Course: Fundamental Natural Resources

Course Description: People depend on natural resources. Regions, cultures, nations, and societies are shaped by how people use land, water, plants, and wildlife. South Dakota’s natural resources – minerals, forests, ranges, wetlands, lakes, rivers, soils, along with all connected domestic and native plant and animal communities – play an important role in its economic health, including mining, agriculture, outdoor recreation, and tourism. The large and small ecosystems that make up the environment are complex. Fundamental Natural Resources provides students with an overview of the planet’s natural resource systems, along with examining those resources unique to South Dakota. Students will explore and develop a basic understanding of how the systems relate to one another other. Students will consider the roles people play in, and the occupations related to, managing, using, protecting, and conserving natural resources. Classroom and laboratory content should be enhanced by utilizing up to date equipment and technology, such as Geographic Information System (GIS) software. 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 FFA activities, conferences and skills competition such as sales related career development events and proficiency awards. Each student will be expected to maintain a Supervised Agricultural Experience (SAE) Program/Internship.

Career Cluster: Agriculture, Food and Natural Resources

Prerequisites: Recommended: Introduction to AFNR

Program of Study Application: Fundamental Natural Resources is a first pathway course in the Agriculture, Food and Natural Resources cluster, Natural Resources and Environmental Science Systems pathway. Fundamental Natural Resources would follow a cluster course and would prepare a student to participate in either Advanced Natural Resources or Wildlife and Fisheries.

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

<table>
<thead>
<tr>
<th>Sub-Indicator 1.1 (Webb Level: 1 Recall)</th>
<th>Explain resource management components to establish or enhance relationships in natural resource systems.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Indicator 1.2 (Webb Level: 3 Strategic Thinking)</td>
<td>Apply Geographic Information Systems (GIS) skills to natural resource activities.</td>
</tr>
<tr>
<td>Sub-Indicator 1.3 (Webb Level: 2 Skill/Content)</td>
<td>Examine planning data to determine natural resource status.</td>
</tr>
<tr>
<td>Sub-Indicator 1.4 (Webb Level: 3 Strategic Thinking)</td>
<td>Discuss weather and other criteria to recognize dangers related to work in an outdoor environment.</td>
</tr>
</tbody>
</table>

**Knowledge (Factual):** Various Natural Resources

**Understand (Conceptual):** Natural resource relationships within an ecosystem

**Do (Application):** Design and solve a Geocache, Create a habitat
## Benchmarks:
*Students will be assessed on their ability to:*
- Create a collage between the ecosystem relationships of plants, animals and humans.
- Map waypoints to create a track with a GPS system.
- Interface geospatial data with a GIS system.
- Collect data to determine resources availability and health of a specific natural resource.
- Categorize poisonous plants and animals.
- Describe basic survival skills and first aid procedures.

## Academic Connections

### ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):

- **Social Studies:**
  1) HS-ESS3-1 – Availability and uses of natural resources.
  2) 9-12.G.6.2 - Different cultures utilizing natural resources.

- **Math:**
  HSG.MG.A.3 - Apply geometric methods to solve design problems

### Sample Performance Task Aligned to the Academic Standard(s):
- Present availability and uses of natural resources.
- Create a collage between the ecosystem relationships of plants, animals and humans.
- Utilize a GPS and GIS system to design and solve a Geocache.

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**INDICATOR #FNR 2:** Interpret scientific principles of natural resource

SUB-INDICATOR 2.2 (Webb Level: 2 Skill/Concept): Identify natural cycles and related phenomena to describe ecologic concepts and principles.

SUB-INDICATOR 2.3 (Webb Level: 1 Recall): Describe soil compositions and properties.

SUB-INDICATOR 2.4 (Webb Level: 1 Recall): Examine wetland, watershed and groundwater properties, classifications and functions.

SUB-INDICATOR 2.5 (Webb Level: 2 Skill/Concept): Discuss forestry management techniques.

