

# **MANAGING OUR NATURAL RESOURCES**

## **Curriculum Content Framework**

*Prepared By*

James Meazle, Clinton High School  
James Thieme, Gosnell High School  
Gene Raines, Warren High School

*Facilitated By*

Karen Chisholm, Program Manager  
Office of Assessment and Curriculum  
Arkansas Department of Workforce Education

*Edited By*

Angela B. Collins, Program Advisor  
Office of Agriculture Science and Technology  
Arkansas Department of Workforce Education

*Disseminated By*

Office of Assessment and Curriculum  
Career and Technical Education  
Arkansas Department of Workforce Education

# Curriculum Content Framework

## MANAGING OUR NATURAL RESOURCES

**Grade Level: 10, 11, 12**  
**Course Code: 491310**

**Prerequisites: None**

Course Description: Students will explore natural resources (soil, water, air, forests, energy, minerals and metal, and wildlife) and develop the knowledge and skills to use them wisely. Other issues include outdoor recreation, careers, and the environment.

### Table of Contents

	Page
Unit 1: Introduction to Natural Resources .....	1
Unit 2: Soil Management.....	3
Unit 3: Water Management .....	4
Unit 4: Energy Resources and Management .....	5
Unit 5: Mineral and Metal Resources .....	7
Unit 6: Forestry Management.....	8
Unit 7: Fish and Wildlife .....	10
Unit 8: Planning for the Future .....	12
Glossary .....	12

# Unit 1: Introduction to Natural Resources

## 7 Hours

Terminology: Career Development Event (CDE), environment, natural resource, natural resource interaction, natural resource interdependence, nonrenewable natural resource, renewable natural resource, Supervised Agricultural Experience (SAE)

<b>CAREER AND TECHNICAL SKILLS</b> What the Student Should Be Able to Do		<b>ACADEMIC AND WORKPLACE SKILLS</b> What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
1.1 Define terms		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]  Uses written resources (books, dictionaries, directories) to obtain factual information [1.3.23]
1.2 List natural resources and how they are utilized by humans	1.2.1 Identify natural resources used in your area  1.2.2 Write a report on how you personally use natural resources	Foundation	Writing	Analyzes data, summarizes results, and makes conclusions [1.6.2]
1.3 Compare the availability of current natural resources to those of a century ago	1.3.1 Use resource materials (newspapers, Internet, magazines, etc.) to compare the availability of current natural resources with those of a century ago	Foundation  Interpersonal  Thinking	Speaking  Teamwork  Reasoning	Communicates a thought, idea, or fact in spoken form [1.5.5]  Contributes to group with ideas, suggestions, and effort [2.6.2]  Sees relationship between two or more ideas, objects, or situations [4.5.5]

<b>CAREER AND TECHNICAL SKILLS</b> What the Student Should Be Able to Do		<b>ACADEMIC AND WORKPLACE SKILLS</b> What the Instruction Should Reinforce		
<b>Knowledge</b>	<b>Application</b>	<b>Skill Group</b>	<b>Skill</b>	<b>Description</b>
1.4 Identify careers in natural resources	1.4.1 Research a career in natural resources to determine educational requirements, working conditions, and salary	Foundation	Reading	Applies information to job performance [1.3.4]  Uses standard occupational resource materials [1.3.22]
		Personal Management	Career Awareness, Development, and Mobility	Develops skills to locate, evaluate, and interpret career information [3.1.4]  Explores career opportunities [3.1.6]
1.5 Discuss FFA opportunities available to students interested in natural resources	1.5.1 Use FFA resources to identify CDEs, SAEs, and Proficiency awards related to the natural resources area	Foundation	Listening	Listens for content [1.2.3]  Listens for emotional meaning [1.2.5]
		Personal Management	Career Awareness, Development, and Mobility	Identifies education and training needed to achieve goals [3.1.8]

## Unit 2: Soil Management

### 8 Hours

Terminology: land, organic matter, parent material, soil, soil conservation, soil erosion, soil horizon, soil profile, soil structure, soil texture

