

### Experiment 04 A Solar Motor

#### Objective

The student builds a simple electric motor that runs from a solar module.

#### Value

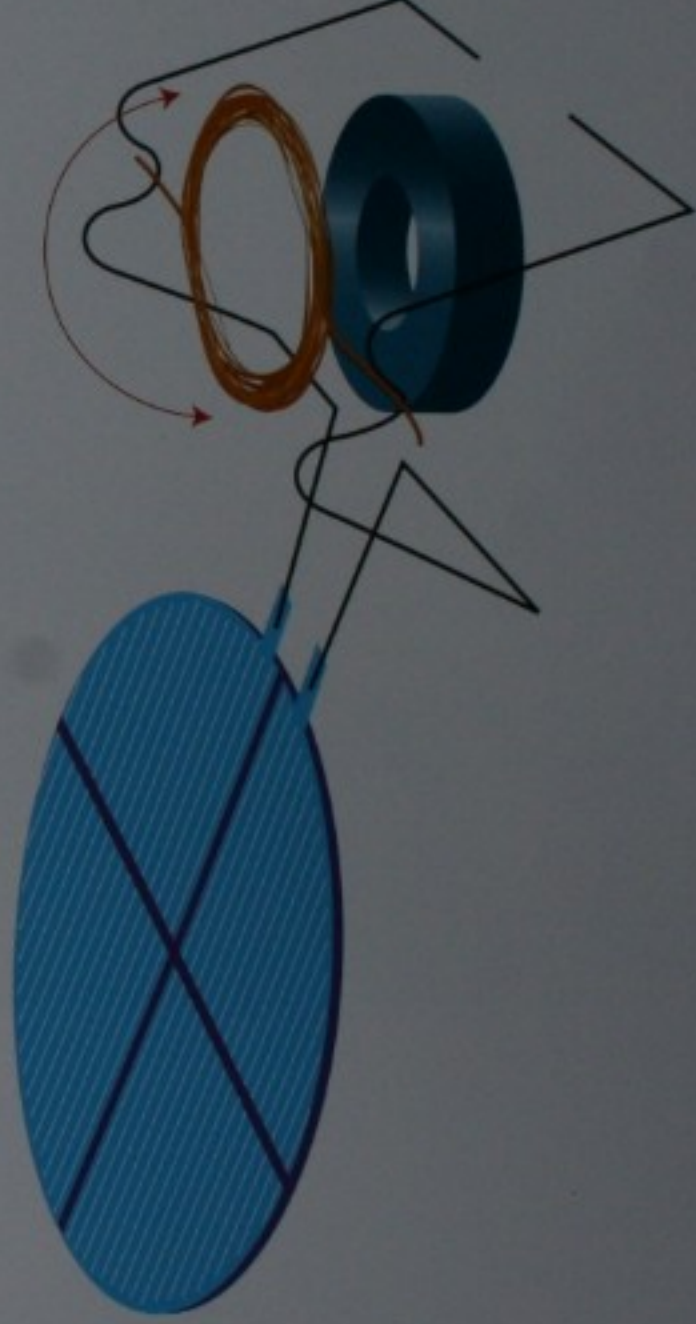
The current from a solar module establishes a magnetic field in a loop of wire. When the loop of wire is suspended near a magnet, there is repulsion or attraction depending upon the direction and magnitude of the current in the loop of wire and the polarity of the magnet's field. The student sees that commutation will allow the loop of wire to become a motor.

#### Note

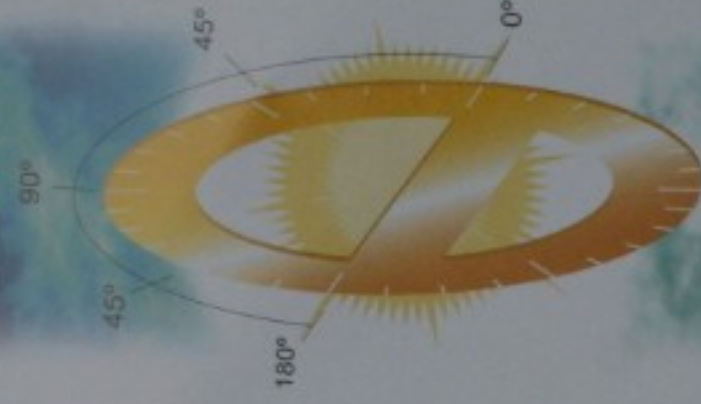
Commutation is effected by having the top half (axial orientation) of the coil's lead insulation removed. This allows current to flow when the lead's bare side contacts the paper clip electrode. As the coil spins the remaining insulation will break the electrical connection. Electrical contact is made and broken as the coil spins.

#### Equipment

One 2-volt solar module, 72mm diameter toroidal ferrite permanent magnet, 35mm film canister used as a coil form, 1.1 metres 26 B&S gauge enamel insulated wire, cellophane tape, knife to remove insulation, two paperclips, two alligator clip leads.







#### Method

The coil is made by winding 50 turns of wire onto a 35 mm film canister. Cut the remaining wire such that there is a 2 cm lead coming from the axis at both ends of the coil.

Position three pieces of tape on the coil to hold the wire in place. Place the coil flat on a table and using a sharp knife, scrape the insulation off the top of both of the wire leads.

Fashion two paperclips as in the photograph and tape these to the magnet. Suspend the coil in the paper clips and then use alligator clip leads to connect the paper clips to the solar module. Give the coil a little push to start it spinning.



50 turns of wire and the 35 mm film canister used as a coil former.



The operating solar powered motor.

