

Getting Warmer

Objectives

By the end of this lesson the student will:

- have examined how different materials absorb energy from the sun
- comment on their suitability for a particular use.

Background

Much of our weather is due to water and land absorbing different amounts of energy from the sun.

Different substances absorb heat at different rates. Even different colours absorb different amounts of heat. A black brick, for example, will warm more quickly in the sun than a lighter coloured brick made of the same material.

Ice and snow, for example, reflect a great deal of the sun's energy back into the atmosphere. Soil and sand absorb much of the sun's energy.

Resources and actions

Ensure that students take care and don't touch the hot globe.

Print off the student worksheet and photocopy one for each student:
http://www.bom.gov.au/lam/Students_Teachers/Worksheet17.shtml.

Ask the students to carry out the activity from the worksheet then go over their results at the end of the class.

Use student's results to complete the temperature change graph on the blackboard.

Questions and solutions

1. What was the temperature increase during heating in the:

a) water?

b) sand?

[Use student's results.](#)

2. How did the temperature changes in the water compare with those in the sand?

[Use student's results.](#)

3. Which heats up more quickly during the day - water (such as lakes or the sea) or land? Which cools more quickly when sunlight is absent - land or water?

[Land heats quicker than water during the day and cools quicker than water when sunlight is absent.](#)

4. Let's say you wanted to build a house that will store the energy of the sun in its walls so that it was warm during the night. What kind of walls could you build that would do this best, using the materials you tested in

this activity? Why did you choose that material?

The best thing to use is water. You could fill large clear glass containers such as bottles, with water and use them like bricks to make your wall. Water will retain the sun's energy longer and keep the house warmer during the night.

5. Use your graph to try to predict how long it would have taken the sand and the water to cool to their original temperatures.

Use student's results.

Extension activities

Repeat the experiment using soil. How does the temperature change compare with sand? Can you suggest an explanation if you notice any difference?

Repeat the experiment with the water bowl, this time gently stirring the water throughout the 10 minutes. How does stirring affect the temperature changes? Suggest an explanation for any change that you observe.

Why do people in hot countries favour light coloured clothes? Are dark clothes better in cold weather?

People in hot countries favour light coloured clothes because they reflect the sun's energy keeping the person cooler. Dark clothes are better in cold weather because they absorb the energy from the sun keeping the person warmer.

Time

60 minutes

Assessment Task

Q2, 3,4 & 5