

2013 ENVIRONMENTAL SCIENCE NATURAL RESOURCES SYSTEMS

ACADEMIC		
AA		SPEAKING AND LISTENING
AA	1	Utilize effective verbal and non-verbal communication skills
AA	2	Participate in conversation, discussion, and group presentations
AA	3	Communicate and follow directions/procedures
AA	4	Communicate effectively with customers and co-workers
AB		READING AND WRITING
AB	1	Locate and interpret written information
AB	2	Read and interpret workplace documents
AB	3	Identify relevant details, facts, and specifications
AB	4	Record information accurately and completely
AB	5	Demonstrate competence in organizing, writing, and editing using correct vocabulary, spelling, grammar, punctuation
AB	6	Demonstrate the ability to write clearly and concisely using industry specific terminology
AC		CRITICAL THINKING AND PROBLEM SOLVING
AC	1	Utilize critical-thinking skills to determine best options/outcomes (e.g., analyze reliable/unreliable sources of information, use previous experiences, implement crisis management, develop contingency planning)
AC	2	Utilize innovation and problem-solving skills to arrive at the best solution for current situation
AC	3	Implement effective decision-making skills
AD		MATHEMATICS
AD	1	Perform basic and higher level math operations (e.g., addition, subtraction, multiplication, division, decimals, fractions, units of conversion, averaging, percentage, proportion, ratios)
AD	2	Solve problems using measurement skills (e.g., distance, weight, area, volume)
AD	3	Make reasonable estimates
AD	4	Use tables, graphs, diagrams, and charts to obtain or convey information
AD	5	Use deductive reasoning and problem-solving in mathematics
AE		FINANCIAL LITERACY
AE	1	Locate, evaluate, and apply personal financial information
AE	2	Identify the components of a budget and how one is created
AE	3	Set personal financial goals and develop a plan for achieving them
AE	4	Use financial services effectively
AE	5	Demonstrate ability to meet financial obligations
AF		INTERNET USE AND SECURITY
AF	1	Recognize the potential risks associated with Internet use
AF	2	Identify and apply Internet security practices (e.g., password security, login, logout, log off, lock computer)
AF	3	Practice safe, legal, and responsible use of technology in the workplace
AG		INFORMATION TECHNOLOGY
AG	1	Use technology appropriately to enhance professional presentations
AG	2	Demonstrate effective and appropriate use of social media
AG	3	Identify ways social media can be used as marketing, advertising, and data gathering tools
AH		TELECOMMUNICATIONS
AH	1	Select and use appropriate devices, services, and applications to complete workplace tasks
AH	2	Demonstrate appropriate etiquette when using e-communications (e.g., cell phone, e-mail, personal digital assistants, online meetings, conference calls)
EMPLOYABILITY		
EA		POSITIVE WORK ETHIC

EA	1	Demonstrate enthusiasm and confidence about work and learning new tasks
EA	2	Demonstrate consistent and punctual attendance
EA	3	Demonstrate initiative in assuming tasks
EA	4	Exhibit dependability in the workplace
EA	5	Take and provide direction in the workplace
EA	6	Accept responsibility for personal decisions and actions
EB		INTEGRITY
EB	1	Abide by workplace policies and procedures
EB	2	Demonstrate honesty and reliability
EB	3	Demonstrate ethical characteristics and behaviors
EB	4	Maintain confidentiality and integrity of sensitive company information
EB	5	Demonstrate loyalty to the company
EC		SELF-REPRESENTATION
EC	1	Demonstrate appropriate dress and hygiene in the workplace
EC	2	Use language and manners suitable for the workplace
EC	3	Demonstrate polite and respectful behavior toward others
EC	4	Demonstrate personal accountability in the workplace
EC	5	Demonstrate pride in work
ED		TIME, TASK, AND RESOURCE MANAGEMENT
ED	1	Plan and follow a work schedule
ED	2	Work with minimal supervision
ED	3	Work within budgetary constraints
ED	4	Demonstrate ability to stay on task to produce high quality deliverables on time
EE		DIVERSITY AWARENESS
EE	1	Recognize diversity, discrimination, harassment, and equity
EE	2	Work well with all customers and co-workers
EE	3	Explain the benefits of diversity within the workplace
EE	4	Explain the importance of respect for feelings, values, and beliefs of others
EE	5	Identify strategies to bridge cultural/generational differences and use differing perspectives to increase overall quality of work
EE	6	Illustrate techniques for eliminating gender bias and stereotyping in the workplace
EE	7	Identify ways tasks can be structured to accommodate the diverse needs of workers
EE	8	Recognize the challenges and advantages of a global workforce
EF		TEAMWORK
EF	1	Recognize the characteristics of a team environment and conventional workplace
EF	2	Contribute to the success of the team
EF	3	Demonstrate effective team skills and evaluate their importance in the workplace (e.g., setting goals, listening, following directions, questioning, dividing work)
EG		CREATIVITY AND RESOURCEFULNESS
EG	1	Contribute new ideas
EG	2	Stimulate ideas by posing questions
EG	3	Value varying ideas and opinions
EG	4	Locate and verify information
EH		CONFLICT RESOLUTION
EH	1	Identify conflict resolution skills to enhance productivity and improve workplace relationships
EH	2	Implement conflict resolution strategies and problem-solving skills
EH	3	Explain the use of documentation and it's role as a component of conflict resolution

