



Solar-Powered Cooker

Estimated Time: 45 minutes to an hour

SUMMARY

Our sun is a source of electromagnetic, radiant energy. This energy can be harnessed for many applications from photosynthesis to electricity to solar heating. In this activity, students learn about solar energy and design a cylindrical solar cooker to be tested, evaluated, and improved.

WHAT YOU'LL LEARN

- About solar energy and its many applications
- The law of conservation of energy (energy flows and cannot be created or destroyed, but rather it changes forms)
- The properties of renewable energy sources, including from the sun
- Designing, testing, and improving an experimental prototype

<p>Materials Used</p> <ul style="list-style-type: none"> ● 1 cylindrical can (such as a Pringles can) ● Hammer & nail (to create hole in can) ● Scissors or utility knife ● At least 1 wooden skewer (12-14 in long) ● Plastic wrap ● Tape (useful to secure plastic wrap) ● Food of choice to cook on skewer (i.e.: hot dogs, favorite kebab recipe) ● Timers ● Thermometer (digital preferred) 	<p>Optional Materials: for redesigning cooker</p> <ul style="list-style-type: none"> ● Transparency film or sheet protectors ● Duct tape ● Spray glue ● Cardboard ● Black poster paper ● White poster paper ● Aluminum foil
<p>Resources Used</p> <ul style="list-style-type: none"> ● "Let the Sunshine In! Solar-Powered Cookers by iBIO Institute EDUCATE Center (adapted from: https://www.pcc.edu/about/events/sustainability-training/documents/solar-cooker.pdf)" 	

WHAT TO DO

1. With assistance from an adult, cut the Pringles can as shown in Diagram 1 on the next page. Bend back the flaps, but do not remove them from the can. Cover the opening from the inside of the Pringles can with plastic wrap and tape the plastic wrap in place.
2. Again, with adult help, make small holes in the metal end of the can and in the plastic lid. Remove the plastic lid from the can.

3. Skewer the food, slide the skewer into the can, and place the end of the skewer into the hole in the metal end. Put the plastic lid back onto the can, fitting the other end of the skewer through the hole. The hot dog should be suspended inside the can as in Diagram 2 on the next page.
4. Take and record the temperature inside the cooker before beginning cooking. Place the solar cooker in direct sunlight, positioning the flaps to reflect the maximum amount of radiant energy onto the hot dog.
5. Record the amount of time required to cook the hot dog. Take and record the temperature again at the end of your cooking time.

Optional Part II: for Improving the Solar Cooker

1. Discuss ways that you could improve your design and record design changes including the reasoning behind each.
2. Build the revised solar cooker, and test it as you did previously. Record your data in a journal.

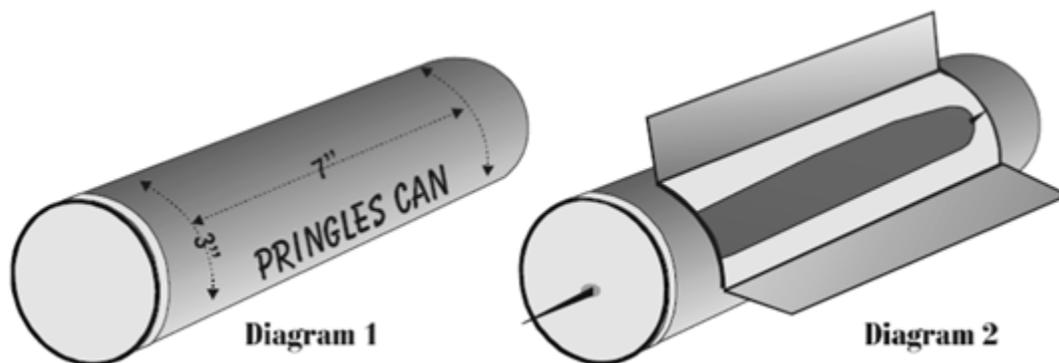


Photo courtesy iBIO Institute EDUCATE Center.

TIPS

- This activity is very customizable to the age range and interest level of the student. It could be a largely independent experimental and product design or it could be more of an activity to learn about various forms of energy. Use the steps of the activity as you see fit.
- Use caution when choosing foods to cook, given that temperatures and cooking methods are not consistent with traditional stovetop methods. Always ensure the internal temperatures of food are at safe consumption levels. See the following link for more information: <https://www.foodsafety.gov/food-safety-charts/safe-minimum-cooking-temperature>