DISCOVERING SOURCES FOR ELECTRICITY

GINA BUSH

Time Frame:	Standards:
Three 35 minute classes	6.S.5.1.1 Identify issues for environmental studies 6.S.5.2.1 Describe how science and technology are part of our society. 6.S.5.3.1 Explain the difference between renewable and nonrenewable resources.

Objectives:

Students will identify sources of energy that produce electricity and understand why certain sources are used in a particular area.

Background Information:

Electricity is one of our most common sources of energy. We us electricity to watch TV, listen to radio, wash our clothes, even brush our teeth. Electricity is an important part of our lives.

Electricity is a secondary energy source, that is, it is generated from a primary energy source--solar, oil, coal, natural gas, nuclear, water, and wind. Electricity is unique in that it is energy in transit, kinetic energy, obtained when electric charges are set in motion by an electromotive force. This force begins the process of moving electrons from atom to atom. The electron current continues to flow as long as the electromotive force is applied.

Factors such as price, availability, reliability of supply, and environmental impact determine which sources are used in different locations. Most electricity in the U.S. today comes from steam powered generating plants which burn fossil fuels--coal, oil, or natural gas --or use nuclear energy to heat water, thereby producing steam. The steam spins a turbine which turns a large magnet in a generator. The generator contains many coils of wire. When the magnet turns in the coils, an electric current is created or "induced" in the wires. In Canada, most electricity is generated by water power which is used instead of steam to turn a turbine.

As we see our nonrenewable resources (coal, oil, natural gas, uranium) rapidly depleting, we are turning more to the development of green power or electricity generated from renewable resources such as solar, wind, geothermal, biomass, and hydro power.

Materials:

- A copy of the Electrical Generation poster for each student
- Paper plates and cups
- M&M candies (or other colorful candies or squares of paper)

Procedure:

Day 1

1. Discuss with the students the sources of energy illustrated on the poster and how they are used to produce electricity.

2. Have the students work in pairs. Give each group a paper plate and a cup full of M&Ms in a variety of colors.

3. Assign the following colors to each type of energy source: brown - coal, orange - natural gas, red - oil, yellow - nuclear, blue - hydro, green - other renewables.

4. Have the students predict the amount of actual everyday use of each of the energy types or fuel mixes. Each candy represents 5%. The students will use 21 candies (equaling 105% to allow rounding up) in different colors to represent their predictions. For example, if they predict that 50% of out electricity is produced by nuclear power, 45% by coal, 3% by oil, and 2% by renewable sources they would have 10 yellow, 9 brown, 1 red, and 1 green candies on their plate.

5. Ask the groups to state their predictions and record them on the whiteboard.

6. Compare the predictions to the actual percentages on the poster. Whose estimations were closest to the actual numbers? Did any group match exactly?

Poster Information:

	U.S.	Canada
Coal (brown)	10	4
Nuclear (yellow)	4	2
Natural Gas (orange)	3	1
Hydro (blue)	2	12
Other Renewable (green)	1	1
Oil (red)	1	1

Day 2

1. Review the amounts of different resources used in the U.S. and Canada.

2. Each group choose a third country to research from our Social Studies area of study (Western Hemisphere).

3. Each group spend 25 minutes in the computer lab researching information about the third country they have chosen.

4. Create one visual to share with two other groups the next day. Discuss findings as to why the fuel mixes in the U.S., Canada, and the thid country so different.

5. Class discussion: Does price, availability, reliability, and environmental impact have any affect on the fuel mix percentages? At our current rate of consumption, how long do you predict our nonrenewable resources will last? Do you think our fuel mixes will change in your lifetime?

Assessment:

Teacher assess during small groups presentation. Were students able to identify fuel mixes of other countries, then compare/contrast to those of the U.S. and Canada.

