Project Exploration creates transformative learning opportunities for youth underrepresented in the sciences --particularly students of color and girls -- by equipping them with the skills, practices, and mindset needed for a lifelong pursuit of learning. STEM@Home makes activities around science, technology, engineering, and math accessible and fun to do at home. This STEMbook activity, resources, and more are available at www.projectexploration.org/stemathome.

In this activity, you will:

learn about solar power and how the sun's energy can be harnessed to create heat.

Supplies Required:

Cardboard pizza box or shoe box with lid
Black construction paper
Plastic wrap or ziploc bag
Aluminum foil
Scissors
Clear tape
Ruler
Newspaper
Wooden spoon
Ingredients to make s'mores or pizza or a grilled cheese

Video

What is solar energy? https://tinyurl.com/tqn3xlg
How to make a solar oven: https://tinyurl.com/jhq6f6m

Overview

There are two types of solar power: photovoltaic solar power, the energy created by converting solar power into electricity using photovoltaic solar cells (solar panels); OR solar thermal energy, or direct solar power, the energy created by converting solar energy into heat. Solar cooking does not require any electricity but uses solar thermal energy to cook the food. This means that you can use a solar oven anywhere that has lots of sun. Solar cooking is done by means of the sun's UV rays. A solar cooker lets the UV light rays in and then converts them to longer infrared light rays that cannot escape. Infrared radiation has the right energy to make the molecules in food vibrate vigorously and heat up. It is the sun's rays that are converted to heat energy that cook the food; and this heat energy is then retained by the box and the food by the means of a covering or lid. This occurs in much the same way that a greenhouse retains heat or a car with its windows rolled up.

Instructions

1. Draw a square on the lid of the pizza box that is 1 inch smaller than the box on all sides.
2. Cut three sides of the square to make a flap.
3. Fold the flap so that it stands up when the lid is closed.
4. Cover the inside of the flap with aluminum foil, using tape to secure it to the cardboard.
5. Cut the bag open along the seams.
6. Open the box lid and tape the freezer bag to the inside of the flap hole. This will create an airtight window for sunlight to enter the box.
7. Put black construction paper on the inside of the bottom of the box.
8. Roll up several sheets of newspaper and tape them around the inside of the box bottom. Be sure that the lid can still close
9. Use the oven between the hours of 11 a.m. and 3 p.m. when the sun is highest.
10. Adjust the flap until as much sunlight as possible is reflecting off of the foil to the window area.
11. Use a ruler to keep the flap open at a right angle.
12. Try buttering a slice of bread and placing cheese on top. Cook the bread in the oven on a clear glass or plastic plate.
13. Be careful when taking the plate out of the oven; it will be hot.

Additional Resources

Think About It! What did you make? How long did it take to cook your food? If you were stranded on a desert island, what materials would you use to make a solar oven? How can solar ovens help the environment?

1. Energy of the earth: https://tinyurl.com/o5nyfd9

Share It Out

Share on social media: Tag your favorite chef and show them what you made in your solar oven! Share a photo of your finished oven and tag using the hashtags:

#SolarOven
#ProjectExploration
#StemAtHome

Share via PE's website: Students who complete STEM@home activities and share what they learned with the PE team via our website will earn points which can be traded in for cash prizes at the Explore Store. Your project number is 307. Learn more at www.projectexploration.org/explore-store

Join PE's character contest!
Design a STEM character who will lead kids through activities and be featured on our website and in our STEMbooks. Cash prizes will be awarded to the top 3 finalists. Learn more at: www.projectexploration.org/character-contest.

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