

● ○ ○ EASY



5 – 10 YRS



2 – 3 HRS



1

Investigate which surfaces are best at absorbing solar energy

2

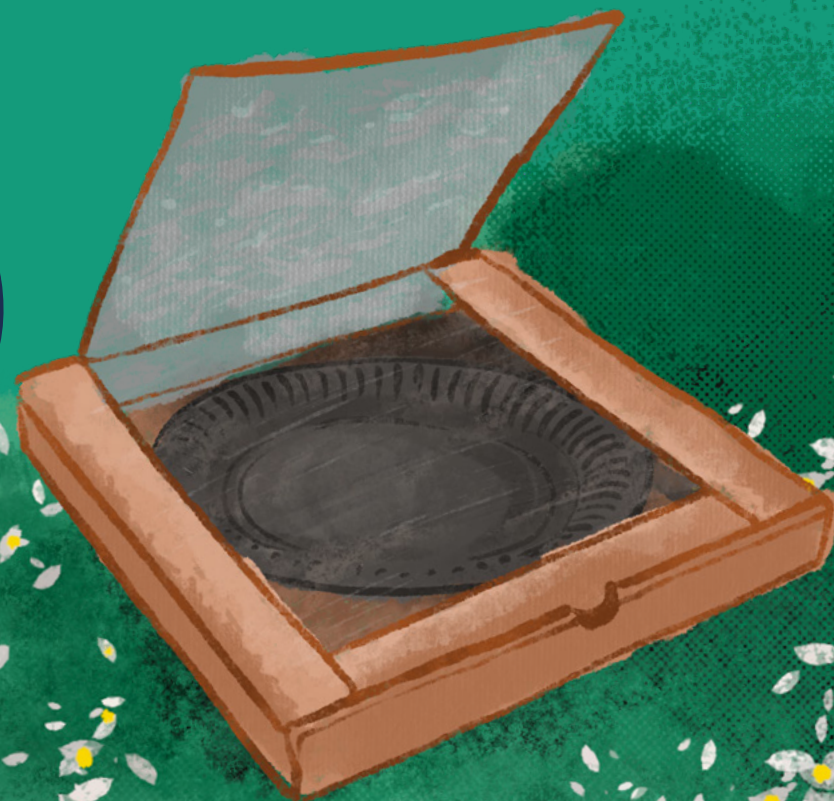
Make and test your own solar oven

3

Find out how solar ovens work

INNOVATION IN CHEMISTRY

SUMMER SOLAR COOKING CHALLENGE



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INTRODUCTION

Using ovens to cook food, to make bricks or pottery, uses a lot of energy.

The energy for ovens usually comes from burning 'fossil fuels' such as coal or gas. Supplies of fossil fuels will run out soon. Burning fossil fuels such as: peat, coal, oil, and gas release carbon dioxide gas which contributes to global warming and climate change.

Solar energy is energy that comes from sunlight and can be used in solar ovens to heat things up. Solar energy is a renewable energy. Renewable energy comes from sources that cannot be used up such as sunlight, wind and waves.



SAFETY

- **Never** look directly at the sun.
- Check the food packaging for allergens.
- Ask an adult for help when handling scissors and handling hot items from your solar oven.
- Material can get hot to touch when left in the sun.
- The marshmallow is only for the experiment. Do not consume.
- This activity should be supervised at all times.



DID YOU KNOW?

At the rate of present production, it is estimated that the earth's supply of gas is predicted to run out by 2069. Oil is predicted to run out by 2077, whilst coal is predicted to run out by the year 2159!

It takes millions of years for these natural resources to form so using renewable energy will be essential in the future.

Reference: ourworldindata.org/fossil-fuels

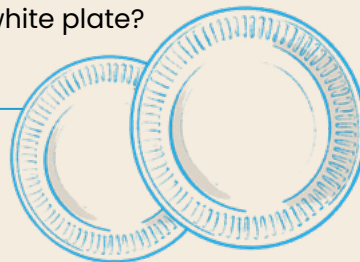
ACTIVITIES

The best time to use a solar oven is between 12pm – 2pm when the sun is at its strongest.

ACTIVITY 1: HOW CAN WE CAPTURE SOLAR ENERGY?

INSTRUCTIONS

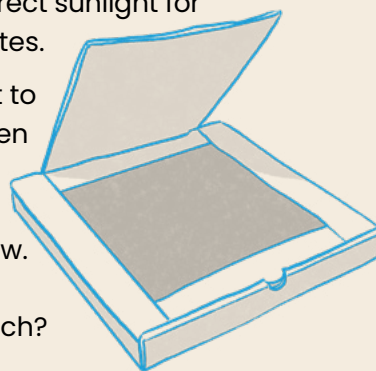
1. Take one of the paper plates, paint it black and allow it to dry.
2. Leave the black & white paper plates next to each other in a sunny place.
3. After twenty minutes, feel each of the paper plates with your hand. Which feels hotter, the black plate or the white plate?



ACTIVITY 2: MAKE A SOLAR OVEN

INSTRUCTIONS

1. Line the inside of the pizza box with kitchen foil. Secure the foil using sellotape.
2. Ask an adult to help cut out three sides of a 15cm x 15cm square to make a flap in the middle of the lid of the box. Lift up the flap and tape it at a right angle to the lid, making an L-shape.
3. Cover the flap on the lid with kitchen foil and secure with tape.
4. Stretch a piece of cling film over the inside of the 15 x 15cm square and tape securely, so that the hole becomes a window.
5. Place the black paper plate from activity 1 inside the box and put a marshmallow on the plate. Close the lid and adjust the angle of the flap so that light is reflected in through the window of the box onto the marshmallow. Put the solar oven outside in direct sunlight for 40–60 minutes.
6. Ask an adult to help you open the box and check the marshmallow. Does it feel warm to touch?



YOU WILL NEED

For Activity 1:

- 2 white paper plates
- Paintbrush
- Black paint
- Access to a sunny place

For Activity 2:

- Clean empty pizza box or shoe box
- Kitchen foil
- Cling film
- Sellotape
- Scissors
- 1 marshmallow



WHAT'S HAPPENING?

The sun gives off energy which surfaces can either absorb or reflect. White surfaces reflect the sun's rays, so they feel cool on a sunny day. Dark surfaces absorb more of the sunlight energy falling on them and will feel warmer to the touch when placed in the sun.

Solar ovens are lined with shiny materials (like kitchen foil) which reflect the sun's energy towards the centre of the oven. The reflected solar energy is absorbed by the food at the centre of the oven. Solar ovens have a clear lid to trap the heat inside the oven and keep it hot.

Using a solar oven to heat food instead of burning fossil fuels means no carbon dioxide is released. Carbon dioxide is a greenhouse gas. Solar energy from the sun hits the earth and some is absorbed by the land and sea. Shiny surfaces such as snow and ice reflect solar energy away from the earth and the energy escapes into space. Some of the reflected solar energy is absorbed by greenhouse gasses like carbon dioxide in the atmosphere, and this causes the temperature of the planet to increase, causing climate change.