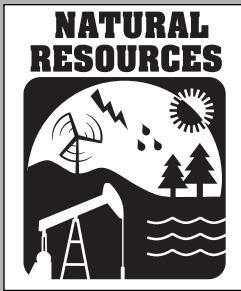


Renewable or Nonrenewable?



OBJECTIVES:

Students will:

1. define renewable, nonrenewable and perpetual resources.
2. classify items as being made from renewable or nonrenewable resources.
3. identify four ways to conserve fossil fuel, minerals, plants and animals.



STANDARDS: Science



SKILLS: Analysis, classification, description, problem solving



SETTING: Classroom



TIME: 50 minutes



VOCABULARY:

Conserve
Natural resources
Nonrenewable resources
Perpetual resources
Product
Renewable resources
Water cycle

Introduction

Overview:

In this lesson, students will learn about renewable, nonrenewable and perpetual natural resources by looking at products made from natural resources. They will work in pairs to classify and group various items as renewable, nonrenewable, or perpetual resources.

Teacher Background:

Natural resources can be classified as renewable, nonrenewable, and perpetual. Resources are considered renewable if they can be replenished within a relatively short period of time. Nonrenewable resources must be considered gone forever once used up because they take millions of years to regenerate. Oil is an example of a nonrenewable natural resource. Perpetual resources are forms of naturally recurring energy beyond human management, such as energy from the sun.

Natural resources are extracted from the Earth to use in their existing form and often changed in form during the manufacturing process, which turns natural resources into products. Fossil fuels include oil, coal, and natural gas. Oil or petroleum is drilled and extracted from the Earth. The resulting crude oil is refined into hundreds of petroleum products including fuel for cars. Minerals such as aluminum, iron and silica are mined from the Earth, extracted and used as components in manufacturing products such as aluminum, steel and glass. Plants are harvested as food crops,

as trees for wood and fiber, or for horticultural purposes. Animals can be kept as pets and used as livestock, or the hides of some animals can be used to make leather for goods.

If we reduce, reuse, recycle and compost materials, then we conserve valuable natural resources that can be used again to produce new materials.

Materials:

Students:

- “Everyday Items” worksheet (one per pair of students)
- “Renewable Resources” worksheet (one per pair of students)
- “Nonrenewable Resources” worksheet (one per pair of students)
- “Renewable or Nonrenewable?” worksheet (one per student)
- Glue (one bottle per pair of students)
- Scissors (one per pair of students)
- Newspaper (one sheet per student)

Teacher:

- A plastic container, aluminum can, steel can, glass bottle, apple, paper and leather belt
- “Natural Resources” overhead
- “Water Cycle” overhead
- Rubric overhead
- Rubrics (one per student)

Preparation:

Be prepared to put students in pairs for part of the activity.



ACTIVITY

Discussion

1. Hold up the plastic container, aluminum can, steel can, glass bottle, apple, paper, and leather belt.
2. Put up the "Natural Resources" overhead, and cover up the bottom half (the pictures of the items). Tell the students that all of these items are made from natural resources and that these resources are either nonrenewable or renewable. Explain that nonrenewable resources exist on Earth in limited amounts, e.g., fossil fuels (coal, oil, natural gas) and many minerals (e.g., iron, gold, and bauxite, the source of aluminum). Fossil fuels are nonrenewable natural resources because they take millions of years to form. Most minerals are also nonrenewable resources. Explain that renewable resources are replaced naturally or through human-assisted actions within a relatively short amount of time, such as a human lifetime. For example, plants, such as trees, can be replanted indefinitely.
3. Hold up the items, one at a time, and ask student volunteers to classify them as made from a nonrenewable or renewable resource. Uncover the rest of the overhead, and review the items that were not discussed (i.e., gasoline, bike helmet, etc.). Briefly explain how natural resources are taken from the Earth and made into products.
4. Let students know that resources can also be classified as perpetual resources. These are forms of naturally recurring energy that are beyond human management, e.g., sun, wind, falling water, tides. Put up the "Water Cycle" overhead, and explain how the water cycle is an example of a perpetual resource.
5. Introduce the concept of conservation. Ask students whether there are ways that they can use fewer resources. Share one way that students can conserve natural resources. For example, by riding a bike to school instead of driving in a car, students can conserve fuel, which comes from a nonrenewable resource.
6. Show an overhead of the lesson rubric, and review the expectations for this lesson.