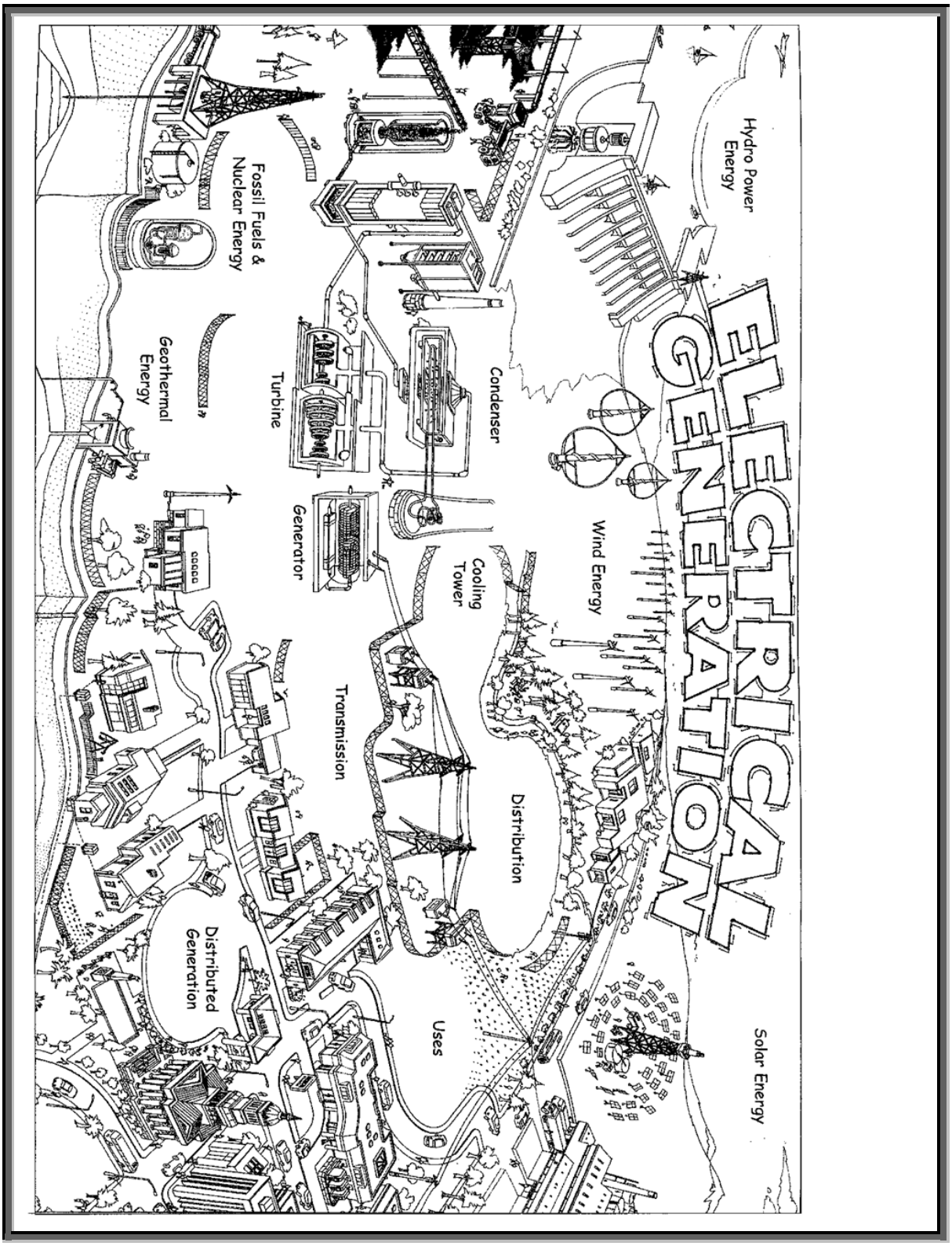
Students write a paragraph explaining why different countries have different sources of energy than the U.S. (availability, reliability, environmental impact, and price).

Additional Content:

Have students research careers for each of the areas illustrated on the poster. Include information about where they might be employed, salary, education, demand.

References:

Energy Fundamentals
Integrated Learning Activities
National Energy Foundation for posters http://www.nef1.org/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