

Lesson A1–1

Exploring Natural Resources

Unit A. Natural Resources

Problem Area I. Introduction to Natural Resources

Lesson I. Exploring Natural Resources

New Mexico Content Standard:

Pathway Strand: Natural Resources and Environmental Systems

Standard: I: Recognize importance of resource and human interrelations to conduct management activities in natural habitats.

Benchmark: I-A: Identify resource management components to establish relationships in natural resource systems.

Performance Standard: 1. Identify natural resources. 2. Identify organizations and agencies involved in resource management. 3. Identify impacts by humans on natural resources. 4. Describe ecosystem relationships.

Student Learning Objectives. Instruction in this lesson should result in students achieving the following objectives:

1. Define and identify types of natural resources.
2. Distinguish between renewable and nonrenewable resources.
3. Explain the difference between inexhaustible and exhaustible resources.
4. Explain the concept of interdependent relationships.

List of Resources. The following resources may be useful in teaching this lesson:

Recommended Resources. One of the following resources should be selected to accompany the lesson:

Lee, Jasper. *Natural Resources and Environmental Technology*. Danville, Illinois: Interstate Publishers, Inc., 2000. (Textbook, Chapter 1)

Porter, Lynn, et al. *Environmental Science and Technology*. 2nd Edition. Upper Saddle River, New Jersey: Prentice Hall Interstate, 2003. (Textbook and Activity Manual, Chapter 1)

Other Resources. The following resources will be useful to students and teachers:

Turk, Jonathan and Amos Turk. *Environmental Science*. 3rd Edition. New York: CBS College Publishing, 1984. (Textbook, Chapter 1)

Arms, Karen. *Environmental Science*. New York: Holt, Rinehart and Winston, 1996. (Textbook, Chapter 1)

List of Equipment, Tools, Supplies, and Facilities

Writing surface
Overhead projector
Transparencies from attached masters
Copies of student lab sheets

Terms. The following terms are presented in this lesson (shown in bold italics):

Air
Atmosphere
Climate
Domestication
Environment
Exhaustibility
Exhaustible natural resource
Fossil fuels
Inexhaustible natural resource
Minerals
Natural resource dependence
Natural resources
Nonrenewable natural resources
Renewability
Renewable natural resources
Soil
Water

Water cycle
Weather
Wildlife
Wind

Interest Approach. Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

Ask students to think about the area around them. Have them write down everything that is living or was once living. Tell them to think about things they are wearing, where they are sitting, what they are writing on, etc. After a few minutes, have one or two students read their lists to the class. Prompt students to think of items they may have missed. Students should include items such as their jeans, t-shirts, wool sweaters, pencils, paper, desks, and chairs. Remind students to think of the air that we breathe, the water we drink, and the sunlight that we use for heat and light. Tell them that without these there would be no life on earth.

Summary of Content and Teaching Strategies

Objective 1: Define and identify types of natural resources.

Anticipated Problem: What are the different types of natural resources?

- I. Resources that occur naturally in nature are known as **natural resources**. Natural resources can be found in our environment. The **environment** are the conditions that surround us. Natural resources cannot be made by man, but man can help ensure their continued existence. People need many natural resources to live. Other natural resources are used to make life easier. There are eight groups of natural resources. Each group can be further subdivided. The eight groups include air and wind, fossil fuels, minerals, people, soil, sunlight, water, and wildlife.
 - A. The **atmosphere** is the area surrounding the Earth. **Air** is the mixture of gases that surrounds the Earth. **Wind** is the movement of the air. Water vapor, gases, and particulate can be found in the atmosphere. The conditions found in the atmosphere are what causes weather. **Weather** is the condition of the atmosphere, including moisture, temperature, movement, and pressure. The climate of an area helps determine which natural resources can survive in the area. **Climate** is the condition of the weather in a particular location.
 - B. **Fossil fuels** are natural resources used to provide energy. Fossil fuels took millions of years to make. They are the remains of decomposed plants and animals. Their energy comes from the energy produced by the plants and animals. One problem with using fossil fuels is the pollution they produce. The three main groups of fossil fuels are petroleum, natural gas, and coal.

