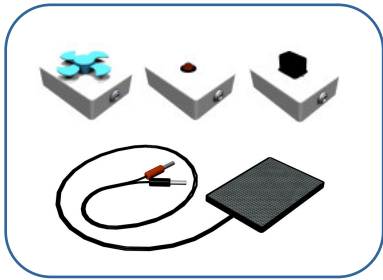
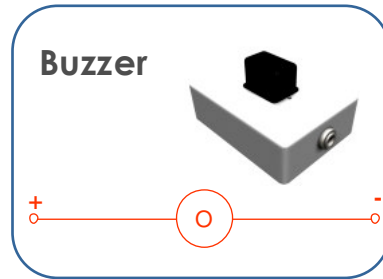


# Solar Photovoltaic (PV) Kit

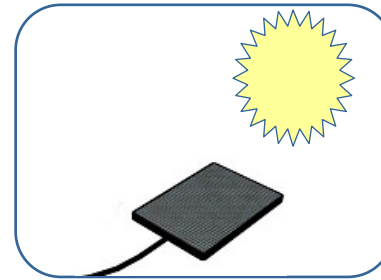
## Activity 1 - Using the solar electric panel to make something happen



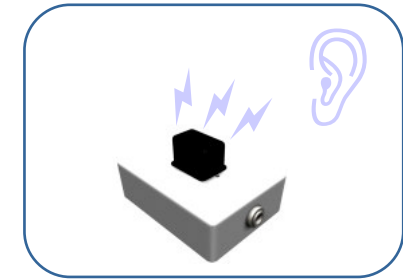
The solar electric panel works like a battery, so to make it power something you will need a complete circuit.



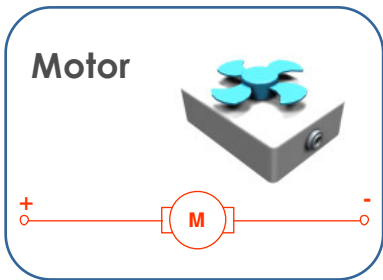
1. Put the red plug from the solar panel into the red socket on the buzzer module. Put the black plug into the black socket.



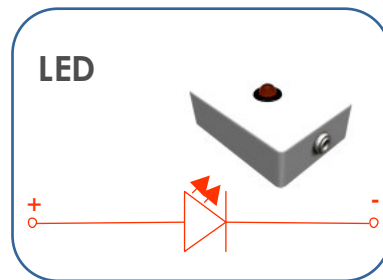
2. Put the solar panel in sunlight, clear side towards the Sun.



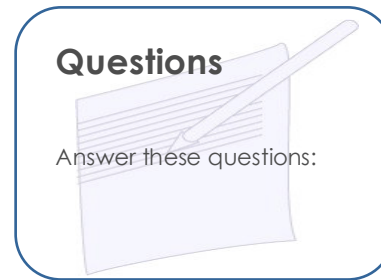
3. The buzzer should make a sound.



4. Repeat this activity and questions with the motor module.



5. Repeat this activity and questions with the LED (light-emitting diode) module.



### Questions

Answer these questions:

- (i) What kind of energy does the solar electric cell generate?
- (ii) What kind of energy do we get from the buzzer/motor/LED?
- (iii) Write down the name of one device that could make use of a solar panel powering a buzzer/motor/LED.



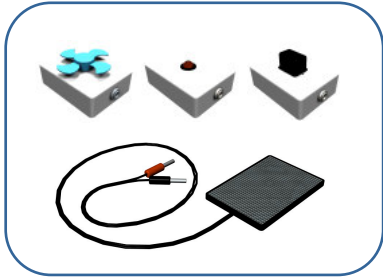
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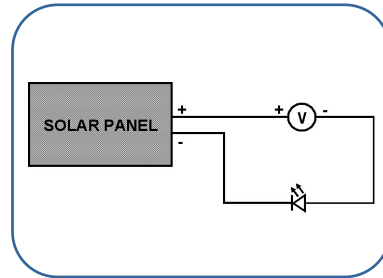
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## Solar Photovoltaic (PV) Kit

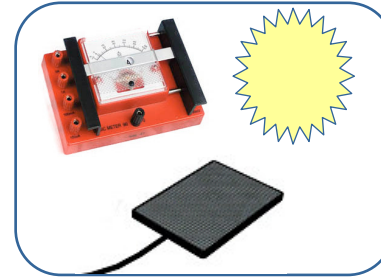
### Activity 2 - Measuring the voltage produced by the solar electric panel



The solar electric panel works like a battery, so to make it power something you will need a complete circuit.



