STEAM Math Lesson: Solar Ovens - Grades 6-8

Get students exploring solar energy through this hands-on and tasty experiment! This lesson is designed for grades 6-8, but can be adapted for younger grade levels, too.

✅ **Teacher Led**	✅ **Requires Computer OR Mobile Device**	✅ **Requires Spaces**

Spaces Prep	**Create your Activity in Spaces before the lesson. Not sure how to create an Activity? Check out this short video tutorial on assigning and managing activities.**

Learning Goals

1. Students will **build** a solar oven using provided materials and instructions.
2. Students will **experiment** with using solar energy to conduct heat.
3. Students will **reflect** on how solar energy is harnessed and used.

Materials

Student Handouts	• **Handout [A] - Solar Oven Procedure** for each group (page 5) • **Handout [B] - Solar Oven Reflection** for each student or group (page 6)
Technology Requirements	• Mobile device, tablet, or laptop • Projector or Smartboard
Video/Audio Clips	• Solar Power video from PBS • Build a Pizza Box Solar Oven from Science Buddies
Additional Materials	• Chart paper and marker or whiteboard and dry erase marker • Pizza box (1 per group) • Aluminum foil • Plastic wrap • Black paper • Pencils or pens • Rulers • Glue • Tape • Box cutter or knife • Wooden skewers or extra pencils • Aluminum pie plate (1 per group) • Newspaper or scrap paper (optional) • Disposable gloves (for handling food) • Cooking ingredients: cookie dough or s'more ingredients (graham crackers, chocolate bars, and marshmallows) are easily available and delicious! • Outdoor space

Instructions

Before the lesson

1. Ask students what they know about solar energy.
    a. Have "solar energy" written on chart paper or whiteboard.
    b. As students share what they know about solar energy, jot ideas down in web notes around the main topic.

2. Once a few students have shared their understanding about solar energy, show the video Solar Power.
    a. After watching the video, ask for students to add on to their initial notes about solar energy, jotting down additional ideas on the chart paper or whiteboard.

During the lesson

1. Now that students have an understanding of solar energy, explain that today they will practice harnessing solar energy by building a solar oven and using solar energy to cook food over the course of the day.

2. Show the video Build a Pizza Box Solar Oven so that students understand the assignment and get a sense of the procedure.

3. Put students in groups of 3-4 and distribute materials for each group, including **Handout A - Solar Oven Procedure** (page 5).

4. Give students time to build their solar oven, encouraging teamwork and cooperation.

5. Once groups are finished building their oven, hand out gloves and ingredients for cooking.

6. Now that the solar ovens and ingredients are ready to go, ask students where they think they should put their solar oven for optimal performance.
    a. You can also use this time to discuss that the solar ovens may need to be moved over the course of the day to “follow” the sun.
    b. If time allows, you can go on a walk around your outdoor space to find an optimal sunny spot.

After the lesson

1. For best results, allow food to cook for several hours before retrieving and eating.

2. In the following class, have students fill out **Handout B - Solar Oven Reflection** (page 6) individually or with their group.

3. If time allows, engage students in a discussion about what else solar energy could be harnessed and used for.

Handout

HANDOUT [A]: Solar Oven Procedure

Names _____

Materials:

- Pizza box
- Aluminum foil
- Plastic wrap
- Black paper
- Pencils or pens
- Rulers
- Glue
- Tape
- Box cutter or knife
- Wooden skewers or extra pencils
- Aluminum pie plate (optional)
- Newspaper or scrap paper (optional)

Procedure:

1. Draw a square on top of the pizza box that leaves about one inch of space from the edge.
2. Use your box cutter or knife to cut three sides of the square outline, NOT cutting the side closest to the hinge of the box.
3. Lift the new lid you created and fasten a piece of aluminum foil to the inside of the lid with glue.
4. Now, cover the cut-out on the top with plastic wrap and tape it securely.
5. Next, glue aluminum foil to the bottom of the box.
6. Glue or tape black paper on top of the aluminum foil on the bottom of the box.
7. Optional step: stuff crumpled up newspaper or scrap paper into the sides of the pizza box.
8. Put your ingredients on an aluminum pie plate or on another piece of aluminum foil and place on top of the black paper.
9. Close the cut-out lid so that the plastic wrap is over the ingredients.
10. Prop the upper lid open with a wooden skewer or extra pencil and secure with tape.
11. Find a sunny spot to put your solar oven and leave for several hours to allow your ingredients to cook.

Worksheet

HANDOUT [B]: Solar Oven Reflection

Name(s) _____

Answer the following questions to reflect on your learning about solar energy.

1. What are 2-3 pros and cons of solar energy?

Pros	
Cons	

2. Explain the purpose of the following materials used for the solar oven, using your understanding of solar energy.

Material	Purpose
Aluminum Foil	
Plastic Wrap	
Black Paper	
Newspaper or scrap paper (optional, but what would its purpose be if used?)	