



MAY | NATIONAL ENERGY MONTH

Download the FREE Grade 9 worksheet
on how to make solar ovens.



Section B
Senior Phase
Grade 9

Sunstruck!

Name:..... Date:.....

In English, the word ‘solar’ means ‘something that comes from the sun’. A solar-powered car is a car that is fitted with panels that capture the sun’s light and turns it into power for the car. Solar panels are also used to provide power (electricity) in homes and to electronic equipment such as computers and cell phones.

The Sasol Solar Challenge is a competition, held every two years, in which participating teams design, manage, build and drive solar-powered vehicles across South Africa. The eight-day event sees local and international cars travelling as far as they can on looped routes in towns between Pretoria and Cape Town. In 2016, some cars broke records by covering distances of over 4 500 km! Combined, the teams covered more than 25 000 km on the power of the sun.

The sun is our closest star in the solar system and the largest object in our solar system. The sun is at the perfect distance from the Earth and is able to provide heat and light. There is a lot of power packed in our sun that all living things on earth depend upon. The energy from the sun provides enough light to grow plants and warm the oceans. Plants use the sun’s energy in photosynthesis, cleaning our air and providing fresh oxygen.

Solar power is known as being “eco-friendly” since it doesn’t emit toxic (poisonous) gases into the environment. It represents a clean, green source of energy. Because solar power doesn’t release any greenhouse gasses, it does not pollute Mother Nature. It is a safe and environmentally-friendly way to generate electricity.

Solar energy is also renewable, meaning we can never run out of sunshine! By harnessing energy from natural renewable sources like the sun, dependence on more environmentally harmful sources such as oil and coal can be decreased.

Part 1
You are now going to create a solar-powered oven to demonstrate the power of solar energy.

- You will need:
- | | |
|------------------------|---|
| • Cardboard pizza box | • Newspapers or shredded paper |
| • Scissors | • Ruler |
| • Tin foil | • Glass dish or plate |
| • Sellotape | • Biscuits with filling or marshmallows |
| • Plastic wrap | • Oven gloves |
| • Black paper or paint | |

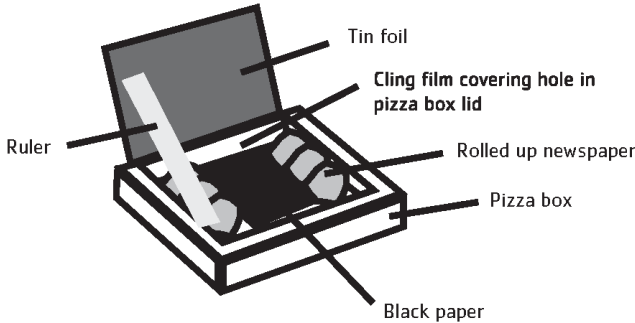


Section B
Senior Phase
Grade 9

- Procedure:**
- Use the scissors to cut a flap in the lid of the pizza box.
 - Cut along three sides, leaving around two centimetres between the sides of the flap and the edges of the lid.
 - Fold the flap back so it stands up when the box lid is closed.
 - Cover the inner side of the flap with tin foil.
 - Sellotape plastic wrap over the hole in the lid of the pizza box. This will create a clear, air tight seal.
 - Paint the bottom of the box black, or line it with black paper.
 - To insulate your oven so it keeps in heat, put shredded paper or rolled up sheets of newspaper around the sides of the pizza box.
 - Make sure you leave enough space for your food! You should still be able to close the box lid.
 - Set up your solar oven outside on a sunny day, between 11am–3pm. Make sure you choose a sunny spot.
 - Adjust the flap so that it reflects the most sunlight possible onto the cling film covered hole in the box lid. Use a ruler to prop open the flap at the right angle. This will pre-heat the solar oven and make sure the inside is hot when you put your food in.
 - After you have pre-heated the oven, put the food you want to cook on a clear glass dish or plate and put it inside your solar oven.
 - Wait for the biscuits or marshmallows to melt!
 - When the biscuits are done, open the lid of your solar oven and use oven gloves to lift the glass plate out of the oven.

