

Science Explorers Lesson 2/7/13

Renewable and Nonrenewable Energy

Materials for Each Group:

1 worksheet per student

1 resources page for each student

1 pencil per student

Newspaper to cover the table for Activity 1

1 bag of each labeled activity 1 (for two groups - pair off with another instructor)

1 pair of scissors

Crayons/Markers

Gluestick (will have to share if not enough)

String

1 paper towel per student

1-2 toothpicks per student

Group Discussion/Demo: Hand Generators (5-10 mins)

1. Make groups of 4 on the floor so they can see the generators. Tutors should sit with their students.
2. Before demo, tutors ask students in group to think about where electricity comes from. How do we generate electricity?
3. Show hand generators can be used to generate electricity
4. Brainstorm different ways to generate that kinetic energy. (What are different ways we can spin this generator?) Discuss how power plants work. (Note: Solar energy is different, but most other power plants use some source to spin turbines)

Activity 1: Harvesting Energy Sources (10-15 minutes)

In each bag:

Rice(solar energy), coal 82% (white beans), uranium 15% (red beans), oil/natural gas 3% (coffee beans)

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

Team up with another group for this activity.

1. Assign each student an "industry" for one of the four energy resources to recover.
2. Scatter all of the wrapped resources, plus a small spoonful of rice spread out over the entire area (we recommend using a whole table so students can move around the perimeter of the table to go gather their resources, everything should be spread out enough that they can't just grab each one). Instruct students that they may unwrap each

to determine if the resource belongs to their industry, but if it does not then they must rewrap them and place them back. (This simulates the resources hidden beneath the ground.) Then give the four energy industries one minute to gather as much of their particular resource as possible.

3. After one minute have the groups count the beans or rice they recovered and record the results on their worksheet. The fossil fuels group should be ahead and the solar group may complain that it's much harder to pickup (if solar group is getting ahead, don't add as a much rice the subsequent rounds).

4. Scatter another small spoonful of rice (since solar energy is a renewable resource, there is the same amount each time) and repeat the one minute search.

5. Again, count and record the results of each group. The fossil fuel "deposits" are becoming more difficult to locate. The solar group is catching up or has by this point.

6. Repeat the one minute search after adding one more spoonful of solar seeds. The fossil fuel companies may have tapped out all available resources by this time while the solar industry continues to gain. (If after this round students want an extra round to finish collecting all the resources, they can or just leave what has not been harvested).

7. Total the results for each group and discuss. Which resources were most plentiful? Which were the least? Which were easier to locate and recover? How does this represent our actual reserves and their availability? Solar energy is more difficult to harness or pick up, but has an advantage in the long run. What is it?

Activity 2: Identifying Renewable and Nonrenewable Energy Sources (15-20 minutes)

1. Have kids color each of the natural resources and the cut them out individually (easiest if they fold the paper in quarters and cut along the lines so that each one is approximately the same size).
2. Ask the kids to separate the resources into piles, one for renewable resources and one for nonrenewable resources. Ask students if they know of other resources not included in either pile. If students would like they can draw/color additional resources blocks to add to their stacks.
3. Optional: Depending on the comprehension of your students or how long they took to color the pictures-Have students cut out the description of each source of energy. Match description with the corresponding energy source and glue them together front/back.

4. Make a display showing which resources are renewable and which are non-renewable.
 - Students can make a book of their resources. Make a cover with the construction paper and a divider for renewable and non-renewable resources (or two separate books). Punch a hole in the top corner and tie pages together with string.
 - Label the front and back of a piece of construction paper or two pieces of construction paper for renewable and nonrenewable resources. Have students glue the appropriate resource on the correct page.

Activity 3: Mining for Non-renewable Resources

(This will be done the last 10-15 minutes of class. We'll hand out cookies at that time).

1. Give two cookies to each student to “mine” for chocolate chips. The chocolate chips represent coal, a non-renewable resource. Before starting, have them draw the cookie on the worksheet and predict how many chocolate chips are in the cookie.
2. Using only the toothpick, have the students mine for chocolate chips. Have them set the chocolate chips off to one side.
3. Once completed, have them color in the actual area that was made of chocolate chips.
4. Discuss the effect on mining on the cookie and answer the questions on the worksheet.