Goofy Grasshopper
Investigation #2

Description
Get that grasshopper going!

Materials
• Frightened Grasshopper from Owikit
• Sunny day or bright incandescent bulb
• A friend

Procedure
1) Have a friend look at the grasshopper and predict what the grasshopper might do.
2) Place the grasshopper in the light.
3) What do you notice?
4) What happens if you block the light?

Results
Explanation
Frightened Grasshopper is equipped with a small solar panel that has an output of 1.1 volts. The cell is connected to a 50mA vibrating motor. When exposed to sunlight, the solar cell produces electricity and causes the motor to vibrate. This vibration makes the grasshopper wiggle. When light is blocked, the motion slows down or stops because the light energy is no longer powering the solar cell. The solar cell is made of two semiconducting layers made of silicon, with different impurities added to each one. There is an electric field between the top layer (N-type) and bottom layer (P-type) of the cell. When light strikes the cell, the silicon absorbs some of that energy, which forces some of the electrons to get loose and move in a specific direction. The resulting electrical current flows through the attached metal connections and powers the motor, which in turn causes the grasshopper to wiggle. Adjusting the legs will result in different movements.

Let’s think about light. Our sun produces light energy that travels to the Earth. Some of that light we can see, while others like ultraviolet and infrared light we cannot. But it is that energy that helps all the living things on Earth to survive. Plants convert that energy into sugars for food to grow, and we use that energy to stay warm. The sun’s energy is also responsible for the water cycle on the planet and even the wind we feel every day. Scientists and engineers continue to think of clever ways to capture energy from the sun to make our lives better.

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