GRADE 4

The United States of Energy

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AMERICAN COAL FOUNDATION

Photos: Peabody Energy and iStockphoto.

Name: _____

Mapping Electricity

Directions: Research answers to the following questions based on the map "The United States of Energy."

1 What is the **source for half of the electricity** produced in the United States?

_____

2 What are the **top 15 coal-producing states** in the United States?

1. _____ 6. _____ 11. _____
2. _____ 7. _____ 12. _____
3. _____ 8. _____ 13. _____
4. _____ 9. _____ 14. _____
5. _____ 10. _____ 15. _____

3 Choose five different states (besides your home state) on the map. Then identify the **top energy resource** used to produce electricity for each state that you chose.

State 1 _____ State 1's Top Resource _____

State 2 _____ State 2's Top Resource _____

State 3 _____ State 3's Top Resource _____

State 4 _____ State 4's Top Resource _____

State 5 _____ State 5's Top Resource _____

4 Where is America's **largest solar facility** located?

_____

5 What barrier is constructed to create **hydroelectric power plants**?

_____

6 What is the top resource for producing electricity in **your home state**?

_____

Powered Up About Electricity!

Follow along with this flow chart to learn how coal is turned into electricity.

1. Miners dig for coal in surface or underground mines.

2. Trains or barges carry hundreds of millions of tons of coal to power plants.

3. Coal is combusted in a power plant. The heat turns water into steam.

4. Pressure from the steam turns the propeller blades of a turbine.

5. The turbine is connected to a generator by a spinning rod. This rod turns magnets inside the generator's wire coils.

Out of these wires comes … electricity!

Photos: Peabody Energy and iStockphoto.

Directions: Answer the following questions based on what you see in the flow chart.

1 How is coal moved from the mines to the power plants?

_____

_____

_____

2 Why is it necessary to combust the coal?

_____

_____

_____

3 Name at least three devices involved in generating electricity after coal is combusted:

_____

_____

_____

4 The combustion of coal creates what substance that turns a turbine's propellers?

_____

_____

_____

_____

5 Inside the generator, electricity is created inside coils of wire. How would you expect electricity to be delivered to homes?

_____

_____

_____

_____

America's Power: It All Adds Up!




Directions: Use simple calculations to solve the following word problems about energy. **Use the back of this sheet or an additional piece of paper to show your work. Make sure to clearly label your answers.**

1 **In key coal-producing states like Wyoming and West Virginia, coal is usually transported from the mine to the power plant on trains.** One train car full of coal can weigh 100 tons. If a train has 100 cars full of coal in it, about how much does the entire train weigh?

2 **In California's Mojave Desert, solar panels are made up of thousands of mirrors to create a power plant. These mirrors cover hundreds of acres and collect the sun's energy.** Five nearby towns have asked to buy electricity from one plant, but there are no power lines to carry the electricity. If the five towns are 3 miles, 11 miles, 15 miles, 67 miles, and 122 miles from the plant and each town needs its own power line, how many miles of power lines will the plant have to build?

3 **In Pennsylvania, there are many more surface coal mines than underground ones. While miners dig for coal in 54 underground mines, miners are also working at 216 surface mines. That means that 20 percent of Pennsylvania's mines are underground mines and 80 percent are surface mines.** How many more surface mines are there than underground mines? _____
How many total coal mines are there in Pennsylvania? _____
Put this information into a pie chart. The chart should have two parts: the number of underground mines and the number of surface mines. Remember to make each part a different color, label both parts, and give the chart a title.

BONUS **Coal is the source of half of the electricity produced in the United States.** Research a coal-producing state on the "United States of Energy" map and create your own word problem based on your findings. Write down your word problem and make sure to also include the answer.

Photos: Peabody Energy and iStockphoto.