

THE SCIENCE BEHIND SOLAR OVENS

Name: _____ Date: _____

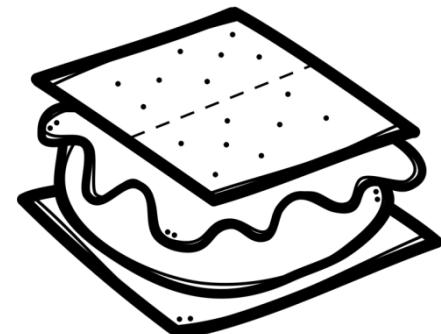
The oven in your kitchen runs on gas or electricity. Even if a home (and its appliances) uses solar panels, the energy that those panels gather from the sun is converted to electricity. However, a solar oven skips that kind of conversion. Rather than changing solar energy to electricity, a solar oven collects light particles and turns them into heat.

This might come as a surprise. On its own, sunlight isn't hot. Sunlight is simply energy that travels in waves. The warm feeling of sunlight on your face is not delivered by these waves of light particles. No, the heat is actually generated by the interaction between the light waves and your skin. Light particles, called photons, mingle with the molecules in your skin. That interaction is how heat is developed.

This same heat-producing interaction is what happens in a solar oven. The oven is built with materials that do two things. First, the materials create an interaction with the sun. This interaction creates the heat. Second, the materials collect and trap the heat in the oven. The basic concept of a solar oven is pretty simple. They are specially designed to absorb more energy than they release.

The most basic solar ovens display these concepts perfectly. They're usually boxes that are topped with plastic or glass. This covering lets the light particles into the box. It generates heat without letting the heat escape. The inside of the box is usually lined with dark-colored material that absorbs heat. (That's why people avoid wearing dark t-shirts on a hot day.) The box is designed to generate heat, trap it, and cook whatever's inside. That's how a solar oven works.

1. In order for a solar oven to work, what must the materials chosen to create it do?



2. Explain the specific purpose of each material.

Material	Purpose
Plastic covering	
Dark-colored material to line the inside of the box	

THE SCIENCE BEHIND SOLAR OVENS

Name: Answer Key Date: _____

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1. In order for a solar oven to work, what must the materials chosen to create it do?

The materials must create an interaction with the sun to create heat. Then they must collect and trap the heat in the oven.

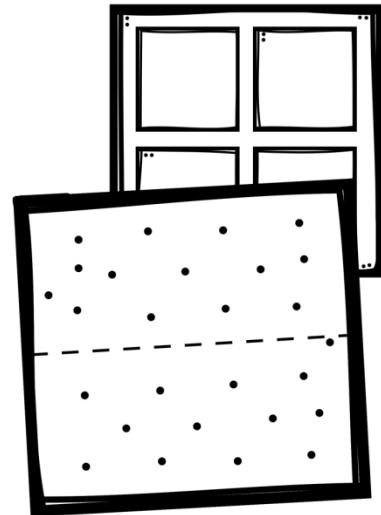
2. Explain the specific purpose of each material.

Material	Purpose
Plastic covering	to allow light particles into the box
Dark-colored material to line the inside of the box	to absorb heat

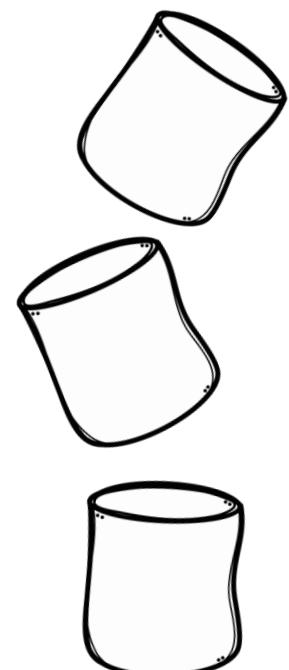
SOLAR OVEN PREDICTIONS

Name: _____ Date: _____

1. Make a list of materials that you think we could use to make our solar ovens. Explain why you chose each material.



2. What treat do you want to make in the solar oven? Make a prediction about how long it will take for the solar oven to cook the treat.



SOLAR OVENS

• Name: _____ Date: _____

Make a list of the materials you will use to create your solar oven. Then write the purpose for each material in the table.

