

Solar Car

Conventions used in this document:

Blue: Questions from facilitator to children

Maroon: Children's anticipated response

Black: Comments, notes, and plan for the facilitator

Session flow

Sr. No.	Activity	Talking points	Time allotted
1	Introduction	<ul style="list-style-type: none"> We are going to build a solar car How do you think the solar car will work? 	15 mins
2	Group formation and worksheet distribution	Assuming you have already explained to them how to use the worksheet. If not please refer ' General instructions for the facilitator '.	15 mins
3	Ideation and Material gathering	Students will come up with the design of the project and list of the material required for the completion of the challenge. Here children should fill the worksheet till the material list.	15 mins
4	Project making	During this time, children will build the project.	150 mins
5	Worksheet completion	It will be difficult for children to complete the worksheet while making the project. So give them extra time to complete the worksheet once the project is completed.	15 mins
6	Final Discussion	Ask the children what they have observed. How do they think the car is moving?	15 mins

The above mentioned is the minimum time you need to give children. Feel free to change the time allotted as per the requirement of the class. This is typically a 4 hr project. You can extend it up to 5 or 6 hrs.



Introduction

Ask them to go through the instruction sheets first. They will read the following:

Challenge 1

Design a car that works on solar energy.

What do you understand from the instructions? Which project are we going to work on today?

Cars working on the sun's energy or solar energy.

What do you think you can use to make a car working on solar power?

Solar panels.

What do cars and other modes of transportation use now?

Petrol, diesel, and natural gas.

So today we will make a car that works on solar energy and no other fuel. Let us start working on the project.

How to help children when they are stuck using the Inquiry driven approach:

1. Making a chassis

They might find it difficult to attach the motor to the chassis (cardboard) since the motor is heavy. You can encourage them to try different things to make the motor stay on the chassis.

2. Speed of the motor

If you have more than one type of gear motor present in the space, there are chances that children will end up using both the motors with different RPM (Rotation Per Minute - It is the measure of how many rotations a shaft makes in one minute. More the RPM; faster the shaft rotates)

You can ask them to attach wheels to the motor and then the battery to each motor. They can then observe if the speed of the wheels are the same or different.

3. Motor connection

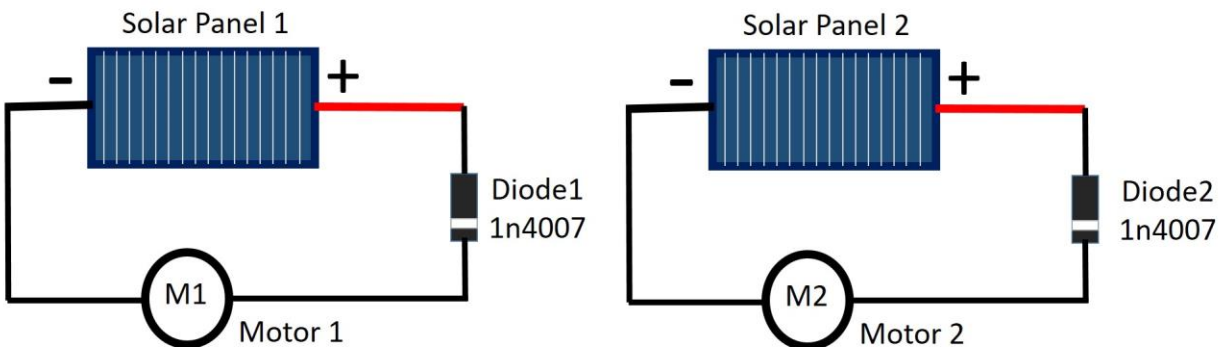
Motors connected in a way that the wheels are rotating in different directions. Ask children to hold their car and observe if the wheels are rotating in the same direction or opposite directions. Give them batteries to test this since testing will be difficult with a solar panel. They can either choose to change the way the motor is attached or simply change the polarity by changing the connections on the solar panel. This can be done by exchanging the wires of the motor connected.

Please refer to how to make it document the connections in detail.

4. Connections for your reference:

1. Connect the negative of the Solar Panel 1 to one terminal of the Motor 1
2. Connect the positive of the Solar Panel 1 to another terminal of the Motor 1
3. Connect the negative of the Solar Panel 2 to one terminal of the Motor 2
4. Connect the positive of the Solar Panel 2 to another terminal of the Motor 2

Make sure that the tires are rotating in the same direction.





Why the project may not work:

1. Check the contact points between the tire and the chassis (Cardboard frame). Make sure that the wheel is free to move and not get stuck on the cardboard. You can check this by trying to move the wheels with your hands. If you have to apply an excessive force that means that something is stopping the wheels from moving freely.
2. Check if the motor is working properly by attaching it to the battery.
3. Make sure that the car isn't too heavy.
4. Check if the solar panel is working properly.
5. Both the wheels are connected to move in the same direction.

Working

The solar car works on the energy of the sun. Though it may work on a rechargeable battery which is charged using solar energy. You can check a few Solar cars [here](#).

Solar panels are made up of Solar cells or Photovoltaic cells stacked together. Solar cells are generally made up of silicons.

When the light particles, photons, fall on the solar panel they knock off the electrons free from the atom. This generates electricity.

To know more about working of solar panel follow the following links:

English: <https://youtu.be/UJ8XW9AgUrw>

Hindi: <https://youtu.be/7ggSjTWSXnU>

In the case of the car which we have designed, we connect solar panels directly to the motor. The solar panels power the motor making its shaft rotates thus rotating the wheels attached to the motor.

Advantages of Solar Cars:

- No air pollution
- A renewable and clean source of energy so no negative impact on natural resources
- No fuel costs
- No recurring energy costs
- Low maintenance costs



Disadvantages of Solar Cars:

- High initial cost
- Weather dependent
- Extra space needed by the solar panels making it bulky
- Manufacture of solar panels causes pollution

Final Discussion:

How did your project work?

The solar panel connected to the motor supplies power to the motor.

Do you think these cars are better than traditional fuel cars?

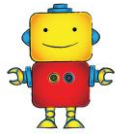
Yes, they do not cause air pollution and no fuel cost.

What will happen if you add more weight to the car?

The car will become slow.

How can you increase the speed of a car?

1. Reducing the weight of the car.
2. Having more powerful solar panels and motors.
3. Changing the design of the car.



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At this point, you can show them the videos and pictures of the solar car and ask them what their thoughts are about the solar car.

