

# Make Sun S'mores!

Harness the energy of the Sun to make the best snack ever invented.



Yummmmm!

A solar oven is a box that traps some of the Sun's energy to make the air inside the box hotter than the air outside the box. In other words, the solar oven is like a super greenhouse.

## You will need:

- Cardboard box with attached lid. Lid should have flaps so that the box can be closed tightly. Box should be at least 3 inches deep and big enough to set a pie tin inside. A 12" x 12"
- Aluminum foil
- Clear plastic wrap
- Glue stick
- Tape (transparent tape, duct tape, masking tape, or whatever you have)
- Stick (about 1 foot long) to prop open reflector flap. (Use a dowel rod, skewer, knitting needle, ruler, or whatever you have.)
- Ruler or straight-edge
- Box cutter or Xacto knife (with adult help, please!)

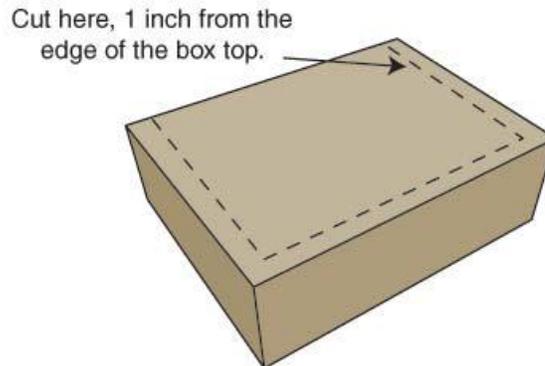
## How to make solar oven:

1. Before putting the box together (or undo the box so it is a flat piece of cardboard), lay the cardboard on a large piece of aluminum foil and draw around it with a sharp pencil twice. It should cut the foil the same shape as the box. If it doesn't, simply cut on the lines.
2. Cover the inside of the box with aluminum foil by spreading a coat of glue from the glue stick onto the cardboard first and then smoothing the foil over it. Let dry.

### CAUTION:

Have an adult cut the box with the box cutter or blade.

3. Turn the box over. Using the straight edge as a guide, cut a three-sided flap out of the top of the box, leaving at least a 1-inch border around the three sides.



4. Tape two layers of plastic wrap over this opening, one on the inside of the box, and one on the outside of the box.
5. Test the stick you will use to prop the lid up. You may have to use tape to get the stick to stay in place.

## Put the oven to work

Set the oven in the direct Sun, with the flap propped to reflect the light into the box. You will probably have to tape the prop in place. Preheat the oven for at least 30 minutes.

## To make S'mores, you will need:

- Graham crackers
- Large marshmallows
- Plain chocolate bars (thin)
- Aluminum pie pan
- Napkins!

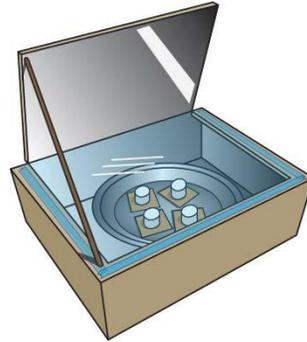
1. Break graham crackers in half to make squares. Place four squares in the pie pan. Place a marshmallow on each.

### IMPORTANT!

Note that unlike most recipes, our s'mores have the marshmallow UNDER the chocolate. That's because, in the solar oven, it takes the marshmallow longer to melt than the chocolate.

2. Place the pan in the preheated solar oven.
3. Close the oven lid (the part with the plastic wrap on it) tightly, and prop

up the flap to reflect the sunlight into the box.



4. Depending on how hot the day is, and how directly the sunlight shines on the oven, the marshmallows will take 30 to 60 minutes to get squishy when you poke them.
5. Then, open the oven lid and place a piece of chocolate (about half the size of the graham cracker square) on top of each marshmallow. Place another graham cracker square on top of the chocolate and press down gently to squash the marshmallow.
6. Close the lid of the solar oven and let the Sun heat it up for a few minutes more, just to melt the chocolate a bit.'
7. Enjoy!

### **What's happening?**

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 will 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. If you do not want to wait long

to have a solar-cooked dish, try heating up something that has already been cooked, like leftovers, or a can of soup. Putting solid food in a glass dish and liquids in a heavy plastic zip lock bag works well. You can also pre-heat your oven by setting it in direct sun for up to an hour.

