STRANDS AND STANDARDS
NATURAL RESOURCE SCIENCE 1

Course Description

Students will develop knowledge and skills related to production management and conservation of natural resources. Major units will include ecology, range resources, waste management, and land use. Field and laboratory experiences will be emphasized.

Intended Grade Level	9-12
Units of Credit	1.0
Core Code	30.03.00.00.001
Concurrent Enrollment Core Code	N/A
Prerequisite	N/A
Skill Certification Test Number	170
Test Weight	1.0
License Type	CTE and/or Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1	Agriculture (CTE/General)
Endorsement 2	Natural Resources Science
Endorsement 3	Agriculture Science

ADA Compliant: March 2022

STRAND 1

Students will explain the role of FFA in agricultural education.

Standard 1

Discuss the history and organization of FFA as it relates to the complete program of agricultural education.

- Explain the interrelationship of classroom and laboratory instruction, supervised agricultural experience, and FFA.
- Describe how, when, and why FFA was organized.
- Identify key FFA historical events.
- Identify the mission and strategies, colors, motto, emblem and parts of the emblem, and organizational structure of FFA.
- Recite and explain the meaning of the FFA Creed.
- Discuss the meaning and purpose of a program of activities and its committee structure.
- List FFA chapter officers, and discuss the role of each.

Standard 2

Identify opportunities in FFA.

- Describe FFA opportunities that develop leadership skills, personal growth, and career success.
- Summarize major state and national activities available to FFA members.

Standard 3

Describe FFA degrees, awards, and career development events (CDEs).

- List and explain the FFA degree areas.
- Identify FFA proficiency awards.
- List and discuss various team and individual CDEs.

Performance Objective

- Attend an FFA Meeting.

STRAND 2

Students will explain the role of supervised agricultural experience (SAE) programs in agricultural education.

Standard 1

Examine the responsibilities and benefits associated with an SAE

- Explain the meaning and benefits of supervised agricultural experience.
- Explain the characteristics of an effective SAE program and the responsibilities of those involved.

Standard 2

Determine the types of SAE programs.

- Compare entrepreneurship SAEs and placement SAEs.
- Describe research/experimentation SAEs.
- Describe exploratory SAEs.

Standard 3

Plan an SAE program.

- Identify the steps in planning an SAE program.
- Describe the function of a business/training plan and/or agreement in an SAE program.
- Develop a short-range plan and a long-range plan for an SAE program.
- Relate classroom and laboratory instruction to an SAE program.

Standard 4

Maintain and use SAE records.

- Explain the importance of keeping records on an SAE program.
- Explain how SAE records are organized.
- Follow approved procedures to make entries in SAE records.

Performance Objective

- Participate in a SAE as part of an integral system approach to Agricultural Education.

STRAND 3

Students will examine natural resource science and management.

Standard 1

Discuss the basics of natural resource science and management.

- Identify types of natural resources.
- Distinguish between renewable and nonrenewable resources.
- Explain the difference between inexhaustible and exhaustible resources.
- Explain the concept of interdependent relationships.

Standard 2

Examine the relationship between natural resources and society, including conflict management.

- Define natural resource management.
- Identify and compare major natural resource management agencies and companies.
- Describe human demands on natural resources.
- Compare and contrast conservation and preservation.
- Provide examples of multiple uses of natural resources (e.g., recreation, mining, agriculture, forestry, etc.).
- Explore and describe societal issues related to natural resource management.

Standard 3

Identify career opportunities in natural resource science.

- Identify and describe the major areas of natural resource science.
- Identify career opportunities in natural resource science, and determine the education and training they entail.

Performance Objective

- Participate in a conflict management activity.

STRAND 4

Students will investigate ecological concepts and science principles related to natural resource systems.

Standard 1

Examine ecology.

- Define ecosystem and related terms, e.g. climate, precipitation, weather, etc.
- Describe the interdependence of organisms within an ecosystem.
- Describe the processes associated with ecological succession.
- Explain population ecology, population density, and population dispersion.
- Explain the importance of biodiversity.
- Explain the process of natural selection.
- Use taxonomy keys to identify common plants and animals.
- Identify and classify game birds and other local birds.
- Identify and classify game animals and other local animals.
- Define invasive species, and discuss factors that influence the establishment and spread of invasive species.