1. Petroleum is the liquid form of fossil fuels used to make gasoline and oils.
 2. Natural gas is the gaseous form of fossil fuels used in heating and cooking.
 3. Coal is the solid form of fossil fuels used in factories and generating electricity.
- C. **Minerals** are natural inorganic substances on or in the earth. Minerals are not living things. Minerals are mined from the earth and are used to produce everything from iron to brick. Jewelry, coins, monuments, and concrete are also made from minerals.
- D. People help determine how other natural resources are used. As the population increases, natural resource use will increase. The wise use of resources is necessary to ensure their future availability.
- E. **Soil** is the outer layer of the earth's surface that supports life. Plants grow in soil, humans and other animals eat plants, humans and animals produce waste that provides nutrients for plants to grow, and the cycle continues. However, soil can be easily eroded by misuse. Soil must be protected in order for it to continue to be a resource.
- F. Sunlight is the source of almost all the energy used on the Earth. The light from the sun produces solar energy. Plants use this energy in the process of photosynthesis. People can also use this energy if it is harnessed using solar collectors. These collectors can then be used to give power to items such as calculators and radios.
- G. **Water** is a tasteless, colorless, liquid natural resource. All living things need water to survive. Water is a naturally occurring compound made up of two atoms of hydrogen and one atom of oxygen. Water can be found in three forms, solid, liquid, and gas. Water is continuously renewed through the water cycle. The **water cycle** is the movement of water from the earth's surface to the atmosphere and back to the surface.
- H. All of the plants and animals that live in the wild are called **wildlife**. These plants and animals have not been domesticated. **Domestication** is the control of plants and animals by man.

Use TM: A1–1A to review the eight types of natural resources covered in this objective. After discussing this lesson, ask students to consider what they would do without one or more of these resources. Have the class think of ideas on how to produce electricity without fossil fuels. A lot of information is available on hydroelectricity and wind-generated electricity. Assign students the responsibility of finding some of this information and have them bring it to the next class for discussion.

Objective 2: Distinguish between renewable and nonrenewable resources.

Anticipated Problem: What is the difference between renewable and nonrenewable resources?

- II. One way to classify natural resources is based on their renewability. **Renewability** is whether or not a resource can be restored after use. Some natural resources can be renewed, others cannot.
- A. **Renewable natural resources** can be replaced when they are used. They can be renewed and used again, but it may take many years. Soil is a renewable natural resource, however it is not a fast process. Plants and water are other renewable natural resources.

- B. **Nonrenewable natural resources** are natural resources that cannot be replaced after use. Minerals and fossil fuels are two types of nonrenewable natural resources.

Use TM: A1–1B to review the terms from this objective. Have students think back to the list made in the interest approach. How many of these items came from renewable and nonrenewable resources? Have them brainstorm and come up with a few ways they can help reduce the use of nonrenewable natural resources in their own lives.

Objective 3: Explain the difference between inexhaustible and exhaustible natural resources.

Anticipated Problem: What is the difference between inexhaustible and exhaustible natural resources?

- III. **Exhaustibility** refers to whether or not a natural resource can be replenished as it is used. As with renewability, some resources can be exhausted, others cannot.
- A. An **inexhaustible natural resource** is a resource that is continuously replenished. The supply of the resource will not run out. Sunlight, wind, and water are inexhaustible natural resources.
- B. An **exhaustible natural resource** is a resource that is available in limited quantity and can be completely used. Exhaustible resources can be replaceable or irreplaceable.
1. A replaceable natural resource can be replenished. Most wildlife are replaceable.
 2. An irreplaceable natural resource is gone once it is used. Fossil fuels and most minerals are irreplaceable.

