



STEM Lab at home - Solar ovens

This is a really fun STEM project you can do with your kids at home. We made them with our camp kids last week and it was so much fun – Build your own Solar Oven!

First – call your favorite pizza restaurant and place your take out order (support local, folks!) Ask them if they could let you have an empty pizza box to take with you. All the other materials you will probably have in your home.

Items Needed:

- Cardboard pizza delivery box
- Aluminum Foil
- Clear Tape
- Plastic Wrap
- Newspaper
- Scissors or utility knife (Make sure an adult helps with cutting!)
- Ruler
- Sheet of black construction paper
- Pencil or skewer
- The hot sun! (Pick a warm, sunny day)
- Graham crackers, Marshmallows, Chocolate Bar (S'mores ingredients)

What happens?

The heat from the sun is trapped inside of your pizza box solar oven, and it starts getting very hot. Ovens like this one are called collector boxes, because they collect the sunlight inside. As it sits out in the sun, your oven eventually heats up enough to melt cheese, or cook a hot dog!

How does it happen? Rays of light are coming to the earth at an angle. The foil reflects the ray, and bounces it directly into the opening of the box. Once it has gone through the plastic wrap, it heats up the air that is trapped inside. The black paper absorbs the heat at the bottom of the oven, and the newspaper make sure that the heat stays where it is, instead of escaping out the sides of the oven.

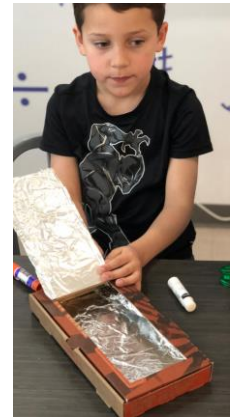
Your solar oven can reach about 200° F on a sunny day and will take longer to heat things than a conventional oven. Although this method will take longer, it is very easy to use, and it is safe to leave alone while the energy from the sun cooks your food.

Steps:

1. Using the scissors or utility knife, with an adult's help, cut a flap in the pizza box lid. Cut along three sides only, leaving one inch between the edge of the box and where you cut. Fold the flap out so it stands up when the box lid is closed.



2. Line the inside of the flap with aluminum foil, folding the edges of the foil over the flap to keep it in place. Tape down the foil and try to keep it as smooth as possible.



3. Lift the lid and line the inside of the box with aluminum foil – shiny side out.
4. Cover the opening made in the pizza box lid by the flap with plastic wrap. The wrap should be as airtight as possible. Tape the plastic wrap in place.



5. Next, cut a piece of black construction paper so that it's 2 inches smaller along each edge than the bottom of the pizza box. If you have a really large pizza box, you might need more than one piece of paper.

6. Center the construction paper in the center of the bottom of the box, on top of the foil. Tape in place.



7. Take newspapers and make four rolled tubes of newspaper out of multiple sheets of paper. Each of these rolls will go along the edges on the inside of the box, creating a border. Tape the rolls in place. Be sure the rolls do not stop the lid from closing.
8. Using a pencil, create a "dent" in the box, where you can insert the pencil or skewer and use it as a "kickstand" for the lid to remain upright for cooking.

9. The solar oven is finished! Take it outside on a sunny day while the sun is high overhead, between 11 AM and 2 PM when the sun's rays are the strongest. Put the graham cracker, topped with a piece of chocolate, and a marshmallow in the oven.
10. Close the lid. Prop up the flap you cut and lined with aluminum foil using the pencil or skewer.
11. Let the sun do its work! It will take some time, but eventually, you'll have a melty, gooey and delicious S'more to try.

