

Natural Resources

18504

Rationale Statement:

South Dakota's natural resources play an important role in its economic health. Mining, toxicology, forestry, conservation, hunting, fishing, recreation and tourism are career areas in which natural resources skills are necessary. Jobs within the natural resources field are very competitive. Depending on the sector within the natural resources industry, job demand is expected to range from remaining steady to increasing dramatically. The Natural Resources course is designed to give students a background in natural resource systems and the many career opportunities available in the field. It addresses the biological and environmental issues within our state. Classroom and laboratory content should be enhanced by utilizing appropriate equipment and technology. Biology, statistics, algebra, English and human relations skills will be reinforced throughout the course. Opportunities for application of clinical and leadership skills are provided by participation in the FFA organization through activities, conferences, and skills competition such as the natural resources career development event or related proficiency awards. Each student will be expected to complete a Supervised Agricultural Experience (SAE) program.

Suggested grade level: 9-12

Topics covered:

- Environmental relationships
- Resource management
- Cartography
- Environmental health
- Weather
- Natural cycles
- Plant and tree identification
- Soils
- Hydrology
- Forestry



Indicator #1: Examine the importance of resource and human interrelations to conduct management activities in natural habitats.

Bloom's Taxonomy Level	Standard and Examples
Understanding	<p>NR1.1 Explain resource management components to establish relationships in natural resource systems.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Identify natural resources. • Identify organizations and agencies involved in resource management. • Identify impacts by humans on natural resources and the resulting effects. • Describe ecosystem relationships between plants, animals and humans. • Translate a habitat management plan.
Applying	<p>NR1.2 Apply cartographic skills to natural resource activities.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Interpret different types of maps such as topographical, relief, etc. • Interpret map features and legends and correctly identify and use. • Use map scales to calculate actual distance. • Use a compass to determine direction. • Interpret elevation and terrain features from topographic maps. • Use directional tools with a map to locate exact position. • Use Geographic Information System to interface geospatial data. • Interpret aerial photos and images and apply to a map. • Use a Global Positioning System to plot a waypoint, make a track, etc.
Analyzing	<p>NR1.3 Examine planning data to determine natural resource status.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Analyze resource inventory and population studies of natural resources. • Establish sample plots and points from which to gather data. • Collect data to determine resource availability and health of a specific natural resource. • Use a Geographic Information System to analyze resource data. • Describe the relationship of harvest levels to long-term availability of those resources.

Applying	<p>NR1.4 Demonstrate environmental and natural resource knowledge to enhance natural resources.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Demonstrate stream enhancement techniques by maintaining water quality. • Demonstrate forest stand improvement techniques through harvesting, thinning, integrated pest management, etc. • Demonstrate range enhancement techniques through weed control, proper grazing, etc. • Demonstrate recreation area enhancement techniques by keeping areas clean, safe, and aesthetically pleasing.
Understanding	<p>NR1.5 Discuss weather and other criteria to recognize dangers related to work in an outdoor environment.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Recognize weather-related dangers through research and creation of a weather report. • Recognize hazards as they relate to terrain to ensure safe travel. • Identify poisonous plants and animals through books, posters and websites. • Recognize hazardous situations at the work location from posters and information researched. • Describe basic survival skills and first aid procedures.
<p>Indicator #2: Interpret scientific principles to natural resource management activities.</p>	
<p>Bloom's Taxonomy Level</p>	<p>Standard and Examples</p>
Understanding	<p>NR2.1 Describe biological and physical characteristics to identify and classify plant-based natural resources.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Identify tree species and other woody vegetation. • Identify grass species. • Identify forbs and shrubs.

<p>Understanding</p>	<p>NR2.2 Identify natural cycles and related phenomena to describe ecologic concepts and principles.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Describe the hydrologic cycle. • Describe the nitrogen cycle and how it is recycled for nature’s use. • Describe the carbon cycle and how carbon is used in nature. • Describe nutrient cycles and how it relates to plants and animals. • Describe succession in relation to a forest community. • Describe primary and secondary producers and the role they play in the environment. • Identify potential pollution sources such as residential, industrial or agricultural. • Define watershed boundaries on a map. • Describe the influence of weather and climatic factors and the impact they have on natural resources.
<p>Understanding</p>	<p>NR2.3 Describe soil compositions and properties.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Identify how soil is created through geological processes. • Examine the biological properties of soil and the impact they have on plant growth. • Test soil samples to determine properties, amounts, and percentages of N,P,K and other minerals. • Identify soil water such as available, unavailable, capillary, etc. • Explain the relationship between soil classifications and land use. • Define the functions of soils such as plant support, providing minerals, etc. • Identify major components of soil such as sand, silt and clay. • Determine soil structure. • Determine soil characteristics based on color. • Determine the texture of soil by performing a ribbon test. • Identify the horizons of a soil profile through the use of a soil pit. • Determine land capability classes and their practical application and use. • Examine types of soil erosion. • Evaluate erosion control methods. • Interpret a soil survey map to identify soil types.

Analyzing	<p>NR2.4 Examine wetland, watershed and groundwater properties, classifications and functions.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Distinguish various living components of wetlands. • Examine techniques used in wetland management, enhancement and restoration programs. • Examine watersheds by looking at the flow of rivers, lakes and streams within it. • Analyze different types of groundwater for potential human use. • Analyze the role of water management in maintaining a healthy environment and lifestyle.
Understanding	<p>NR2.5 Discuss forestry management techniques.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Define a forest community. • Identify parts of a tree and correctly label. • Classify trees as deciduous or coniferous by using tree taxonomy. • Calculate board feet in a tree. • Measure tree height and diameter breast height using a tree caliper. • Determine growth rate and age of trees by examining a tree cookie. • Select trees for harvesting. • Identify and use forestry safety equipment. • Identify forest harvesting tools/equipment and correctly label. • List steps in processing logs into various wood products. • Identify uses of wood products for human use. • Identify lumber defects such as knots, splits, etc. • Identify methods of drying wood. • Evaluate and grade finished lumber. • Identify forest assistance agencies such as the US Forest Service.

Indicator #3: Describe production practices and processing procedures for natural resources.

Bloom's Taxonomy Level	Standard and Examples
Understanding	<p>NR3.1 Describe how natural resource products are produced, harvested, processed and used.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Explain forest harvest techniques and procedures such as selective thinning, clear-cut, etc. • Describe how minerals and ores are extracted and processed for human consumption. • Discuss how oil is extracted and processed into various products. • Explain hydroelectric generation techniques and procedures used to make electricity. • Describe wind energy generation techniques and procedures used to utilize it efficiently. • Discuss the effects of using different kinds of energy sources on air and water pollution.

Indicator #4: Explain responsible practices to protect natural resources.

Bloom's Taxonomy Level	Standard and Examples
Understanding	<p>NR4.1 Describe techniques and equipment needed to manage fires.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Explain fire prevention precautions while working in natural environments. • Discuss controlled burn options and uses. • Describe techniques used to put fires out.
Understanding	<p>NR4.2 Discuss animal and plant disease symptoms and prevention.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Discuss rabies. • Explain chronic wasting disease. • Describe black knot. • Discuss dutch elm disease.

Understanding	<p>NR4.3 Recognize insect types and available controls to prevent insect infestation.</p> <p>Examples:</p> <ul style="list-style-type: none">• Classify insects into their proper family groups.• Recognize damage caused by insects by observing various examples of infestation.• Discuss emerald ash borer.• Describe mountain pine beetle infestation.• Explain lyme disease.• Describe which Integrated Pest Management techniques are appropriate to use to control an infestation.
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