Plant and Land Science

Valid KY Course # 02 02 21

Course Description: Plant and Land Science develops basic scientific knowledge and skills pertaining to management of the land and its effects on food and fiber production, the environment, and the quality of life. The relationship of land to plant growth will be emphasized. Plant composition, reproduction, growth, and current biotechnological advances will be included. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.	
NATIONAL AFNR STANDARDS	**Content/Process** statements followed by # codes in **Bold = KOSSA Standards,** *Italic = Academic Expectations*
CS.01. CS.02. CS.03.	**Students will:** • demonstrate employability and social skills relative to the career cluster. **AA1, AA 8, AA 11, AA 14, AA 15.** *1.1, 2.36, 2.38.*
ESS.03.	• assess the benefit of plants and land to human kind in local, national, and world agriculture. **OD 13, OD 14, OF 1.** *2.19,2.20,2.36*
ESS.03.	• relate the physical properties of soil to plant and land use. **OD 1, OD2, OD 3, OD 5, OD 7.** *2.2, 2.4, 2.6*
ESS.03.	• relate the chemical properties of soil to plant and land use. **OD 4, OD 8, OD 9.** *2.2, 2.4, 2.6*
ESS.03. ESS.03. ESS.01. ESS.06.	• relate the biological properties of soil to plant and land use. **OD 4, OD 9.** *2.2, 2.4, 2.6* • critique the principles of good land use. **OA 1, OA 3, OO 1, OD 11**. *2.2,2.15,2.20*
ESS.03.	• select appropriate plant nutrition practices and management. **OG 1, OG 2.** *4.1,2.2,2.4*
ESS.03.	examine the processes for plant development, growth, and reproduction. **OB 006, AC 002, AC 003.** *2.1,2.2,2.4,2.6*
ESS.03.	• relate biotechnology to plant production. **AC 006, AC007.** *2.1,2.2,2.4,2.3*

ABS.03	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions. **EC3, EC4, AB1, AB2.v***1.11,2.13,2.18*
CS.01	• utilize activities of FFA as an integral component of course content and leadership development. **AA6, AA10, AA12, AA15.** *1.12,2.16,2.37*
CS.11	• apply science, math and communication skills within the technical content. **AB 2, AA1, AB 5.** *1.9, 1.10, 1.12*

CONNECTIONS

- PROGRAM OF STUDIES – REVISED 2006
- **KENTUCKY OCCUPATIONAL SKILL STANDARDS (KOSSA) above are from the Environmental/Natural Resources area.**
- *ACADEMIC EXPECTATIONS*
- SECRETARY'S COMMISSION ON ACHIEVING NECESSARY SKILLS (SCANS)
- FFA CONNECTIONS: Land Judging, Agronomy CDE's , Grain, Div. Crop, Fiber & Oil Crop, Forage, Specialty Crop Proficiencies, Crop Impromptu Speaking Contests, etc.

Course Title **Plant/Land Science** Grade Levels 10-11 Credit Value 1

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Prerequisites It is recommended that a student take an introductory agricultural course, such as Principles of Agricultural Science and Technology

Unit Title Introduction to Plant Science

Technical Content

1 - Demonstrate employability and social skills reletive to the career cluster
2 - Assess the benefit of plants and land to human kind in local, national, and world agriculture
9 - Relate biotechnology to plant production
10 - Maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions
11 - Utilize activities of FFA as an integral component of course content and leadership development

KY Core Academic Standards (Big Idea)

Career Awareness, Exploration, Planning - Vocational Studies
Career awareness, exploration and planning gives students the opportunity to discover the various career areas that exist and introduce them to the realities involved with the workplace. Many factors need to be considered when selecting a career path and preparing for employment. Career awareness, exploration and planning will enable students to recognize the value of education, learn how to plan for careers and integrate academic subjects.

Cultures and Societies - Social Studies
Culture is the way of life shared by a group of people, including their ideas and traditions. Cultures reflect the values and beliefs of groups in different ways (e.g., art, music, literature, religion); however, there are universals (e.g., food, clothing, shelter, communication) connecting all cultures. Culture influences viewpoints, rules and institutions in a global society. Students should understand that people form cultural groups throughout the United States and the World, and that issues and challenges unite and divide them.

Employability Skills - Vocational Studies
Employability skills will focus on student's competencies with their work habits and academic/technical skills that will impact an individual's success in school and workplace. School-to-work transition skills will help students develop interpersonal skills and positive work habits.

