the concept of culture? How do languages and cultures compare?** **How can I use foreign languages to participate in multilingual communities?** Who are the family members in different cultures?	**Students will** **Standard 1.1** • respond to one-on-one interactions, simple questions, and simple requests. • ask simple questions and make simple requests. **Standard 1.2** • demonstrate listening comprehension. **Standard 1.3** • give directions, commands, and instructions. • write personal communications (e.g., notes, letters, invitations). • summarize main ideas of selected authentic and/or contextualized material (e.g., weather reports, TV commercials). **Standard 2.1** • identify and react to cultural perspectives and practices in target cultures. • identify some commonly-held generalizations about target cultures. • identify social, geographic, and political factors that impact cultural practices. • identify common words, phrases, and idioms that reflect target cultures.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • create surveys about family members and their roles. Survey peers and analyze results. • conduct interviews of classmates and community members from target cultures about family members and their roles. • create graphs comparing family sizes of different cultures to identify generalizations. Write feature articles for school newspapers explaining how families from various cultures differ *(WP-Transactive).* • examine greeting cards from target culture to identify social factors that impact cultural practices. Write personal communications on birthday or saint's day cards created for family members. • assemble family albums that identify and describe family members. • present family albums orally to classmates, using common words, phrases, and idioms that reflect the target culture.	Fine motor coordination is difficult for Brian. He will work with a peer tutor to create cards. Brian will be responsible for dictating birthday messages to his tutor (*Types of extensions: level of support, demonstration of learning).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the World Languages Content Chart
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Unit: Leisure Activities** **How can I effectively communicate using a foreign language?** **How are the target cultures' practices and products reflective of their life-styles and philosophies?** **What is the nature of language? What is the concept of culture? How do languages and cultures compare?** What are the leisure activities of my culture and the target culture? How do the leisure activities of my culture and the target culture compare?	**Students will** **Standard 1.1** • express basic needs, basic courtesies, states of being, likes and dislikes, and agreements and disagreements. • respond to one-on-one interactions, simple questions, and simple requests. • ask simple questions and make simple requests. **Standard 1.2** • read and respond to developmentally appropriate material. • demonstrate listening comprehension. • identify aural, visual, and contextual clues. • comprehend and respond to simple written communications (e.g., notes, invitations). • identify main ideas and key words in oral and print material. **Standard 1.3** • present prepared material (e.g., poems, dialogues, songs) to audiences. **Standard 3.2** • use authentic sources (e.g., newspapers, magazines, TV programs) to identify perspectives of target cultures.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • write letters to pen pals expressing likes and dislikes and leisure time activities. Use simple questions to request similar information. • use Venn diagrams to compare their own leisure activities with leisure activities in the target culture. Present findings to the class. • read entertainment pages of target language publications. Identify and select activities to attend, using key words and contextual clues. Communicate via phone or e-mail in the target language to make plans to attend. Write reviews for entertainment section of school newspapers describing events *(WP-Transactive).* • use common words, phrases, and images from the target language to create advertisements for leisure time activities Display on class bulletin boards. • create memory card games to match names of famous people from target cultures with their contributions to areas of sports, music, art, drama, dance, literature, cinema, and television.	Genie learns at a slower pace than her peers. She learns best when concepts are presented in small increments and when activities are modeled. Teachers will model steps in creating advertisements for Genie. She will use only common words to create an advertisement (*Types of extensions: pace, purpose and appropriateness, complexity, magnitude, level of support, procedures and routines, demonstration of knowledge).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the World Languages Content Chart
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Unit: Clothes** **How can I effectively communicate using a foreign language?** **How are the target cultures' practices and products reflective of their life-styles and philosophies?** **What is the nature of language? What is the concept of culture? How do languages and cultures compare?** **How can I use foreign languages to participate in multilingual communities?** What types of clothing do people in different cultures wear?	**Students will** **Standard 1.1** • express basic needs, basic courtesies, states of being, likes and dislikes, and agreements and disagreements. **Standard 1.2** • read and respond to developmentally appropriate material. • demonstrate listening comprehension. • identify aural, visual, and contextual clues. • identify main ideas and key words in oral and print material. **Standard 1.3** • give directions orally and in writing. • present prepared material (e.g., poems, dialogues, songs) to audiences. **Standard 2.1** • identify some commonly-held generalizations about target cultures. • identify common words, phrases, and idioms that reflect target cultures. **Standard 3.2** • use authentic sources (e.g., newspapers, magazines, TV programs) to identify perspectives of target cultures. **Standard 4.2** • use evidence from authentic sources to identify similarities and differences between target cultures and students' own cultures.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • create shopping lists in target language identifying basic items of their school wardrobe. • view photographs of children from target cultures. Prepare back-to-school shopping lists that could be used by children in target cultures. • select destinations in target countries. Describe items that should be taken to accommodate weather conditions and activities in target countries. • work in cooperative groups to present fashion shows, giving descriptions orally in target language. • use authentic print material to compile gift lists for family and friends. • make wallet-sized reference cards of clothing sizes in the target language and culture for two members of your family. • create two clothing store window displays: one for their own culture and one for target culture. Display at foreign language fair or parents' night.	Sarah works at a clothing store and is active in the school's DECA club. She will be responsible for overseeing the development of store displays (*Types of extensions: complexity, magnitude, pace).*

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Academic Expectations	Guiding and Essential Questions	Correlations to the World Languages Content Chart
Multiculturalism (2.17) **Similarities and Differences Among Languages (2.27)** **Second Language (2.28)**	**Unit: Daily Routines** **How can I effectively communicate using a foreign language?** **How are the target cultures' practices and products reflective of their life-styles and philosophies?** **How can I use foreign languages to enhance, reinforce, and further knowledge of other disciplines?** **What is the nature of language? What is the concept of culture? How do languages and cultures compare?** **How can I use foreign languages to participate in multilingual communities?** **How can I use foreign languages to participate in multilingual communities?** How do students in different cultures spend their time?	**Students will** **Standard 1.1** • express basic needs, basic courtesies, states of being, likes and dislikes, and agreements and disagreements. • respond to one-on-one interactions, simple questions, and simple requests. **Standard 1.2** • demonstrate listening comprehension. **Standard 1.3** • present prepared material (e.g., poems, dialogues, songs) to audiences. **Standard 2.1** • identify some commonly-held generalizations about target cultures. • identify social, geographic, and political factors that impact cultural practices. **Standard 3.2** • use authentic sources (e.g., newspapers, magazines, TV programs) to identify perspectives of target cultures. **Standard 4.2** • use evidence from authentic sources to identify similarities and differences between target cultures and students' own cultures. • identify similar and different behavioral patterns between target cultures and the students' own cultures.

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Sample Activities	Sample Extensions for Diverse Learners
Students will • give oral and written descriptions of their school schedules, including times, subjects, and days. • give oral and written descriptions of their after school and weekend activities. Design weekly calendars. • interview community members from target cultures to identify daily routines of students in these cultures. Prepare spreadsheets and graphs to compare use of time in different cultures. Give oral descriptions of their findings. Write feature news articles for school papers explaining how people in different cultures spend their time *(WP-Transactive).* • write children's books illustrating daily routines. Make audio recordings of books to share with other classes *(WP-Transactive).*	

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