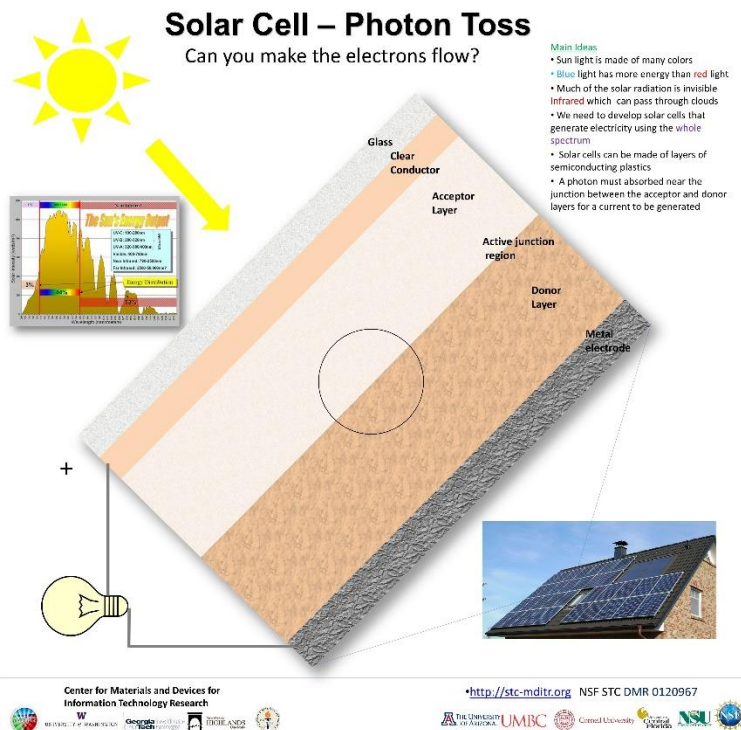
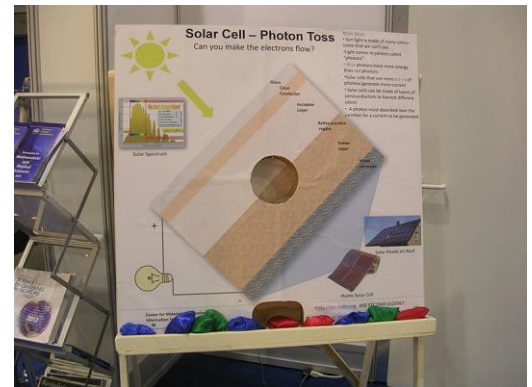


## Overview

This interactive exhibit is a bean bag tossing game that teaches about the energy of different colors of light and how a solar cell works. Kids toss colored bean bags at a model solar cell and make the lights blink if they hit the hole with the right color. This is a great physical activity for elementary age kids.

The 4 x 4ft board has a central hole with a pressure sensitive switch behind. The bean bags are blue-heavy full of beans, yellow –medium weight -half beans and half fiber stuffing, the red is light- stuffing only. When a heavy bag is thrown into the hole with enough force the switch completes the circuit and a set of blinking lights indicates that electricity has been generated. The diagram is a generalized schematic that could apply to organic or inorganic thin film solar cells.



## Directions / Socratic Sequence

Hand the child the bean bags. Tell them

“The poster shows the layers of a solar cell seen from the side. The bean bags represent different color of light. See if you can make the solar cell generate electricity.”

Use the term photon if it seems appropriate. Let them try several time and coach them to notice the difference in the bags and their effects.

“Which color of light works the best”

Kids may say the blue bags are heavier. Explain-

“This is how a solar cell works. First light has to get to right place, it doesn’t work if you don’t hit the hole at the junction between these two layers. Next you have to have light with enough energy to make the solar cell work. The blue bags weigh more to show that blue light has more energy than red light.”

Point out the spectrum diagram.

“Energy from the sun comes in different color or wavelengths all the way from radiant heat, up through the colors of the rainbow, to blue, violet and even ultraviolet. Do you think ultraviolet light is more or less powerful than red light? Have you ever gotten a sunburn? Ultraviolet light is so powerful it can burn the skin. We are trying to build solar cells that can absorb all the colors of light so that we make the most electricity. Light on this side of the spectrum (red) is not as powerful but there is a lot of it and it can pass through clouds so cells that use it could work on cloudy days.”

### **Main Ideas**

- Sun light is made of many colors
- Blue light has more energy than red light
- Much of the solar radiation is invisible Infrared which can pass through clouds
- We need to develop solar cells that generate electricity using the whole spectrum
- Solar cells can be made of layers of semiconducting plastics
- A photon must be absorbed near the junction between the acceptor and donor layers for a current to be generated
- After a photon is absorbed an electron moves one direction and a hole moves the other direction forming a complete circuit.