

Earth Systems

Standard 6, objective 1

Title: Distribution of Energy

Description: Student will create a “foldable” to model **the distribution of energy coming from the sun that is reflected, changed into heat, or stored by plants.** (Utah State Core)

Materials: light source, plant, metric ruler, one piece of paper per student, textbooks, scissors, colored pencils, markers or crayons.

Time Needed: 50 minutes

Procedures:

1. Find the pages in your text where support material can be found. Check your text material against that in the activity. You may have to make some alterations depending on what information your text has available.
2. Shine a desk lamp or spotlight on a plant and turn the room lights out. Discuss with students where the energy of the light is going. They should be able to see that much of the light is lost into “space” , some is absorbed by the plant, stored by the plant and some is reflected (the reason we can see the object is because of reflected light) Compare Earth and sun’s light to this model to “hook” the kids on the next part of the activity.
3. Read the student page (below) with students. Explain where materials are and how to clean up.
4. Allow time for students to make “foldable”.
5. As students finish, encourage them to answer analysis questions and write conclusion.
6. Ask students to share conclusions with the class.

Scoring Guide:

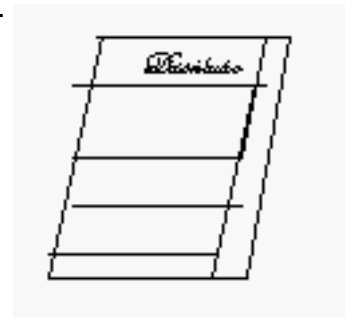
Title: Distribution of Energy

Introduction: Energy from the sun is the most important source of energy for Earth. Without it, life as we know it could not exist. In this activity you will model what percentages of sun's light are absorbed, reflected and stored by plants using a "foldable".

Procedures:

1. Find the pages in your textbook indicated by your teacher.
2. Get your paper, scissors, ruler, and colored pencils or markers.
3. Follow the directions carefully.

The foldable should look something like this:



4. Fold your paper in half the long (hot-dog) way.
5. Write your name and class period on the back.
6. Measure 7.5 centimeters down from the top of your paper. Make a horizontal line. Then cut the front half of the paper on the horizontal line. Title this section "Distribution of Energy from the Sun." Behind the flap you just made describe what percentage of the Sun's energy Earth receives and how much is lost in space. Use your textbook to find this information.
7. Draw a line on the inside of your foldable to match the flaps.
8. From the bottom of the last flap measure 1.2 cm down, make a line, and cut as you did on the last flap. Title this flap "Atmosphere Reflection." On the inside of the flap write the percentage of energy from the sun that is reflected by Earth's atmosphere.
9. Do the same thing for the energy reflected by the clouds and Earth's surface. Measure 4 cm for the length of the "Reflected by Clouds" flap and .8 cm for the "Reflected by Earth's Surface" flap.
10. Indicate on the inside flap the total amount of energy from the sun reflected by the Earth.
11. From the bottom of the last line measure down 3.8 cm. Make another flap and title it "Absorbed by Atmosphere and Clouds." On the inside of this flap write the percentage of energy from the sun absorbed by the atmosphere and clouds.
12. The last section should measure 10.2 cm. Title it "Absorbed at Surface." On the inside of this flap indicate the % of energy for this flap. Then write: "Of all this energy a crucial 0.08% is absorbed by plants and used for photosynthesis." Then describe why the 0.08% is crucial for us..
13. Draw a picture on each flap to illustrate what happens to the sun's light.
14. Answer analysis questions and be prepared to read your conclusion to the class.

Analysis:

1. Some scientists have proposed placing solar panels in space to collect sunlight. What part of sun's energy are they thinking of gathering?
2. Using the size of the flaps as indicators, is more energy reflected or absorbed by Earth?
3. If plants were not able to store sunlight as sugar, what would happen to energy sources for other living things?
4. Some scientists have suggested that global warming due to greenhouse effect will be offset by global cooling as more water evaporates and clouds form. Why would Earth cool in that scenario?

Conclusion: (What important concepts did this activity help you learn?)