

LESSON 1: Defining Natural Resources

LESSON'S CONCEPTS

- Natural resources are things from the natural environment, such as plants, animals, soil, minerals, energy sources (e.g., sunlight, fossil fuels), air, and water. They are the living and nonliving components that support life on Earth.
- While humans use natural resources to satisfy their needs, they should conserve all the materials they consume.

PURPOSE

Students learn about natural resources and the products people make from these resources. Students also prepare for the unit by making journals.

OVERVIEW

In this lesson students will:

- Make journals.
- Observe and record information on natural resources found on the school grounds.
- Listen to the story *Just a Dream* by Chris Van Allsburg, and identify categories of natural resources described in the story.
- Compare scenes in *Just a Dream* by Chris Van Allsburg to those that could have represented a natural environment before it was changed by people.
- Work as a class to develop a rubric to assess the projects they will be completing.
- Design a project by selecting a natural resource to research, gathering information from different sources for a report, and making a mobile or collage on ways that the specific natural resource is used by people.
- Present their projects to the class.

CORRELATIONS TO CALIFORNIA'S CONTENT STANDARDS AND FRAMEWORKS

- Students identify categories of natural resources, conduct research on a specific natural resource, and determine ways humans acquire and use natural resources.
 - "Humans use air, fresh water, soil, minerals, fossil fuels, and other sources of energy that come from the Earth." (*Science Framework*, page 97)

- "They (people) farm the soil, mine resources from the Earth, and get energy by burning fuels, including wood, which is also used to make paper and to build." (*Science Framework*, page 125)
- "Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation. As a basis for understanding this concept, students know . . . (the) natural origin of the materials used to make common objects." (*Science Content Standards, Grades K–12; Grade 6; Resources, Standard 6c*)
- Students write a report about a specific natural resource, obtaining information from several sources.
 - Students "create multiple-paragraph expository compositions." (*English–Language Arts Content Standards for California Public Schools, Kindergarten Through Grade Twelve*, page 30)
- Students present their reports and displays and listen to presentations by other students.
 - "Students listen critically and respond appropriately to oral communication. They speak in a manner that guides the listener to understand important ideas by using proper phrasing, pitch, and modulation." (*English–Language Arts Content Standards for California Public Schools, Kindergarten Through Grade Twelve*, page 26)

SCIENTIFIC THINKING PROCESSES

observing, communicating, comparing, classifying

TIME

15 minutes to prepare for the lesson; 45–60 minutes to implement the lesson, plus 30–45 minutes three times a week for students to work on their projects over a three-week period

VOCABULARY

energy sources, natural resources

PREPARATION

1. Read the “Background Information for the Teacher” at the end of this lesson.
2. Make a copy of the “Student’s Natural Resource Information Sheet” for each student (pages 254–255).

MATERIALS

- Pocket folders for each student (If you plan to have students make their own journals, see “One Way to Make Your Own Journal” on page 252.)

For “Part I, Learning About Natural Resources and Reading *Just a Dream* by Chris Van Allsburg”

- The book, *Just a Dream* by Chris Van Allsburg

For “Part II, Conducting Research About Natural Resources”

- A copy of the “Student’s Natural Resource Information Sheet” for each student
- Magazines that would contain pictures of products made from natural resources
- Coat hangers (or pieces of cardboard), poster paper or butcher paper or used file folders, art supplies, scissors, glue, and yarn for making mobiles and collages

PRE-ACTIVITY QUESTIONS

- A. Tell students that they will each make a journal. In the journal they will write and draw information about what they are studying. Students should know that people write and draw in journals to record observations, thoughts, ideas, and information about certain topics.
- B. Provide a pocket folder and ten sheets of paper for each student. (If you do not have access to pocket folders, students can make their own folders by following the directions in “One Way to Make Your Own Journal.”) To model reusing (and therefore conserving) paper, distribute paper that was used on one side.