English/Language Arts Common Core Standards

CC.9-10.L.1 Conventions of Standard English: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
CC.9-10.L.2.c Conventions of Standard English: Spell correctly.
CC.9-10.L.6 Vocabulary Acquisition and Use: Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression
CC.11-12.L.2 Conventions of Standard English: Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

Technical Literacy Standards

Craft and Structure: (Grade 9-10) 7. Translate quantitative or technical information expressed in words in a text into visual form

21st Century Skills and Knowledge

Civic Literacy
Collaboration
Communication
Creativity and Innovation
Critical Thinking and Problem Solving
Environmental Literacy
Financial, Economic, Business and Entrepreneurial Literacy
Flexibility and Adaptability

Global Awareness
Health Literacy
Information Literacy
ICT (Information, Communications, and Technology) Literacy
Initiative and Self-Direction
Media Literacy
Social and Cross-Cultural Skills

KOSSA Standards

1001.OA.1 Understand scientific plant classification
1001.OA.5 Analyze the process of plant growth and development
1001.OG.1 Clean and maintain hand tools
1001.OH.2 Identify immediate and real costs of an accident
1001.OH.3 Identify hazardous substances in the workplace
1001.OH.4 Comply with established safety practices
1001.OH.5 Identify fire exits and fire fighting equipment
1001.OH.6 Maintain a clean and safe work facility

Learning Targets	Sample Learner Activities - Click in the box to go to Activities
Evaluate the uses of plants for use as food, fiber, fuel, medical, aesthetic, as well as other uses.	File "Importance of Plants" A group learning activity where students evaluate a specific plant for its importance in food, fiber, fuel, medical, aesthetic and other uses.
Implement a comprehensive SAE plan with connections to a career path	Link: SAE Contract, SAE Yearly SMART Goals www.theaet.com Files: "IntroToSAEsGuide.pdf" "IntroTOSAEGuideQuiz" "Record_Book_Calendar1" "SAE_Introduction_to_SAE_Programs" "SAE_Contract" Students will be introduces to SAEs and be given the opportunity to set goals and make plans for their SAE.
Describe the major segments of the plant science/horticulture industry	File: Segments of the plant science hort industry
Research and evaluate careers related to plan and land science along with describing the skills necessary to gain employment	Files: "Careers in Agriculture Wheel Notes" and "Careers Research Project" Students will research a career that interests them and create a presentation on that career.
Identify the impacts of biotechnology on plan sicence/horticulure	File: "Innovations in Plant Biotechnology" and "Innovations in Plant Biotechnology Gallery Walk Sheet" Students will create a mini-poster of an innovation in Plant Biotechnology then do a gallery walk to record information from others' innovations.

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Prerequisites It is recommended that a student take an introductory agricultural course, such as Principles of Agricultural Science and Technology

Unit Title Plant Physiology

Technical Content

7 - Select appropriate plant nutrition practices and management
8 - Examine the processes for plant development, growth, and reproduction

KY Core Academic Standards (Big Idea)

Biological Change (Biological Science) - Science
The only thing certain is that everything changes. At the high school level, students evaluate the role natural selection plays in the diversity of species. Modern ideas of evolution provide a scientific explanation for three main sets of observable facts about life on Earth: the enormous number of different life forms we see about us, the systematic similarities in anatomy and molecular chemistry we see within that diversity, and the sequence of changes in fossils found in successive layers of rock that have been formed over more than a billion years.

Energy Transformations (Unifying Concepts) - Science
Energy transformations are inherent in almost every system in the universe—from tangible examples at the elementary level, such as heat production in simple Earth and physical systems to more abstract ideas beginning at middle school, such as those transformations involved in the growth, dying and decay of living systems. The use of models to illustrate the often invisible and abstract notions of energy transfer will aid in conceptualization, especially as students move from the macroscopic level of observation and evidence (primarily elementary school) to the microscopic interactions at the atomic level (middle and high school levels). Students in high school expand their understanding of constancy through the study of a variety of phenomena. Conceptual understanding and application of the laws of thermodynamics connect ideas about matter with energy transformations within all living, physical and Earth systems.

