UNIVERSE SIMPLIFIED FOUNDATION

Empowering For Innovation

Solar Fan

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	• We are going to make a solar fan today • Tell me what do you understand by the term solar fan Here, create room for dialogue. Let children talk about what they understand by a solar fan.	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 have filled the worksheet till the material list.	15 mins
4	Project making	During this time, children will build the project.	45 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	• What did children learn? • Where can they use what they have learned?	15 mins

The above mention 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 2 hr project. You can extend it up to 3 hrs.

Introduction

Ask them to go through the instruction sheets first.

They will read the following,

Challenge 1

- *Build a fan that works on solar energy with the help of solar panels.*
- *The fan should be able to stand independently without support from you or any other person.*

What do you understand from the instructions? Which project are we going to work on today?
Fan working on solar panels/ solar power

What do you understand by solar power/ solar panel?
Something that uses the sun's energy to work.

So this is the solar panel, it converts solar energy to electrical energy. You can think of this as a battery or power supply. (You can show them the solar panel now. Keep the solar panel attached with the diode)

Now you need to design a fan that will work on solar power.

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

1. Making a fan

Ask them how does a fan look? Once they give you a few examples, tell them to use the material available to make a fan. It is okay if it looks different then what you had envisioned as long as it is serving the purpose.

In case they have never used a motor you can give them the motor, wires, and battery. Else they will tinker and figure out.

Once the basic structure of the fan is ready, ask them to test it with a battery.

2. Making a stand

You are not allowed to hold the fan in hand so find something to support it.

3. Connections

For your reference:

Without switch

1. Positive of a solar panel to the positive of the diode (The black end is positive)
2. Negative of a diode (End with the silver band) to one terminal of the motor
3. Negative of a solar panel to the other terminal of the motor
4. Attach a propeller to the axle/ shaft of the motor

To know how to make Solar Fan, refer to the document here.

We are going to have a diode already attached to the solar panel, so it will be simple for students to make the connections. If they are still unable to do it, give them a battery. Once they are able to run the motor with battery ask them to replace the connections with solar panels.

With switch

1. Positive of a solar panel to the positive of diode
2. Negative of a diode to one terminal of the switch
3. Another terminal of the switch to one terminal of the motor
4. Negative of a solar panel to the other terminal of the motor
5. Attach a propeller to the axle/ shaft of the motor

Use the same battery method for this as well. Give students battery and switch for this. Once they are able to figure out switch with the motor they will be able to connect it to the solar panel as well.

Why the project may not work:

1. Check the connection

Check if any wire is not connected properly. Check the wires at the motor and solar panel terminals. Make sure that the diode is connected properly, positive of the diode to positive of a solar panel.

2. Motor

Remove the motor and attach it to the 9V battery in place of the solar panel to see if the motor is working or not. If the motor isn't working, change the motor.

Make sure that the 9V battery is charged and functioning correctly. You can either use a fresh battery or you can use Digital Multimeter (DMM) to check the voltage. You can learn about using DMM, here.

3. Solar panel

Connect the solar panel to DMM and check the voltage. You can either put the solar panel under the sun or use a 200 Watt bulb.

Working

Working of Solar Fan

When the solar panel is placed in the Sun, it converts solar energy to electrical energy. Since the solar panel is connected to the motor, the required voltage and current is supplied to the motor for it to rotate. The motor then converts the electrical energy to mechanical energy by rotating the axle. Now, this Axle has a fan connected, thus leading to the rotation of the fan.

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

To learn how toy motors work, please click here.

Final Discussion

What did you understand while making this project?
We were able to generate electricity through solar power.

How is this useful?

1. Once we install the solar panel then we do not have to worry about the electricity bill for a long time.
2. We do not have to worry about the power cut.
3. We can use it in our houses.
4. We can make different things which can use solar power to work.

What happens during the night? The solar panel works only in the presence of the sun.
We can charge and store energy in a battery during the day time and use it at night.