



Inspire EdVentures



Welcome to Your Virtual Summer Camp!

Week 7 Materials

Technology Week: Solar Power

inspire-edventures.com/virtual-summer-camp/



This Week's Activities:

- Go to our website and scroll down to the Week 7 Material **inspire-edventures.com/virtual-summer-camp/**
- Read the material on how solar powered lights work.
- Complete the experiment on solar power.

What You Will Need This Week

Your journal

A solar light similar to the one above. You can get one of these for about \$2 from Walmart or Target

A sunny day

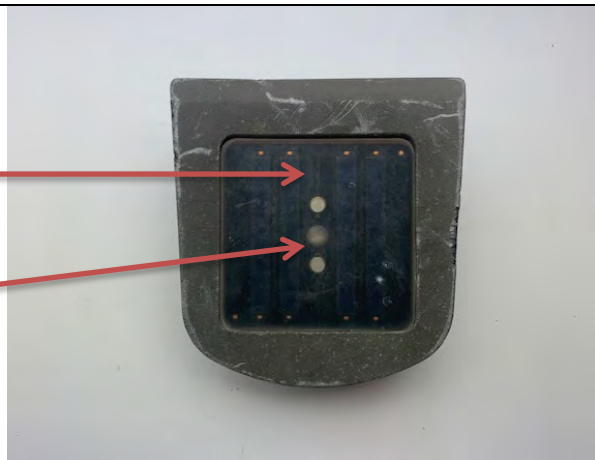
Solar Power: Using Energy From The Sun

I'm sure you've seen them; they are in almost everyone's yard or home – solar lights. They are so easy to install any fit almost every budget, we hardly think twice about how they work. They are incredibly simple and ingenious at the same time. Today we are going to walk you through how they work and how similar they are to the lights in your home.

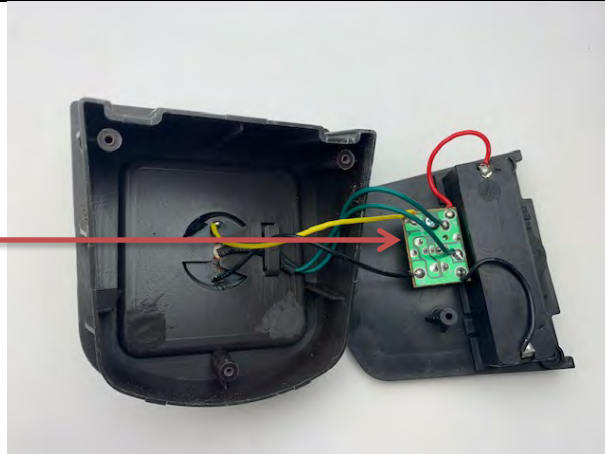
First, let's talk about how the lights work in your house. (note – please do not touch any piece of the equipment discussed below without adult supervision and permission) Electricity comes into your home through power lines and into a breaker box. This is a special piece of equipment that breaks down the power into smaller, more appropriate amounts of energy for lights and outlets. From this box, individual lines of wire carry power to the light switches in your house. When you flip on a light switch, you are allowing the electricity to flow to the light bulb and thus illuminating it. When you turn off a switch, you stop the flow of electricity to the bulb, making it dark.

The solar light works in a very similar fashion. There is a power source, a switch and a light. When the 'switch' is on, the led light shines. When it is off, the light is dark. The battery is the power source, but that energy ultimately comes from the sun! Let's take a closer look at the parts and what they do.

Here is an example of the top of a solar light. This setup should look similar to most lights. You will see several solar panels, which collect the energy from the sun and a small eyeball-looking item. This is the photoresistor – it senses darkness and light and tells the light when to turn on/off – it's the switch!



On the inside of the light, we see wires that are sending signals to the circuit board. This is where the solar power is sent to the battery to charge and also where the photoresistor sends the information of when to turn on/off the light.



On the bottom of the light is where the LED light is located. Once the photoresistor senses that it is dark out, it sends a signal to the circuit board to stop accepting energy and charging the battery. Then the light is illuminated using the charged battery.



Now that you understand how the light turns on and off, let's talk about how the sun's energy actually powers the light!

Those solar panels on the top of the light contain special cells that convert the sunlight into power. (Kind of like the chloroplast does inside of plants – but we'll talk about that more when we discuss photosynthesis). The special cells in solar lights are called photovoltaic (which actually means "light electricity") or PV cells. The sun's rays are made of photons or tiny little particles of energy and the special materials in the PV cells collect that energy and convert it to energy that can be stored in the battery. So when the solar light is off, the PV cells are constantly collecting energy from the sun.

So not only does the solar light work a lot like the lights that are in your house, it also collects energy a lot like plants do. Even though these lights are simple looking and fairly inexpensive, they contain some really neat technology that you can relate to your everyday world.

Activity: Experimenting with Solar Lights

Next, we are going to experiment with how a solar light works. Before you begin, make sure that you remove the orange tab within the light so that it can be charged by the sun.



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Step 1: Charge the Light

Place the solar light in bright direct sun for 60 seconds.

Step 2: Determine How Long the Light Remains Charged.

Bring the solar light back into the house and cover the solar panel at the top. You can do this easily by placing the light upside down on a table, or covering the panel with your hand.



How long does it take the light to go out?

Step 3: Repeat the Experiment with Longer Time

This time, place the solar light in the direct sun for a longer period of time.

Then cover the solar panel again and then watch to see how long it takes for the light to go out.

How long did you charge the light for this time?

How long does it take the light to go out this time?

Thinking Like A Scientist

- What do you think would happen if you charged the light, in partial shade for a few minutes? Why?
- Design an experiment to test your hypothesis about solar lights and shade.
- The sun rises in the east and sets in the west. Why would you set up solar panels on your house to face to the west?
- From what you have learned, why is solar power such as useful way of generating electricity?

Solar Light Word Search

L E P A S R R A F Q I E N T K
K Q O H O F O B S R L L G B Q
V E O V O H B N P E Z N V F P
J L I Y B T O M C V Z M X Q O
Z E Y D N T O T H G I L N U S
V C J S O H R V Y E N E R G Y
E T Y H O O Y C O R J S A U R
A R P R N L Q F C L E K P O I
E I T S Y S A P E W T T S H L
G C R U X I H R L H P A T X S
A I U W X N G I L O V S I A W
R T D Q V E U J S Z E P M C B
O Y E E Z Q B S E Y W F B K E
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BATTERY
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