



Solar Oven Activity

Recommendations: For grades 3-8. Can be made inside or outside but will need to be placed outside for the experiment. Adult supervision is required (*some materials will need to be cut*).

Purpose: Examine how energy from the sun can be used to cook.

Materials:

- Pizza box
- Black construction paper (*black paint will also work*)
- Aluminum foil
- Plastic wrap
- Newspaper
- Clear tape
- Scissors or box cutter (*adult supervision/assistance*)
- Writing utensil
- Oven/Meat Thermometer (*only required if you want to know the temperature within your solar oven*)
- A stick or other object to hold the flap of your oven open
- Something to cook (*smores, hotdogs, heat up leftovers, or if you are feeling adventurous you could even heat up nachos!*)

How it Works:

Context: Solar radiation is created in the sun's core, which causes it to emit a large amount of electromagnetic radiation, mostly in the form of visible light. This radiation is the energy that heats the Earth or helps us to make yummy treats in a solar oven!

Step 1: Using scissors/ box cutters (*adults can do this or be there to supervise*), cut a flap in the lid of the pizza box leaving about an inch of cardboard on each side, leave the back (*hinge*) of the box intact. *Shown right*>



Step 2: Using the aluminum foil, cover the bottom/inside of the flap with aluminum foil and secure it with clear tape.

The aluminum foil is the material that will reflect the sunlight into your solar oven.

Step 3: Cover the hole you made with 2 layers of clear plastic wrap and secure them with tape. Make sure that the plastic wrap is pulled tight and secured well to eliminate air from getting in or out.

The plastic wrap is the material that will trap the heat in your solar oven (*like heat being trapped in a car on a hot summer day*). Your solar oven should now look like the image to the right:



Step 4: Open the pizza box and line the bottom and sides with black construction paper and secure it with tape.

The black construction paper is the material that will absorb the heat from the sun.

Step 5: Roll up newspaper, place it around the edges inside the pizza box and secure it with tape.

The newspaper is the material that will help to insulate the pizza box. *Your solar oven should now look like the image on the right:*



Step 6: Place the food you would like to cook/reheat in the solar oven and close the lid. *(You can place an oven/meat thermometer in the solar oven during this step if you are interested in the internal temperature as you cook)*

Step 7: Place the solar oven in a sunny location outside, that is sheltered from wind and adjust the flap until you have as much sunlight as possible being reflected into the oven. You can use a stick or other object to hold the flap open where you want it.

Step 8: Sit and watch the magic happen, checking on your food every 10-15 minutes. *(depending on the food being cooked/reheated it could take anywhere from 30 minutes to over an hour)*

Note: You may need to rotate the solar oven or adjust the flap throughout cooking to ensure the most sunlight is being used and the most heat is being captured.

Conclusion:

By reflecting, absorbing and trapping heat, the temperature within the solar oven will slowly increase.

To further learning you can engage older students in discussion about energy and how it is never created or destroyed, only transferred. Can you track the transfer of energy from the sun to the food you eat? Where does the energy go after that?

How long did it take to cook/reheat the food?

How would a larger box effect your solar oven?

Resources:

Check out this YouTube video!

<https://www.youtube.com/watch?v=Uqmgu2L7kek>