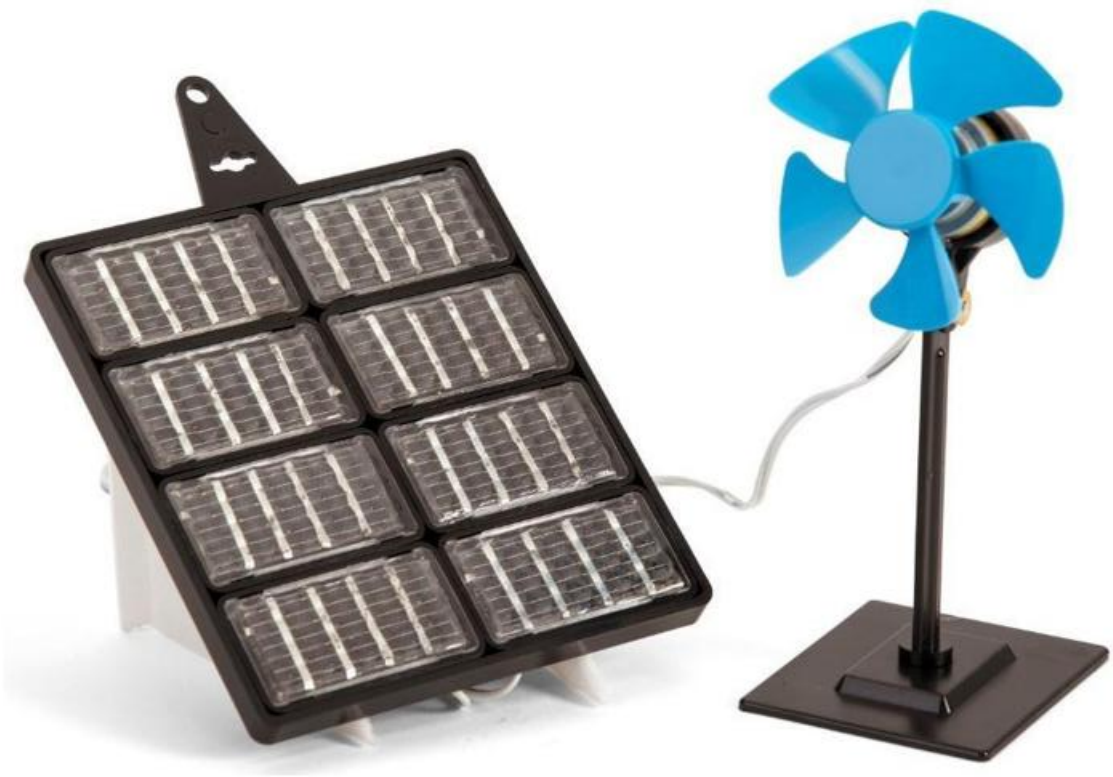
Pedestal Fan Instructions



Renewable Energy Project

Follow this step-by-step guide on how to assemble the solar panel and build the pedestal fan.

Associated resources:

- Renewable energy lesson plan
- Presentation 1 - Pedestal fan
- Workbook 1 – Pedestal fan

<u>You will need:</u>

A sunny day!

Parts included in class kit:

- 1 solar renewable energy kit
- 1 foam sheet

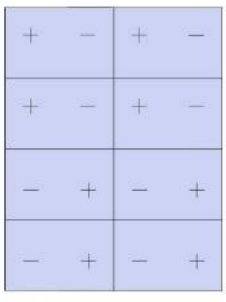
Other parts, tools and consumables

- Ruler
- Pencil
- Felt tip pen
- Large scissors
- Protractor
- Low melt glue gun
- Sheet of card roughly A4, e.g. old cereal box
- Small bowl

Step 1

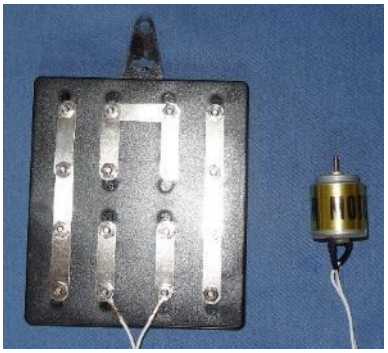
Open the solar renewable energy kit and remove the 8 solar cells from the mounting plate. Unscrew the nuts and washers and remove the metal connecting strip from each one. Place these in the bowl so you **don't lose them**.

