Environmental Science and Natural Resources
Kansas Agricultural Education

Hours Completed _____ Competencies Completed _____/151
Verification Signatures:

Student:_____ Date: _____

Instructor:_____ Date: _____

Name: _____

Instructor: _____ School Year:_____

Key to Integrated Competencies
(CD)- Career Development
(L)- Leadership
(E) - Experienced Based
(LK) - LifeKnowledge Lessons
(LA) – Language Arts
(M) - Math
(S) – Science
(SS) – Social Science

Circle to indicate level of competency achieved:
3 - Skilled-Works Independently **2** Limited skill-Needs assistance **1** -Skill undeveloped-but received instruction **0** -No exposure

Our Natural Resources
3 2 1 0 1. Describe the environment and how human activity causes change (S, SS, LA)
3 2 1 0 2. Explain natural resources, and list examples (S, LA)
3 2 1 0 3. Contrast and compare renewable and nonrenewable natural resources (S, LA)
3 2 1 0 4. List natural resources found in Kansas (S)

Sustaining the Environment
3 2 1 0 1. Describe the importance of sustainability
3 2 1 0 2. Appraise the need for biodiversity (S)
3 2 1 0 3. Explain the basic life needs that the environment provides (S, LA)
3 2 1 0 4. Identify three roles of humans in the environment (LK MS 18)

Resource Conservation
3 2 1 0 1. Contrast and compare conservation and preservation (LA)
3 2 1 0 2. Identify ways humans affect resources

Human Population Growth and demand
3 2 1 0 1. Describe world population changes and trends and interpret graphs and maps (SS, LA)
3 2 1 0 2. Create a timeline on how population changes occur (E, SS)
3 2 1 0 3. Identify and explain three major problems associated with overpopulation (SS, LA)

Biology and the Environment
3 2 1 0 1. Utilize the taxonomy of living things (S)
3 2 1 0 2. Classify organisms by their role in the environment (S)

Organisms and the Environment
3 2 1 0 1. Construct a life span of two different types of animals (S,E)
3 2 1 0 2. Describe the life processes essential for life (S, LA)
3 2 1 0 3. Compare and contrast the structure of living organisms (S, LA)
3 2 1 0 4. Relate heredity, genetics, and biodiversity to the environment (S)

Earth Science and the Environment
3 2 1 0 1. Identify the six areas of earth science (S)

Applying Ecology
3 2 1 0 1. Define ecology and ecosystems (S, LA)
3 2 1 0 2. Describe natural selection, adaptation and succession (S, LA)
3 2 1 0 3. Define population attributes and survival factors (A, LA)
3 2 1 0 4. Identify and distinguish diverse biomes (S)

Biotechnology
3 2 1 0 1. Define biotechnology (S, LA)
3 2 1 0 2. Analyze issues related to biotechnology and the environment (S)
3 2 1 0 3. Assess the benefits of living organisms to biotechnology(S)
3 2 1 0 4. Identify and explain applications of genetic engineering in environmental science (S)

Soils
3 2 1 0 1. Classify basic soil properties and formation (S)
3 2 1 0 2. Determine basic soil properties and limitations, such as mottling and permeability, by observing a soil pit or soil profile (S)
3 2 1 0 3. Identify causes and types of soil erosion and discuss methods of soil conservation (S)
3 2 1 0 4. Utilize soil information, including soil surveys, in land use planning (E)
3 2 1 0 5. Analyze how point and non-point pollution effect soil
3 2 1 0 6. Describe soil degradation
3 2 1 0 7. Take soil samples to have them evaluated by K-State Research and Extension (E)
3 2 1 0 8. Compare local soil test with K-State Research and Extension (E)
3 2 1 0 9. Calculate slope, % soil loss and soil depth (M), E
3 2 1 0 10. Demonstrate safety procedures when working with and around surveying and soil analysis equipment (CD, E)

Water Supply and Management and Quality
3 2 1 0 1. Describe the composition and uses of water (LA)
3 2 1 0 2. Identify sources of water (S)
3 2 1 0 3. Conduct a water quality test (E,S)
3 2 1 0 4. Demonstrate proper safety using water test equipment (CD, E)
3 2 1 0 5. Illustrate the process of the water cycle (S,)

3 2 1 0 6. Describe the chemical and physical properties of water (S, LA)
3 2 1 0 7. Delineate the watershed boundary for a small water body
3 2 1 0 8. Explain the different types of aquifers and how they relate to water quantity and quality (S, LA)
3 2 1 0 9. Describe the benefits of wetlands and riparian areas, both function and value (LA, S)
3 2 1 0 10. Know methods used to sample, assess and manage aquatic environments.
3 2 1 0 11. Utilize water quality information to assess the general water quality of a given body of water (E)
3 2 1 0 12. Distinguish between methods and laws used to protect water quality to make management decisions

Aquatics

3 2 1 0 1. Identify common aquatic organisms, aquatic plants, fish, game and other non-game species (S)
3 2 1 0 2. Describe the changes to the aquatic ecosystem based on alteration of an aquatic habitat (S, LA)
3 2 1 0 3. List characteristics of common freshwater fish (S)
3 2 1 0 4. Research the fish trade industry (LA)
3 2 1 0 5. Identify native Kansas fish (S)
3 2 1 0 6. Develop a management plan for a farm pond for sport fishing (E)