Interdependence (Unifying Concepts) - Science
It is not difficult for students to grasp the general notion that species depend on one another and on the environment for survival. But their awareness must be supported by knowledge of the kinds of relationships that exist among organisms, the kinds of physical conditions that organisms must cope with, the kinds of environments created by the interaction of organisms with one another and their physical surroundings, and the complexity of such systems At the high school level, the concept of an ecosystem should bring coherence to the complex array of relationships among organisms and environments that students have encountered. Students growing understanding of systems in general will reinforce the concept of ecosystems. Stability and change in ecosystems can be considered in terms of variables such as population size, number and kinds of species, productivity and the effect of human intervention.

Nutrition (Health Education) - Practical Living
Proper nutrition is critical to good health. To maintain a healthy weight, good dietary habits and physical activity are essential. Nutritious foods are necessary for growth, development and maintenance of healthy bodies.

Unity and Diversity (Biological Science) - Science
All matter is comprised of the same basic elements, goes through the same kinds of energy transformations, and uses the same kinds of forces to move. Living organisms are no exception. At the high school level, an in-depth study of the specialization and chemical changes occurring at the cellular level builds upon the foundational ideas developed earlier to investigate deoxyribonucleic acid (DNA) and effects of alterations in DNA for an individual organism as well as for a species. Emphasis at every level should be placed upon the understanding that while every living thing is composed of similar small constituents that combine in predictable ways, it is the subtle variations within these small building blocks that account for both the likenesses and differences in form and function that create the diversity of life.

English/Language Arts Common Core Standards

CC.9-10.L.1 Conventions of Standard English: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
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CC.9-10.L.6 Vocabulary Acquisition and Use: Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression
CC.11-12.L.2 Conventions of Standard English: Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

Technical Literacy Standards

Integration of Knowledge and Ideas: (Grades 9-10) 4. Determine the meaning of symbols, key terms and other domain-specific words...

21st Century Skills and Knowledge

Collaboration

Communication

Creativity and Innovation

Environmental Literacy

ICT (Information, Communications, and Technology) Literacy

KOSSA Standards

1001.OA.2 Compare the anatomical parts and distinguishing characteristics of plants
1001.OA.3 Understand the reproductive processes of plants
1001.OA.4 Investigate sexual and asexual reproduction of plants including tissue culture

Learning Targets	Sample Learner Activities - Click in the box to go to Activities
Identify major plant parts and their functions	File: Plant Anatomy and Plant Anatomy Key
Compare the processes of photosynthesis and cellular respiration and the irganelles involved in each	File: Virtual Lab Worksheet Plant Physiology
Identify various types of plants and their reproductive structures, types/purpose of flowers, and pollination methods.	File: "Daffodil Flower Dissection Worksheet" This pdf guides students through the dissection of a daffodil to identify reproductive structures.
Identify macro- and micro-nutrients essential for plant growth	File: "Essential Nutrients Worksheet" File: Part B Plant Growth and Development Students determine which elements are essentials for plant growth and determine whether they are typically found in air, soil or water.
Identify three major life cycles of plants	File: "TBA"

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Prerequisites It is recommended that a student take an introductory agricultural course, such as Principles of Agricultural Science and Technology

Unit Title Soils and Land Uses

Technical Content

3 - Relate the physcial properties of soil to plant and land use
4 - Relate the chemical properties of soil to plant and land use
5 - Relate the biological properties of soil to plant and land use
6 - Critique the principles of good land use

KY Core Academic Standards (Big Idea)

Biological Change (Biological Science) - Science
The only thing certain is that everything changes. At the high school level, students evaluate the role natural selection plays in the diversity of species. Modern ideas of evolution provide a scientific explanation for three main sets of observable facts about life on Earth: the enormous number of different life forms we see about us, the systematic similarities in anatomy and molecular chemistry we see within that diversity, and the sequence of changes in fossils found in successive layers of rock that have been formed over more than a billion years.

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Motion and Forces (Physical Science) - Science
Whether observing airplanes, baseballs, planets, or people, the motion of all bodies is governed by the same basic rules. At the middle level, qualitative descriptions of the relationship between forces and motion will provide the foundation for quantitative applications of Newton's Laws. These ideas are more fully developed at the high school level along with the use of models to support evidence of motion in abstract or invisible phenomena such as electromagnetism.