- C. Lead students outdoors and ask them to identify items that come from the natural environment (nature). Ask students to draw and describe in their journals five different items that come from nature that they saw (e.g., animals, plants) or felt (e.g., air) on the school grounds.
- D. Back in the classroom, discuss what students observed.

PROCEDURE

Part I, Learning About Natural Resources and Reading *Just a Dream* by Chris Van Allsburg

- A. Tell students that things that come from the natural environment are called *natural resources*. Natural resources are what all living things need in order to live. Ask students to identify some categories of natural resources. *Plants, animals, soil, minerals (rocks), energy sources (e.g., fossil fuels, sunlight), water, and air.* (You might need to provide students with hints to help them with some of the answers.)
- B. Ask students to point out something in the classroom (or outside the classroom) that can represent each of the categories of natural resources.
- C. Discuss with students:
 - Which of these natural resources are living and which are nonliving? *Plants and animals are living; minerals, fossil fuels, sunlight, water, and air are nonliving; soil can be both, because fertile soil is full of microscopic organisms, in addition to rock particles and dead plant and animal parts.*
 - What types of products do people make from natural resources? *Television sets, cars, houses, books, paper, shoes, belts, leather, pencils, plastics.*
- D. Read to students or allow different students to read parts of the book *Just a Dream* by Chris Van Allsburg.

1. Ask students to determine categories of natural resources described. For example:
 - Landfill—*soil*
 - Forest—*plants (trees)*
 - Smokestack—*air; fossil fuels*
 - Mountain—*minerals*
 - Ocean—*water, animals (fish)*
 - Freeway—*fossil fuels*
 - Grand Canyon—*minerals*
 - Duck—*animals*
 2. Discuss with students which scenes could have represented a natural environment before it was changed drastically by people. What natural resources would have been there?
 - Landfill—*habitat for plants and animals (including people); clean air and water*
 - Forest—*plants and animals, habitat for plants and animals, clean air and water*
 - Smokestack—*clean air*
 - Mountain—*mountain, minerals, plants and animals, habitat for plants and animals, clean air and water*
 - Ocean—*ocean, plants and animals, habitat for plants and animals, clean air and water*
 - Freeway—*natural environment that used to be there, plants and animals, habitat for plants and animals, clean air*
 - Grand Canyon—*canyon, plants and animals, habitat for plants and animals, clean air and water*
 - Duck (wetland)—*animals, wetland that used to be there (habitat for plants and animals)*
- E. Discuss with students how people can improve some environments (e.g., plant flowers, clean up litter, repair eroded areas, build buildings that blend into the environment, design parks and playground areas).
- F. Ask students whether they think that people are part of nature. Help students to conclude that people are classified as “animals” and are therefore part of the natural environment (nature). People, like all other living things, are dependent on all the natural resources that exist on Earth. Once people recognize their dependence on

natural resources, they may wish to conserve these resources.

Part II, Conducting Research About Natural Resources

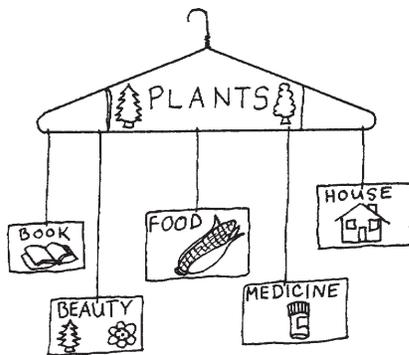
Note: In this part of the lesson, only five categories of natural resources will be featured, because these are the natural resources from which most products are manufactured.