Procedure

1. Divide the class into pairs. Give each pair of students the following worksheets: "Everyday Items," "Renewable Resources," "Nonrenewable Resources." Also give them a pair of scissors, and glue.
2. Instruct each pair to cut out the items and classify them by gluing them into one of the two possible categories: renewable or nonrenewable resources.
3. Review with the whole class which items they classified as renewable or nonrenewable resources.



Wrap-Up

1. Ask students what they think will happen to nonrenewable resources if we continue using them. (They will be depleted.)
2. Ask students whether they think renewable resources are always available forever. Pass out one sheet of newspaper to each student, and have them roll it up to represent a tree. Put all of the "trees" together at the front of the class to represent a forest. Ask the students what would happen if they needed to cut down ten trees a year to provide enough paper for their school but only five trees were replanted each year (the natural resource will be depleted).
3. Ask the students to turn to a partner to brainstorm some ways that they can conserve nonrenewable and renewable resources. (Use less. Use renewable resources instead, e.g., a paper bag in place of a plastic bag. Reuse bags and recycle them.)
4. Pass out the "Renewable or Nonrenewable" worksheet, assign students to name one item from each of the four categories (fossil fuels, minerals, plants and animals) and explain how they can conserve the natural resources.

Final Assessment Idea

Have students identify ten items in the classroom, writing the natural resource used to produce the item and whether the resource is renewable or nonrenewable.

RESOURCES

Extensions:

Assign students to write a hypothetical story about a nonrenewable resource that has been depleted, explaining why it was depleted (overused) and what alternative resources, if any, can be used in its place.

Using the Internet or school library, have students choose a natural resource that they would like to learn more about and research the answers to questions such as:

- Is it renewable or nonrenewable?
- Where is it found (locate on a world map)?
- Are there any efforts currently underway to conserve this natural resource?

Have students research and identify the different elements that make up types of minerals, fossil fuels, plants, animals and water using a periodic chart. Once they have identified the elements, ask students to locate and check off the element on a periodic chart.

Teacher Materials:

California State Content Standards

The standards below represent broad academic concepts. This lesson provides connections to these academic concepts through hands-on activities and exploration. This lesson is not designed for a student to master the concepts presented in the standards. Additional lessons in the classroom that build on this lesson or the standard(s) ensure that students will have the opportunity to master these concepts.

SCIENCE	CONTENT STANDARDS
Grade 4	Life Science 3.a. Students know ecosystems can be characterized by their living and nonliving components.
Grade 5	Earth Science 3.b. Students know that when liquid water evaporates, it turns into water vapor in the air and can reappear as a liquid when cooled or as a solid if cooled below the freezing point of water. 3.c. Students know water vapor in the air moves from one place to another and can form fog or clouds, which are tiny droplets of water or ice, and can fall to Earth as rain, hail, sleet or snow. Investigation and Experimentation 6.a. Students will classify objects (e.g., rocks, plants, leaves) in accordance with appropriate criteria.





