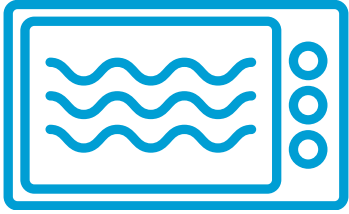


## ACTIVITY 5: BUILD A SOLAR OVEN TO MAKE S'MORES



The purpose of this activity is for students to design a device that can utilize the energy from sunlight to warm or cook food.

### Materials:

- Pizza box (standard size)
- Aluminum foil
- Plastic wrap (clear)
- Black construction paper
- Tape (preferably duct tape or strong adhesive tape)
- Scissors or a craft knife
- Kebab skewers
- Thermometer or temperature probe (to measure temperature inside the oven)
- Food items for cooking (e.g., s'mores ingredients)

First, pose a challenge to students to consider and discuss with a partner: can you cook a s'more without using fire or electricity? After eliciting some responses and engaging in a brief discussion, inform students that they will be engineering a device that can utilize sunlight to cook s'mores.

They will partner up with 1-2 other students to build their device. Provide the materials for them to do this activity in class, and give them time to explore what materials are available and brainstorm a design.

Next, give students time to research and develop a design plan for their solar oven. You might show a video clip for inspiration, like [this one from Science-U on PBS LearningMedia](#).

Then, give students time to build their solar ovens. You can challenge them to come up with a design that will cook the s'mores fastest or achieve the highest internal oven temperature. Monitor their progress and supervise students to provide support as they engineer their designs.

### Optionally, guide students through the design process or provide procedural steps:

- Line the inside bottom of the pizza box with aluminum foil to reflect sunlight onto the food.
- Attach the black construction paper to the bottom of the box to absorb heat.
- Cut an opening in the top of the box lid and create a clear plastic lid using plastic wrap or a clear plastic sheet to cover the opening of the box.
- Use tape to secure all materials and ensure a tight seal to retain heat.
- Place a thermometer inside the oven to monitor temperature changes.

Last, allow students to get feedback on their designs from classmates and make any adjustments they want. Encourage students to think about the angle at which they prop open their ovens to maximize reflectance of the light. You could use a light source to test the temperature inside the solar ovens using a temperature probe or regular thermometer as an additional way for them to optimize their design.

Look ahead on the weather forecast for a day that will be warm and sunny to test the solar ovens in class by taking them outdoors with the ingredients to make s'mores and cooking together as a group. Alternatively, if class time does not permit you to do the cooking, you can have students demonstrate their solar ovens cooking the s'mores outside of class by recording a video of their experiment. Make sure that they take the internal oven temperature periodically during cooking and graph the temperature over time to show how well their ovens worked.

### Discussion:

Facilitate a discussion to get students to understand how their design harnessed sunlight to cook their s'mores. Ask what design changes they would make if they did this again.

**\*Teaching Tip:** Create a working solar oven of your own ahead of time to have a model to demonstrate.