



Drexel-SDP GK-12 ACTIVITY

Science

Solar Energy

Harnessing Solar Energy: Building a “Solar House”

Grade Level 5

Lesson # 1 of 1

Lesson Dependency Solar Oven Lesson

Time Required 2 Days

Summary

Students will draw, plan and build a solar house, taking window exposure and colors into account for their plan. Some students will create multiple "rooms" with different heat properties. Concepts learned in the previous experiments may be applied to this one (i.e. insulation). As a final extension, we will explore the addition of a heat sink for heat radiation throughout the solar house during cooler periods.

Keywords

- Solar Energy, Solar House, Insulation, Heat Retention, Energy Conservation

Educational Standards: 3.4.7

Learning Objectives

- Utilize various techniques for effecting heat retention in different areas of a home (i.e. colors, awnings, insulation, etc.).
- Construct a model house that takes advantage of solar energy for heat.
- Observe the utility of crude heat sinks for situations in which traditional heat sources are not available.

Introduction / Motivation

- How do we heat our homes? Many of us turn on the heater and think nothing of it. But, like our cars, this requires some type of fuel -- electricity, gas, or oil, for example. This is why we become so concerned when there is an oil crisis. Someday, we will run out of oil. As we learned in the Solar Oven experiment, we can use convection, radiation and insulation to keep ourselves warm. Other tricks include using things that dissipate heat slowly, like water or air.

What's so special about a greenhouse? What is a greenhouse and how does it really work? Again, we are using solar energy to our advantage. But this, like our other experiments, has used solar energy for heat alone. Heat is typically a byproduct of energy spent. How else can we spend energy? Can we spend solar energy in the same ways? We will explore this in a future lesson.

Lesson Background & Concepts for Teachers

- A detailed procedure will not be given to students. However, they should be reminded about the following things as you explore the solar house:
 - What are the most important things you can do to trap heat inside your house? Recall the solar cooker; but know that you can do more (as you found from the insulation experiment). Would more glass help? What do you think? Don't be afraid to try something.
 - Draw and plan your house before you start! In the real world, we don't do anything without a plan.
 - Build your house and put a thermometer inside, which you will use to take the temperature over time. You will graph the temperature over a 15 minute period, just as you did in previous experiments. You will note the overall change in temperature on your worksheet.
 - Groups should intentionally try different ideas; for example, some houses should get a lot of sunlight through the windows, some should get less. Some might introduce things for shade, too.

Assessment

Post-Introduction Assessment

- Students should be assessed on their reasoning (which they should log) on why they chose certain materials or techniques, creativity in their approach, and focus on the task.

Author

William Mongan

Date

9/11/2007