

## Materials

- 1 Solar Oven, plus a carpenter's square
- 1—2 medium winter squash (butternut or acorn squash are best)
- 1 large work table,
- (2) 9X13-inch glass baking dishes, water
- Cutting board, sharp knife, a ruler, measuring cups and spoons, aluminum foil, oven mits, large serving spoon, serving bowls and plastic silverware, napkins
- Salt and pepper (optional seasonings: olive oil and balsamic vinegar OR butter and brown sugar)

## Preparation

- Assure that weather conditions are right for solar cooking. A bright, sunny day is ideal, but solar ovens also function on partly cloudy days. Your food will cook more slowly under these conditions, so allot extra time. During the winter months, the best time to cook is between 10 AM and 2PM.
- Place the solar cooker in a sunny garden location, but wait until the lesson to position it correctly.

## PROCEDURE

### Step 1: Position the Solar Oven

- Gather students in the outdoor classroom and introduce the activity. Lead them to the solar oven.
- “A solar oven cooks food using only the power of the sun. The sun’s rays are concentrated with reflectors and collected in a well-insulated box. Depending on weather conditions, temperatures can reach 175—400 degrees Fahrenheit.”
- “When cooking during the winter months, it’s important to keep the sun at a 90-degree angle relative to the glass of your solar oven so that the oven gets hot enough to thoroughly cook the food”.
- Demonstrate how to use a carpenter’s square to correctly position the solar oven. Place the carpenter’s square on the glass and tilt the solar oven towards to sun until the square’s shadow disappears.
- Your oven is now positioned correctly. Return to the outdoor classroom to begin kitchen preparation.

### Step 2: Prepare the Winter Squash

- Introduce students to the kitchen materials.
- Demonstrate how to cut the stem off the top and slice the squash in half lengthwise.
- Have a student use a large spoon to remove the seeds. Place squash, skin side down, in baking dish.
- Select a student to fill one baking dish with  $\frac{1}{4}$  inch of water. Measure the correct amount with a ruler.
- If there is enough room in the solar oven, prepare an additional dish of cut squash and  $\frac{1}{4}$ -inch of water.
- Select another student to tightly cover baking dish(es) with aluminum foil.

### Step 3: Bake Winter Squash in Solar Oven

- Place the covered glass baking dish(es) in the solar oven. Note the time that cooking started.
- Cooking times will vary depending on the weather conditions. On a sunny day, squash will cook more quickly, in about 2—3 hours. On a cloudy, it may take up to 6 hours for squash to cook completely. If necessary, rotate the solar oven every hour in order to keep it directly in line with the sun.
- Periodically poke a fork into the thickest part of the squash. Squash is ready to eat when the inside is soft.
- Use oven mits to remove squash from solar oven. Remove the meat of the squash from the skin with a spoon or fork. Season to taste with salt and pepper, or thoughtfully combine any of the additional ingredients to create a unique flavor. Serve and enjoy!

# Baking in a Solar Oven: Winter Squash

## Patterns & Preparation

### ENGAGE

Early human's discovery of fire allowed for a radical transformation of the human diet, expanding the possibilities of what humans could eat. Once cooked, previously indigestible foodstuffs such as tubers and grains became a valuable source of energy for human populations. Over the course of history, humans developed a variety of methods to cook their food. *How many different methods can you think of? Make a list.*

Although there are many methods, the outcome is the same: heat transforms food, changing its taste, texture, and appearance as well as making it easier to digest.

### Objectives

- Students will understand how raising the temperature of starchy foods affects their sweetness by turning starches into sugars
- Student will understand the nutritional and environmental benefits of cooking with a solar oven

### EXPLAIN

#### What are starchy foods? How does raising the temperature affect their sweetness?

Starch is an abundant carbohydrate commonly found in seeds, potatoes, corn, wheat, and rice. Starchy foods are an important part of the human diet because they supply us with sustained energy over a long period of time. Foods such as corn, wheat, rice, and potatoes are dietary staples for much of the world's population. These staples are loaded with carbohydrates that supply people with the long-term energy they need in order to survive.

Unfortunately, humans are unable to digest these starchy foods in their raw state. Therefore, starchy foods need to be cooked before eating in order to increase their digestibility. Cooking also improves the flavor of starchy foods, making them sweeter and more pleasing to the palate. For example, winter squash would taste relatively bland in its raw state. When heated, however, the starch present in winter squash begins to break down into simpler sugars. The cooking process transforms bland squash into a sweet and succulent delight.

#### What are the nutritional and environmental benefits of cooking with a solar oven?

A solar oven uses the energy from the sun to cook food. This is a very environmentally friendly method of cooking food that doesn't rely on external energy inputs such as gas or electricity. Solar ovens cook food over a longer period of time. Cooking food for a longer amount of time at a lower temperature helps to conserve moisture and minimize nutrient loss. The end result: delicious, healthy, and environmental friendly food, compliments of the sun.

### ADDITIONAL CONTENT INTEGRATION *(see previous page)*

Explain how solar oven cooking conserves moisture and prevents nutrient loss by cooking foods at a lower temperature for a longer amount of time. During the tasting, explain how starches are transformed into sugars. Compare/contrast cooked and uncooked pieces of squash. What are the taste and texture differences between the two?

#### Additional Materials

- 1 uncooked winter squash, cut into bite-size pieces

### EVALUATE

**Journal prompt:** What ingredients did you use to season your winter squash?