EI		CUSTOMER/CLIENT SERVICE
EI	1	Recognize the importance of and demonstrate how to properly acknowledge customers/clients
EI	2	Identify and address needs of customers/clients
EI	3	Provide helpful, courteous, and knowledgeable service
EI	4	Identify appropriate channels of communication with customers/clients (e.g., phone call, face-to-face, e-mail, website)
EI	5	Identify techniques to seek and use customer/client feedback to improve company services
EI	6	Recognize the relationship between customer/client satisfaction and company success
EJ		ORGANIZATIONS, SYSTEMS, AND CLIMATES
EJ	1	Define profit and evaluate the cost of conducting business
EJ	2	Identify "big picture" issues in conducting business
EJ	3	Identify role in fulfilling the mission of the workplace
EJ	4	Identify the rights of workers (e.g., adult and child labor laws and other equal employment opportunity laws)
EJ	5	Recognize the chain of command, organizational flow chart system, and hierarchy of management within an organization
EK		JOB ACQUISITION AND ADVANCEMENT
EK	1	Recognize the importance of maintaining a job and pursuing a career
EK	2	Define jobs associated with a specific career path or profession
EK	3	Identify and seek various job opportunities (e.g., volunteerism, internships, co-op, part-time/full-time employment)
EK	4	Prepare a resume, letter of application, and job application
EK	5	Prepare for a job interview (e.g., research company, highlight personal strengths, prepare questions, set-up a mock interview, dress appropriately)
EK	6	Participate in a job interview
EK	7	Explain the proper procedure for leaving a job
EL		LIFELONG LEARNING
EL	1	Acquire current and emerging industry-related information
EL	2	Demonstrate commitment to learning as a life-long process and recognize learning opportunities
EL	3	Seek and capitalize on self-improvement opportunities
EL	4	Discuss the importance of flexible career planning and career self-management
EL	5	Employ leadership skills to achieve workplace objectives (e.g., personal vision, adaptability, change, shared vision)
EL	6	Recognize the importance of job performance evaluation and coaching as it relates to career advancement
EL	7	Accept and provide constructive criticism
EL	8	Describe the impact of the global economy on jobs and careers
EM		JOB SPECIFIC TECHNOLOGIES
EM	1	Identify the value of new technologies and their impact on driving continuous change and the need for life-long learning
EM	2	Research and identify emerging technologies for specific careers
EM	3	Select appropriate technological resources to accomplish work
EN		HEALTH AND SAFETY
EN	1	Assume responsibility for safety of self and others
EN	2	Follow safety guidelines in the workplace
EN	3	Manage personal health and wellness
OCCUPATIONAL		
OA		SAMPLE COLLECTION
OA	1	Identify sample types and sampling techniques, explain the importance of unbiased sampling and collect samples