The Earth and the Universe (Earth/Space Science) - Science
The Earth system is in a constant state of change. These changes affect life on Earth in many ways. At the high school level, most of the emphasis is on why these changes occur. An understanding of systems and their interacting components will enable students to evaluate supporting theories of Earth changes. The use of models and observance of patterns to explain common phenomena is essential to building a conceptual foundation and supporting ideas with evidence at all levels. Patterns play an important role as students seek to develop a conceptual understanding of gravity in their world and in the universe. High school is the time to bring all of the ideas together to look at the universe as a whole. Students will use evidence to evaluate and analyze theories related to the origin of the universe and all components of the universe.

English/Language Arts Common Core Standards

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Technical Literacy Standards

Craft and Structure: (Grades 9-10) 4. Determine the meaning of symbols, key terms and other domain-specific words and phrases...

Mathematics Common Core Standards

CC.9-12.N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.*
CC.9-12.N.CN.1 Know there is a complex number i such that i^2 = −1, and every complex number has the form a + bi with a and b real.
CC.9-12.A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
CC.9-12.A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
CC.9-12.F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.*

21st Century Skills and Knowledge

Collaboration

Communication

Environmental Literacy

ICT (Information, Communications, and Technology) Literacy

KOSSA Standards

1001.OC.1 Collect soil samples
1001.OC.2 Analyze soil samples
1001.OC.3 Interpret soil samples
1001.OC.5 Analyze site according to soil type, slope, and drainage
1001.OC.4 Adjust fertility and pH from analysis

Learning Targets	Sample Learner Activities - Click in the box to go to Activities
Compare and Contrast how sand, silt, and clay particles impact soil texture	Files: Soil Texture Activity and "Reading the Soil Texture Triangle Practice" Students learn to both feel soil to determine its texture as well as utilize a soil texture triangle.
Determine the effects of soil salinity on plant growth and development	File: "Soil Salinity and Fertility Lab" Students will collect data on the salinity and fertility of a soil sample using a LabQuest.
Discuss the importance of microbiological organisms in the soil	File: "Are There Bugs Under Your Feet" In this lab, students will determine the microorganism content of a particular soil.
Identify conservatin practices and their appropriate uses	File "Erosion Activity" Students will create a model to view the effects of erosion.

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Prerequisites It is recommended that a student take an introductory agricultural course, such as Principles of Agricultural Science and Technology

Unit Title Soil Fertility

Technical Content

4 - Relate the chemical properties of soil to plant and land use
5 - Relate the biological properties of soil to plant and land use
6 - Critique the principles of good land use
7 - Select appropriate plant nutrition practices and management

KY Core Academic Standards (Big Idea)

Consumer Decisions - Vocational Studies

Individual and families need to make consumer decisions due to the numerous products/services on the market, multiple advertising techniques, and the need to make responsible financial management decisions. Accessing and assessing consumer information, comparing and evaluating products and services, provides basis for making effective consumer decisions. Consumer decisions influence the use of resources and the impact they have on the community and environment.

Geography - Social Studies

Geography includes the study of the five fundamental themes of location, place, regions, movement and human/environmental interaction. Students need geographic knowledge to analyze issues and problems to better understand how humans have interacted with their environment over time, how geography has impacted settlement and population, and how geographic factors influence climate, culture, the economy and world events. A geographic perspective also enables students to better understand the past and present and to prepare for the future.

English/Language Arts Common Core Standards

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CC.9-10.SL.1 Comprehension and Collaboration: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
CC.9-10.SL.1.c Comprehension and Collaboration: Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.
CC.9-10.SL.1.d Comprehension and Collaboration: Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.
CC.11-12.L.2 Conventions of Standard English: Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
CC.11-12.SL.1 Comprehension and Collaboration: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

Technical Literacy Standards

Craft and Structure: Grades 9-10 4. Determine the meaning of key symbols, key terms...

21st Century Skills and Knowledge

Collaboration
Communication
Environmental Literacy
ICT (Information, Communications, and Technology) Literacy

KOSSA Standards

1001.OC.4 Adjust fertility and pH from analysis
1001.OC.1 Collect soil samples
1001.OC.2 Analyze soil samples
1001.OC.3 Interpret soil samples
1001.OC.5 Analyze site according to soil type, slope, and drainage
1001.OC.6 Demonstrate the use of different soil mixes and growing media

Learning Targets	Sample Learner Activities - Click in the box to go to Activities
Collect and analyze soil samples	File: "GPS Mapping Soil Adjustments", "Soil Analysis Activity Data Sheet- 1", "Soil Samples Key-1" Students will collect soil samples at given spots using GPS coordinates. This can illustrate the use of technology and precision agriculture.
Calculate and apply proper soil amendments based on soil analysis	See Soil Salinity and Fertility Lab from Soils and Land Uses Unit.
Calculate and adjust soil pH based on soil analysis	File "Adjusting pH Lab" Students will learn the importance of pH and how to make adjustments.

