



Watts On Your Mind?

Solar energy educational activities for schools

Activity Overview

Grade Level: 3-5

Activity: UE-3

General Description

Students will use thermometers to measure temperature of different earth materials to see which stores solar energy best.

Learning Outcome

Students will read thermometers and monitor change over time, recognize that solar energy creates heat and recognize that different materials absorb different amounts of solar energy (heat).

Subjects

Science, math, social studies

Process Skills

Observation, measurement

Duration

30 minutes

Key Vocabulary

Absorption, earth materials, energy transfer, infrared light

Curriculum Standards

Texas (TEKS):

112.6.a.2, 112.7.b.5.8,

112.6.b.4.11, 122.7.a.2

Louisiana (LSCS):

ESS-E-B5, PS-M-C3

Arkansas (ASCF):

3.1.4

National (AAAS Project 2016):

The Designed World – 5th

What's Hot and What's Not

Materials

- Thermometer
- Cup of sand
- Cup of water
- Cup of dry soil
- Cup of wet soil
- Data sheet

Method

1. Discuss appropriate safety issues.
2. Discuss background information.
3. Provide cups with equal amount of each materials for groups.
4. Divide groups into pairs and distribute cups as follows:
 - One pair will monitor water and sand in sun and shade
 - One pair will monitor wet soil and dry soil in sun and shade
5. Provide one thermometer to be placed in each cup
6. Students will observe and record temperature change for each cup at 5-minute intervals for 20 minutes, first in the sun and then in the shade.
7. Pairs of students will share information with their groups
8. Teacher will lead a discussion comparing the results



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Background Information

Most of the solar energy that reaches the earth is in the form of visible light and infrared energy (the heat we feel). The earth's surface is approximately 75% water and 25% land. Land almost always heats faster and gets hotter than water. Water almost always cools faster and gets cooler than land. Water needs 5 times more heat than land to heat it to the same temperature.

Assessments

Students record temperature changes on data sheets. Students communicate absorption properties of earth materials.



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Datasheet

CUP CONTENTS	TEMPERATURE	
Water	SUN	SHADE
00:00 (START)		
00:05		
00:10		
00:15		
00:20 (END)		

CUP CONTENTS	TEMPERATURE	
Sand	SUN	SHADE
00:00 (START)		
00:05		
00:10		
00:15		
00:20 (END)		

CUP CONTENTS	TEMPERATURE	
Wet Soil	SUN	SHADE
00:00 (START)		
00:05		
00:10		
00:15		
00:20 (END)		

CUP CONTENTS	TEMPERATURE	
Dry Soil	SUN	SHADE
00:00 (START)		
00:05		
00:10		
00:15		
00:20 (END)		



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Questions

1. Did the temperature inside each cup change?

2. Did the sun or shade make a difference? Why or why not?

Discussion

How do you feel about your results? Are they valid?

What, if anything, would you change to make your results more valid?

Did you control your variables?

Did your results cause you to think of more questions to explore?

Source: This activity adapted from "Getting Energized", National Renewable Energy Laboratory, Energy Programs Office, Golden, CO.