



**The Messy Meter**

Recommended Grades:  
**Pre-K -2, 3-5**

Estimated Time:  
**20 minutes**

Subject:  
**Electronics, Biology**

## WHAT YOU'LL NEED

### PANTRY STAPLES:

- String
- Construction or printer paper

### SPECIALTY SUPPLIES:

- 3 different colored LEDs
- 1 Watch battery
- Electrical Tape

### Optional Add-Ons:

- Colored pencils/markers/crayons

## Science Bug

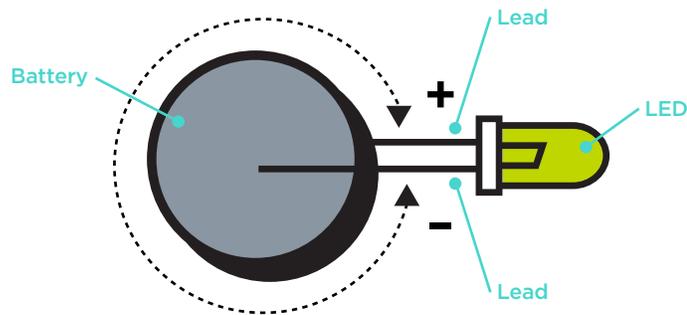
In this activity kids will make a light up Science Bug necklace. Through this they will learn about circuits and electricity as they practice lighting up LEDs. The activity was developed by the 4-H Youth in Action Winner, Cassandra Ivie.

Check out the bonus fun section to learn how to connect this electronics activity to biology!

### STEPS

Use the below steps to get started, but don't forget to let kids experiment with different designs and create all on their own!

1. Look at your watch battery and identify which side is positive and which side is negative (most batteries have a + symbol on one side).
2. Take one LED and place the watch battery in-between the Leads. The positive side of the LED (the long lead) will connect with the positive side of the watch battery. The negative side of the LED (the short lead) will connect with the negative side of the battery. The LED should light up.
3. Repeat this with each LED.
4. Try to light up two LEDs by putting both LEDs on the battery at the same time. Try different LED pairs.
5. Pick two LEDs that light up together and tape them to the battery with the electrical tape.
6. Take your science bug cutout and position the battery and two LEDs so they become your bug's antennae. Tape them to the backside of the cutout.
7. Now let's turn your science bug into a necklace! Cut two equal pieces of string. Tape one end of each piece of string to opposite ends of the science tie bug. Now bring them together and tie a knot.



### Bonus Fun:

Use the PDF Lab sheet to challenge kids to draw their own Science bug, using the five key things that define an insect. Then walk them through the activity steps to light up their bug's antennae.

### Questions to Engage Youth:

- Why does the LED only light up when both sides are touching the battery?
- Why does it matter which side of the LED is connected to positive and which side is connected to the negative side of the battery?
- What happens to the brightness of the first LED when you connect the second LED to the battery? Why?



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### Explanation:

This Science Bug is a complete circuit- a pathway for electricity to flow through. By connecting the LED to the positive and negative sides of the battery, you made the electricity go through the LED, lighting it up. LEDs just like this are all around you - from lightbulbs to Christmas lights. For the LED to work, it must have a complete connected path from positive to negative. That is why if you take one leg of the LED off the battery, it won't light up.

When you connect more than one LED to a single battery the current - or flow of electric charge - gets split between them. This means there is less current per LED, so the light is less bright.

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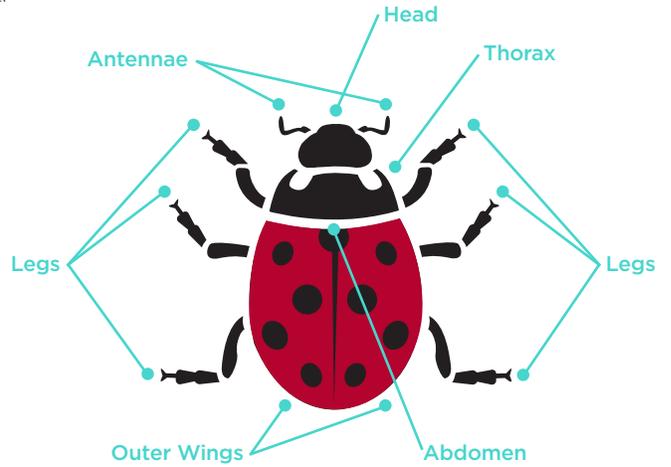
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Design your own Science Bug! Make sure your bug meets all the main criteria for being an insect. Check out the diagram to see the parts of an insect.

- Head
- Thorax
- Abdomen
- 6 legs
- 2 Antennae
- Wings are optional, but most insects have them!



## SCIENCE BUG TEMPLATE