- A. Tell students that they will be conducting research on a specific natural resource and will complete a project, which will include making a mobile or collage. With the class, develop a rubric on how each project will be judged. See the example at the end of this lesson. Students might decide to use this lesson’s rubric as is or change it. Make certain that all students understand clearly what they are expected to do. As a class, agree on a timeline. A reasonable amount of time for students to complete the project is approximately three weeks.
- B. Provide a copy of “Student’s Natural Resource Information Sheet” for each student. Ask students to select one of the following natural resources: plants, animals, soil, minerals (rocks), or fossil fuels; and to circle the name of the resource on their sheets. Tell them that they will need to do the following:
 - Conduct research on the natural resource they have selected. They should find out what products people make from this natural resource and how it is gathered from the natural environment. They should also include ways this natural resource is used or admired in its natural state (without manufacturing products out of it). For example, when minerals are not mined, they might be part of a mountain where people hike and enjoy the natural environment.
 - Write a multi-paragraph text that presents effective introductions and concluding paragraphs that guide and inform the reader’s understanding of key ideas and evidence concerning the natural resource selected.
 - Make a mobile or collage of items made from this natural resource. For example:
 - For the mobile, students can write the name of a natural resource, glue a picture of the natural resource in

its natural state, and attach it to the hanger or piece of cardboard. They can draw and/or cut out pictures from magazines of products that are made from this natural resource and hang these from the hanger or piece of cardboard.

- For the collage, students can draw a line down the middle of a piece of poster paper, butcher paper, or a used file folder. They can glue pictures or draw the natural resource in its natural state on one side of the paper (or folder). On the other side of the paper (or folder), they can glue cutout pictures, showing products made from the natural resource.
- Include, on the mobile or collage, ways that the natural resource is used or admired in its natural state (i.e., without manufacturing products from it).

Note: Individually, students can complete the information sheet and report. Then they can work in small groups to make a mobile or collage, so that only two or three mobiles or collages would be made for each category of natural resources.



- C. Allow some class time for students to work on their projects. If possible provide them with access to the internet. Once students have completed their projects, they should present these to the class. The class can help determine where each project fits on the rubric, based on the work presented.
- D. If some students complete their projects before others are finished, ask them to make a list, on a piece of butcher paper, of products in someone's home that are made from plants (includes trees). Review and post this list before assigning the homework assignment.

Picture Intentionally deleted.

Students from Nona Reimer's fifth-grade class at John Malcom Elementary School use the internet to gather information about natural resources.

Homework Assignment: Ask students to describe in writing a typical morning when they are getting ready to go to school or a typical evening at home. Then they should rewrite what their morning or evening would be like if no products made from plants were in their homes.

DISCUSSION/QUESTIONS

- A. What have you learned about natural resources? (Answers will vary.)
- B. Why are natural resources important? *They provide us with things we need in order to live.*
- C. What natural resources are most important to you and why? (Answers will vary.) For example, students might say that air and water are most important because they cannot live without them. Students should conclude that all natural resources are important.

APPLICATION

- A. Display on a bulletin board and/or compile in a class book the work that students have completed on natural resources.
- B. Have the students make a bulletin board of different types of trash and the natural resources used to make the trash.
- C. Ask students to draw on the covers of their journals a scene from a natural environment (e.g., desert, ocean, forest, marsh). Have them include examples of natural resources from each category.

Project Idea: Have groups of students select a natural resource in their community and develop a plan to share its importance with community members.

EXTENSIONS

- A. Have students make a collection of minerals (usually in rock form) and conduct research on the ways people use them.
- B. Have students make a photo album of scenes of natural environments (e.g., forest, pond, ocean, marsh), showing natural resources in their natural state. Students could also collect nature scenes from magazines and outdated calendars and make a scrapbook out of these.
- C. Use the book, *The Secret Life of School Supplies* by Vicki Cobb, to identify the natural resources used in the manufacturing of school supplies.

RESOURCES

Video

Conserving Our Natural Resources. Chatsworth, Calif.: AIMS Media, 1979 (15 minutes)

Describes natural resources and the importance of conserving them.

Books

Cobb, Vicki. *The Secret Life of School Supplies*. Illustrated by Bill Morrison. New York: Harper-Collins Publishers, 1981.