<b>CAREER AND TECHNICAL SKILLS</b> What the Student Should Be Able to Do		<b>ACADEMIC AND WORKPLACE SKILLS</b> What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
2.1 Define terms		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]  Uses written resources (books, dictionaries, directories) to obtain factual information [1.3.23]
2.2 List the components of soil		Foundation	Science	Describes/Explains scientific principles related to soil [1.4.14]
2.3 Differentiate between natural and accelerated erosion	2.3.1 Identify examples of erosion in the local area	Foundation	Speaking	Asks questions to clarify information [1.5.3]
		Thinking	Reasoning	Uses logic to draw conclusions from available information [4.5.6]
2.4 Explain methods used in controlling erosion	2.4.1 Differentiate between rural erosion control and urban erosion control	Foundation	Reading	Determines what information is needed [1.3.10]
		Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.5 Discuss factors used to determine land capability classes	2.5.1 Evaluate local sites to determine land capability classes	Foundation	Reading	Distinguishes between fact and opinion [1.3.11]
		Thinking	Decision Making	Evaluates information/data to make best decision [4.2.5]

## Unit 3: Water Management

### 8 Hours

Terminology: aquifer, groundwater, hydrologic cycle, potable water, runoff water, surface water, water, watershed

<b>CAREER AND TECHNICAL SKILLS</b> What the Student Should Be Able to Do		<b>ACADEMIC AND WORKPLACE SKILLS</b> What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
3.1 Define terms		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
3.2 Identify and discuss the users of water	3.2.1 Invite a representative from a local plant to discuss its water use and the environmental regulations it must follow	Foundation	Listening	Listens for content [1.2.3]
3.3 List the types of water pollution	3.3.1 Identify local sources of water pollution	Foundation	Reading	Determines what information is needed [1.3.10]
	3.3.2 Identify various water testing methods	Thinking	Knowing how to Learn	Uses available resources to acquire new skills or improve skills [4.3.4]
3.4 Discuss the procedures for treating water for use	3.4.1 Invite local water department employees to explain local treatment procedures	Foundation	Science	Chooses appropriately from a variety of scientific methods and techniques to complete a task [1.4.9]
	3.4.2 Tour a wastewater treatment plant to observe the procedures used	Personal Management	Integrity/Honesty/Work Ethic	Complies with safety and health rules in a given work environment [3.2.2]
3.5 Explain the importance of planning for future water needs		Foundation	Writing	Organizes information into an appropriate format [1.6.10]

## Unit 4: Energy Resources and Management

### 8 Hours

Terminology: biofuels, coal, crude oil, geothermal energy, hydropower, natural gas, nuclear energy, seismograph, solar energy

<b>CAREER AND TECHNICAL SKILLS</b> What the Student Should Be Able to Do		<b>ACADEMIC AND WORKPLACE SKILLS</b> What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
4.1 Define terms		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
4.2 Discuss the use of energy resources in the United States		Foundation	Reading	Comprehends written information, and applies it to a task [1.3.8]
		Thinking	Decision Making	Evaluates information/data to make best decision [4.2.5]
4.3 Identify sources of energy	4.3.1 Research an energy source (coal, oil, gas, nuclear energy, solar, geothermal, biofuels, hydropower, or wind), and present a group report to the class	Foundation	Science	Describes/Explains scientific principles related to energy [1.4.14]
			Reading	Uses written resources (books, dictionaries, directories) to obtain factual information [1.3.23]
		Thinking	Reasoning	Uses logic to draw conclusions from available information [4.5.6]
4.4 Discuss concerns related to the use of fossil fuels	4.4.1 Research the effect of fossil fuel emissions on the environment	Foundation	Science	Acquires and processes scientific data [1.4.1]
4.5 List and discuss ways to conserve energy		Foundation	Writing	Uses words appropriately [1.6.21]
		Interpersonal	Teamwork	Contributes to group with ideas, suggestions, and effort [2.6.2]

<b>CAREER AND TECHNICAL SKILLS</b> What the Student Should Be Able to Do		<b>ACADEMIC AND WORKPLACE SKILLS</b> What the Instruction Should Reinforce		
<b>Knowledge</b>	<b>Application</b>	<b>Skill Group</b>	<b>Skill</b>	<b>Description</b>
4.6 Discuss farm-raised energy alternatives	4.6.1 Research the present and future uses of biofuels	Foundation	Reading	Comprehends written information, and applies it to a task [1.3.8]
		Thinking	Decision Making	Evaluates information/data to make best decision [4.2.5]

## Unit 5: Mineral and Metal Resources

### 8 Hours

Terminology: ferrous metals, metal, mineral, nonferrous metals, ore, strip-mining, subsurface mining, surface mining

