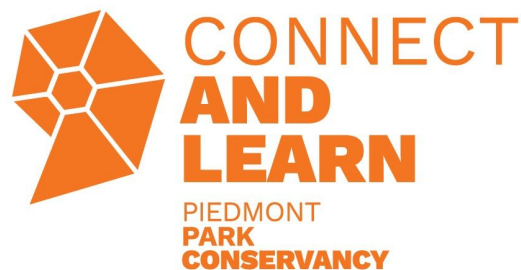


Sun Baking

Reuse household materials to create your own oven, powered by the sun!



Key Terms

Molecules- fundamental units of a chemical compound, can break apart during a chemical reaction

Heat- the energy that makes molecules move; molecules with more heat energy move fast, while molecules with less heat energy move slow

Convection- heat transfer through fluids (including both liquids and gases) achieved through currents in which heated fluid moves upward and cooler liquid moves downward. Think of boiling water in a pot: as the water heats it moves upward and you begin to see bubbles as water turns into water vapor, and steam rises from the pot

Conduction- heat transfer through direct contact of objects, like when you touch a hot mug and your hand becomes hot

Radiation- heat transfer through waves (no molecules involved), such as heat coming from the sun, or off a campfire

Absorption- taking in or soaking up of a substance, in this case taking in or soaking up heat energy by molecules

Reflection- change in the direction of a light wave that is caused by a collision with a reflective surface, usually something smooth and shiny, like a mirror or metal

Insulation- to prevent transfer of energy such as heat or electricity

Materials

An old pizza box (reuse one from take-out!)

Tin foil

Plastic wrap

Black construction paper, 2-3 sheets

Newspaper

Tape

Scissor

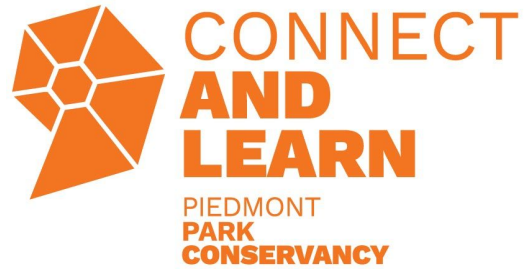
Ruler

Pencil

Procedure

1. Measure out a square in the center of your pizza box lid. Depending on the size of your box, your square may be a different size, but ideally it will be at least 6 inches by 6 inches. Trace the lines of the square with your pencil.
2. Using your scissors (and adult supervision), cut along 3 sides of the square that you drew: the bottom, left, and right sides. Be sure to leave the top side intact. You should be able to lift the square like a flap or door, and it should stand up when the box is closed.

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3. Open your pizza box, and from the inside cover your cut out square with plastic wrap and tape it into place. Make sure there is enough plastic to cover the whole square. You may have to use two layers.
4. Close your pizza box and cover the inside facing side of the square flap with tin foil. You can easily wrap the tin foil around the edges of the square to secure into place. The tin foil should be covering the entire bottom portion of the flap, facing the inside of the box when the flap is closed.
5. Line the inside of your pizza box with the black construction paper.
6. Roll your newspaper up and nestle it into all four sides of the pizza box. It will almost form a square of newspaper rolls around the edge.
7. Your oven is complete! Test out your new appliance: what will you make? Some easy options include:
 - a. Smores
 - b. A pizza
 - c. Toast
8. When you're ready to get cooking, place your solar oven in direct sunlight.
9. Insert your food, placing it on the black construction paper inside the oven and close the lid.
10. Lift the square flap and prop it open, so the tinfoil is exposed.
 - a. You may need to prop up your flap with your ruler, pencil, or a stick.
11. Wait and watch as your solar oven cooks your food! Keep in mind that your solar oven will take longer and may not cook your food as well as a regular oven.

Guiding Questions

1. Which type or types of heat transfer are we taking advantage of to cook our food in our solar oven? How do you know?
2. Some of our materials are performing very specific tasks: absorption, reflection, and insulation, can you match the materials to their job?
 - a. Absorption = _____
 - b. Reflection = _____
 - c. Insulation = _____
3. When do you think is the best time of day to test your solar oven? Early morning when the sun is rising, afternoon, or early evening when the sun is setting? Why?