Use TM: A1–1C to review this objective. Continue to have students look at their lists from the interest approach. Have them determine which items are exhaustible, inexhaustible, replaceable, and irreplaceable.

Objective 4: Explain the concept of interdependent relationships.

Anticipated Problem: What are interdependent relationships?

- IV. The idea that all natural resources depend on each other is known as **natural resource dependence**. This means that all living things depend on each other. Humans need animals for food, clothing, and at one time for work. Humans and animals need plants to live. They use the plants for food and the plants help produce oxygen needed to breathe. Plants also depend on animals and humans. Animals, including humans, give off carbon dioxide that the plants need to live. When animals die, they decompose. The decomposition process releases minerals back into the soil. Plants can use these minerals for growth.

Use the diagram on TM: A1–1D to review this objective with the students. For an added activity, have the students draw this diagram using different plants and animals.

Review/Summary. This lesson provides the basic information needed to start a unit on natural resources. In order to review the objectives, have students take notes and review the terms and anticipated questions provided.

Application. Refer to Chapter 1 of the *Environmental Science and Technology Activity Manual* for an additional application of this lesson.

Evaluation. Use the following sample test to evaluate the students' comprehension of the material covered in this lesson.

Answers to Sample Test:

Part One: Matching

1 = a, 2 = e, 3 = b, 4 = h, 5 = f, 6 = d, 7 = c, 8 = g

Part Two: Completion

1. natural resource dependence
2. Renewable
3. Nonrenewable

Part Three: Short Answer

See Objective 3.

Test

Lesson A1-1: Exploring Natural Resources

Part One: Matching

Instructions. Match the term with the correct response. Write the letter of the term by the definition.

- | | |
|-------------------|----------------------|
| a. air | e. renewability |
| b. exhaustibility | f. wind |
| c. climate | g. natural resources |
| d. domestication | h. weather |

- _____ 1. The mixture of gases that surrounds the earth.
- _____ 2. Whether or not a resource can be restored.
- _____ 3. Whether or not a natural resource can be replenished as it is used.
- _____ 4. The condition of the atmosphere.
- _____ 5. The movement of air.
- _____ 6. The control of plants and animals by man.
- _____ 7. The condition of the weather in a particular location.
- _____ 8. The resources that occur naturally in nature.

Part Two: Completion

Instructions. Provide the word or words to complete the following statements.

1. The idea that all natural resources depend on each other is known as _____.
2. _____ natural resources can be replaced when they are used.
3. _____ natural resources are natural resources that cannot be replaced after use.

Part Three: Short Answer

Instructions. Provide information to answer the following question.

Explain the difference between exhaustible and inexhaustible natural resources.

EIGHT TYPES OF NATURAL RESOURCES

- ◆ **Air and Wind**
- ◆ **Fossil Fuels**
- ◆ **Minerals**
- ◆ **People**
- ◆ **Soil**
- ◆ **Sunlight**
- ◆ **Water**
- ◆ **Wildlife**

