CTE Standards Unpacking
Fundamental Natural Resources

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.		
SUB-INDICATOR 1.1 (Webb Level: 1 Recall): Explain resource management components to establish or enhance relationships in natural resource systems.		
SUB-INDICATOR 1.2 (Webb Level: 3 Strategic Thinking): Apply Geographic Information Systems (GIS) skills to natural resource activities.		
SUB-INDICATOR 1.3 (Webb Level: 2 Skill/Content): Examine planning data to determine natural resource status.		
SUB-INDICATOR 1.4 (Webb Level: 3 Strategic Thinking): Discuss weather and other criteria to recognize dangers related to work in an outdoor environment.		
Knowledge (Factual):	**Understand (Conceptual):**	**Do (Application):**
-Various Natural Resources	-Natural resource relationships within an ecosystem	-Design and solve a Geocache -Create a habitat

-Ecosystem relationships	-Effect of human interactions on the environment	management plan
-Geographic Information Systems (GIS) and Global Positioning Systems (GPS)		-Collaborate with Game, Fish and Parks on wildlife management
-How to collect and interpret data		-Apply survival skills on an outdoor trip
-Dangers related to outdoor environments		-Collect and interpret data points

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):	Sample Performance Task Aligned to the Academic Standard(s):
Social Studies: 1) HS-ESS3-1 – Availability and uses of natural resources.	-Present availability and uses of natural resources.
2) 9-12.G.6.2 - Different cultures utilizing natural resources.	-Create a collage between the ecosystem relationships of plants, animals and humans.
Math: HSG.MG.A.3 - Apply geometric methods to solve design problems	-Utilize a GPS and GIS system to design and solve a Geocache.

INDICATOR #FNR 2: Interpret scientific principles of natural resource

management activities.

SUB-INDICATOR 2.1 (Webb Level: 1 Recall): Identify and classify plant- and animal-based natural resources.

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.

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

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):	Sample Performance Task Aligned to the Academic Standard(s):
English: 9-12 SL.4 - Presenting information	-Present a forestry management plan.
Science: HS-LS4-6 - Use a simulation to research and analyze possible solutions for the adverse impacts of human activity on biodiversity. (SEP: 5; DCI: LS4.C, LS4.D, ETS1.B; CCC: Cause/Effect)	-Conduct a rainwater simulator experiment.

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.

Knowledge (Factual):	Understand (Conceptual):	Do (Application):
-Production techniques of natural resources -Harvesting techniques of natural resources -Processing techniques of natural resources	-Relationship between processing natural resources and the effect on the environment	-Calculate board feet in a tree -Select trees for harvesting -Build a wind turbine

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.

Academic Connections

ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	Sample Performance Task Aligned to the Academic Standard(s):
Math: 1) HSG.GMD.A.3 - Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.	-Calculate board feet in a wooden structure as a measure of its volume.

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.

Knowledge (Factual):	Understand (Conceptual):	Do (Application):
-Plant and animal diseases -Methods of soil conservation -Insect infestation	-Assess and apply methods to sustain natural resources	-Implement preventative measures for insect and disease control -Create a IPM plan

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	
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	**Sample Performance Task Aligned to the Academic Standard(s):**
English: 9-12 SL.4 - Presenting information	English: Present information on plant and animal diseases.

Additional Resources:
GPS and GIS Lesson Plans http://sciencespot.net/Pages/classgpslsn.html
NRCS
U.S. Forest Service
Smokey the Bear
www.projectwild.org Project WILD
www.projectwet.org Project WET
www.plt.org Project Learning Tree
Use Leaf Snap application