

## INSTRUCTIONAL GUIDE

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Recommended for activities:

- [DC Powered Motor 10 Pack \(P8-8375\)](#)



## Background

Solar cells generate electricity from sunlight using semiconducting materials. Photons in sunlight are absorbed by the semiconductor and excite electrons within the material. These electrons can either pass through the conductor until they reach an electrode or dissipate their extra energy as heat. Current needs to flow through this material in order to neutralize the potential and allow for the capture of electrical energy.

Semiconductors are most often constructed of two layers of oppositely charged crystalline silicon. These layers obtain their charge through a process called “doping” where the material either gains an excess of electrons (n-type) or has “electron holes” (p-type). When energized, the extra electrons from the n-type silicon jump to the electron holes in the p-type silicon and an electrical potential is created. This is called a p—n junction and is used in billions of devices and solar cells around the world.

## Instructions

1. Connect the solar cell to an appropriate load, such as a small motor.
2. Place the cell in bright sun, with the sun’s rays perpendicular to the cell surface.
3. To create more current, connect two or more cells in parallel. Total maximum current can be found by multiplying 400mA by the number of cells.
4. To create more voltage, connect two or more cells in series. Total maximum voltage can be found by multiplying 0.5V by the number of cells.

## Related Products

**Fuel Cell Car Science Kit (P8-3530)** The reversible PEM fuel cell splits water into oxygen and hydrogen. The hydrogen is then used to power the fuel cell car.

**Solar Energy Science Kit (P6-7000)** Use this simple apparatus to design an experiment to test the usefulness of solar energy! Kit includes 0.5V, 500mA photovoltaic cell, motor, and diffraction foil disk.

**Renewable Energy Education Set (P4-2023)** Use endlessly renewable solar power to create hydrogen fuel from water and learn the workings of a renewable energy system from start to finish.