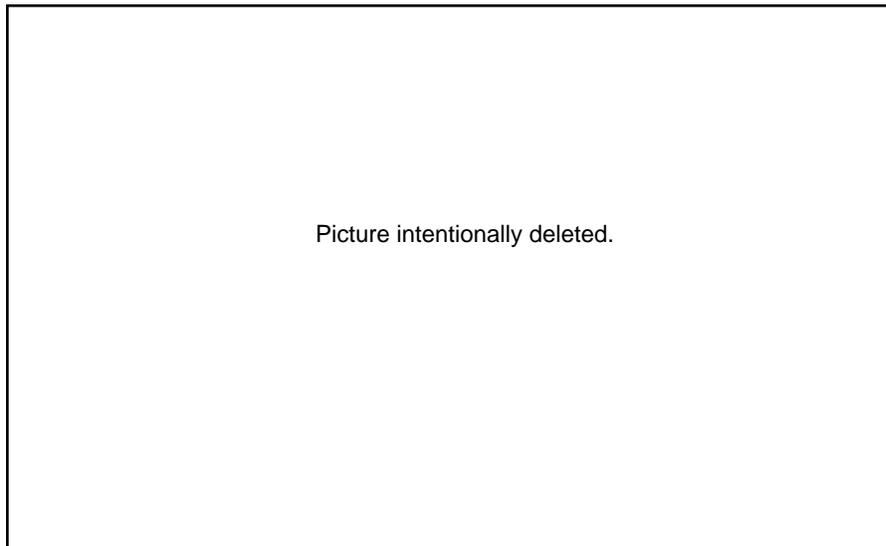
Provides information on school supplies, such as paper, writing instruments (chalk, pencils, pens), and adhesives. Simple experiments students could do with each item are described.

Van Allsburg, Chris. *Just a Dream*. Boston: Houghton Mifflin Company, 1990.

A story about a boy who dreams about a future after natural resources were not used wisely. After the dream, the boy decides to do what he can to care for natural resources.

Websites

See "Appendix F–IV, Natural Resources websites."



Students from Oak Valley Elementary School use the internet to gather information about natural resources.

ONE WAY TO MAKE YOUR OWN JOURNAL

Supplies Needed

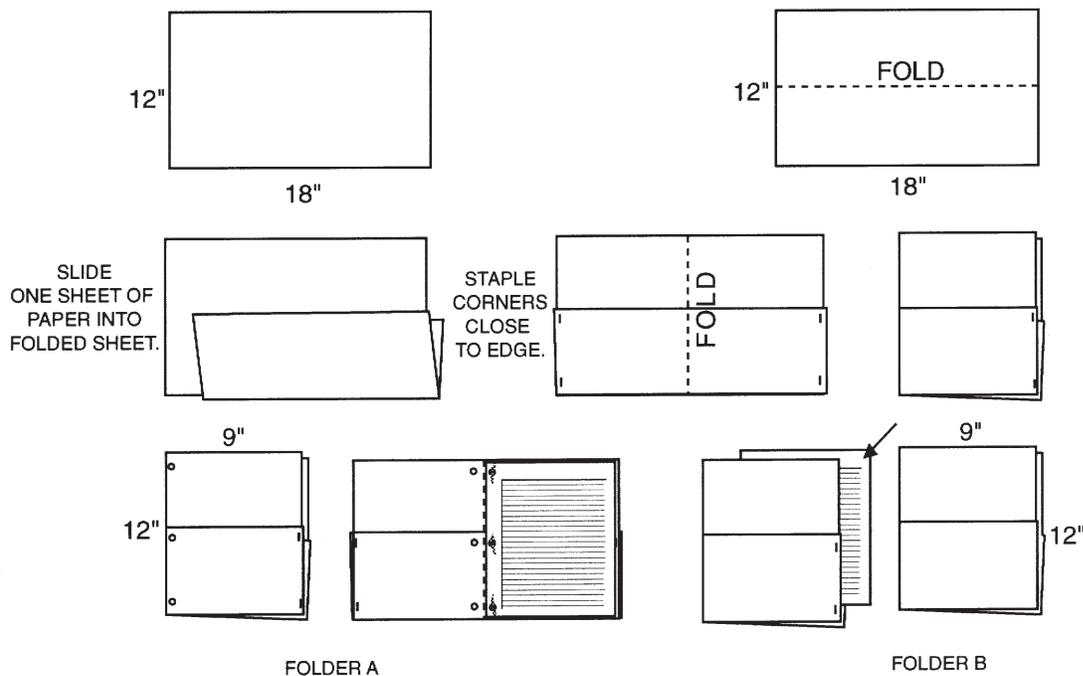
- 12- by 18-inch tagboard or construction paper (two sheets for each student)
- Stapler
- Three-hole paper punch and brass fasteners (three for each student). If these are not available, the pages can be stapled.
- Lined and unlined paper (15 sheets per student: 5 lined and 10 unlined) To model reusing, use paper that has been used on one side.

