ACTIVITY | Grades 6–8

Video Topic Series Episode: Energy

Overview

Throughout *Copper Connects Us*, a five-part Video Topic Series, students will explore how copper is a natural resource essential for helping the world meet its future environmental, economic and societal needs. In this special Energy segment, students will learn about the importance of copper's conductivity and the high demand for copper as the world strives to reduce greenhouse gas emissions.

The accompanying activity included here will reinforce learning from the video by guiding students in creating simple circuits as they investigate copper's conductivity in real life. It also will extend learning from the video as students perform research to better understand exactly how copper and its conductive properties are used in sustainable innovations.

Learning Objectives

Students will:

- **Construct** simple electrical circuits using various types of wires and **conclude** which are the best conductors
- **Identify** why there is a high demand for copper today
- **Research** a sustainable innovation and **evaluate** the role copper plays

Materials*

For groups of three or four students:

- Build-a-Circuit Activity Sheet
- LED light
- Tape
- AA or AAA battery

For the class to share:

- One cup labeled "Copper Wire" with several six-inch pieces of copper wire
- Two other cups with six-inch pieces of aluminum, iron, coated steel or nichrome wire (one type per cup), labeled accordingly
- Copper Connects Us: Energy video, to show students
- Copper Connects Us Activity Sheet, one per student
- Devices with internet access, for student pairs to share

*Estimated average cost as of 2024: $32–37 for a classroom of 30 students.

DIG INTO MINING
THE STORY OF COPPER

Activity | Grades 6–8

Engage

- Begin by dividing students into groups of three or four. Explain that group members will work together to create a simple circuit to light up a light bulb!
- Distribute the **Build-a-Circuit Activity Sheet** to each group and review the directions together. Also distribute the LED light, tape and battery to each group and show students where they can find the three different types of wire.
- Then give groups time to follow the activity sheet's directions and create their circuits!
- When groups have finished, bring the class back together to discuss their results. Ask the class: Out of the wires that you tested, which one was the best *conductor*?

Be sure students understand that a conductor is a material that allows electricity to flow through it easily.

Investigate & View

- Pass out the **Copper Connects Us Activity Sheet** to each student.
- Tell students they are about to watch a video called *Copper Connect Us: Energy* where they will learn more about why copper is important when it comes to energy.
- Bring students' attention to the "While You Watch" section of the handout. Read the question provided and instruct students to jot notes here as they learn more about why there is a high demand for copper today. (They will complete the rest of the handout *after* watching the video.)
- Play the **Copper Connects Us: Energy** video.

Apply

- Spend a moment reviewing the innovations that were presented during the video. Ask students again: Why is there a high demand for copper today?
- Then bring students' attention to the second part of their handout. Read through the remaining directions and explain that students will select one of the innovations mentioned in the video to learn more about. Decide whether students should work individually or in pairs, and then instruct them to grab a device and begin their research.
- When there are a few minutes remaining in the session, bring the class back together. Wrap up by discussing: What role does copper play in sustainable energy? Encourage students to use their research to support their responses.

National Standards

NEXT GENERATION SCIENCE STANDARDS

Disciplinary Core Idea: PS3.C: Relationship Between Energy and Forces: When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object.

Crosscutting Concept: Energy & Matter: The transfer of energy can be tracked as energy flows through a designed or natural system. (MS–PS3–3)

COMMON CORE ENGLISH LANGUAGE ARTS STANDARDS

CCSS.ELA-LITERACY.CCRA.W.7: Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

BUILD-A-CIRCUIT

Introduction: A simple circuit is a loop that allows electricity to flow. Your challenge is to build a simple circuit where electricity travels from a battery to light up a bulb. Follow the directions below to test three different types of wire to determine which type conducts electricity the best!

Materials

- Bulb
- Tape
- Battery
- 3 types of wire

Directions

1. Take two pieces of **one** type of wire. Record the type of wire in the chart below.
2. Use tape to attach one piece of wire to the positive (+) end of the battery.
3. Use tape to attach the other end of this wire to the longer leg (+ end) of the LED bulb.
4. Take the second piece of wire and attach one end to the shorter leg (- end) of the LED bulb.
5. Finally, connect the other end of the second wire to the negative (-) end of the battery.
6. Does the LED bulb light up? Record your results in the chart below.
7. Then take your circuit apart and return your wire.
8. Repeat Steps 1–7 two more times with the two other types of wire!

Observations

Wire Type	Did the wire conduct electricity and light up the bulb?	Observations
	Yes No	
	Yes No	
	Yes No	

COPPER CONNECTS US

While You Watch: Jot Notes

Why is there a high demand for copper today?

After You Watch: Research

The video explored several sustainable innovations, such as electric cars, wind turbines, solar power, hydroelectric power and more. Select one innovation to focus on: _____

Then perform internet research to answer the following questions:

Why is this innovation important?	
How does this innovation work?	What role does copper play in this innovation?