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Unit Title Pest and Disease Management

Technical Content

5 - Relate the biological properties of soil to plant and land use
7 - Select appropriate plant nutrition practices and management

KY Core Academic Standards (Big Idea)

Safety (Health Education) - Practical Living
Accidents are a major cause of injury and death to children and adolescents. Unintentional injuries involving a motor vehicle, falls, drowning, fires, firearms and poisons can occur at home, school and work. Safe behavior protects a person from danger and lessens the effects of harmful situations.

Unity and Diversity (Biological Science) - Science
All matter is comprised of the same basic elements, goes through the same kinds of energy transformations, and uses the same kinds of forces to move. Living organisms are no exception. At the high school level, an in-depth study of the specialization and chemical changes occurring at the cellular level builds upon the foundational ideas developed earlier to investigate deoxyribonucleic acid (DNA) and effects of alterations in DNA for an individual organism as well as for a species. Emphasis at every level should be placed upon the understanding that while every living thing is composed of similar small constituents that combine in predictable ways, it is the subtle variations within these small building blocks that account for both the likenesses and differences in form and function that create the diversity of life.

English/Language Arts Common Core Standards

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CC.9-10.L.2.c Conventions of Standard English: Spell correctly.
CC.9-10.L.4.c Vocabulary Acquisition and Use: Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology.
CC.9-10.L.6 Vocabulary Acquisition and Use: Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression
CC.11-12.L.2 Conventions of Standard English: Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

Technical Literacy Standards

Craft and Structure: (Grades 9-10) 4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases...

21st Century Skills and Knowledge

Civic Literacy
Collaboration
Communication
Creativity and Innovation
Critical Thinking and Problem Solving
Environmental Literacy
Global Awareness
ICT (Information, Communications, and Technology) Literacy

KOSSA Standards

1001.OF.1 Determine proper pesticide for given symptoms
1001.OF.2 Demonstrate safe handling and storage of pesticides
1001.OF.3 Calculate, mix, and apply pesticides
1001.OF.4 Monitor for plant damage

Learning Targets	Sample Learner Activities - Click in the box to go to Activities
Examine plant damage and identify pest involved	File:"Identifying Plant and Damage" Students will identify common plant pests and the damage they cause in an internet activity.
Examine plant symptoms and identify disease involved	File "Plant Disease Symptoms Identification" Powerpoint and "Plant Identification Worksheet" Students view a presentation on major plant diseases and record essential information on the worksheet
Identify and eradicate common invasive plants and evaluate their economic impact	File "Identifying and Eradicating Common Invasive Plants" Students will create a presentation on a common invasive plant and how to eradicate it.
Demonstrate proper safety measures used in pesticide selection and application	Link "http://www.unce.unr.edu/programs/sites/pesticide/files/pdf/Chapter11.pdf" File: "Pesticide Application" Students will research essential knowledge related to pesticide application from the National Pesticide Applicator Certification Core Manual.
Determine the appropriate pesticide to use for a given situation and application procedure to use	File: "Selecting Appropriate Pesticides and Applications" Students will view the manual to determine appropriate methods for applying pesticides.

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Unit Title Marketing and Management

Technical Content

1 - Demonstrate employability and social skills relative to the career cluster

2 - Assess the benefit of plants and land to human kins in local, national, and world agriculture

KY Core Academic Standards (Big Idea)

Communication/Technology - Vocational Studies

Special communication and technology skills are needed for success in schooling and in the workplace. Students will be able to express information and ideas using a variety of technologies in various ways.

Consumer Decisions - Vocational Studies

Individual and families need to make consumer decisions due to the numerous products/services on the market, multiple advertising techniques, and the need to make responsible financial management decisions. Accessing and assessing consumer information, comparing and evaluating products and services, provides basis for making effective consumer decisions. Consumer decisions influence the use of resources and the impact they have on the community and environment.