Directions

1. Distribute two sheets of 12- by 18-inch tagboard or construction paper to each student.
2. Have students make their journals by doing the following (see illustrations below):
 - Fold one sheet of tagboard or construction paper in half lengthwise.

- Slide one sheet of paper into the folded sheet.
 - With the folder open, staple the left side and the right side of the folded sheet onto the unfolded sheet, as close to the edge as possible. The folded sheet will make pockets on the inside and outside of the front cover.
 - Fold the entire journal cover in half so it closes like a book.
3. **A.** If you have brass brads, punch three holes in the left margin with a three-hole punch. (See Folder A.) Place the brass fasteners through the back of the folder and through the lined and unlined pages but not through the front cover. This will make the front cover easier to open.
 - B.** If you do not have brass brads, staple the journal pages to the journal cover. (See Folder B.)

TWO 12" X 18" SHEETS OF TAGBOARD OR CONSTRUCTION PAPER



Rubric for the Natural Resources Project

RUBRIC FOR THE NATURAL RESOURCES PROJECT

	<ol style="list-style-type: none"> 1. Select a natural resource and complete the information sheet. 2. Conduct research on the natural resource selected. Use at least three different sources and list the sources in the report. 3. Identify the products that people make from this natural resource and list at least five of these. 4. Describe how the natural resource is gathered from nature and write at least one paragraph about this. 5. Write at least one paragraph about the ways this natural resource is used or admired in its natural state. 6. Make a mobile or collage and include a written report consisting of an introduction, one middle paragraph, and a concluding paragraph that guide and inform the reader's understanding of the key ideas and evidence of the information gathered in items 2-5 above. 7. Present the materials to the class. 	<ol style="list-style-type: none"> 1. Select a natural resource and complete the information sheet. 2. Conduct research on the natural resource selected. Use at least two different sources and list the sources in the report. 3. Identify the products that people make from this natural resource and list at least three of these. 4. Describe how the natural resource is gathered from nature and write at least two sentences about this. 5. Write one paragraph about the ways this natural resource is used or admired in its natural state. 6. Make a mobile or collage and include a written report of the information gathered in items 2-5 above. 7. Present the materials to the class. 	<ol style="list-style-type: none"> 1. Select a natural resource. 2. Conduct research on the natural resource selected. Use at least one source of information and list the source in the report. 3. Identify the products that people make from this natural resource and list at least one of these. 4. Describe how the natural resource is gathered from nature and write at least one sentence about this. 5. Write one sentence about the way this natural resource is used or admired in its natural state. 6. Make a mobile or collage. 7. Present the materials to the class. 	

STUDENT'S NATURAL RESOURCE INFORMATION SHEET

1. Select and circle one of the following natural resources that you want to research: plants, animals, soil, minerals (rocks), fossil fuels.
2. Conduct research on the natural resource you have selected. Use different sources to get information and list the sources in your report. If you use books or magazine articles, be sure to include the author, title of reference, year of publication, and page numbers of the information.

