



TITLE:

Building and Understanding Simple Circuits

GRADE LEVEL: 6TH GRADE TO 8TH GRADE

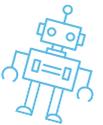
STEAM AREAS: SCIENCE, TECHNOLOGY,
ENGINEERING

MATERIALS NEEDED:

- Breadboard
- Jumper wires
- Resistors (for safety, use 220 ohms or higher)
- LEDs
- Battery pack
- Switch
- Multimeter (optional)
- Pen and paper for note-taking

OBJECTIVES:

- Students will learn about the basic components of a simple electrical circuit and their roles;
- Students will understand how to properly connect circuit components on a breadboard;
- Students will explore the flow of electricity in a simple circuit and the importance of a closed loop;
- Students will develop problem-solving skills and critical thinking by troubleshooting and fixing common circuit issues.



PROCEDURE:

Setting up a simple circuit involves several steps, and it's important to follow them carefully to ensure proper functioning. In this detailed procedure, I will guide you through the process with step-by-step instructions and explanations.

Step 1: Gather the necessary components To set up a simple circuit, you will need the following components:

- A power source: This is typically a battery. Choose the appropriate voltage and size for your circuit.
- A switch: The switch acts as a gate to control the flow of electricity in the circuit.
- An LED (Light Emitting Diode): LEDs emit light when electricity passes through them. You can choose an LED with your desired color.

Step 2: Prepare the breadboard A breadboard is a device that allows for easy circuit building without the need for soldering. It consists of a grid of holes in which you can insert components. To start, place the breadboard on a stable surface.

Step 3: Connect the positive terminal of the battery Take a jumper wire and insert one end into the positive terminal of the battery. On the breadboard, locate a row marked with a red line or a plus sign (+). Insert the other end of the jumper wire into any hole in that row to establish a connection.



PROCEDURE:

Step 4: Connect the switch Take another jumper wire and insert one end into a hole in the same row as the positive terminal connection on the breadboard. On the other side of the switch, you will find two terminals. Insert the other end of the wire into one of these terminals.

Step 5: Connect the LED Take a third jumper wire and insert one end into the other terminal of the switch. On the breadboard, locate another row marked with a positive sign. Insert the other end of the wire into any hole in that row to establish a connection.

Step 6: Connect the negative terminal of the battery and LED Take a fourth jumper wire and insert one end into the negative terminal of the battery. On the breadboard, locate a row marked with a blue line or a minus sign (-). Insert the other end of the jumper wire into any hole in that row to establish a connection.

Step 7: Connect the LED to complete the circuit On the breadboard, find a hole in the same row as the negative terminal connection. Insert one leg of the LED into that hole. Take a fifth jumper wire and connect the other leg of the LED to a hole in the row marked with a positive sign.

Step 8: Test the circuit Flip the switch to the "on" position. If everything is connected correctly, the LED should light up, indicating that the circuit is functioning properly. If the LED doesn't light up, double-check your connections and make sure all components are properly inserted.

That's it! You have successfully set up a simple circuit. It's important to note that this is a basic circuit configuration, and there are many variations and additional components you can explore as you dive deeper into electronics.

Happy experimenting!

ASSESSMENT:

- Students' understanding will be assessed through their participation in the hands-on activity and their answers to the circuit questions. Their ability to troubleshoot and fix common circuit issues will also be evaluated.

REFERENCES:

- "Setting Up a Simple Circuit Tutorial" video (<https://youtu.be/S2YFXhr69Q0>)
- "Introduction to Electrical Circuits for Kids" by Science Buddies
- All About Circuits - "Simple Circuits" (<https://www.allaboutcircuits.com/text-book/digital/chpt-1/simple-series-circuits/>)