Economics - Social Studies

Economics includes the study of production, distribution and consumption of goods and services. Students need to understand how their economic decisions affect them, others, the nation and the world. The purpose of economic education is to enable individuals to function effectively both in their own personal lives and as citizens and participants in an increasingly connected world economy. Students need to understand the benefits and costs of economic interaction and interdependence among people, societies, and governments.

Financial Literacy - Vocational Studies

Financial literacy provides knowledge so that students are responsible for their personal economic well-being. As consumers, individuals need economic knowledge as a base for making financial decisions impacting short and long term goals throughout one's lifetime. Financial literacy will empower students by providing them with the knowledge, skills and awareness needed to establish a foundation for a future of financial responsibility and economic independence.

Geography - Social Studies

Geography includes the study of the five fundamental themes of location, place, regions, movement and human/environmental interaction. Students need geographic knowledge to analyze issues and problems to better understand how humans have interacted with their environment over time, how geography has impacted settlement and population, and how geographic factors influence climate, culture, the economy and world events. A geographic perspective also enables students to better understand the past and present and to prepare for the future.

Government and Civics - Social Studies

The study of government and civics equips students to understand the nature of government and the unique characteristics of American representative democracy, including its fundamental principles, structure, and the role of citizens. Understanding the historical development of structures of power, authority, and governance and their evolving functions in contemporary U.S. society and other parts of the world is essential for developing civic competence. An understanding of civic ideals and practices of citizenship is critical to full participation in society and is a central purpose of the social studies.

Information, Communication and Productivity - Technology

Students demonstrate a sound understanding of the nature and operations of technology systems. Students use technology to learn, to communicate, increase productivity and become competent users of technology. Students manage and create effective oral, written and multimedia communication in a variety of forms and contexts.

Research, Inquiry/Problem-Solving and Innovation - Technology

Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.

Safety and Ethical/Social Issues - Technology

Students understand safe and ethical/social issues related to technology. Students practice and engage in safe, responsible and ethical use of technology. Students develop positive attitudes toward technology use that supports lifelong learning, collaboration, personal pursuits and productivity.

English/Language Arts Common Core Standards

CC.9-10.L.1 Conventions of Standard English: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
CC.9-10.L.1.b Conventions of Standard English: Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.
CC.9-10.L.2 Conventions of Standard English: Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
CC.9-10.L.2.c Conventions of Standard English: Spell correctly.
CC.9-10.L.6 Vocabulary Acquisition and Use: Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression
CC.9-10.SL.2 Comprehension and Collaboration: Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
CC.9-10.SL.4 Presentation of Knowledge and Ideas: Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.
CC.9-10.W.6 Production and Distribution of Writing: Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
CC.11-12.L.2 Conventions of Standard English: Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

Technical Literacy Standards

Craft and Structure (Grades 9-10) 4. Determine the meaning of symbols, key terms

Mathematics Common Core Standards

CC.9-12.F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.*

21st Century Skills and Knowledge

Civic Literacy
Collaboration
Communication
Creativity and Innovation
Critical Thinking and Problem Solving
Environmental Literacy
Financial, Economic, Business and Entrepreneurial Literacy
Flexibility and Adaptability
Global Awareness
ICT (Information, Communications, and Technology) Literacy
Initiative and Self-Direction
Leadership and Responsibility
Media Literacy
Productivity and Accountability
Social and Cross-Cultural Skills

KOSSA Standards

1001.OB.1 Develop a marketing plan
1001.OB.2 Address customer questions about products and services
1001.EM.1 Identify the value of new technologies and their impact on driving continuous change and the need for life-long learning
1001.EI.6 Recognize the relationship between customer/client satisfaction and company success
1001.OI.3 Interpret the impact of the horticultural industry on local, state, national, and international economy

Learning Targets	Sample Learner Activities - Click in the box to go to Activities
Identify government agencies and describe their role in plant/horticulture science	File: "Facebook Page: Government Agency" Students will use the provided template to create a Facebook page for a Government agency involved in horticulture and plant science.
Develop a production budget for a specific crop	Link: "http://www.ideas4ag-ed.com/uploads/3/7/0/4/3704787/melanie_bloom_hort_budget_worksheet.docx" Students will develop a production budget for a crop of their choosing.
Develop a yearly production schedule for a specific crop	File: "Crop Scheduling" Students will determine scheduling for a specific crop.
Analyze the impact of local weather patterns on plant growth	File: "United States Drought Monitor and Crop Production" Students will complete a webquest to familiarize themselves with resources producers can use to determine weather patterns and predict their impact.