Sources I used:

3. What products do people make from this natural resource?

4. How is this natural resource used or admired in its natural state (without making a product out of it)?

5. How is this natural resource gathered from the natural environment?

6. Make a mobile or collage, include a written report of the information gathered in items 2–5 above, and present your project to the class.

BACKGROUND INFORMATION FOR THE TEACHER

Many products we use every day come from the Earth's natural resources. Natural resources are things that come from the natural environment and are the living and nonliving components that support life on Earth. They can be classified according to seven categories: plants, animals, soil, minerals, energy sources (e.g., sunlight, fossil fuels), air, and water. There are, however, other definitions for *natural resources*. Some dictionaries and textbooks define natural resources as raw materials or forms of energy in the natural environment that are useful to *people*. For example, "any portion of our natural environment—soil, water, rangeland, forest, wildlife, or minerals—that human beings can use to promote their welfare is a natural resource."¹ Another definition of *resource* states, "substances that support life and fulfill human needs . . ."² A more ecological definition of natural resources would be: things in the natural environment that support life on Earth (whether or not they are valuable to people). Some people also separate natural resources into three groups: (1) those raw materials found in the natural environment (e.g., minerals, trees); (2) human-made materials (e.g., glass, paper pulp); and (3) recycled material (e.g., cullet or crushed glass ready to be remanufactured; recycled paper). In this unit, natural resources are defined as the things in the natural environment that support life and are used by people to live and to make products.

Natural resources are required by all living things; therefore, humans are totally dependent on natural resources, such as air, water, plants, and animals, for their survival. Some natural resources are used as the raw materials for many products that people manufacture. For example, iron ore is a raw material classified as a mineral. People use iron ore to manufacture steel. Steel is used to make cars, appliances, and many other products. Trees are raw materials classified as plants. People use trees for lumber to build houses and other

structures; they also use soft-wooded trees to grind into pulp to make paper.

Obtaining and using natural resources affect the environment. The extraction or harvesting of natural resources has an impact on the habitats of plants and animals that live there. The manufacturing of products from natural resources can create air, land, and water pollution; and many natural resources used to make products often end up in a landfill.

In this unit, natural resources are classified according to seven categories. The category of energy sources can be further subdivided into sunlight, fossil fuels, and other energy sources (e.g., wind, hydropower). The seven categories of natural resources and ways that people depend on these categories of natural resources are briefly described below.

PLANTS—Plants are living things that can produce their own food. Trees, shrubs, grasses, seaweed, and some microscopic algae are examples of plants. Green plants produce oxygen. They also produce their own food through the process of photosynthesis. Many animals depend on plants for food.

Humans breathe the oxygen that plants make, and they use plants for food, clothing, medicines, and shelters. They also use wood to heat their homes. Humans use plants to beautify an area, to keep soil from eroding, to make lumber for houses, and to serve as windbreaks.

ANIMALS—Most animals can be defined as living things that differ from plants, rely on other organisms for food, and can move and respond rapidly to stimulation. Animals have a nervous system and can usually move on their own. Examples of types of animals are: mammals (includes humans), birds, reptiles, amphibians, fish, and invertebrates, such as insects, spiders, and worms. Some microscopic living things, including single-celled protozoans, are also classified as animals.

Humans use animals for food, clothing, education (e.g., animal behavior), companionship, and aesthetic purposes; e.g., bird watching. The manure of some domesticated animals is used as fertilizer. Humans also use animal products in medicines.

¹Oliver S. Owen, *Natural Resource Conservation*. New York: Macmillan Publishing Co., 1985, p. 12.

²Linda Schwartz, *Earth Book for Kids*. Santa Barbara, Calif.: The Learning Works, Inc., 1990, p. 182.

SOIL—Soil is a mixture of minerals from weathered rock and decaying plant and animal matter. It also consists of microscopic living things, such as bacteria and fungi. Most plants that live on land need soil in which to grow. Soil provides water and nutrients to plants. Many animals live on or in soil.