OA	3	Determine the appropriate sampling techniques needed to generate statistical analysis data, and prepare valid chemical laboratory samples according to instructions
OA	4	Analyze and interpret results of sample measurements
OA	5	Identify and explain the use of basic laboratory equipment and environmental monitoring instruments
OA	6	Demonstrate the proper use and maintenance of basic laboratory equipment and environmental monitoring instruments
OA	7	Calibrate and use laboratory and field equipment and instruments according to standard operating procedures
OB		LAWS AND REGULATIONS
OB	1	Identify laws associated with environmental service systems
OB	2	Identify the purposes of laws associated with environmental service systems
OB	3	Abide by the specific laws pertaining to environmental service systems
OC		METEOROLOGICAL PRINCIPLES
OC	1	Identify components and structural layers of the earth's atmosphere
OC	2	Differentiate the types of weather systems and weather patterns
OC	3	Explain how meteorological conditions influence air quality
OC	4	Explain climate change and recognize signs of climate change
OC	5	Prepare a report on the environmental consequences of climate change
OC	6	Evaluate the predicted impacts of global climate change on environmental service systems
OC	7	Explain the earth's balance of energy
OC	8	Explain the basics of the greenhouse effect and describe how the greenhouse effect alters the earth's balance of energy
OC	9	Explain processes that contribute to the change in levels of greenhouse gases
OD		SOIL SCIENCE
OD	1	Explain the process of soil formation through weathering
OD	2	Differentiate rock types and relate the chemical composition of mineral matter in soils to the parent material
OD	3	Apply knowledge of soil orders to environmental service systems
OD	4	Describe the biodiversity found in soil and the contribution of biodiversity to the physical and chemical characteristics of soil
OD	5	Relate the activities of microorganisms in soil to environmental service systems
OD	6	Evaluate the uses of soil microorganisms in environmental service systems
OD	7	Explain how the physical qualities of the soil influence the infiltration and percolation of water
OD	8	Identify the physical qualities of the soil that determine its use for environmental service systems
OD	9	Conduct tests of soil to determine its use for environmental service systems
OD	10	Identify land uses, capability factors, and land capability classes
OD	11	Use a soil survey to determine the land capability classes for different parcels of land in an area
OD	12	Design a master land-use management plan for a given area
OD	13	Explain sustainability of land uses
OD	14	Differentiate between sustainable and non-sustainable land uses
OD	15	Determine maximum sustainable production levels under different resource conditions
OE		HYDROLOGY
OE	1	Describe the world's water supplies and discuss the many uses of water
OE	2	Describe characteristics of water that influence the biosphere and sustain life
OE	3	Research and debate one or more current environmental issues associated with the supplies of groundwater and surface water
OE	4	Demonstrate knowledge of hydrogeology by differentiating between groundwater and surface water
OE	5	Describe interactions between groundwater and surface water

OE	6	Use groundwater flow equations and Darcy's Law to explain how geology and meteorology affect groundwater and groundwater flow
OE	7	Define groundwater production potential
OE	8	Identify differences in groundwater production potential
OE	9	Delineate groundwater production potential zones
OE	10	Identify environmental hazards associated with groundwater supplies
OE	11	Describe precautions taken to prevent/reduce contamination of groundwater supplies
OE	12	Test and document the quality of groundwater supplies
OE	13	Discuss factors that influence the velocity of water through an open channel
OE	14	Explain how the velocity of water influences channel morphology and stream processes
OE	15	Measure and document water flow through an open channel and interpret channel flow analysis
OE	16	Identify the operational components of a pumping or fluid movement system
OE	17	Discuss design principles related to hydraulic systems and highflow technologies related to fluid movement
OE	18	Install and maintain pumps and associated delivery systems
OF		WETLANDS
OF	1	Describe the functions of wetlands and differentiate types of wetlands
OF	2	Explain the criteria for classifying wetlands
OF	3	Apply the Hydrogeomorphic (HGM) Approach and National Wetland Inventories (NWI) to determine the classifications for local wetlands
OF	4	Identify the major types of living organisms that inhabit wetlands
OF	5	Identify the predominant species in a local wetland
OF	6	Conduct a survey of the predominant species in a local wetland
OF	7	Explain the importance of wetland management, creation, enhancement, and restoration programs
OF	8	Identify techniques used in wetland management, creation, enhancement, and restoration programs
OF	9	Evaluate and document the condition of a local wetland and apply techniques to manage, create, enhance, and/or restore local wetlands
OG		CHEMISTRY
OG	1	Explain basic chemistry principles
OG	2	Distinguish the characteristics of inorganic and organic compounds as they relate to environmental service systems
OG	3	Apply standard operating procedures for use of chemicals in environmental service systems
OH		MICROBIOLOGY
OH	1	Identify the basic structures of microorganisms and the major groups of microorganisms
OH	2	Describe microbial growth in the environment and analyze the influence of environmental factors on microbial growth
OH	3	Collect, culture, and examine microorganisms following safety procedures
OH	4	Define the purposes of bioassay test
OH	5	Outline procedures for a bioassay test
OH	6	Conduct bioassay test related to environmental service systems and interpret results
OI		POLLUTION CONTROL
OI	1	Identify types of pollution and distinguish between point source and nonpoint source pollution
OI	2	Give examples of how industrial and non industrial pollution has damaged the environment
OI	3	Survey the local area for evidence of industrial and non industrial pollution
OI	4	Describe ways in which pollution can be managed and prevented
OI	5	Conduct tests to determine the presence and extent of pollution
OI	6	Plan and develop a pollution remediation, management, or prevention program
OJ		WASTE DISPOSAL
OJ	1	Describe different types of solid waste

