

Simplicity of Electricity

Grade Levels: 4-8

Duration: 90 min

Design a robust learning experience by selecting resources from this guide that fit the needs of your students. Reinforce learning before, after, and even during your visit by diving deeper into some of the science and engineering concepts.

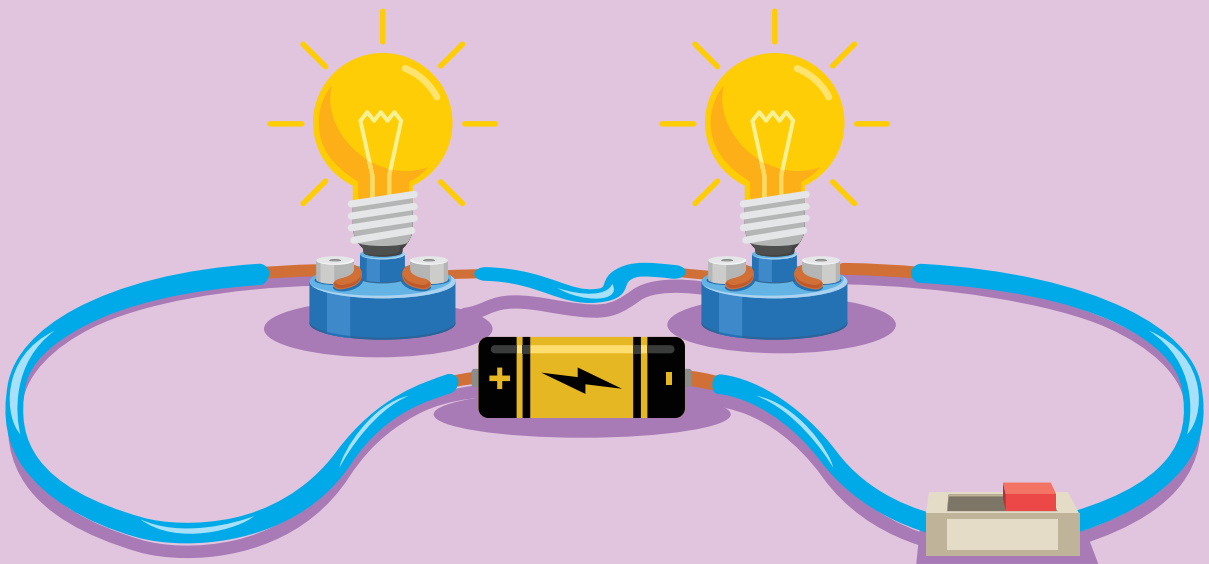


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When to implement

The following icons indicate when resources should be implemented for the greatest benefit to your students' experience in the lab.



Grade Levels: 4-8

Duration: 90 min

Concepts/Skills

Circuits, static electricity, direct current electricity, cause and effect, energy and matter

Objectives

Students will:

- Test and accurately categorize materials as conductors and insulators.
- Explore the difference between static electricity and direct current electricity.
- Design, build and test series and parallel circuits capable of powering an electrical load.

Vocabulary

These are words and concepts that we will discuss in the lab. Your students' experience will be enhanced if they are familiar with these terms prior to your visit. If you need inspiration for vocabulary activities, please see our Vocabulary Choice Board activity.

Term	Definition
Circuit	A closed loop, including a power source and electrical device such as a light bulb, that provides a path for electrical current to flow.
Conductor	A material that allows electricity to flow through it easily.
Current	The flow of moving electric charge in a closed path. The flow of current from negative to positive.
Insulator	A material that does not allow electricity to flow through it easily.
Open Circuit	A circuit that is interrupted so that electricity will not flow.
Parallel Circuit	A circuit in which each device has an independent connection to the power source.
Series Circuit	A circuit in which devices are arranged in a row, one after another on a single path. Devices in series share the energy from the power source.
Short Circuit	A path in the circuit that has no device between two different voltage potentials (power source).
Volt	A measuring unit of electric power.

Related Texts



The following titles may provide students with a greater contextual understanding of the field of chemical preservation and give additional opportunities to incorporate science and engineering into Language Arts lessons. We are not endorsing the following authors but feel that the information presented in these texts may benefit your students and enhance their learning experience.

Age Range	Title and author	Text Type	Description
Grades 3-5	"Electricity! (Discover your World Series)" by Kurt Zimmerman	Reference	An illustrated guide through the subject of electricity, this is a straightforward explanation of electricity basics, including how it's made, how it's used and how it affects everything we do.
Grades 3-5	"Power Up!: A Visual Exploration of Energy" by Shaker Paleja	Reference	A comprehensive look at human preservation processes through the last 500 years.
Grades 7-12	"Michael Vey" by Richard Paul Evans	Narrative	A comprehensive look at human preservation processes through the last 500 years.
Grades 3-6	"Charged Up: The Story of Electricity (Science Works)" by Jacqui Bailey	Reference	A comprehensive look at human preservation processes through the last 500 years.

Exhibit Connections



Make connections between learning from the lab and the exhibits and programs found in The Tech Interactive's galleries.



Social Robots

Students put together their own robot using pre-programmed cubes. When the input cubes and output cubes are correctly connected to the power source and connected together via wires, they create a circuit! Students can explore whether they can build series or parallel circuits, and identify the conductors and power source components in their robot circuits.



Lab-Related Activities



The following activities can be implemented either before or after the lab and are meant to bridge the learning from the lab to the classroom.

Activity	Description	Time
Drawing Circuits 	Build circuits and draw out diagrams of those circuits using your own key.	45-60 minutes
Math behind the Circuits 	Explore different types of circuits and make calculations to gain practical skills in building, visualizing, and understanding circuits.	Two 60-minute sessions



Looking for other hands-on activities and resources to use in your classroom? Check out our [education resources](#) page!



Writing Prompts



The following writing prompts and questions are just a few examples of journal topics you can use to incorporate writing into your students' lab experience. These prompts can be used in conjunction with any classroom writing journal.

Pre-visit prompts

- We will be attending Simplicity of Electricity at The Tech Interactive; what are you looking most forward to in this lab? Why?
- Every day you probably turn a light switch on and off at least 30 times. Explain how you think a light switch works to turn the lights on and off. Why do you think it works this way?
- If we didn't have electricity in our classroom, we would...

Post-visit prompts

- The principal is very excited to hear about your lab experience! Explain what you did and learned about in the lab since they were unable to attend the lab.
- In the lab you learned about two types of circuits: series and parallel. Explain the difference between the two in a way that someone who didn't go to the lab would understand.
- (Take photos of student's scribble bots during the lab). Ask students to review the scribble bots and write about problems they had building their device? How did they solve these problems?

Next Generation Science Standards

Simplicity of Electricity supports the following NGSS:

Grades	Engineering Design	Physical Sciences	Disciplinary Core Ideas	Crosscutting Concepts	Science and Engineering Practices
Grade 4	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	4-PS3-2 4-PS3-4	PS3.A ETS1.A PS3.B ETS1.B ETS1.C	Energy and Matter	1, 2, 3, 6
Grade 5	3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3		PETS1.A ETS1.B ETS1.C	Systems and System Models Influence of Engineering, Technology, and Science on Society and the Natural World	1, 2, 3, 6
Grades 6-8	MS-ETS1-1 MS-ETS1-2 MS-ETS1-3 MS-ETS1-4	<i>Forces and Interactions</i> MS-PS2-3	ETS1.A ETS1.B ETS1.C	Structure and function	1, 2, 3, 6



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