Greenhouse Effect and Surface Radiation

Summary

Students will design a controlled experiment to demonstrate the greenhouse effect and the effect of different surfaces on light reflection.

Time Frame

1 class periods of 70 minutes each

Group Size

Small Groups

Materials

1 large beaker and one plate per group
thermometers or Intel temperature probes (2 per student group)
different substances for the bottom of the beaker and plate such as dirt, water, white paper, snow, black paper, grass or leaves, rocks etc.
light sources (4-5 per classroom)

- student page
(attached)

Background for Teachers

The plastic wrap used in this experiment to model the action of greenhouse gases is limited. It should be explained to students that individual molecules of C02, methane and water vapor act to reflect heat back to Earth instead of allowing it to immediately radiate back out into space. The plastic wrap, being a solid is a poor model but effective for this experiment. Students should be able to read a thermometer or use their Intel probe.

Instructional Procedures

Day 1 (20 minutes):

Read the introduction on the student page with students. Show students the materials and read the procedures with them. Have students look carefully at the drawings.
Remind student that the reason for the control is to have a way to compare their test results.
Give students time to work in their groups and decide on what substance they want to place in the bottom of their beakers. Have a group member come to the board and write the groups' choice on it. No two groups can have the same one.
Groups may chose to place substances in their beaker that you do not provide. Give them the opportunity to bring them in for the experiment on day 2.
Have students write a hypothesis based on the list of substances on the board. Have them predict which beaker will heat the most and the least.

Day 2 (50 minutes):

Have students begin their experiment and place it under the light source. Remind them to keep the beaker and plate about 30 cm from the light.
Allow 10 minutes for students to gather and record data.
Have students report to the class by group with their findings. Record their findings on the board or an overhead as they present them. Ex.:
Have each group explain why they think they got their results.

Assessment Plan

Scoring Guide

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1. Student participates and contributes to activity……4
2. Student collects data and graphs accurately……4
3. Student correctly answers analysis questions……..4

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

Utah LessonPlans