



Solar Ovens

Solar Ovens Lesson 8: Professional Sun Oven

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DESCRIPTION: Students will view a professional solar oven in use and hypothesize how it works. They will do this through observing the oven in action as it cooks an egg, then recording their observations. This will be recorded in their energy notebooks.

GRADE LEVEL(S): 4 and 5

SUBJECT AREA(S): Science, solar energy, electromagnetic radiation, energy transfer

ACTIVITY LENGTH: 45 minutes

LEARNING GOAL(S): Students will learn how a professional solar oven works. Students will make scientific observations about the functionality of a solar oven. Students will practice prototyping through their own sketches of a solar oven.

STANDARDS MET:

Next Generation Science Standards:

4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

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Student Background:

Students will need to have their notes about the greenhouse effect at the front of their memory, particularly information about solar and infrared radiation.

Educator Background:

If you do not have access to a professional solar oven, you can do an Internet search and find many great videos. Suggested Websites: www.sunoven.com, www.solarcookers.org

Materials List:

- Sun Oven or demonstration video from the Internet
- thermometer for ambient temperature
- oven mitts
- a small metal plate or pan for cooking eggs
- several eggs for cooking
- a day with full sunlight
- one toothpick

Vocabulary:

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Lesson Details:

- Question of the Day/Exit Slip: How do you think that the Sun Oven is able to cook?
- STEP 1: If possible, pre-heat the Sun Oven before the class in a safe location for at least 20-minutes. (The sun Oven glass and interior become very hot and could cause serious burns. Do not leave unattended and keep out of reach of children. Create signs so that adults do not touch the oven.)
- STEP 2: Sit the students near the sun oven so that they can sketch a picture of it on page 13 of their Student Solar Energy Workbooks. Call small groups to take a closer look.
- STEP 3: Emphasize to students that the size of the shadows on either side of the Sun Oven should be equal.
- STEP 4: Crack an egg and place it on a small metal plate. Using oven mitts, open the Sun Oven and place the egg inside. Have the students watch as the egg cooks. The egg should be fully cooked in about 10 minutes if in full sunlight and oven is able to reach 300-350 degrees.
- STEP 5: When fully cooked, use oven mitts to carefully remove the egg. Place a toothpick in the yolk to show students that the yolk is cooked.
- STEP 6: Have the students fill out page 13 in their Solar Energy Student Workbooks.

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- STEP 7: Go the Solar Cookers International website at <http://www.solarcookers.org/basics/how.html> Let students take notes on what they learn.
- Note: Students may need to have some form of review going over the greenhouse effect and different forms of radiation.

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