

Grade Level 4-8

Length of Lesson 45 minutes

Objective

By the end of this lesson, students will understand how circuits work and build a closed circuit.

Materials

- Clothespins (one per student)
- <u>Pre-wired LED</u> <u>diode lights</u> (two per student)
- <u>Coin cell batteries</u> (one per student)
- Pipe cleaners (assorted colors)
- <u>Wire stripper with</u>
 <u>22g AWG</u>
- Masking tape (optional - but helps!)

Standards

<u>NGSS</u> 4-PS3-2, 4-PS3-4

This lesson was adapted from <u>STEAM-Powered Family</u>.

e Classroom_{ss}

CIRCUIT BUGS

Lesson Summary

In this hands-on craft activity, students will build a bug with lights for eyes which will illuminate when the circuit is completed with a battery.

Suggested Sequence of Events:

- 1. Set Up: Gather the necessary materials.
 - Optional setup to streamline the activity: cut and strip the diode lights - if you are using the lights linked to the left, you will want to cut about half the length of wire off of them. Then, strip about a half inch of the casing off of each wire.
 22g AWG strippers work best.
- Read The Boy Who Harnessed the Wind picture book edition or young reader's edition - by William Kamkwamba to capture student interest.
- 3. Read through the <u>IAITC Transportation Ag Mag</u> to learn more about transportation and agriculture or the <u>IAITC Pollinator Ag</u> <u>Mag</u> to learn more about pollinators. Online versions can be found on the <u>IAITC website</u>.
- 4. Complete the activity following the procedures:
 - Pass out all materials.
 - Follow the pictured step-by-step instructions on the next page of this lesson plan.
 - Assist students as needed.
- 5. Whole class discussion and reflection of activity.
 - · In what ways have you used electricity today?
 - · Why is electricity important to agriculture?
 - · How would your life change if there was no electricity?
 - Why are insects important?
 - · What are the parts of an insect?



CIRCUIT BUGS



Step 1 Gather all materials.



Step 2 Cut the prewired diode lights to about half the length of wire provided.



Step 3 Using the smallest wire stripper size, strip off about 1/2" of the wire casing.



Step 4

Place the lights on the safety pin as shown. Be sure your positive and negative wires face the same direction. *Optional: wrap tape around each end to secure it.*



Step 5

Using your fingers, twist the two positive wires together on one side and the two negative wires together on the other.



Step 6 Test your lights with your battery. The colored wire is the positive wire.



Step 7 Pinch the battery and the wires inside the safety pin as shown.



Step 8 Decorate your bug with pipe cleaners of your choosing! Be sure to wrap tightly and cover all the wires.



TEACHER RESOURCES

Background Information

A circuit is a path or route that electricity can follow, like a car follows a road. A circuit must be complete, or closed, for the electricity to properly flow. Everything we use that runs on electricity relies on circuits.

Here is a great video for kids about circuits.

Modern agriculture relies on circuits to power machinery, keep products cold, illuminate processing facilities and operate their equipment, and much more. Without circuits in agriculture, we would be limited to consuming only raw, unprocessed products from plants and animals within the shelf life from when they were grown and harvested by hand.

Extension Ideas

- Challenge students to decorate their bugs with a specific type of insect (doesn't have to be a pollinator!). Discuss beneficial versus harmful bugs and their importance.
 - Hold a role-playing activity where the different types of insects interact with each other how they would in nature.
- View other IAITC <u>Supply Chain</u> and <u>Pollinator</u> Lessons.
- Learn about alternate sources of electricity and how to use them to protect our environment with <u>IAITC Sustainability Lessons</u>.
- Read some of our favorite ag-accurate <u>Supply Chain books</u>.
- Check out this <u>Circuit Flower activity</u> from STEAM-Powered Family using similar materials.
- Explore more about circuits with these <u>18 science activities</u>.
- Go to <u>agintheclassroom.org</u> to contact your County Ag Literacy Coordinator for free classroom sets of our Ag Mags.

