STEM in

LESSON PLAN

Building a simple circuit

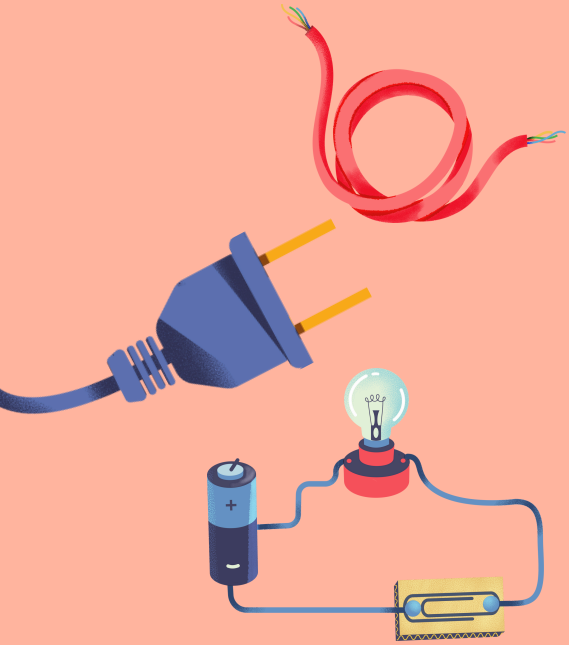
In this activity, students will learn about electrical circuits by building a simple circuit using basic materials such as a battery, wires, and a light bulb.

45-60 min **Duration**

Recommended age for this game

10-12 years

Learning Objectives



- Students will understand the concept of an electric circuit and how electricity flows through a circuit.
- Students will build a simple circuit using a battery, wires, and a light bulb.

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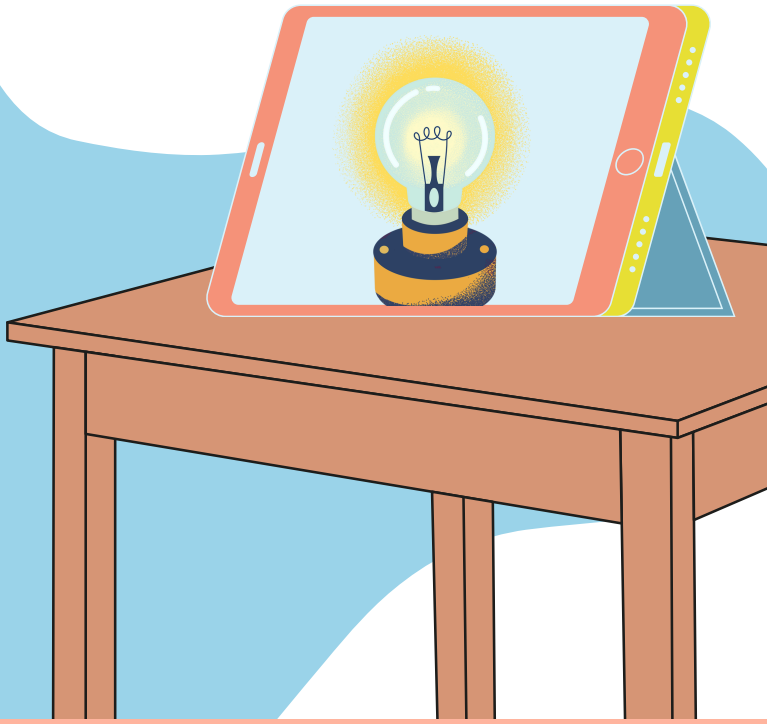
Materials and tools needed

- 1 AA Battery per student
- Battery holder (optional)
- 1 small light bulb per student
- Electrical wires (with clips)
- Electrical tape (if necessary)
- Circuit-building app



Guidance for Teachers

Activity description

In this hands-on activity, students will build a simple electric circuit using a battery, wires, and a light bulb to understand how electricity flows. They will learn the basic components of a circuit and explore how connecting them correctly powers a light. Students will also experiment with different configurations, such as adding multiple bulbs in series and parallel. The activity is designed to foster curiosity, experimentation, and the application of STEM concepts through both physical and digital circuit-building tools.