Teacher

Renewable or Nonrenewable Rubric

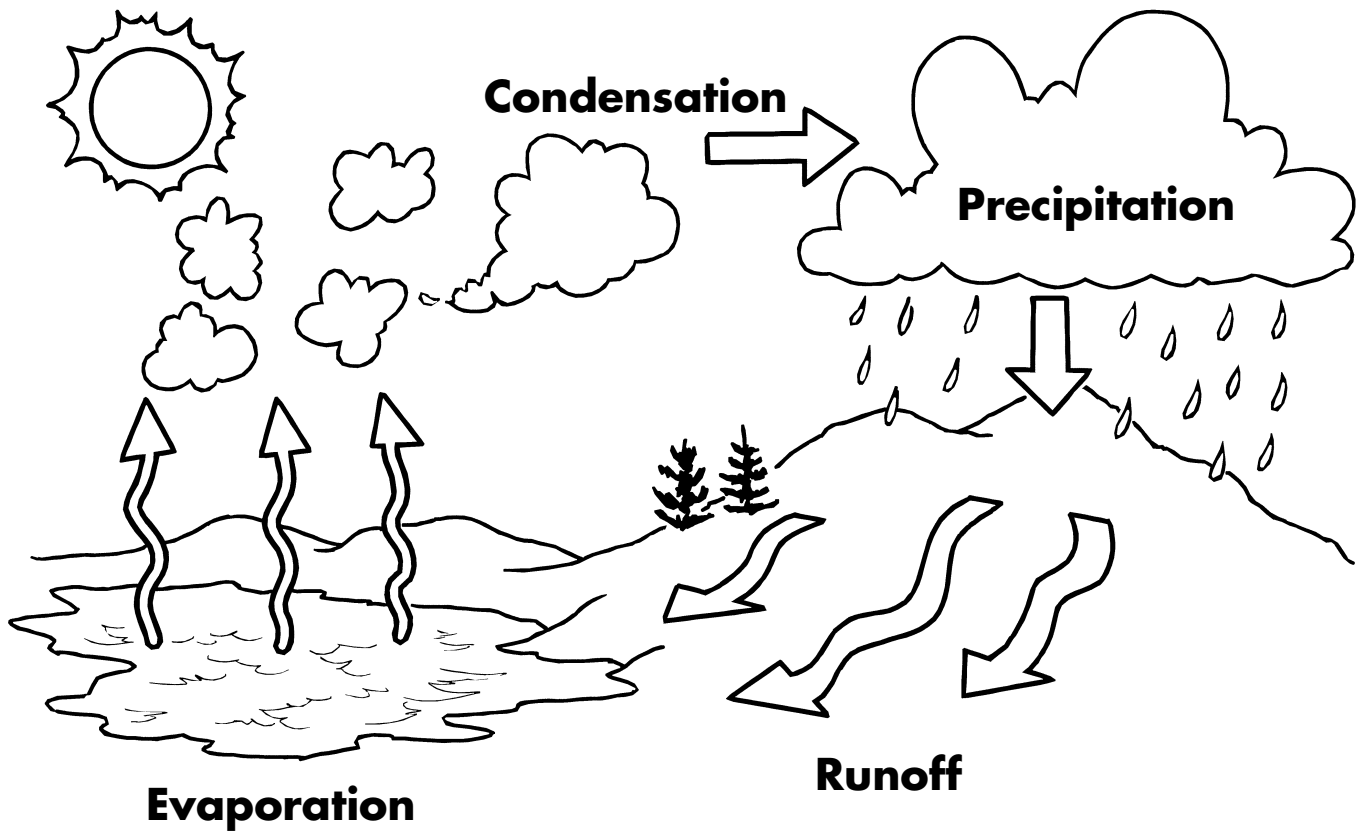
A rubric is a scoring tool that defines the criteria by which a student's work will be evaluated. This rubric is provided to assist you in setting expectations for students and assessing their performance and engagement during the lesson based on specific tasks. Ideally, a rubric is developed with the cooperation of the students. Two blank rows have been provided for you and your class to develop and add your own assessment criteria.

CATEGORY	4	3	2	1
Classify items into renewable and nonrenewable	All items were correctly classified.	Most of the items were correctly classified.	Some of the items were correctly classified.	None of the items were correctly classified.
Identify ways to conserve natural resources	All four items were listed under the proper categories and had an appropriate explanation of how to conserve the natural resources.	Three items were listed under the proper category and had an appropriate explanation of how to conserve the natural resources.	Two items were listed under the proper category and had an appropriate explanation of how to conserve the natural resources.	Only one item was listed under the proper category and had an appropriate explanation of how to conserve the natural resources.