Step 2



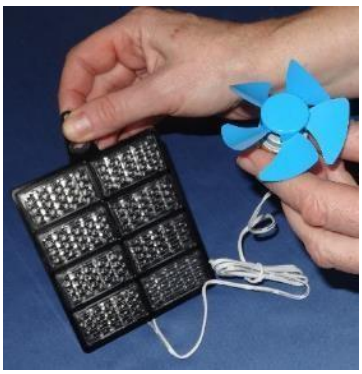
Lay the solar cells out in the order shown. Plus (+) and minus (-) symbols are shown on the back of each solar cell. Turn the mounting plate over and slide it onto the studs which are sticking out from the solar cells. Make sure the mounting plate connection tab is at the top. The studs should fit into the smaller holes, not the larger ones. You may need to adjust the position of the cells a little so they slide in easily.

Step 3



Fit the metal connecting strips in the order shown here. You will need to use 3 additional strips from your solar renewable energy kit. Fit the contacts from the solar motor onto the two studs shown. Slide a washer onto each stud and screw on a nut. First spin the nut on gently with your fingers, then nip it up with the plastic spanner provided. Don't lift the solar panel up until you have screwed on all the nuts with your fingers.

Step 4



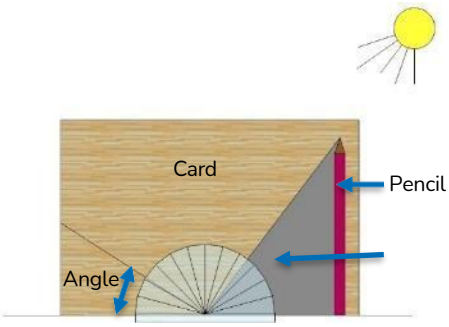
Hold the back of the motor shaft with your thumb and push the propeller onto the front of the motor shaft. Hold the solar panel facing the sun and check the propeller spins. Feel which way the air is blowing – the fan should be blowing air away from the motor. If it isn't then remove the two nuts and washers holding the motor contacts onto the solar panel. Swap over the motor contacts then put back the washers and nuts. Check the propeller is now blowing air the correct way.

Step 5

With the solar panel connected up as described in step 3 it should produce roughly 1.6 V (volts) when the sun shines on it, and up to 200 mA (milliamps) of current. The voltage stays roughly the same if light is falling on the panel, but the current varies with the intensity of the incident light (i.e. the light falling on the solar cells). Try holding the solar panel in various orientations relative to the incident sunlight. Try and feel the difference in the breeze created by the fan.

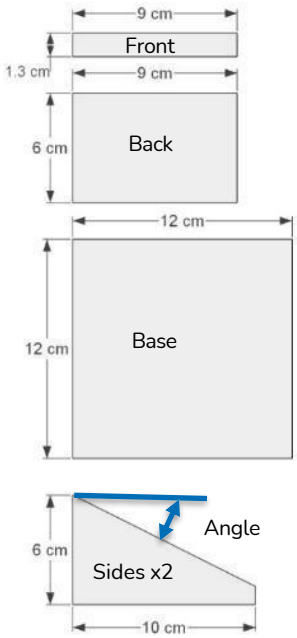
Step 6

The solar panel needs to be mounted at right angles to the incident light to maximise the output power. In order to measure this angle, hold the sheet of card vertically on a flat table in the sunshine as shown. Hold the pencil vertically at one end of the sheet and mark the position of the point on the card. Adjust the card position until the shadow from the pencil falls just next to it and mark the end of the shadow on the card. Use the pencil and ruler to draw a line on the card from one mark to the other. Draw a line at right angles to this, starting at the second mark. Measure the angle of this line from the horizontal (i.e. edge of the card).



Step 7

Make a stand to mount your solar panel at this optimum angle. Note that the angle of the incident light varies over the course of the day. The solar panel will perform best around midday, so if you completed step 6 at a different time of day you may prefer to use a default angle of 30° to get better overall performance. An example of the parts needed to make the stand is shown here. You can draw them on the polystyrene foam sheet with the felt tip pen, ruler and protractor, cut them out with the scissors then glue them together.



Step 8

Assemble the stand for the pedestal fan. Take the upright, push the end down into the slot in the base and twist it clockwise by 90°. If you look at the bottom of the base you can see how it goes together. Take the propeller off the motor shaft, loosen the screw on the upright and push the motor in. Tighten the screw again and re-fit the propeller.

Step 9

Rest the solar panel on the stand and try out your pedestal fan. If your desk is in sunshine then you can use this as a desk fan!