

# SOLAR POWERED CAR

## Teachers Notes



### Overview

Subject: Science and Technology

Grade: Years 7 – 9

Topics: Conversion of energy (light energy to electricity)  
Relationship between speed, distance, and time  
Interaction between energy and materials

Curriculum: Physical Sciences

- Energy appears in different forms including movement (kinetic energy), heat, light, chemical energy and potential energy; devices can change energy from one form to another (VCSSU104)
- The description and explanation of the motion of objects involves the interaction of forces and the exchange of energy and can be described and predicted using the laws of physics (VCSSU133)

Science Inquiry Skills

- In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task (VCSIS109)
- Analyse patterns and trends in data, including describing relationships between variables, identifying inconsistencies in data and sources of uncertainty, and drawing conclusions that are consistent with evidence (VCSIS138)
- Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (VCSIS140)
- Identify questions, problems and claims that can be investigated scientifically and make predictions based on scientific knowledge (VCSIS107)

### Objectives

1. Construct a car propelled by solar power
2. Develop an understanding of energy conversion (light to electricity), energy loss, friction (different wheels on different surfaces), and use knowledge to improve performance of the model car
3. Create visual representations of data by constructing tables and graphs to analyse patterns and relationships

4. Summarise interactions between energy and materials based on data found

## Key Concepts

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**Energy.** The capacity for doing work. It can exist in potential, kinetic, thermal, electrical, chemical, nuclear, or other various forms. (Britannica)

**Kinetic energy.** The work needed to accelerate an object from rest to motion. An object that has any motion, either vertical or horizontal, has kinetic energy. (Physics Classroom)

**Friction.** A force that impairs or stops the sliding or rolling of one object over another. (Britannica) In this experiment, friction occurs between the wheels and the surface, and all moving parts, including the washers, straws, and skewers.

**Solar power.** Solar energy, radiation from the Sun capable of producing heat, causing chemical reactions, or generating electricity. (Britannica)

## Additional Resources

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<http://blog.theexpertta.com/solar-panels-physics-classroom>

<https://www.youtube.com/watch?v=v-1zjdUTu0o>

## Materials

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6mm Plywood (3mm can be used)  
Tamiya single gearbox  
Duratech solar panel  
4x plastic wheels  
Wire (red/black)  
On/off switch  
Skewer  
Straw

## Tools

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Glue – General purpose (Tarzan grip used)  
Screwdriver  
Saw  
Soldering iron

## Risk Management/Hazards

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Using the soldering iron is one of the major risks in this activity. The soldering iron is very hot and must be used with caution as well as being used in a well ventilated area. Correct techniques and safety should be enforced while using the soldering iron.

The drill and saw are two tools with potential danger if used inappropriately. Ensure to wear safety glasses while using these tools and keeps fingers a safe distance away from the blade and drill bit.

## Activity

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The activity follows the instructions/procedure given to students. This outlines step-by-step the process to undertake to successfully construct a model solar powered car. Once the car has been constructed ask students to assess what worked and what didn't, while also thinking about ways to improve the car or make alterations to enhance speed or distance travelled.

## Expected Results

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The car is expected to move at a steady pace while operating under solar power. The distance the car moves is dependent upon the sunlight available.

## Difficulties

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Obstacles that students may come across include soldering correctly. This is important as there needs to be a solid connection between the two contact points without any two points touching each other.

The gap between the straw and the wheels on the front axle may also provide a small difficulty. The gap here needs to be minimised but needs to still be big enough to allow for free rotation of the front axle.

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