Water Cycle





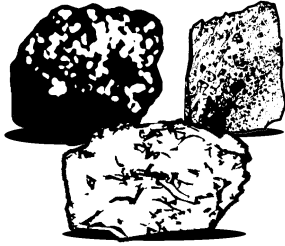
Teacher

Natural Resources

NONRENEWABLE



Fossil Fuels

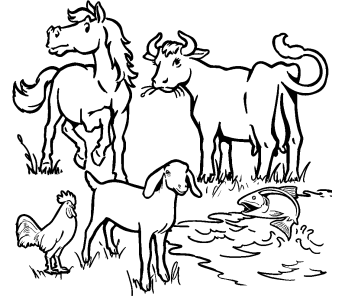


Minerals

RENEWABLE

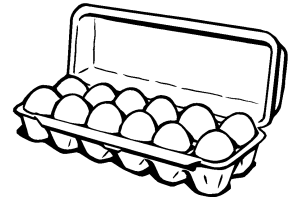
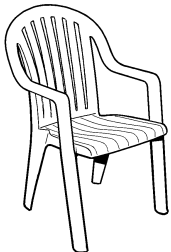
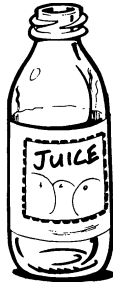


Plants



Animals

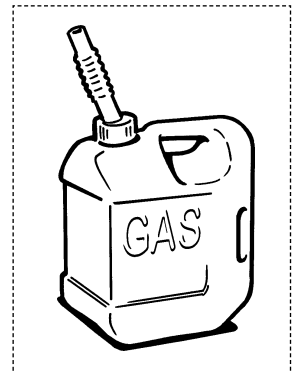
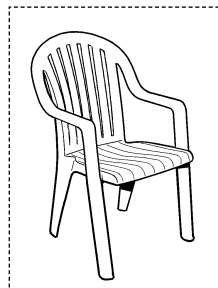
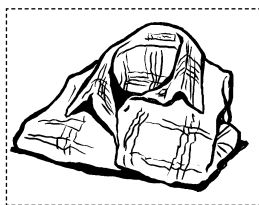
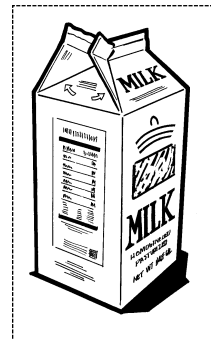
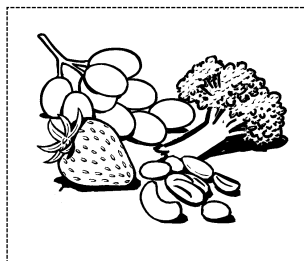
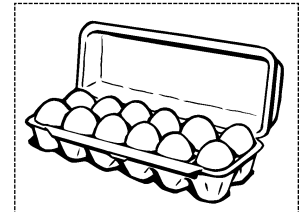
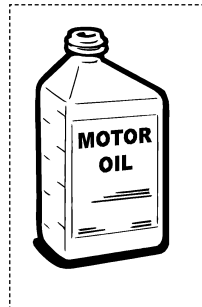
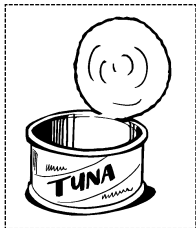
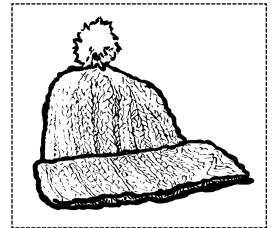
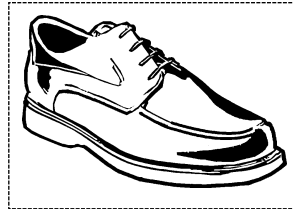
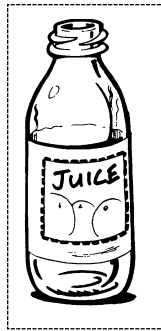
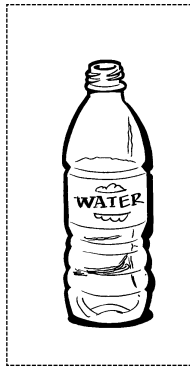
Everyday Items Made from Natural Resources





Everyday Items

Directions: Cut out each item and decide whether it is made from a renewable or nonrenewable resource.



