



Solar Oven S'mores

Winter is coming, but that doesn't necessarily mean it is cold enough to have a fire. Discover a new way to roast your own marshmallow using energy from the Sun! Create a tasty treat as you explore alternative energy resources.

TEKS:

SCI 4.7C: The student is expected to identify and classify Earth's renewable resources, including air, plants, water, and animals; and nonrenewable resources, including coal, oil, and natural gas; and the importance of conservation.

SCI 4.8B: The student is expected to explain the role of the Sun as a major source of energy.

SCI 5.7C: The student is expected to identify alternative energy resources such as wind, solar, hydroelectric, geothermal, and biofuels.

SCI 8.10A: The student is expected to recognize that the Sun provides the energy that drives convection within the atmosphere.

Materials:

- Aluminum foil (enough to cover the bottom and lid of the box)
- Black construction paper (enough to cover the walls of the box)
- Cardboard box with lid (gift box, pizza box, etc.)
- Chocolate
- Glue stick
- Graham crackers
- Large marshmallow
- Saran wrap (enough to cover the top opening of the box)
- Scissors
- Wooden dowel

How To:

1. After you have chosen your cardboard box, cover the entire bottom face inside of the box with aluminum foil. Be sure to glue the foil as flat as possible, smooth out any wrinkles, and ensure the shiny side is facing up.

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2. Line the inside lid of the top of the box with aluminum foil, making sure the shiny side now faces down into the box. If using a pizza (or similar) box, you can cut the lid to create a flap to make it easier to place foil. (see photo below)
3. Measure, cut, and glue the black construction paper to fit along the four walls inside the box.
4. Build your s'more(s) with your favorite ingredients and place the sandwich(es) into the oven. Make sure the sandwich(es) is still open with the marshmallow on top.
5. Cover and tape saran wrap over the opening of the box when the lid is open, creating an airtight window for sunlight to enter the box.
6. Now your oven is ready to try out! Take your box outside and place it in direct sunlight.
7. Adjust the angle of box's lid until the most sunlight possible is reflecting off the aluminum foil and into the plastic covered window. Use a wooden dowel to keep the lid propped open at this angle.
8. Let the oven remain in the sun to cook the marshmallow(s). Once your marshmallow(s) is melted, pull back the saran wrap/lid, place the second graham cracker on top of the sandwich(es), and enjoy your s'more(s)!



<https://www.teacherspayteachers.com/Product/Science-Experiment-Solar-Smores-and-Solar-Energy-1098357>

STEM Explanation:

Solar energy, or energy from the Sun, is a renewable resource that can replenish itself naturally over time. The solar oven captures solar energy from the Sun and cooks our marshmallow for some yummy s'mores. How are we able to turn these simple materials into something as useful as an oven? First, the foil on the lid reflects sunlight into the box and the bottom foil reflects the sunlight back up. This series of reflections amplifies the light energy and heat present in the box. The black construction paper absorbs the heat energy to keep the box warm inside. The saran wrap allows the light energy to travel through it because it is transparent, but heat energy cannot pass through it; therefore, heat gets trapped in the box by the saran wrap. These materials' physical properties work together to create an oven and cook your marshmallow with the Sun's energy. Enjoy your sweet treat!

Career Connection:

Civil engineers design and supervise the construction of solar power plants. They also oversee design and construction of other necessary structures, including: roads, support structures, foundations, canals, dams, buildings, bridges, and plumbing systems.

Resources:

<https://ww2.kqed.org/guest/2014/11/14/how-solar-power-works/>

<https://www.teacherspayteachers.com/Product/Science-Experiment-Solar-Smores-and-Solar-Energy-1098357>

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