Material	Purpose

SOLAR OVEN OBSERVATIONS

Name: _____ Date: _____

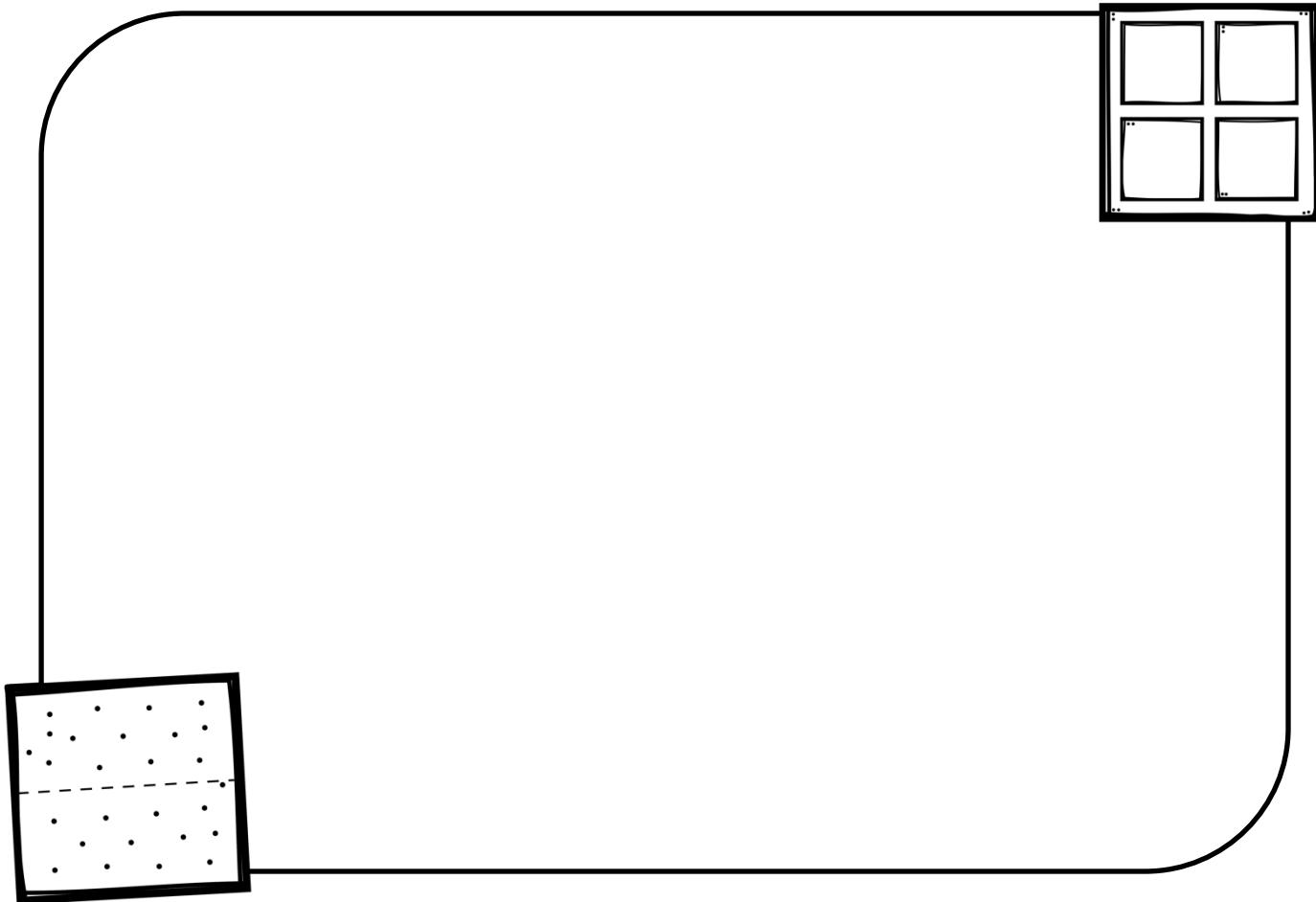
Use the table below to record the temperature and what you observe while your solar oven is heating up your treat.

Time	Temperature	Observation

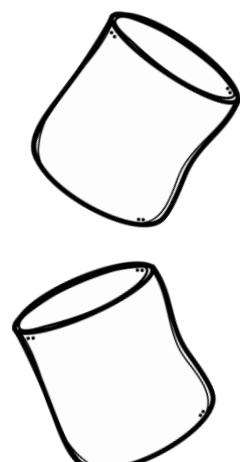
SOLAR OVEN

Name: _____ Date: _____

1. In the space below, make a sketch of your completed solar oven. Label the different materials and the purpose of each.



2. What could you have done differently to create a more efficient solar oven? Explain how this change would have made your solar oven more efficient.



How to Create a Solar Oven

Solar Oven Materials

- Marker or pencil
- Ruler
- Box cutter
- Tape
- Black construction paper
- Cardboard pizza box
- Thermometer
- Aluminum foil
- Plastic wrap
- Oven mitt
- Dish

To make s'mores

- Chocolate bars
- Marshmallows
- Graham crackers

To make nachos

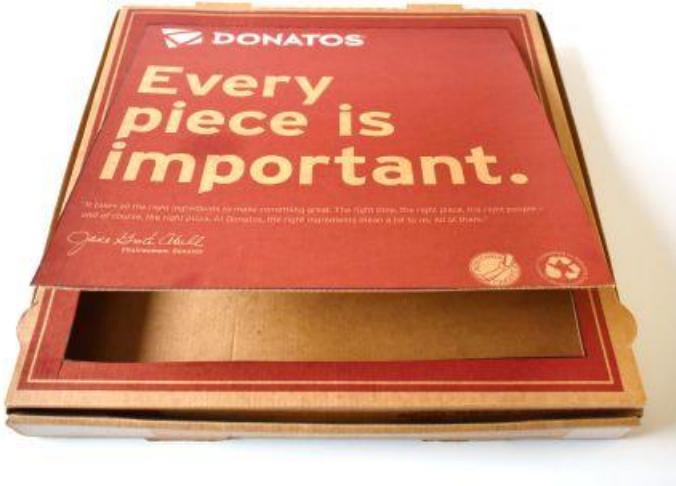
- Tortilla chips
- Shredded cheese
- Taco seasoning

Solar Oven Directions

1. Start with a clean cardboard pizza box.



2. Using a marker or pencil and a ruler, draw a square one-inch in from the edges on the top of the pizza box.



3. Using a box cutter cut out three of the four lines to make a flap. Do not cut the line at the top of the pizza box.



4. Cover the inside of the flap with aluminum foil and tape it down securely.



5. Line the inside edges of the bottom of the pizza box with strips of aluminum foil.



6. Line the bottom of the bottom of the pizza box with black paper.



7. Now you'll need to cover the opening with plastic wrap. Securely tape one piece of plastic wrap to the top of the hole and one piece underneath the hole. You want to create an airtight window.



8. Place an aluminum pie pan or a plate covered with aluminum foil inside your new solar oven.

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