Humans use soil in which to grow plants for food and on which to build roads, houses, other buildings, and landfills. They also use soil in products, such as adobe bricks.

MINERALS—Minerals are naturally occurring *inorganic* substances that originally came from rock. Inorganic means “being or composed of matter other than plant or animal.”³ Examples include phosphorous, bauxite, iron, salt, gold, silver, copper, mercury, and potassium. Many minerals are essential for the healthy growth of plants, animals, and other living things. Most plants absorb the minerals that are dissolved in water through their roots. Animals must obtain their required minerals by eating plants or by eating other animals that have eaten plants.

Humans use minerals to manufacture thousands of different items. Silica is used to make glass; bauxite is used to make aluminum; and many minerals are used to make items, such as cars, computer parts, cooking utensils, and appliances. Humans also need certain minerals in order for their bodies to function properly. They get these minerals from the food they eat.

AIR—Animals need oxygen in air (or water, in the case of aquatic animals) to breathe, and plants use carbon dioxide in air (or water, in the case of aquatic plants) in the process of photosynthesis. The gases are recycled through plants and animals. Air that is not clean can make organisms (living things) sick.

WATER—Water is used by plants during the process of photosynthesis. Animals drink or absorb water to maintain body functions. Some animals live in water, and some use it as a source of food, as a means of protection, or as an air conditioner. Fresh water on land is replenished by the water cycle and is essential to all living things. Water that is polluted can make organisms sick.

³*Merriam-Webster's Collegiate Dictionary* (Tenth edition). Springfield, Mass.: Merriam-Webster, Inc., 1994, p. 603.

ENERGY SOURCES

• **Sunlight**—The energy derived from sunlight is used by green plants for photosynthesis to make sugars, which are then used as a source of chemical energy for growth and maintenance. This energy is transferred to animals through food chains. Sunlight also powers the water cycle by evaporating water from the land and from surface waters, and it creates wind energy through alternate heating and cooling of the atmosphere. People depend on sunlight to provide energy for plants to live and grow. People depend on plants for food, fiber, building materials, and fuel. Solar energy is also used to heat homes and to produce electricity.

Note that “sunlight” is not addressed in this curricular guide, because the focus of the lessons is on the connections among natural resources, manufactured items, and the management of solid waste.

• **Fossil Fuels**—Fossil fuels include crude oil, coal, and natural gas. Technically, fossil fuels are not classified as minerals because they are *organic* in origin, originating from partially decayed plants that lived millions of years ago. *Organic* refers to materials that consist of molecules containing carbon and were once part of a living thing.

Humans use fossil fuels as a source of energy to generate electricity or to move machinery. The entire transportation system is dependent on petroleum products. Humans use petroleum and natural gas to make plastics from which many items are manufactured. Petroleum is also used in making many commonly used products, such as fertilizers, lubricating fluids, cosmetics, and pesticides.

• **Other Energy Sources**—Other energy sources include wind power, hydropower, geothermal energy, and tidal energy. These are not, however, addressed in this curricular guide.

In this lesson students are not only introduced to categories of natural resources but also to the methods for gathering information on natural resources for projects that they will present later to the class.

⁴*Merriam-Webster's Collegiate Dictionary* (Tenth edition). Springfield, Mass.: Merriam-Webster, Inc., 1994, p. 932.

The word *project* can sometimes be confusing. For the purpose of this lesson, a *project* is defined as a “task or problem engaged in usually by a group of students to supplement and apply classroom studies.”⁴ Usually, students plan and design the projects. They might research information through direct experience or by reading about or listening to the experiences of others. They might work individually, in pairs, in small groups, or as a class. As a result of their participation in projects, the students are more likely to learn more, enjoy the process of learning, and

be well on the way to become life-long learners. A variety of projects and, when available, examples of classes and schools implementing such projects are described in the overview of each unit.

A more formal approach to implementing projects is called *project-based learning*. For more information on project-based learning, see “Tips for Implementing Projects” at the beginning of this curricular guide.