Standard 2

Describe biological, physical, and chemical properties of soil.

- Explain the importance of soil as a life-supporting layer.
- Explain the roles of parent material, topography, organisms, time, weathering, and climate in soil formation.
- Describe the physical characteristics of soil.
- Describe the biodiversity found in soil and the contribution of biodiversity to the physical and chemical characteristics of soil.
- Describe the chemical properties of soil.
- Explain the characteristics of soil water.

Standard 3

Examine hydrology principles.

- Describe the movement of water through the water cycle.
- Compare and contrast ground-water and surface-water flow.
- Discriminate between point and nonpoint pollution sources.

- Survey the local area for pollution sources.
- Calculate water distribution for an irrigation district.
- Compare and contrast water usage in flood irrigation systems and sprinkler irrigation systems.
- Identify local drinking water sources and measures that may be taken to protect the quality of the drinking water.
- Discuss current regulations associated with water quality and water pollution.
- Compare and contrast the differences between fresh water and salt/saline water.

Standard 4

Investigate air resources

- Identify components and structural layers of the earth's atmosphere.
- Identify sources of air pollution.
- Describe the effects of air pollution on people and their environment.
- Illustrate the formation of acid precipitation, and explain its impact on the environment.

Performance Objective

- Identify and classify common Utah flora and fauna.
- Demonstrate air-monitoring techniques.
- Collect and interpret weather data.

STRAND 5

Students will relate range resources and management to natural resources.

Standard 1

Analyze the interrelationships between range management and other natural resource activities.

- Identify characteristics of healthy rangeland.
- Identify methods of rangeland improvement, e.g. facilities, wells, springs, reseeding, chaining, etc.
- Evaluate a rangeland, and develop a management plan for improvement.
- Discuss livestock use of rangeland, e.g. Animal Unit Month (AUM) carrying capacity.
- Discuss wildlife use of rangeland.
- Discuss additional uses of rangeland (e.g., recreation, mining, watershed, etc.).
- Compare and contrast the effect of various uses of rangelands.
- Describe plant environment interactions.
- Explain range transects and their use in evaluating a specific location.

Performance Objective

- Observe a professional in natural resource management.

STRAND 6

Students will examine waste management.

Standard 1

Investigate waste generation, waste reduction, and disposal.

- Describe different types of solid waste.
- Evaluate environmental hazards created by different types of solid waste, solid waste accumulation, and solid waste disposal.
- Explain practical management options for treating solid waste.
- Explain the importance of reducing, reusing, and recycling.
- Describe recycling methods, and identify materials that can be recycled, e.g. biogas generation, green waste composting, animal waste recycling, etc.
- Define wastewater (effluent).
- Discuss the general steps in wastewater treatment.
- Assess agriculture's impact on the environment through waste generation (e.g., animal waste, pesticide residue, fertilizer runoff, sedimentation/erosion, and odors/dust).
- Discuss the meaning and use of nutrient management plans.

STRAND 7

Students will explain land classification, resource inventories, and monitoring methods.

Standard 1

Discuss land-use management planning.

- Describe the interrelationships between land-use planning and natural resources.
- Identify land uses, capability factors, and land capability classes.
- Demonstrate how GIS/GPS applies to land-use planning.
- Use a soil survey to determine the land capability classes for different parcels of land in an area.

Standard 2

Discuss monitoring of land use.

- Identify the components of a monitoring plan.
- Discuss the procedures for conducting resource inventories and population studies.
- List and describe the required components of an Environmental Impact Statement.
- Develop and implement a basic plan for monitoring a natural resource project.
- Participate in public involvement processes in land-use planning.

Performance Objective

- Survey a site to determine potential land use.
- Analyze a current, local Environmental Impact Statement (EIS) and determine the preferred alternative.

Skill Certificate Test Points by Strand

Test Name	Test #	Number of Test Points by Strand										Total Points	Total Questions
		1	2	3	4	5	6	7	8	9	10		
Natural Resource Science 1	170	2	2	16	22	11	9	9				71	64