Plants

3 2 1 0 1. Identify common grasses, shrubs, weeds, and wildflowers (S)
3 2 1 0 2. Distinguish between domesticated and wild plants (S)
3 2 1 0 3. Describe types of plants based on life cycle and vegetative growth (S, LA)
3 2 1 0 4. Compare and contrast how wildlife plants are depleted and regenerated (S, LA)
3 2 1 0 5. Evaluate a grassland for signs of wildlife habitat (E)
3 2 1 0 6. Demonstrate safe handling of all plant species (E)
3 2 1 0 7. Demonstrate safe operation of tools and equipment (CD, E)
3 2 1 0 8. Attend of compete in Environmental Science or Natural Resource related CDE (CD, L, E)

Forestry

3 2 1 0 1. Identify common trees found in Kansas (S, E)
3 2 1 0 2. Describe forest ecology concepts and factors affecting them (S, LA)
3 2 1 0 3. Define the cause and effect relationship of factors affecting tree growth and forest development (climate, insects, microorganisms, wildlife, etc.) (S,LA)
3 2 1 0 4. Explain the value of trees in urban and suburban settings and factors affecting their health and survival (S, LA)
3 2 1 0 5. Compare how the following issues are affected by forest health and management: biological diversity, forest fragmentation, air quality, fire and recreation (S, LA)
6. Apply basic forest management concepts and tools such as: (E, CD)
3 2 1 0 a. How silviculture practices are utilized
3 2 1 0 b. Use of tree measuring devices, i.e. Biltmore stick
3 2 1 0 c. Best management practices (CD)
3 2 1 0 7. Calculate board feet, tree height, tree diameter, number of logs in the standing tree (M, E)

Wildlife

3 2 1 0 1. Distinguish between domesticated animals and wildlife animals (S)
3 2 1 0 2. Identify common wildlife species based on wildlife signs including fur, hair, feathers, gnawing, nests, rubbings, pellets, tracks, bird calls, and scat from list provided (S)
3 2 1 0 3. Identify basic wildlife survival needs (CD)
3 2 1 0 4. Describe predator-prey relationships and examples (S, LS)
3 2 1 0 5. Describe the potential impact of the introduction of non-native species (S, LA)
3 2 1 0 6. Describe the major factors affecting threatened and endangered species and methods used to improve the populations of these species (S, LA)
3 2 1 0 7. Describe ways habitat can be improved for specific species by knowing their requirements (S, LA)
3 2 1 0 8. Discuss the concepts of carrying capacity and limiting factors (M, LA)
3 2 1 0 9. Analyze various ways the public and wildlife managers can help in the protection, conservation, and management of wildlife species (SS)
3 2 1 0 10. Evaluate a given habitat for its suitability for designated species, given a description of their habitat needs (E)
3 2 1 0 11. Demonstrate hunter safety (E)
3 2 1 0 12. Describe how hunting regulates animal populations
3 2 1 0 13. List legal regulations that apply to hunting and trapping (SS)

Air Quality

3 2 1 0 1. Describe how air pollution is tested and measured (LA)
3 2 1 0 2. Describe the kinds and sources of air pollution (LA)
3 2 1 0 3. Explain the effects of air pollution on humans and other living things (LA)
3 2 1 0 4. Compare and contrast procedures to lesson air pollution dangers (LA)
3 2 1 0 5. Understand the purpose of the Clean Air Act (SS)

Wastewater

3 2 1 0 1. Identify the kinds and sources of wastewater
3 2 1 0 2. Describe the hazards in wastewater (LA)
3 2 1 0 3. Compare ways of treating wastewater
3 2 1 0 4. Describe the products of wastewater treatment (LA)
3 2 1 0 5. Explain important biological and chemical processes in wastewater treatment (S, LA)

Solid Waste

3 2 1 0 1. Describe the kinds and sources of solid waste (LA)
3 2 1 0 2. Explain hazards in solid waste materials and disposal (LA)

3 2 1 0 3. Describe ways of disposing of solid wastes (LA)
3 2 1 0 4. Create a recycling system (E)
3 2 1 0 5. Describe composting (LA)

Hazardous Wastes

3 2 1 0 1. Explain hazardous wastes (LA)
3 2 1 0 2. Classify wastes on the basis of hazards
3 2 1 0 3. Analyze ways of disposing of hazardous wastes
3 2 1 0 4. Describe ecotoxicology (LA)
3 2 1 0 5. Describe procedures for handling hazardous waste spills (LA)

Sustainable Agriculture

3 2 1 0 1. Explain sustainable agriculture (LA)
3 2 1 0 2. Describe sustainable agricultural practices (LA)
3 2 1 0 3. Describe the use of nutrient management (LA)
3 2 1 0 4. Explain site specific agriculture and the use of GPS (S)
3 2 1 0 5. Demonstrate GPS/GIS use (S, E)