OJ	2	Evaluate environmental hazards created by different types of solid waste, solid waste accumulation, and solid waste disposal
OJ	3	Analyze environmental hazards associated with the identification and acceptance of solid waste disposal sites
OJ	4	Discuss practical management options for treating solid waste
OJ	5	Identify characteristics of solid waste treatment and recognize the byproducts of solid waste treatment
OJ	6	Collect and treat solid waste materials
OJ	7	Define sanitary landfill
OJ	8	Explain basic sanitary landfill operating procedures and design
OJ	9	Evaluate sanitary landfill procedures
OJ	10	Define compost and composting
OJ	11	Explain scientific principles related to composting
OJ	12	Evaluate methods of operating a composting facility
OJ	13	Explain the basic concepts associated with solid waste incineration
OJ	14	Describe the environmental impact of solid waste incineration
OJ	15	Evaluate methods of incinerating solid waste, including those used in waste to energy plants
OJ	16	Explain the importance of recycling
OJ	17	Describe recycling methods and identify materials that can be recycled
OJ	18	Survey and evaluate local recycling programs and procedures
OK		WATER TREATMENT
OK	1	Identify chemical and physical properties of drinking water
OK	2	Illustrate the steps in the public drinking water treatment process
OK	3	Demonstrate the use of water testing instruments and water treatment equipment for processing public drinking water
OK	4	Define source water quality
OK	5	Define source water assessment steps
OK	6	Conduct and interpret source water assessments
OL		WASTEWATER TREATMENT
OL	1	Define wastewater
OL	2	Diagram the steps in wastewater treatment
OL	3	Demonstrate the use of water testing instruments and water treatment equipment to treat wastewater
OM		HAZARDOUS MATERIALS
OM	1	Identify types of hazardous materials
OM	2	Describe risks related to hazardous materials and describe health and safety practices to reduce risk from hazardous material
OM	3	Describe the procedures for the treatment and disposal of hazardous materials and hazardous waste
ON		ENERGY SOURCES
ON	1	Identify conventional energy sources and list conservation measures to reduce energy consumption
ON	2	Identify advantages and disadvantages to conventional energy sources
ON	3	Evaluate the impact that burning fossil fuels has on the environment
ON	4	Identify alternative energy sources
ON	5	Identify advantages and disadvantages to alternative energy sources
ON	6	Evaluate the impact of alternative energy sources on the environment
OO		MAPPING LAND AND FACILITIES
OO	1	Explain the importance of surveying and mapping for environmental service systems
OO	2	Explain surveying/mapping principles and identify/explain the use of equipment for surveying and mapping
OO	3	Demonstrate surveying and cartographic skills to make site measurements and map facility accesses and infrastructure