<table>
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<th>Knowledge (Factual):</th>
<th>Understand (Conceptual):</th>
<th>Do (Application):</th>
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<tr>
<td>- Dichotomous keys</td>
<td>- Functionality of dichotomous keys</td>
<td>- Create a dichotomous key</td>
</tr>
<tr>
<td>- Water, carbon, nitrogen and phosphorus cycles</td>
<td>- Relationships among the natural cycles</td>
<td>- Research the effects of natural cycles on the environment specific to the region</td>
</tr>
<tr>
<td>- Soil properties</td>
<td></td>
<td>- Participate in Land and Range Judging</td>
</tr>
<tr>
<td>- Wetland, watershed, and groundwater properties</td>
<td></td>
<td>- Core a tree and interpret the age</td>
</tr>
<tr>
<td>- Forest management techniques</td>
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<td></td>
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</tbody>
</table>

Benchmarks:
Students will be assessed on their ability to:
- Use a dichotomous key.
- Illustrate the water, carbon, nitrogen and phosphorus cycles.
- Identify soil horizons and describe soil erosion.
- Describe the role of water management in maintaining a healthy environment and lifestyle.
- Sketch and label the parts of a tree.
- Identify and use forestry safety equipment.

Academic Connections
**ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):**

**English:**
9-12 SL.4 - Presenting information

**Science:**

**Sample Performance Task Aligned to the Academic Standard(s):**

- Present a forestry management plan.
- Conduct a rainwater simulator experiment.

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**INDICATOR #FNR 3:** Describe production practices and processing procedures for natural resources

**SUB-INDICATOR 3.1 (Webb Level: 1 Recall):** Describe how natural resource products are produced, harvested, processed and used.

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<th>Understand (Conceptual):</th>
<th>Do (Application):</th>
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<tbody>
<tr>
<td>- Production techniques of natural resources</td>
<td>- Relationship between processing natural resources and the effect on the environment</td>
<td>- Calculate board feet in a tree</td>
</tr>
<tr>
<td>- Harvesting techniques of natural resources</td>
<td></td>
<td>- Select trees for harvesting</td>
</tr>
<tr>
<td>- Processing techniques of natural resources</td>
<td></td>
<td>- Build a wind turbine</td>
</tr>
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</table>

**Benchmarks:** Students will be assessed on their ability to:
- Identify forest harvesting tools and equipment.
- List the steps in processing logs into wood products.
- Compare and contrast the extraction of minerals, ores and oils.
- Debate alternative energy techniques.

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**Academic Connections**
**INDICATOR #FNR 4: Explain responsible practices to protect natural resources**

**SUB-INDICATOR 4.1 (Webb Level: 1 Recall):** Describe techniques and equipment needed to manage and conserve natural resources.

**SUB-INDICATOR 4.2 (Webb Level: 2 Skill/Concept):** Discuss animal and plant disease symptoms and prevention.

**SUB-INDICATOR 4.3 (Webb Level: 1 Recall):** Recognize insect types and available controls to prevent insect infestation.

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<th>Understand (Conceptual)</th>
<th>Do (Application)</th>
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</thead>
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<tr>
<td>- Plant and animal diseases</td>
<td>- Assess and apply methods to sustain natural resources</td>
<td>- Implement preventative measures for insect and disease control</td>
</tr>
<tr>
<td>- Methods of soil conservation</td>
<td></td>
<td>- Create an IPM plan</td>
</tr>
<tr>
<td>- Insect infestation</td>
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</tbody>
</table>

**Benchmarks:**  
*Students will be assessed on their ability to:*  
- Recognize damage caused by insects or disease  
- Create a presentation for a plant or animal disease.  
- Classify insects into family groups and discuss their impact on plants and wildlife.

**Academic Connections**

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<th>ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):</th>
<th>Sample Performance Task Aligned to the Academic Standard(s):</th>
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<tr>
<td><strong>English:</strong> 9-12 SL.4 - Presenting information</td>
<td><strong>English:</strong> Present information on plant and animal diseases.</td>
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Additional Resources:
GPS and GIS Lesson Plans [http://sciencespot.net/Pages/classgpslsn.html](http://sciencespot.net/Pages/classgpslsn.html)
NRCS
U.S. Forest Service
Smokey the Bear
[www.projectwild.org](http://www.projectwild.org) Project WILD
[www.projectwet.org](http://www.projectwet.org) Project WET
[www.plt.org](http://www.plt.org) Project Learning Tree
Use Leaf Snap application