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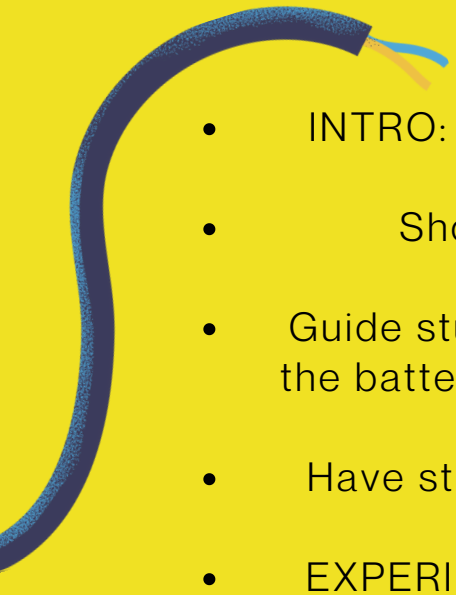
Guidance for Teachers

Preparation

- Gather materials: AA batteries, light bulbs, wires, battery holders (optional), electrical tape, and worksheets.
- Ensure students have access to digital circuit-building apps (e.g., Tinkercad Circuits) for extension activities.
- Prepare a demonstration of how to build a basic circuit and explain key concepts (battery, wires, and light bulb).
- Set up the classroom for hands-on experimentation, ensuring each student has the necessary materials.



Implementation steps

- INTRO: Briefly explain what a circuit is and introduce the key components (battery, wires, and light bulb).
- Show also a short video or diagram to illustrate how electricity flows through a circuit.
- Guide students to connect a wire from the positive end of the battery to the light bulb, then from the light bulb to the negative side of the battery.
- Have students test their circuit by ensuring the light bulb lights up.
- EXPERIMENTATION: Encourage students to modify their circuit (e.g., add a second bulb in series or parallel). Allow time for students to troubleshoot and experiment with different configurations.

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Guidance for Teachers

- **Technology integration**: Let students use a digital tool like Tinkercad Circuits to replicate their physical circuit and observe its behavior in a simulation. Discuss any differences between the real-world and digital circuit results.

Follow-up and reflection

- Quiz: Create an interactive quiz (e.g., Kahoot) to test students' understanding of circuit concepts like series vs. parallel and the roles of each component.
- Assessment: Review students' worksheets to evaluate their understanding of circuit construction and reflective answers.
- Discussion: Ask students to share any challenges they faced during the experiment and how they overcame them.

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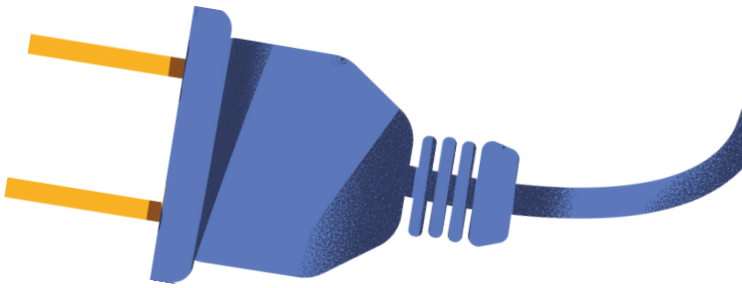
Student Activities

Activity description	Expected outcome	Technology integration
Create a Simple Circuit	Students will understand how electrical circuits work and be able to create one on their own.	Use a circuit-building app (e.g., Tinkercad Circuits) to simulate the process digitally.
Group Project: Circuit Design Challenge	Students will apply their knowledge to design a functional circuit.	Use digital tools to document and present their designs (e.g., Google Slides, Canva).
Interactive Quiz on Circuit Concepts	Students will reinforce their learning through assessment and feedback.	Use an interactive quiz platform like Kahoot to test knowledge and provide instant feedback.
Build a Parallel Circuit	Students will learn how to create a parallel circuit and understand its behavior.	Use a digital simulation tool (e.g., PhET Interactive Simulations) to test parallel circuit designs.
Design a Simple Switch	Students will understand how a switch works in controlling the flow of electricity.	Create a digital model of a switch and simulate its operation using an online tool like Tinkercad Circuits.