OP		EQUIPMENT MAINTENANCE
OP	1	Demonstrate proper use and maintenance of hand tools
OP	2	Operate equipment and machinery in accordance with manufacturers' instructions and OSHA standards, specifically addressing personal protective equipment and proper machine guarding
OP	3	Demonstrate proper preventive maintenance techniques and set up a mock preventive maintenance schedule
OQ		NATURAL RESOURCE OVERVIEW
OQ	1	Identify natural resources
OQ	2	Differentiate between renewable and nonrenewable natural resources
OQ	3	Research and debate one or more current issues related to the conservation or preservation of natural resources
OQ	4	Define ecosystem and related terms
OQ	5	Describe the interdependence of organisms within an ecosystem
OQ	6	Conduct a field study of an ecosystem and record/document observations of species interactions
OR		NATURAL RESOURCE CLASSIFICATION
OR	1	Describe morphological characteristics used to identify trees and other woody plants
OR	2	Identify trees and other woody plants
OR	3	Conduct a field inventory of trees and other woody plants, and record/document findings
OR	4	Describe morphological characteristics used to identify herbaceous plants
OR	5	Identify herbaceous plants
OR	6	Conduct a field inventory of herbaceous plants, and record and document findings
OR	7	Describe morphological characteristics used to identify wildlife species
OR	8	Identify wildlife species
OR	9	Conduct a field inventory of wildlife species, and record and document findings
OR	10	Describe morphological characteristics used to identify aquatic species
OR	11	Identify aquatic species
OR	12	Conduct a field inventory of aquatic species, and record/document findings
OR	13	Demonstrate techniques used to identify rock, mineral, and soil types
OR	14	Identify rock, mineral, and soil types
OR	15	Conduct a field inventory of rock, mineral, and soil types and record/document findings
OS		SAFETY PLANS
OS	1	Identify hazards associated with the outdoor environment
OS	2	Demonstrate safety practices when working in an outdoor environment
OS	3	Demonstrate appropriate responses to accidents and injuries that occur in an outdoor environment
OS	4	Recognize biohazards associated with natural resources
OS	5	Use appropriate techniques and equipment when working with biohazards
OS	6	Demonstrate appropriate responses for disasters involving biohazardous materials
OT		CARTOGRAPHIC SKILLS
OT	1	Demonstrate how to use maps to identify directions, features, calculate actual distance, and determine the elevations of points
OT	2	Locate natural resources using a land survey and geographic coordinate system
OT	3	Employ Global Positioning System and Geographic Information Systems technologies to inventory features in natural resource management
OU		EVALUATE RESOURCES
OU	1	Describe the value of resource inventories and population studies
OU	2	Discuss the procedures for conducting resource inventories and population studies
OU	3	Conduct resource inventories and population studies to assess resource status
OV		NATURAL RESOURCE ENHANCEMENT

OV	1	Identify the different kinds and classification systems of streams
OV	2	Identify indicators of the biological health of a stream
OV	3	Create and implement a stream enhancement plan
OV	4	Identify characteristics of a healthy forest
OV	5	Identify ways in which forest stands may be improved
OV	6	Formulate a forest management plan
OV	7	Identify characteristics of a healthy wildlife habitat
OV	8	Identify methods of wildlife habitat improvement
OV	9	Conduct a survey of a habitat and devise a comprehensive improvement plan
OV	10	Identify characteristics of a healthy rangeland
OV	11	Identify methods of rangeland improvement
OV	12	Evaluate a rangeland and develop a management plan for improvement
OV	13	Identify natural resource characteristics desirable for recreational purposes
OV	14	Identify natural resource management techniques for improving recreation opportunities
OV	15	Evaluate the impact of recreational activities on natural resources and create an improvement plan
OV	16	Identify characteristics of healthy marine and coastal natural resources
OV	17	Identify methods to improve marine and coastal natural resources
OV	18	Assess marine and coastal natural resources and prepare an improvement plan
OW		NATURAL RESOURCE LAWS
OW	1	Identify laws associated with natural resource systems
OW	2	Identify the purposes of laws associated with natural resource systems
OW	3	Abide by specific laws pertaining to natural resource systems
OW	4	Define mitigation
OW	5	Identify issues involving mitigation of natural resources
OW	6	Demonstrate mitigation techniques for natural resources
OX		ECOLOGICAL CONCEPTS
OX	1	Identify biogeochemical cycles
OX	2	Diagram biogeochemical cycles and explain the processes
OX	3	Determine the human influence on biogeochemical cycles
OX	4	Describe properties of watersheds and identify the boundaries of local watersheds
OX	5	Describe the relationship of watersheds to natural resources
OX	6	Analyze ecosystem functions of a watershed
OX	7	Compare and contrast groundwater and surface water flow
OX	8	Explain stream and karst hydrology and structure, and determine the different classes of streams
OX	9	Classify and predict the behavior of local streams
OX	10	Define riparian zones and riparian buffers and explain their functions
OX	11	Identify techniques used in the creation, enhancement, and management of riparian zones and riparian buffer
OX	12	Create, enhance, and manage riparian zones and riparian buffers
OX	13	Describe the processes associated with ecological succession
OX	14	Give examples of primary succession and secondary succession species in a community of organisms
OX	15	Conduct a field study to determine the stages of ecological succession in a community of organisms
OX	16	Explain population ecology, population density, and population dispersion
OX	17	Discuss factors that influence population density and population dispersion
OX	18	Create and implement a management plan based on a population study for a community of organisms
OX	19	Define and identify invasive species
OX	20	Discuss factors that influence the establishment and spread of invasive species