<b>CAREER AND TECHNICAL SKILLS</b> What the Student Should Be Able to Do		<b>ACADEMIC AND WORKPLACE SKILLS</b> What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
5.1 Define terms		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]  Uses written resources (books, dictionaries, directories) to obtain factual information [1.3.23]
5.2 Identify uses of various minerals and metals	5.2.1 List examples of ferrous and nonferrous metals	Foundation	Reading	Comprehends written information, and applies it to a task [1.3.8]
		Thinking	Decision Making	Evaluates information/data to make best decision [4.2.5]
5.3 Explain procedures for extracting minerals and metals from the earth		Foundation	Reading	Determines what information is needed [1.3.10]
		Thinking	Knowing how to Learn	Uses available resources to acquire new skills or improve skills [4.3.4]
5.4 Discuss the availability and management concerns of nonfuel minerals and metals	5.4.1 List known reserves of different minerals	Foundation	Speaking	Applies/Uses technical terms as appropriate to audience [1.5.2]
		Thinking	Reasoning	Determines which conclusions are correct when given a set of facts and a set of conclusions [4.5.3]

## Unit 6: Forestry Management

### 8 Hours

Terminology: board foot, cord, cruising, dendrometer, diameter breast height (DBH), forest, forest enemies, forester, forestry, harvest cutting, hypsometer, intermediate cutting, tree, tree height

<b>CAREER AND TECHNICAL SKILLS</b> What the Student Should Be Able To Do		<b>ACADEMIC AND WORKPLACE SKILLS</b> What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
6.1 Define terms		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
6.2 Determine the percentage of forest land in Arkansas and the different types of ownership	6.2.1 Determine forest ownership in your county	Foundation	Arithmetic/ Mathematics	Calculates percentages, ratios, proportions, decimals, and common fractions [1.1.10]
		Thinking	Knowing how to Learn	Processes new information as related to workplace [4.3.5]
6.3 Identify forest products and how they impact our daily lives		Foundation	Science	Describes/Explains scientific principles related to forest use [1.4.14]
			Reading	Uses written resources (books, dictionaries, directories) to obtain factual information [1.3.23]
		Thinking	Reasoning	Uses logic to draw conclusions from available information [4.5.6]
6.4 List practices used to manage forests	6.4.1 Demonstrate ways to measure timber	Foundation	Speaking	Organizes ideas, and communicates oral messages to listeners [1.5.7]
	6.4.2 Identify different types of cuttings	Personal Management	Responsibility	Exhibits enthusiasm in approaching and completing tasks [3.4.3]
	6.4.3 Discuss ways to reproduce the forest			

<b>CAREER AND TECHNICAL SKILLS</b> What the Student Should Be Able To Do		<b>ACADEMIC AND WORKPLACE SKILLS</b> What the Instruction Should Reinforce		
<b>Knowledge</b>	<b>Application</b>	<b>Skill Group</b>	<b>Skill</b>	<b>Description</b>
6.5 Identify forest enemies and their control	6.5.1 Collect different types of forest damage	Foundation  Thinking	Reading  Reasoning	Applies information to job performance [1.3.4]  Sees relationship between two or more ideas, objects, or situations [4.5.5]
6.6 Identify and discuss environmental concerns associated with forestry		Foundation	Science	Analyzes environmental issues (ecology, pollution, waste management) [1.4.2]

## Unit 7: Fish and Wildlife

### 8 Hours

Terminology: carrying capacity, domesticated animal, habitat, home range, limnetic zone, littoral zone, territory, wildlife

<b>CAREER AND TECHNICAL SKILLS</b> What the Student Should Be Able to Do		<b>ACADEMIC AND WORKPLACE SKILLS</b> What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
7.1 Define terms		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
7.2 Identify species of fish and wildlife found in Arkansas	7.2.1 Do reports about wildlife and fish found in Arkansas	Foundation	Science	Acquires and processes scientific data [1.4.1]
	7.2.2 Take photographs and make videos of wildlife in Arkansas	Thinking	Knowing how to Learn	Organizes and processes images – symbols, pictures, graphs, objects, etc. [4.6.2]
7.3 Compare the current populations of various species to those populations 100 years ago	7.3.1 Discuss how wildlife populations declined and how they have been brought back to present populations	Foundation	Reading	Uses graphs/charts/tables to obtain factual information [1.3.21]
		Thinking	Reasoning	Comprehends ideas and concepts related to changes in populations [4.5.2]
7.4 Identify the three parts of a wildlife habitat and ways to establish and manage these parts	7.4.1 Do a survey of personal property to determine ways to improve wildlife habitat	Foundation	Science	Acquires and processes scientific data [1.4.1]
7.5 Explain how hunting can be beneficial to some wildlife populations	7.5.1 Complete a Hunter Safety Course	Foundation	Speaking	Interprets nonverbal cues – such as eye contact, posture, and gestures – for meaning [1.5.6]
		Personal Management	Integrity/Honesty/Work Ethic	Follows established rules, regulations, and policies [3.2.5]

