

Is It Hotter?

Overview Students investigate the heat of the sun.

Related Standards of Learning 3.11a, b

Objectives

The students should be able to

- explain that the sun is the major source of energy for the Earth;
- design a basic investigation to determine the effect of sunlight in warming various objects and materials, including water.

Materials needed

Per group of students:

- Two Celsius thermometers
- Stopwatch or timer
- Pencil and paper
- “Scientific Investigations” handout (see p. **Error! Bookmark not defined.**)

Instructional activity

Content/Teacher Notes

This lesson is best done outside on a fairly sunny day. Be sure to spend some time discussing appropriate behavior while outside, emphasizing that during this activity the outside area is a science laboratory, not a playground.

Introduction

1. Draw the students into the activity by carrying an umbrella around quite obviously as you explain that part of the science lesson will be done outside. Ask students why they think you might need an umbrella today, since it’s sunny. Lead the students to suggest that umbrellas can be used to provide shade on sunny days, as well as protection from the rain on rainy days. Include the following points in the discussion:
 - The sun provides heat.
 - Heat is a form of energy.
2. Ask the students, “How can you prove that the sun provides heat?” Guide the discussion to using a thermometer to measure temperatures in shade and direct sunlight.

Procedure

1. Before going outside, have students make a data sheet by making a Temperature graph, labeling one side “Sunny” and the other “Shady.” Then divide the class into about five groups of students, and equip each group with two thermometers, a stopwatch, and pencil and paper.
2. Take the class outside, and have each group choose a sunny and a shady area to place the thermometers. Have the groups wait about five minutes for the thermometers to register, and then have them read and record the temperatures on their data sheets. Encourage them to write descriptions of each area on their data sheets in addition to recording the

temperature reading. Check to make sure the students are reading the thermometers correctly.

3. Have each group repeat the place-wait-read-record process twice so that each group collects data from three trials.
4. Have the groups observe how the temperature *feels* in the sun and in the shade. Encourage them to describe the difference in feel between the two areas. Have the students make observation about the sun *without looking directly at it*. (*Safety Note: Caution students against ever looking directly at the sun, as they may permanently damage their eyes.*) Have students record these observations as well.
5. Return to the classroom, and have students graph the data they collected on a line graph.

Observations and Conclusions

1. After students complete their graphs, ask them to make some conclusions and discuss their conclusions as a class.

Sample assessment

Have students first design and then conduct their own investigation to determine the effect of sunlight in warming two different objects. Distribute the “Scientific Investigations” handout (see next page) to aid their design work. After individually designing their investigations, they might work in groups and pick one investigation to conduct.

Follow-up/extension

Have students determine the effect of sunlight in warming different colored examples of the same object. They should discover that sunlight more readily warms the dark colored example than it does the light colored one.

Resources

Connections: Connecting Books to the Virginia SOLs. Fairfax County Public Schools and The College of William and Mary. <http://www.fcps.edu/cpsapps/connections>. Presents a database of more than 1,000 works of children’s literature and their connection to the Virginia Standards of Learning.

Outstanding Science Trade Books for Students K–12. National Science Teachers Association (NSTA). <http://www.nsta.org/ostbc>.

Search for Literature: Literature for Science and Mathematics. California Department of Education. <http://www.cde.ca.gov/ci/sc/ll/ap/searchlist.asp>. Offers a searchable database.