<http://www.planetsmarty.com/2015/06/10-fun-solar-experiments-for-kids.html>

- Part 2**
Answer these questions:
- How long it did it take for the biscuits to melt?
 - How did covering up the plate help melt the biscuits?
 - Why did you line the plate with tin foil?
 - How does this activity demonstrate how the sun could be used to help us to do daily tasks?



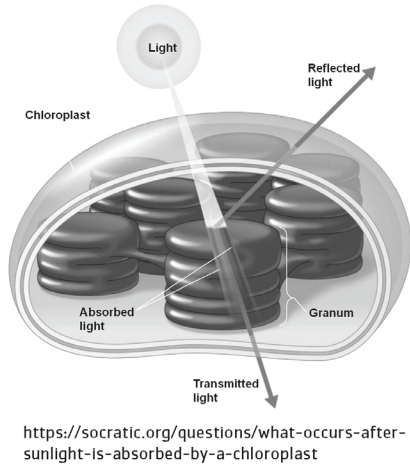
<http://www.planet-science.com/categories/experiments/outdoors/2011/07/build-a-solar-oven.aspx>



Section B
Senior Phase
Grade 9

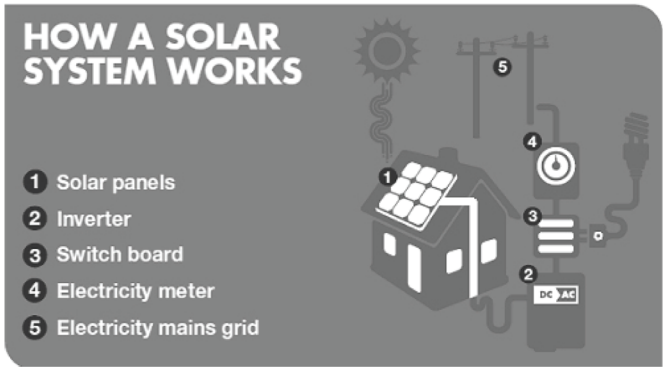
Part 3
Read the following to understand how solar energy works.

A solar cell is what converts sunlight into electricity. In plants, these solar cells are called chloroplasts. They collect sunlight and transform it into usable energy. When we use the sun to generate energy the solar cells are called photovoltaic or PV cells. Photovoltaic (meaning “light electricity”) cells convert the sun’s energy into electrical power. The cells are made up of materials (usually silicone) that can carry electrical current and help capture light. The sun’s rays are made up of tiny particles of light energy. When the sunlight hits a photovoltaic cell, it is either reflected, passes right through, or is absorbed (just like when a plants chloroplast cells absorb light). Only absorbed light provides energy that can be used for electricity.



Part 4
Now that you know how sunlight is converted into electricity, look at this picture, and read the explanation below, on how solar panels work:

- The sun shines on the solar panels, generating “DC” (Direct Current) electricity
- The electricity is fed into a solar inverter that converts into “AC” (Alternating Current) electricity
- The AC electricity is used to power appliances in your home
- Any power not required by your home goes via your home’s switchboard into the mains power grid for others to use



Section B
Senior Phase
Grade 9

Part 5
Answer these multiple-choice questions to show your understanding of solar energy.

- 5.1 Devices that convert sunlight directly into electricity are called...
- a. photosynthetic b. photovoltaic c. photo-converters
- 5.2 Sunlight is composed of which type of energy particle?
- a. photons b. electrons c. neutrinos
- 5.3 What material is used in solar panels that help absorb the sun’s energy?
- a. sulphur b. silicone c. carbon
- 5.4 Solar power is non-renewable
- a. true b. false

Part 6
Based on your group discussions, organise a class debate on the following topic:
Solar energy is the answer to future energy supplies.