RENEWABLE AND NONRENEWABLE NATURAL RESOURCES

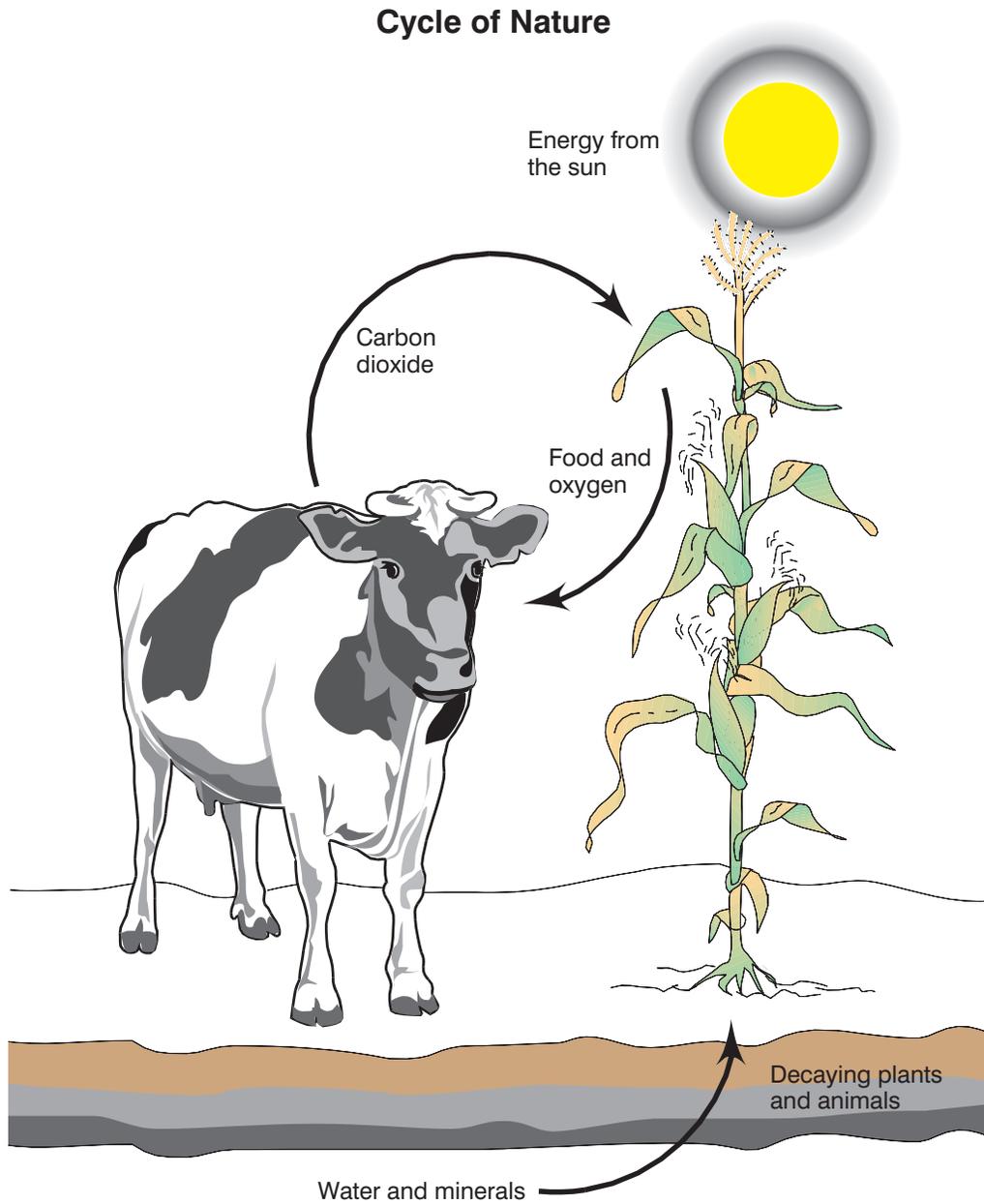
- ◆ **Renewable natural resources can be replaced after use.**
- ◆ **Nonrenewable natural resources are natural resources that cannot be replaced after use.**

EXHAUSTIBLE AND INEXHAUSTIBLE NATURAL RESOURCES

- ◆ **Exhaustibility refers to whether or not a natural resource can be replenished as it is used.**
 - ➔ **An inexhaustible natural resource is a resource that is continuously replenished.**
 - ➔ **An exhaustible natural resource is a resource that is available in limited quantity and can be completely used.**

- ◆ **Exhaustible resources can be replaceable or irreplaceable.**
 - ➔ **A replaceable natural resource can be replenished.**
 - ➔ **An irreplaceable natural resource is gone once it is used.**

INTERDEPENDENT RELATIONSHIPS



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