You may need to line the bottom of the box with black construction paper - black absorbs heat. The black surface is where your food will be set to cook.

You can make toast by buttering a slice of bread, or sprinkling cheese on it, then letting the sun do the rest. Cooking a hot dog or making nachos with chips and cheese are also fun treats to make in your solar oven! It would also work great to heat up leftovers. So the paper at the bottom doesn't get dirty, put what you would like to cook on a clear plastic or glass plate. A pie plate would work well.

Other recipes you may want to try are making baked potatoes, rice with vegetables, chocolate fondue, and roasted apples with cinnamon and sugar. Even on partly cloudy days there may be enough heat and light from the sun to slow cook a special dish. Here are a few tips for having success with your solar oven:

- Stir liquids (if you're cooking something like fondue, rice, or soup) every 10 minutes. You can rotate solid food every 10-15 minutes as well, so it cooks evenly.
- Reposition your solar oven when needed, so that it faces direct sunlight. You should be checking periodically on your oven, to make sure it is in the sun.
- Make sure that the foil-covered flap is reflecting light into the pizza box, through the plastic-covered window.

Directions and pictures from <http://climatekids.nasa.gov/smares/>

Use your solar oven to do other cooking projects:

<http://www.hometrainingtools.com/build-a-solar-oven-project/a/1237/> - Home Science Tools solar oven recipes

<http://solarcooking.wikia.com/wiki/Recipes> - A wiki of recipes for almost any type of food.

## Spooky Story Writing Prompts

These are just a couple of SUGGESTED prompts. There are numerous websites devoted to spooky writing prompts. Or have students generate their own ideas.

### *Nonfiction Prompts:*

#### **(Primary)**

How do you feel about spooky stories? Think of a time when you heard a spooky story or you tried to tell a spooky story to someone else. What happened? Where were you? Who was there? What happened after you heard/told the story?

What's your favorite spooky story? Summarize it, telling readers why it's your favorite.

#### **(Secondary)**

Do you believe in ghosts? If yes, write the story that makes you a believer. If no, write the story as to why you are not.

Write about a time when you were irrationally spooked. To set the tone and mood, write the scene in first person, present tense.

### *Fiction Prompts:*

#### **(Primary)**

Write a spooky story about your favorite (or least favorite) animal. It can be a live animal... or maybe a stuffed friend!

Write a story about a strange building or structure near where you live. It can be a house, a warehouse, or maybe even a sad-looking bridge. What happens there?

#### **(Secondary)**

You are driving alone on a country road when you get a flat tire. Without good cell reception, what do you do? How does this scene play out?

You stumble across a social media site that has been created to "memorialize" your untimely death... tomorrow. What happens next?

This would also be a good time to conduct a read aloud of spooky stories.

# Solar Ovens – The World Sustainability Connection



There are lots of ways to make a solar oven. Some solar ovens do not work like a greenhouse, but instead have so many reflectors that much more sunlight is directed at the food.

The shiny panels reflect the sunlight toward the cooking pot in the center.

Some of these cook food and boil water just like a gas or electric oven. Several solar cookers at work boiling water to make it safe to drink. Solar ovens are a big help in places like western Africa, where drinking water is not safe and fire wood is scarce. But boiling is just what is needed to kill disease-causing bacteria and parasites, which are very common in their drinking water.



Family gathers around a solar cooker to see how dinner is coming along.

Some projects are underway to bring solar ovens to the villages. With the hot climate and plentiful sunshine in Africa, the solar ovens can boil a big pot of water and make it safe to drink. And it will also cook their dinner and save a few trees in the process.



Woman shows people how to use solar cooker.

Story and S'mores recipe from:

<http://climatekids.nasa.gov/smares>

## SOLAR COOKER PROJECT

**The Solar Cooker Project** protects Darfuri refugee women and girls in eastern Chad by decreasing the need for dangerous firewood-collection trips outside the refugee camps, thereby reducing their exposure to rape by over 85%. The environmentally-sound Solar Cooker Project also gives young girls more time to attend school while empowering women with entrepreneurial manufacturing and training opportunities. Learn more and make connections for your class to a world project in sustainability at

<http://www.jewishworldwatch.org/projects/ontheground/sudan/solar-cooker-project>