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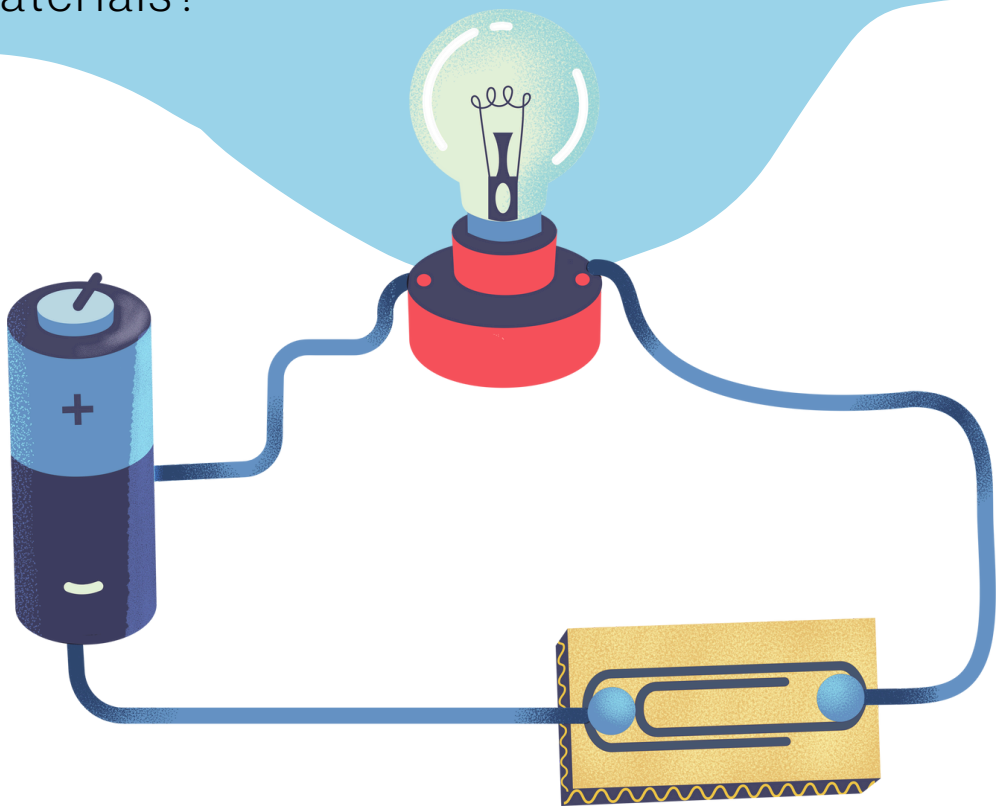
Reflective questions for students

- What did you learn about how electricity flows through a circuit that surprised you?
- What challenges did you face and how did you solve them?
- What was the most interesting thing you learned about circuits during this activity?
- How would you improve your circuit if you had more time and materials?



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Differentiation ideas

Advanced Students

- Ask advanced students to design a circuit with specific constraints, such as a circuit that includes multiple switches, LEDs, or resistors.
- Have them research real-life uses of circuits (e.g., in home wiring, electronics) and propose improvements or alternative designs.

Students with special needs

- Use large, color-coded wires and components for students with motor skill challenges.
- Provide tactile tools like snap circuits that are easy to manipulate.

Tips

- Provide clear instructions
- Demonstrate how to build a circuit before students begin
- Promote teamwork among students
- Walk around the classroom regularly to offer support
- Acknowledge each student's success

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Additional materials and references

Video: “The Power of Circuits”
Guide: Instruction of Building a Simple Circuit
Book: Creative SEL
Lesson plan: Making Circuits

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ANNEX 1

Questions for the quizz

What is needed for an electric circuit to work?

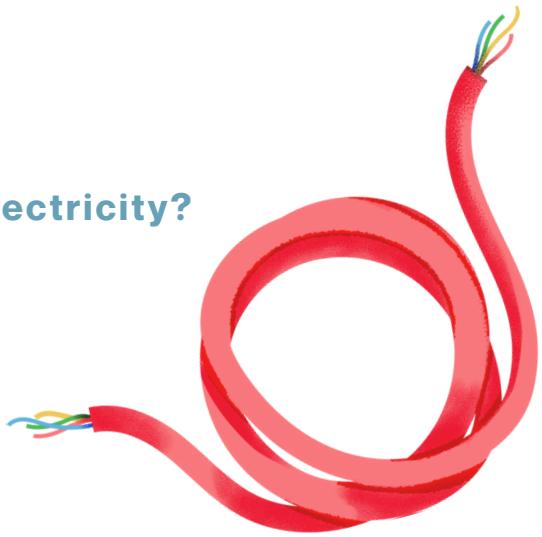
a) Only a light bulb
b) A complete path with no breaks
c) Just a battery
d) A switch

What happens if there is a break in a circuit?

a) The current keeps flowing
b) The circuit works faster
c) **The electricity stops flowing**
d) The battery loses power

Which material is a good conductor of electricity?

a) Plastic
b) Rubber
c) Copper
d) Wood



What is the role of a battery in a circuit?

a) It stops the electricity
b) It provides the energy for the circuit
c) It controls the flow of electricity
d) It changes the direction of current

What happens when you add more light bulbs to a series circuit?

a) They shine brighter
b) They turn off completely
c) They all shine dimmer
d) They explode

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