Sustaining Wildlife

3 2 1 0 1. Explain the classes of wildlife that need protection (LA)
3 2 1 0 2. Identify endangered wildlife (S)
3 2 1 0 3. Evaluate why wildlife species are vulnerable to extinction
3 2 1 0 4. Describe legal regulations and practices that protect endangered wildlife (SS)

Energy

3 2 1 0 1. Explain major sources of energy
3 2 1 0 2. Describe ways of conserving energy (LA)
3 2 1 0 3. Identify alternative sources of energy

Wetlands

3 2 1 0 1. Compare and contrast between the kinds of wetlands (LA, S)
3 2 1 0 2. Explain the importance of wetlands (S, LA)
3 2 1 0 3. Identify wetland areas of Kansas (SS)
3 2 1 0 4. Describe how humans damage wetlands (LA)
3 2 1 0 5. Explain three ways humans can improve wetlands (LA, S)

Global Environmental Issues

3 2 1 0 1. Explain the importance of global environment (SS, LA)
3 2 1 0 2. Describe war and terrorism as a threat to global environment (SS, LA)
3 2 1 0 3. Explain landscape degradation (LA)
3 2 1 0 4. Describe acid rain and how it is prevented (S, LA)
3 2 1 0 5. Describe ozone destruction and global warming and how they can be prevented (LA, S)
3 2 1 0 6. Explain the importance of rain forests and the effects of their destruction (S, LA)
3 2 1 0 7. Select a local issue and suggest ways to resolve the issue (LA, SS, L, E)
3 2 1 0 8. Visit waste or landfill facilities, waste-water treatment facilities, recreation areas, recycling centers, wetlands, etc (E)

Future Environments

3 2 1 0 1. Describe the role of forecasting and futuring in environmental science and technology (LA)
3 2 1 0 2. Develop an environmental plan (E)
3 2 1 0 3. Explain four examples of planning (L)

Environmental Agencies and Organizations

3 2 1 0 1. Categorize agencies that have a major emphasis in environmental science and technology and give the general purpose of the agency (E)
3 2 1 0 2. Categorize organizations that have a major emphasis in environmental science and technology and give the general purpose of the organization (E)

Preparing for an Environmental Career

3 2 1 0 1. Identify career areas within the environmental systems and natural resources career clusters (CD) (LK HS 123)
3 2 1 0 2. Research and report on the education and skills needed, salary expectations and work required for a career in the two clusters (CD, LA, E)

Opportunities in the FFA

3 2 1 0 1. Research and present a 3-5 minute speech on an agricultural topic.(LK HS 90) (L, LA)
3 2 1 0 2. Serve on a POA committee.(LK AHS 45) (L)
3 2 1 0 3. Participate in a local chapter activity. (L)
3 2 1 0 4. Demonstrate how to conduct an engaging chapter meeting. (LK AHS 47) (L)
3 2 1 0 5. Identify and relate the benefits of FFA to his/her education and personal goals. (L)

SAE

3 2 1 0 1. Maintain records on income and expense.(LK MS 69) (M, CD, E)
3 2 1 0 2. Complete a cash flow statement. (M, CD, E)
3 2 1 0 3. Complete year-end records.(M, CD, E)
3 2 1 0 4. Complete a SAE packet.(LK AHS 53)

Work Place Skills

Decision Making/Problem Solving

1. Describe the factors that impact on decision making: (LK HS 20)

3 2 1 0 a. Needs and wants (LK HS 95)
3 2 1 0 b. Values (LK HS 10)
3 2 1 0 c. Goals (LK HS 44)
3 2 1 0 d. Standards

3 2 1 0 2. Distinguish between types of decisions: economic and/or technical.
3 2 1 0 3. Apply the steps In interpreting a problem, coming up with a plan and then a result. (LK HS 40)

Computer Literacy

3 2 1 0 1. Define, understand and use common computer technology terminology.
3 2 1 0 2. Compose, organize, and edit financial records using a computer.
3 2 1 0 3. Use functions to store, query, retrieve, and sort data.
3 2 1 0 4. Use presentation and multimedia software to design/create and variety of presentations.
3 2 1 0 5. Access, navigate, and use on-line services.
3 2 1 0 6. Apply ethical considerations to the operation and management of

information systems common to the FFA organization.

Listening Skills

1. Follows oral instructions:
   - 3 2 1 0 a. Listen for and identify key words.
   - 3 2 1 0 b. Listen for words that identify a procedure.
   - 3 2 1 0 c. Listen for steps or actions to be performed.
   - 3 2 1 0 d. Listen for clues regarding the order or sequence in which a task is performed.
2. 3 2 1 0 Distinguish fact, opinion, and inference in oral communication.
3. 3 2 1 0 Interpret nonverbal cues (eye contact, posture, gestures).
4. 3 2 1 0 Analyze a speaker's point of view.
5. 3 2 1 0 Draw conclusions or make generalizations from another's oral communication.
6. 3 2 1 0 Restate or paraphrase a conversation to confirm what was said.
7. 3 2 1 0 Reduce barriers (or interference) that may impede effective listening.