<b>CAREER AND TECHNICAL SKILLS</b> What the Student Should Be Able to Do		<b>ACADEMIC AND WORKPLACE SKILLS</b> What the Instruction Should Reinforce		
<b>Knowledge</b>	<b>Application</b>	<b>Skill Group</b>	<b>Skill</b>	<b>Description</b>
7.6 Discuss freshwater fish management		Foundation	Reading	Identifies relevant details, facts, and specifications [1.3.16]
		Personal Management	Responsibility	Pays close attention to details [3.4.8]

## Unit 8: Planning for the Future

### 5 Hours

Terminology: conservation, conservationist, greenhouse effect, preservation, recycling, resource depletion

<b>CAREER AND TECHNICAL SKILLS</b> What the Student Should Be Able to Do		<b>ACADEMIC AND WORKPLACE SKILLS</b> What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
8.1 Define terms		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
8.2 Identify concerns about the future availability of natural resources	8.2.1 Discuss natural resources that could be depleted in the near future	Foundation	Reading	Analyzes and applies what has been read to specific task [1.3.2]
		Thinking	Seeing Things in the Mind's Eye	Organizes and processes images – symbols, pictures, graphs, objects, etc. [4.6.2]
8.3 Explain how recycling can be better used to conserve natural resources	8.3.1 Visit a local recycling business	Foundation	Science	Applies a scientific principle to solve a problem [1.4.8]
		Personal Management	Responsibility	Sets high standards for self in completion of a task [3.4.9]
8.4 Discuss current issues regarding the use of natural resources	8.4.1 Debate issues regarding the use of natural resources, using the class as a forum	Foundation	Speaking	Uses verbal language and other cues, such as body language, appropriate in style, tone, and level of complexity to the audience and the occasion [1.5.14]
		Interpersonal	Leadership	Helps an individual or group challenge existing procedures, policies, or authority [2.4.7]

<b>CAREER AND TECHNICAL SKILLS</b> What the Student Should Be Able to Do		<b>ACADEMIC AND WORKPLACE SKILLS</b> What the Instruction Should Reinforce		
<b>Knowledge</b>	<b>Application</b>	<b>Skill Group</b>	<b>Skill</b>	<b>Description</b>
8.5 Explain the role of the Environmental Protection Agency and other government agencies in planning for natural resource management		Foundation  Thinking	Science  Reasoning	Analyzes environmental issues (ecology, pollution, waste management) [1.4.2]  Determines which conclusions are correct when given a set of facts and a set of conclusions [4.5.3]
8.6 Determine ways students can be involved in planning for natural resource management	8.6.1 Develop a recycling program for your school or community as a SAE or a community development project	Foundation  Interpersonal	Speaking  Teamwork	Communicates a thought, idea, or fact in spoken form [1.5.5]  Takes an interest in what others say and do [2.6.5]

# Glossary

## Unit 1: Introduction to Natural Resources

1. Career Development Event (CDE) – an activity sponsored by the FFA offering members the opportunity to display competencies gained in agriculture education classes
2. Environment – all the factors that affect a living thing
3. Natural resource – a naturally occurring material or organism that supports life, provides fuel, or is used in other ways by humans
4. Natural resource interaction – the action of natural resources on one another
5. Natural resource interdependence – all resources depend on each other
6. Nonrenewable natural resource – a natural resource that cannot be replaced
7. Renewable natural resource – a natural resource that can be replaced
8. Supervised Agriculture Experience (SAE) – a program (production, experience, cooperative, or directed lab) operated by an FFA member

## Unit 2: Soil Management

1. Land – soil and the environment surrounding the soil
2. Organic matter – dead plant and animal material in various stages of decay
3. Parent material – those materials underlying the soil from which the soil was formed
4. Soil – the layer of natural materials on the earth's surface, containing both organic and inorganic materials, that is capable of supporting plant life
5. Soil conservation – use of soil so damage or loss is minimal or nonexistent
6. Soil erosion – the process by which soil is removed
7. Soil horizon – layers in a mature soil
8. Soil profile – a vertical section of a soil at a specific site
9. Soil structure – the arrangement of soil particles into shapes and sizes
10. Soil texture – the proportion of sand, silt, and clay in soil

