

Discovery Solar Oven

Use solar energy to make a tasty, sweet treat in a pizza box.

Most electricity is generated from a variety of energy resources. We use different mixtures of energy resources to provide electricity to our local communities, states, and countries, and around the world. But did you know that access to energy can look very different based on where you live?

In some places, people can power up their cell phones or flip a switch to instantly turn on a light. But in other places, students don't have enough electricity to light up their room so they can do their homework at night or even cook a meal with their family.

However, there are solutions that can help improve those conditions. For example, did you know you can harness the power of the Sun to create renewable energy?

Today, we're going to do just that by creating our own solar-powered oven.

What is a solar oven?

Variations of solar ovens (or solar cookers) are used all over the world. They are designed to collect as much solar radiation as possible and retain heat. Solar ovens are used not just for cooking food—many communities rely on them to pasteurize water and sterilize medical instruments.

Today, we're going to use our ovens in the most delicious way possible.

Solar Oven S'mores



So many great things are synonymous with “summertime yummys!” We can’t think of a summer treat we enjoy quite as much as a s’more: warm, drippy chocolate oozing around a melted marshmallow and sandwiched in a graham cracker. But what would you do if you weren’t allowed to have a fire or didn’t have the materials to build one? We came up with a neat way to harness solar energy—to create a simple Discovery Solar Oven. You can make a delicious batch of s’mores without a fire!

What You Need:

- Cardboard box (like a pizza box)
- Box knife or scissors
- Aluminum foil
- Clear tape
- Plastic wrap (a heavy-duty or freezer Ziplock bag will also work)
- Black construction paper
- Ruler
- Thermometer (optional)
- An adult to help with cutting



1. On the lid of the pizza box, draw a square that measures about 2 inches (5 cm) from the four edges of the box. Using a box cutter or scissors, cut along three sides of the square, leaving the side near the hinge of the box intact. You may need to score the cardboard slightly along the hinge side. The square becomes a flap that lifts on the hinge side.





2. Measure and cut a piece of aluminum foil large enough to line the entire bottom and two sides of the pizza box. Be sure to place the shiny side of the foil facing out. You may need to join two narrower pieces to do this. Fold them together along an edge and press the seam between them flat and tight against the table.



3. Apply glue to the bottom and two sides of the box and lay the foil piece on it. Smooth and press the foil onto the glue.





4. Measure and cut a piece of aluminum foil large enough to cover the inside surface of the flap you cut into the lid in Step 1. Cover this inside surface with glue then smooth and press the foil onto it with the shiny side facing out.



5. Cut a piece of black construction paper that measures 1-2 inches (2-5 cm) from each edge of the bottom of the pizza box. You may need to use more than one piece of paper.





6. Center the black paper on the foil bottom inside the box. Hold it in place using the clear, wide packing tape around the edges of the paper. Tape it directly to the foil.



7. Grab both page protectors and carefully pull the thin sheets apart along the short, bottom edge of each sheet. Lay out both rectangles and tape two long edges together to make a single, large piece of plastic.





8. Tape your plastic creation to the inside of the box lid so it's smooth and tight. **DO NOT** tape it to the flap you cut out; tape it inside the lid. The flap should still move freely, and the plastic should cover the flap's opening from underneath the lid.



9. Use the sharp end of the skewer to poke two small dents about 2 inches (5 cm) apart into one side of the lid. Make them about 0.5 inches (1 cm) from the flap and about halfway along the flap. Don't poke all the way through. You'll use these dents to prop the flap open during cooking (see Step 12).





10. Wrap a 5-inch (13 cm) piece of sticky tape around the skewer near its flat end. Do it in such a way that the tape crosses itself on the stick. The skewer and tape make the letter "T". This will be the "kickstand" you use to prop open the flap.

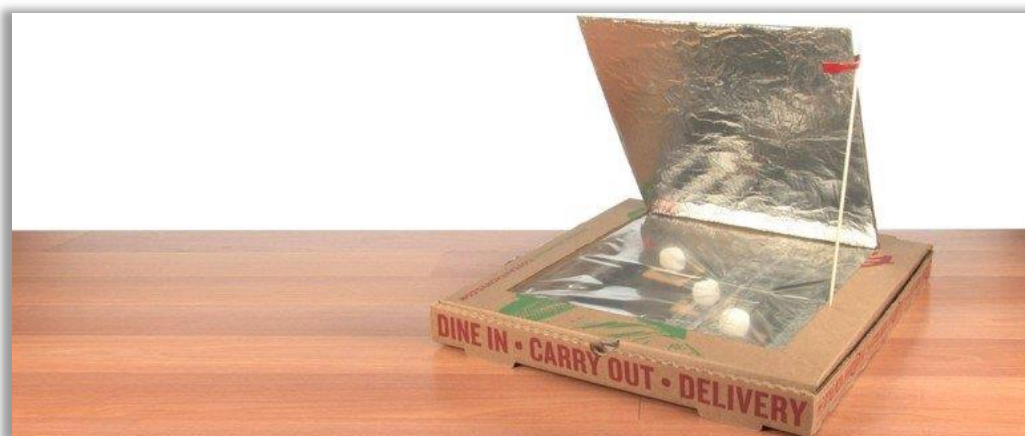


11. Use the sticky tape on the skewer to attach the skewer to the side of the flap with the dents you made in Step 9. The pointy end of the skewer goes towards the hinge of the flap. The top half of the tape goes over the flap and the bottom half goes under the flap.

You're almost ready to cook! Open the lid and load your oven with a few s'mores. For this recipe, use one graham cracker as a "pan" to hold the chocolate and the marshmallow. Put on the top cracker when you're ready to eat it up. Keep the s'mores spread out on the black paper in your oven.

Before you close it up for cooking, you might want to tape a thermometer near the black paper inside the box. Place it where you can see it through the plastic liner, so you can keep track of the temperature inside your solar oven.





12. When you're ready, go outside and find a spot that will have full sun for a long time. Then place your solar oven in this spot and open the flap. The best hours to set up your solar oven are when the sun is high overhead—from 11 am to 3 pm. Adjust the flap to reflect as much heat as possible into the oven. You'll need to leave it outside for a while but check on it often so you can keep it pointed directly toward the sun. Your treats will be ready soon!

Extension Activity:

How can you improve your solar oven? Could you increase the heat it produces or the speed in which it heats by changing your design? Changes could include altering the shape, size, material, or angle in which you position your solar oven and see how it impacts the way your oven works.

Try out variations of your solar oven and share your results by tweeting us at @DiscoveryEd!

