4-H at HOME

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BUILD AN ELECTRICAL CIRCUIT TO CREATE LIFE FROM LIGHT

SCIENCE BUG

Science Bug

This activity was developed by the 4-H YOUTH IN ACTION winner, Cassandra Ivie.

About the Activity

Have you ever wondered why the light in your bedroom turns on when you flip on the light switch? Or how a simple action like pressing a button can make your favorite toy zoom across the room? These actions happen because of what are called electrical circuits. In this activity, we will explore how circuits work and even practice making our own as we build a light-up Science Bug necklace.

Supplies

These simple materials — along with a few specialty supplies — will get you started:

- 3 LEDs, each a different color
- 1 watch battery
- String
- Construction or printer paper
- Electrical tape
- Colored pencils/markers/crayons
- Scissors

Grades: Pre-K–5

Topic: Electronics, Biology, STEM
Time: 20 minutes

Activity Steps

Follow these steps to build your own light-up bug. Along the way, you'll learn about **electrical circuits**, which are paths for sending and receiving electricity (every electrical circuit includes a source of electricity, something that receives or uses that electricity, and connecting wires that carry the electricity from the source to the thing that will use it).

Part 1: Create your bug

1. Start by downloading the activity.
2. Print it out, and decorate to your liking using your crayons, markers, or colored pencils.
3. When you are done decorating, cut out the bug using scissors. If you are having trouble cutting out your bug, feel free to ask your grownup for help.

See below for a bonus activity where you build your own bug!

Part 2: Build your antennae

1. Now it's time to grab your watch battery. Are you ready to build a circuit?
2. Start by identifying which side is positive and which side is negative. Hint: Most batteries have a + symbol on the positive side.
3. Take one LED and place the watch battery in between the leads (the metal stems sticking out of the light). Connect the positive side of the LED (the long lead) to the positive side of the watch battery. Connect the negative side of the LED (the short lead) to the negative side of the battery.

FUN FACT:
You have just created a circuit—or rather, a pathway for the electricity to flow from the battery and to your light!

4. Repeat this with each LED to make sure they all work.
5. Try to light up two LEDs by putting both LEDs on the battery at the same time. Try different LED pairs until you find a working pair that you like best.
6. Pick two LEDs that light up together and tape them to the battery with the electrical tape. You will want the LEDs angling slightly away from one another to look like antennae.

Bring your bug to life

Take your science bug cutout and position the battery with the battery on the back of your bug's head. The two LEDs should stick out so they look like your bug's antennae. Tape them to the backside of the cutout. Your bug has come to life!

Create your necklace

1. Now let's turn your science bug into a necklace, so you can wear it.
2. Cut two equal pieces of string.
3. Tape one end of each piece of string to opposite ends of the science bug.
4. Now bring them together and tie a knot.

Bonus Activity

If you want to test your creativity, you can try drawing your own bug from scratch. As you do, think about how many eyes will it have? What about legs? What shape do you want its body to be? If you need help getting started, follow this **4-H STEM Lab worksheet**, which shows the different criteria that make up an insect. That includes:

- Head
- Thorax
- Abdomen
- 6 legs
- 2 antennae
- Wings (optional)

You can also check out this article from **National Geographic Kids** to learn about different bugs and their unique features. How can you incorporate some of these features into your drawing?

20 minutes | Grades: Pre-K–5

Test Your Knowledge

We've learned a lot about insects, electricity, and even had some fun with art! Let's see what we can remember.

QUESTION 1

True or false? An electrical circuit has three key parts: a source of electricity, something to receive that electricity, and something that carries the electricity between those points.

a. True
b. False

QUESTION 2

An insect **must** have all of the following, except: _____ .

a. A head
b. Thorax
c. 6 legs
d. Wings

QUESTION 3

True or false? Batteries have both a positive and a negative side.

a. True
b. False

QUESTION 4

True or false? Batteries should have two positive sides.

a. True
b. False

QUESTION 5

Fill in the blank: A circuit must be _____ in order to work.

a. Sense
b. Cardiovascular
c. Musculoskeletal
d. Endocrine

Reflection Questions

Questions to deepen wonder and understanding.

- 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 the positive end of the battery and which side is connected to the negative end of the battery?
- What happens to the brightness of the first LED when you connect the second LED to the battery?

  Why do you think that is?

Investigate & Explore

Take your new knowledge to the next level.

Let's learn more about how circuits work.

The Science Bug you made forms a complete circuit –a pathway for electricity. By connecting the LED to the positive and negative sides of the battery, you made the electricity move through the LED, allowing it to light up.

LEDs like this are all around you–from lightbulbs in your living room and kitchen to Christmas lights on the houses outside. In order for the LEDs to work, they must have a complete connected—or closed —path from positive to negative. That is why if you take one leg of the LED off the battery, opening up the circuit, it won't light up.

When you connect more than one LED to a single battery, the current–or flow of electric charge–is split between them. Basically, this means LEDs have to share. Since there is less current flowing through each LED, the light is less bright.

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