PRELIMINARY ACTIVITY FOR

An Investigation of Passive Solar Heating

Alternative energy sources are energy sources other than the nonrenewable fossil fuels—coal, petroleum, and natural gas. Solar energy, or energy from the sun is one energy alternative. In *passive solar heating*, the sun's energy is used to heat buildings without the use of pumps or fans to distribute the collected heat. Certain design features can be used to warm buildings and retain heat in the winter and help them to remain cool in the summer. In this experiment, you will be investigating design features that retain heat.

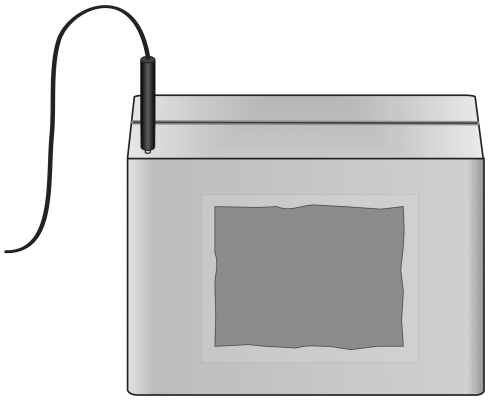
In the Preliminary Activity, you will monitor temperature and determine the cooling rate of a model solar house that has been heated by a lamp representing the sun.

After completing the Preliminary Activity, you will first use reference sources to find out more about passive solar heating before you choose and investigate a researchable question dealing with heat retention in solar houses. Some topics to consider in your reference search are:

- renewable energy sources
- direct solar energy
- indirect solar energy
- passive solar heating
- active solar heating

After completing the Preliminary Activity, you will use the class research results as you alter the model house in preparation for a contest to see which group can produce the best modified model solar house, as determined by the lowest cooling rate.

PROCEDURE



1. Connect the Temperature Probe and the data-collection interface.
2. Set up the data-collection program to collect data for 300 seconds following your teacher's instructions.
3. Note and record room temperature.
4. Obtain a model solar house. Insert the Temperature Probe into the hole provided in the top of the model house. Position a lamp with its bulb about 3 cm away from the model solar house's window.
5. Turn the lamp on and allow it to warm the model house.
6. Turn the lamp off when the internal temperature of the model house is 7.0ºC greater than room temperature.
7. When the temperature drops to exactly 6.0ºC greater than room temperature, start data collection.

8. After data are collected, use the linear regression function to determine the cooling rate.

QUESTIONS

1. What was the classroom temperature (in ºC) at the beginning of the Preliminary Activity?

2. What was the cooling rate (in ºC/s) of your model solar house?

3. List some features of passive solar houses that help capture solar energy and retain heat.

4. List at least one researchable question for this experiment.