Name: _____

Date: _____



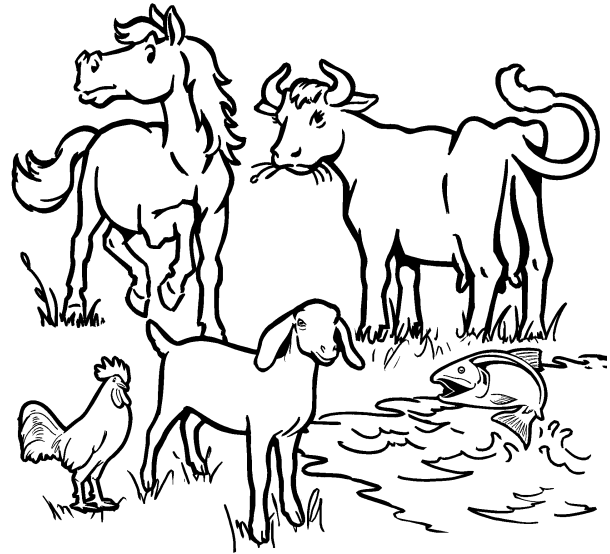


Student

Renewable Resources



PLANTS



ANIMALS

Directions: Glue examples of items made from renewable resources here.

Name: _____

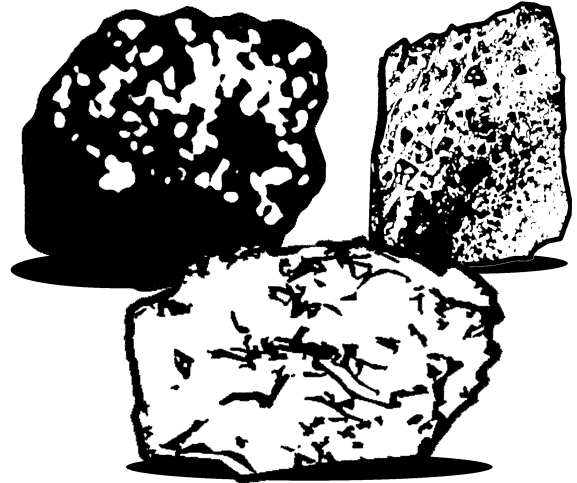
Date: _____



Nonrenewable Resources



FOSSIL FUELS



MINERALS

Directions: Glue examples of items made from nonrenewable resources here.

Name: _____ Date: _____





Student

Renewable or Nonrenewable?

Directions: Write the name of one item from each of the four natural resource categories (fossil fuels, minerals, plants, animals), and explain how to conserve the natural resources needed to produce it.

1a. Item made from fossil fuels: _____

1b. How can you conserve fossil fuel resources?

2a. Item made from minerals: _____

2b. How can you conserve mineral resources?

3a. Item made from plants: _____

3b. How can you conserve plant resources? _____

4a. Item made from animals: _____

4b. How can you conserve animal resources?

Name: _____ Date: _____



DEFINITIONS

Vocabulary:

Conserve: to protect something from harm or destruction.

Natural resources: living and nonliving materials that come from the Earth such as fossil fuels, minerals, plants, animals, water, air, sunlight, and other forms of energy.

Nonrenewable resources: minerals or sources of energy that can be mined or collected from the Earth, such as coal, petroleum, iron ore, copper, etc. The processes of their formation are so slow that these resources may be considered gone forever once they are used up.

Perpetual resources: forms of naturally recurring energy that are beyond human management, e.g., sun, wind, falling water, tides.

Product: something produced by human or mechanical effort or by a natural process.

Renewable resources: naturally occurring raw materials or form of energy that has the capacity to replenish itself within a relatively short amount of time (e.g., a human lifetime) through ecological cycles and sound management practices, e.g., trees, agricultural crops, grasses.

Water cycle: sunlight evaporates water that condenses to clouds that produce rain that falls on the land, flows to an ocean or lake and evaporates again. The water can flow through other routes such as through sand underground or through an animal. The cycle begins with evaporation and ends with water returning to a place for evaporation to occur again.