## Unit 3: Water Management

1. Aquifer – an underground stream or pool in sand or gravel layers
2. Groundwater – the water beneath the surface of the earth; found in spaces between rocks and soil particles
3. Hydrologic cycle – the water cycle
4. Potable water – water that is appropriate for human consumption without further purification or boiling
5. Runoff water – water that runs on the earth's surface
6. Surface water – water on the earth's surface, such as lakes, ponds, and streams
7. Water – a colorless, transparent, naturally occurring compound made of hydrogen and oxygen
8. Watershed – an area of land from which all the water that does not infiltrate the soil runs to a downhill location

## Unit 4: Energy Resources and Management

1. Biofuels – any plant or animal material that can be used as a fuel
2. Coal – fossil fuel in the form of a black or brown rock that developed from plants that died between one and four hundred million years ago
3. Crude oil – fossil fuel taken from the earth in a liquid form and then refined into different types of petroleum fuels
4. Geothermal energy – heated groundwater used as an energy source
5. Hydropower – power produced by capturing the energy of falling water
6. Natural gas – fossil fuel taken from the earth in the form of a gas
7. Nuclear energy – energy produced by the fission of atomic nuclei
8. Seismograph – device using sound waves to find fossil fuels
9. Solar energy – heat collected from the sun as an energy source

## Unit 5: Mineral and Metal Resources

1. Ferrous metals – metals containing iron
2. Metal – an element with a metallic luster that is malleable, ductile, and has a high tensile strength
3. Mineral – a natural inorganic substance on or in the earth
4. Nonferrous metals – metals not containing iron
5. Ore – a rock that contains a large amount of a certain mineral
6. Strip-mining – a form of surface mining in which the mineral is extracted after removing the soil covering it
7. Subsurface mining – methods used to extract minerals from below the surface of the earth
8. Surface mining – methods used to extract minerals on or near the earth's surface

## Unit 6: Forestry Management

1. Board foot – a standard unit of measure for lumber; a piece of lumber 1 inch X 1 foot X 1 foot (or the equivalent) before surfacing
2. Cord – a stack of wood 4 feet X 4 feet X 8 feet or the equivalent
3. Cruising – the process of estimating the pulpwood or lumber that a standing parcel of trees can produce
4. Dendrometer – any device used to measure the diameter of a tree trunk
5. Diameter breast height (DBH) – the diameter of the tree trunk, in inches, measured 4.5 feet above the ground
6. Forest – a very complex community of associated trees, shrubs, other plants, and animals
7. Forest enemies – any insects, diseases, wildlife, wildfire, or other agents that can damage a forest
8. Forester – a professional who plans, manages, and/or supervises a forest
9. Forestry – the science of planting and managing forests for specific purposes, such as timber production or conservation
10. Harvest cutting – removal of any or all trees in an area for sale
11. Hypsometer – any device used to measure usable tree height
12. Intermediate cutting – harvests taken from a stand of trees before the trees reach planned maturity
13. Tree – woody plants with single stems; they generally consist of three major parts – roots, trunk, and crown
14. Tree height – the length of the tree trunk from the point where it will be cut to the end of the last usable section to be kept

## Unit 7: Fish and Wildlife

1. Carrying capacity – the number of animals that a habitat can support
2. Domesticated animal – an animal removed from nature and raised in an environment that is more or less controlled
3. Habitat – the physical area where a plant or animal lives under natural conditions
4. Home range – the area over which animals repeatedly travel
5. Limnetic zone – the zone of a lake that extends from the end of rooted vegetation to the point where sunlight no longer penetrates the water
6. Littoral zone – shallow water zone containing rooted vegetation
7. Territory – the area an animal will defend, usually to its death
8. Wildlife – animals that have not been domesticated and live and survive in a natural environment

## **Unit 8: Planning for the Future**

1. Conservation – the wise use of natural resources
2. Conservationist – a person who promotes the wise use of natural resources
3. Greenhouse effect – the warming of the earth's surface caused by the buildup of certain materials in the atmosphere
4. Preservation – the non-use or very limited use of a natural resource
5. Recycling – the reuse of a product or waste materials in making a product
6. Resource depletion – the act of using resources faster than they can be restored or replaced