

Searching for Energy: A Graphing Game

Grade Level:	Time Frame:
6th Grade	50 Minutes
Standards (ALCOS Mathematics & Science):	
<p>Data Analysis, Statistics, and Probability 24. Represent numerical data graphically, using dot plots, line plots, histograms, stem and leaf plots, and box plots.</p> <p>b. Use graphical representations of real-world data to describe the context from which they were collected.</p> <p>Earth and Human Activity 15) Analyze evidence (e.g., databases on human populations, rates of consumption of food and other natural resources) to explain how changes in human population, per capita consumption of natural resources, and other human activities (e.g., land use, resource development, water and air pollution, urbanization) affect Earth's systems.</p>	
Objectives:	
<p>Students will analyze rates of renewable and non-renewable energy use and explain how consumption of natural resources affects human activities.</p> <p>Students will record rates of renewable and non-renewable energy use by graphically representing data using histograms.</p>	
Background Information:	
<p>In the early part of last century, solar energy was a leader in the developing energy industry, but was quickly displaced by less expensive coal, petroleum and natural gas. Fossil fuels were an important energy source and they were available and plentiful. Today, fossil fuels are becoming more difficult to discover and more expensive to recover. However, renewable energy is as plentiful as it was 100 or 1,000 years ago and research and development have increased the economics and competitiveness of this resource. It is a valuable, renewable, non-polluting resource with great potential to help us meet our future energy needs. Also, as technology has continued to progress, we are able to do things with substantially less energy than ever before.</p>	
Materials:	

- Teacher will need a timer/watch/clock or a device with a timer app.

Each group of 3-5 students will need a **Searching for Energy kit**:

- **Searching for Energy kits:**
 - 3 pieces of graph paper (1 piece for each of the 3 rounds in the game)
 - colored pencils
 - Ziploc bag
 - large bowl or tub (represents earth)
 - 3-5 plastic spoons (represents energy excavators)
 - 3-5 small bowls
 - Beads of the following colors:
 - 100 yellow represents solar energy (100% Renewable)
 - 100 blue represents wind energy (100% Renewable)
 - 82 brown and black (coal 82%)*
 - 15 red (uranium 15%)*
 - 2 white (natural gas 2%)*
 - 1 orange (oil 1%)*

*These portions are an approximate representation of the nonrenewable energy reserves in the U.S. and Canada

Engage (5 minutes):

1. **Make it active!** Students will have 2 minutes to find an object in the room that is “using energy.” They must place one hand on the object or point to the object and freeze in place.
2. Students will share a 3 minute open-ended discussion on “where the energy used by these objects come from” in groups of 3 or 4 surrounding peers.
3. Students will return to their seats!

Explore (35 minutes):

1. **Graph it!** Students will form groups of 3-5 preferably sitting at a shared table or on the floor in the room/hallway/outdoor area.
2. Each group will use their **Searching for Energy kits** (see **Materials** section) to play each round of the **Searching for Energy** game. Students will empty all of the beads into the large bowl. Each student will get an energy excavator (spoon) and a small bowl. One student may want to play the role of “data collector.”
 - a. The data collector will create the x and y-axis for the histogram with “amount of energy excavated” (number of beads collected) on the y-axis and “types of energy available” (color of beads) on the x-axis.
 - b. Each group should Table 1, Table 2, Table 3 histograms for each round.
3. **Round 1:**
 - a. Students have 30 seconds to excavate energy from the earth (scoop beads from the large bowl into their small bowl using the spoon). They can only excavate one source of energy at a time (place one bead at a time into their bowl).

- b. Students should use their graph paper to record the group totals of the amount of energy excavated (how many beads) and what types of energy were available (what color beads) by coloring in the bar of the histogram (Table 1) with the according bead color.

4. Round 2:

- a. Students will place all of the renewable energy sources (yellow and blue beads) back into their bowl. All non-renewable energy sources (other colors) are to remain to the side.
- b. Students, once again, have 30 seconds to excavate energy and record their results in Table 2.

5. Round 3:

- a. Students will place all of the renewable energy sources (yellow and blue beads) back into their bowl. All non-renewable energy sources (other colors) are to remain to the side.
- b. Students, once again, have 30 seconds to excavate energy and record their results in Table 3.

Evaluate (10 minutes):

1. **Make a conclusion!** Students will make a one paragraph conclusion reflecting the concept of and the results of the data they recorded in the **Searching for Energy** game. They could create a response individually or as a group.

Additional Content and References:

Activity

- Show the students pictures of each source of energy before they attempt to match each energy source to a bottle/Mason jar. Include a few silly choices as well.
- Color the water to represent the different types of energy sources shown.
- Pour the water faster and then slower. What could that represent (energy efficiency = slower)?
- What are some examples of how energy efficiency has gotten better over time? (ie, fuel mileage on cars)

Additional Ideas:

- Use a map of the United States or break down the energy sources by 'region' of the country where students must map where the energy came from.

Kid Wind - <http://www.kidwind.org/>

Smart Power - <http://www.smartpower.org/>



The National Energy Education Development Project – <http://need.org>

NASA Climate Kids Energy Resources - <http://climatekids.nasa.gov/menu/energy/>