



Solar Oven Experiment

Grade Level: 7th-9th

Objective: After performing this experiment, you will be able to design an apparatus to cook food with energy from the sun.

Introduction:

The idea is simple. If you have ever started anything on fire with a magnifying glass, you have used an uncontrolled solar cooker. The solar cooker you will build will concentrate the sun's rays in order to achieve a temperature suitable for cooking food. This heat from the sun must be stored or trapped, in order to reach cooking temperature. In order to trap the heat efficiently, reflectors, a glass or Plexiglas window, and insulation around the perimeter will be used. As you build your solar cooker, think about how it would fit into your lifestyle and how this technology could be used as an alternative fuel source.

Materials and Supplies:

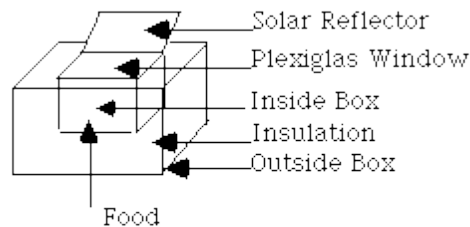
- 2 large cardboard boxes with flaps (one fitting inside the other with 5 cm on the sides and bottom)
- 1 piece of cardboard (larger than biggest box)
- 1 piece of glass or Plexiglas
- aluminum foil
- clear mailing tape
- 1 piece of black construction paper (to fit bottom of smaller box)
- newspaper
- string
- stick
- scissors

Procedure:

1. Remove the flaps from the smaller box.
2. Make four 4 cm high stacks (3 cm x 3 cm) from discarded flaps for bottom supports.
3. Crumple newspaper into baseball size balls and cover bottom of large box with the supports.
4. Use aluminum foil to cover:
 - a. inside of small box.
 - b. outside of small box.
 - c. both sides of flaps on large box.
5. Put the covered smaller box inside larger box on the newspaper balls and supports.
6. Add newspaper balls between sides of the boxes.

7. Cut black construction paper to fit inside smaller box.
8. Cut flaps of larger box to fit inside the smaller box and cover the space between both boxes. Tape in place.
9. Make a snug fitting lid from the single piece of cardboard and tape (do not tape to large box).
10. Cut three sides of a rectangle in the lid (the same size as the smaller box).
11. Cut the Plexiglas 2 cm larger than the lid's rectangle.
12. Center and tape Plexiglas in lid and put lid on the cooker.
13. Bend the uncut side of the rectangle in the lid to open window and cover inside of the cardboard with aluminum foil.
14. Tape a 10 cm piece of string to the rectangle to open the window.
15. Use a stick to prop open the window to collect the sun's rays.

You are now ready to cook in your solar cooker.



Data and Calculations:

Sample	Time	Temperature

Research Questions:

1. Identify the collector, storage, and controls on your solar cooker.
 - a. collector: b. storage: c. controls:
2. How does the sunlight cook the food?
3. What parts of the world would a solar cooker work the best? the worst?
4. What are some disadvantages of using a solar cooker?
5. What are some advantages of using a solar cooker?
6. What are some health benefits of using a solar cooker in developing countries?
7. How are solar cookers beneficial to the environment?
8. What other types of materials could be used in the construction of a solar cooker? Would cost have to be a consideration?