

How to Make a Solar Oven

Research Information

- Several scientific phenomena are involved in making your oven the best heater it can be. Heat is the form of energy (sometimes called thermal energy) that is transferred by a difference in temperature. You want to transfer the sun's heat to your solar oven. Reflection is the throwing back of light, heat or sound by a body or surface, like a mirror. The shiny foil you'll use in your oven will reflect the sun's light and heat inside your oven. During absorption, energy is taken into a material rather than reflected. You will line the inside of your oven with black paper so it can absorb the light and heat being reflected into it. Another energy process you should be familiar with for this project is convection, which is the transfer of heat by the movement of a gas or liquid. You'll use plastic wrap to make your oven airtight so the air warmed by the sun doesn't leave your oven through convection. One final energy term important to this project is insulation. Insulating materials prevent heat leaving your oven through radiation. That's why you are going to line the inside of your oven with a cheap and effective insulator—newspaper!

Materials

- Cardboard pizza box
- Pencil
- Ruler
- Box cutter or scissors
- Aluminium foil
- Clear type of tape
- Black construction paper
- Plastic wrap or large, transparent plastic bag
- Newspapers
- Oven mitt
- Dish or pie plate
- Cooking Ingredients, like those for some smores or nachos (don't use your oven to prepare raw meat)

Method

- Clean any stray bits of cheese, sauce or crumbs out of your pizza box.
- Using the ruler and pencil, draw a square one inch in from the edges of the top of the box .
- Use the box cutter or knife to cut out three of the four sides of the square – **get a parent to do this.**
- Make a crease along the uncut side of the square to create a flap that stands up.
- Cut a piece of aluminium foil large enough to cover the inner side of the cardboard flap.
- Wrap the foil tightly, and secure with tape. What purpose does the foil serve?
- Line the bottom of the pizza box with black construction paper. What purpose does the black paper serve? Would white paper work as well? Why or why not?
- Cut two pieces of plastic wrap that are the same size as the top of the pizza box.
- Use tape to secure the plastic wrap to the inside edges of the square window you cut into the box. You are creating an airtight window. Why do you want to make your oven airtight?
- Roll up some newspaper pages into tubes to stuff into the sides of the box. Make sure you are still able to close the lid of the pizza box. Remember—what purpose does the newspaper serve?
- Now it is time to cook something! The best time to use your oven is between 11 AM and 2 PM. Make sure to set the food on a dish so you don't mess up the interior of your oven.
- One food option is a solar smore. Place one or two marshmallows on top of a graham cracker. Put two to three squares of chocolate on top of the marshmallow. Wait until it's done cooking to top it with the second graham cracker. Any idea why it might be smart to have the chocolate on top?