OX	21	Develop and implement a plan to reduce the impact of invasive species on natural resources
OX	22	Describe sources of pollution and define between point and nonpoint source pollution
OX	23	Describe the impact of pollution on natural resources
OX	24	Create and implement a plan to prevent or limit the effects of pollution on natural resources
OX	25	Describe climatic factors that influence natural resources
OX	26	Describe the impact climate has on natural resources
OX	27	Monitor the effects of climate on plants and wildlife
OY		NATURAL RESOURCES PRODUCTION AND HARVEST
OY	1	Describe forest harvesting methods
OY	2	Determine when to harvest forest products
OY	3	Harvest forest products according to principles of sustainable forest management
OY	4	Describe uses of tree species
OY	5	Describe processing of forest products
OY	6	Process forest products
OY	7	Identify wildlife species that can be sustainably harvested
OY	8	Describe techniques used in the harvesting of wildlife
OY	9	Formulate a management plan for protecting wildlife from overexploitation
OY	10	Identify products obtained from wildlife species
OY	11	Describe techniques used in the processing of wildlife
OY	12	Process harvested wildlife
OY	13	Describe the value of minerals and ores to the economy
OY	14	Describe economically important minerals and ores that are extracted and processed
OY	15	Give examples of methods used to extract and process minerals and ores
OY	16	Describe the value of fossil fuels to the economy
OY	17	Describe sources of fossil fuels and products made from fossil fuels
OY	18	Give examples of methods used to extract and process fossil fuels
OY	19	Describe the benefits of non fossil fuel generation
OY	20	Describe characteristics of sites that lend themselves to non fossil fuel generation
OY	21	Describe non fossil fuel generation techniques and procedures, and prepare a report on the impacts of hydroelectric dams on aquatic systems
OY	22	Identify recreational uses of natural resources
OY	23	Debate an issue related to the recreational use of natural resources
OY	24	Evaluate a natural resource site and recommend opportunities for recreational activities
OY	25	Identify aquatic species harvested for commercial and recreational purposes
OY	26	Describe techniques used to harvest aquatic species
OY	27	Harvest aquatic species according to sustainable management principles
OY	28	Identify uses of aquatic species
OY	29	Explain techniques used to process aquatic species
OY	30	Process harvested aquatic species
OZ		FIRE MANAGEMENT
OZ	1	Differentiate between desirable and undesirable fires and prepare a report on the role fire plays in an ecosystem
OZ	2	Describe techniques used to suppress wildfires and manage prescribed fires
OZ	3	Demonstrate the application of fire suppression and fire safety techniques
OAA		DISEASE CONTROL
OAA	1	Identify causes of disease in plants
OAA	2	Report the observance of disease affecting plants to the appropriate authorities

OAA	3	Explain management techniques used to reduce infection and spread of plant disease in natural resources
OAA	4	Identify causes of disease in wildlife
OAA	5	Report the observance of disease affecting wildlife to the appropriate authorities
OAA	6	Explain wildlife disease management techniques
OAB		INSECT INFESTATIONS
OAB	1	Identify harmful and beneficial insects and signs of insect damage to natural resources
OAB	2	Report observance of insect pests to the appropriate authorities
OAB	3	Describe techniques used to manage pests of natural resources
OAC		PUBLIC EDUCATION
OAC	1	Identify ways in which a message regarding natural resources may be communicated to the public
OAC	2	Design and construct a display that communicates a natural resource topic and discuss the topic in a public forum
OAC	3	Communicate a natural resource message through the press, radio, television, or public appearances