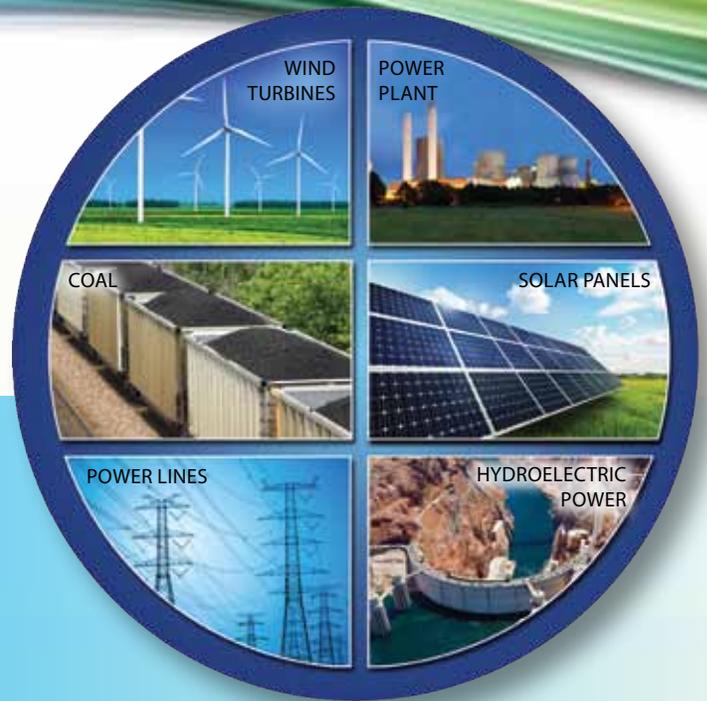


# LESSON 3

## Identifying Different Types of Coal\*

\*Based on the poster article "Meeting the Energy Challenge"

**Objective:** To review the characteristics of one of the most plentiful natural resources and examine samples of coal; identify coal reserve locations around the world; and understand the role coal plays in addressing our global energy challenge.



*Important: In order to implement this lesson, coal samples are required.*

*See the back page of this Teacher Guide for information on how to order coal kits for classroom use.*

### Overview

Students will distinguish between the different types of coal; categorize the ranks of coal; and complete a mapping activity identifying countries and states where large coal deposits are found.

### Standards Addressed

#### National Science Education Standards (NSES):

- Science as Inquiry, K-4, 5-8: Abilities necessary to do scientific inquiry
- Physical Science, 5-8: Properties of matter and changes in properties of matter

#### National Council for the Social Studies (NCSS) Standards:

- Production, Distribution, and Consumption
- Global Connections

### Materials

- Specimens of four types of coal (ordered through the American Coal Foundation)
- Photocopies of outline maps of the world and the United States
- Colored pencils or crayons

## Activity Steps

1. Begin by explaining or reviewing the differences between rocks and minerals. You may want to write this information on the blackboard or display it on the overhead projector and have students copy it into their notebook. Explain that minerals are inorganic (nonliving) substances found in nature that are made of single elements or compounds. A rock, on the other hand, is a combination of two or more types of minerals fused together. Both rocks and minerals are essential components of our planet.
2. Pass an unidentified sample of anthracite coal around the classroom. Explain that the object is a rock, but see if students can guess what kind of rock it is: igneous, sedimentary, or metamorphic. When students have finished guessing, explain that anthracite is a type of coal that is formed by metamorphism. Most other types of coal are classified as sedimentary rock. Reproduce the following chart on the blackboard or overhead projector. Pass around the other samples of coal as you review the four types of coal.

Type of Coal	Appearance	Texture	Rock or Mineral Classification	Carbon Content
<b>Peat</b>	Dark brown to black, with many visible plant fragments	Soft; breaks unevenly when dry	Sedimentary rock	Low
<b>Lignite</b>	Brown to black; fossilized plant material may be visible	Crumbly	Sedimentary rock	Medium
<b>Bituminous</b>	Black; shinier than lignite	Hard and brittle	Sedimentary rock	High
<b>Anthracite</b>	Glossy black	Uneven surfaces	Metamorphic rock	Extremely high

3. Explain to students that coal contains lots of energy. It can be combusted to produce heat that generates electricity in power plants. Coal is important because of its abundance and its use in producing energy. Ask students if they know where coal can be found.
4. Distribute two blank outline maps: one of the world and another of the United States.
5. Have students create a color-coded legend for the world map, identifying, in order, eight countries with the largest coal reserves. Using their own legend, have them color in the following countries according to their rank in recoverable coal reserves. Provide the information in descending order so that students are surprised to find that the United States has the largest recoverable coal reserve in the world: Ukraine, South Africa, Germany, Australia, India, China, Russia, and the United States. Ask the students if they are surprised to find that the United States has more coal than any other country in the world. Ask them if they know where in the United States coal is found.
6. Name the 37 states that have coal deposits: AL, AK, AZ, AR, CA, CO, GA, ID, IL, IN, IA, KS, KY, LA, MD, MI, MS, MO, MT, NE, NV, NM, NY, NC, ND, OH, OK, OR, PA, SD, TN, TX, UT, VA, WA, WV, and WY. As you do, have students identify them on the map, then color or shade them in. Ask students whether they are surprised to find out how many states have coal deposits. Tell them that one-eighth of the land area of the United States lies atop coal beds.
7. As a class, discuss the role that coal plays in the economy of the United States. Review with students that coal is a plentiful, inexpensive, and reliable source of energy. How do these attributes affect the economy of the United States and the lives of Americans?

## Assessment

Have students write a newspaper article or a television news report about coal. Make sure they include information about where coal can be found, what types of coal there are, what characteristics coal has, and how it is used.