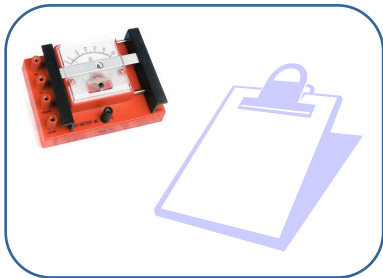
1. Put the red plug from the solar panel into the positive (+) socket of a voltmeter. box. Put the black plug into the negative (-) socket.



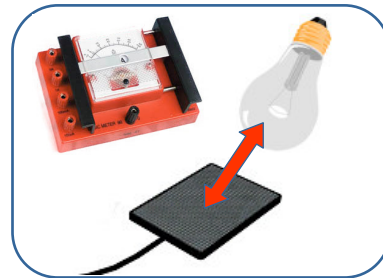
2. Put the solar panel in sunlight, clear side towards the Sun. Record the voltage produced by the solar panel,



3. Repeat this activity with different sources of light, and in different locations. Put your results into a table.



4. Put your results into a table.



5. Measure the voltage produced by the cell at different distances from the same light source - you will need to use an artificial light source for this, as the Sun is too far away for you to be able to make much change in the distance!

### Questions

Answer these questions:

- (i) Does the solar panel always produce the same voltage?
- (ii) What factors do you think affect the voltage produced?
- (iii) Does the distance from an artificial light source make a difference to the voltage produced?

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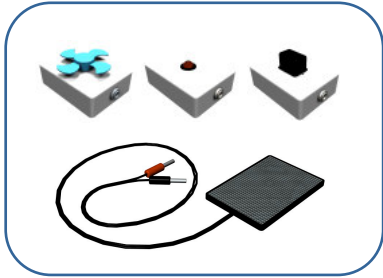
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## Solar Photovoltaic (PV) Kit

### Activity 3 - How much power is produced by the solar panel?



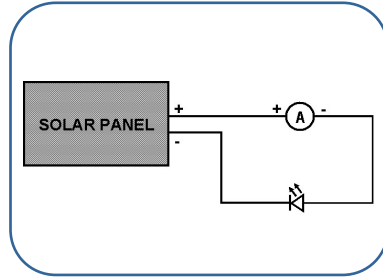
Power is measured in Watts (W) and kilowatts (kW). To calculate the power, we must measure both the voltage and the current in a circuit when it is connected to a component.

**Power = Voltage x Current**

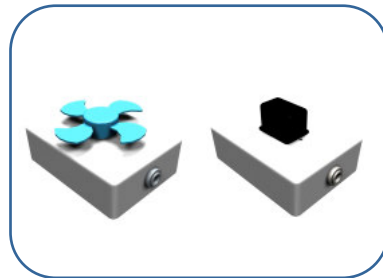
**Watts = Volts x Amps**

**$W = V \times A$**

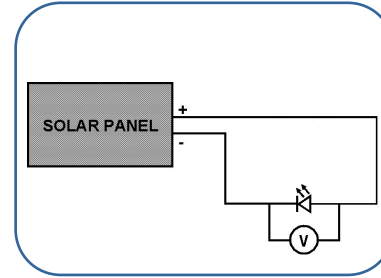
**4.** Work out the electric power of the cell in Watts by multiplying the voltage in Volts by the current in Amps.



**1.** First, make a series circuit with the solar panel, LED and ammeter. It is very important to connect the positive terminal of the ammeter (+) to the positive (red) plug from the solar panel.



**5.** Repeat the experiment with the motor module and the buzzer module.

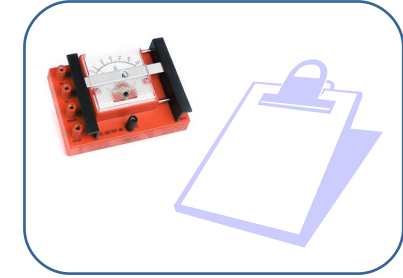


**2.** Connect the positive socket of the voltmeter to the socket on the LED positive plug from the solar panel, and connect the negative socket of the voltmeter to the other (negative) side of the LED.

### Questions

Answer these questions:

- (i)** Is the power supplied by the solar panel always the same?
- (ii)** Does the power change if you change the component to a motor or a buzzer?



**3.** Measure the current and the voltage with the panel in different places, so you have different kinds and amounts of light, and write down the current and the voltage.

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