

Photo Description



This image shows a circuit board with wires connected to different colored terminals (green, blue, yellow, pink, and black). The wires are connected to numbered ports labeled 1-8, a blue section labeled "P/MV," and a yellow section labeled "R1, R2, C." Multiple colored wires carry electricity through the circuit, similar to how roads carry cars to different places.

Scientific Phenomena

Anchoring Phenomenon: Electricity flowing through different pathways to light up devices or make them work.

Why This Happens: Electricity needs a complete path (circuit) to travel from a power source through wires and devices, and back to the starting point. Think of it like a water slide—water flows down because there's a path for it to follow. In this circuit board, the colored wires create pathways for electricity to flow to different components (like lights, sounds, or sensors). When the circuit is complete with no breaks, electricity can move, and devices turn on. When a wire is disconnected or broken, the circuit is "open," and electricity stops flowing—just like closing a gate stops water flow.

Core Science Concepts

- * Circuits: A complete loop or pathway that electricity travels through. Electricity needs a beginning, a middle, and a way to return home to work.
- * Conductors: Materials (like copper wires and metal) that allow electricity to flow easily through them. The colored wires in the photo are conductors.
- * Open and Closed Circuits: A closed circuit has a complete path for electricity to travel (devices work). An open circuit has a broken path (devices don't work).
- * Electrical Components: Different parts of a circuit, such as power sources, wires, switches, lights, or buzzers that work together.

Pedagogical Tip:

Third graders benefit from tactile, kinesthetic learning. Before introducing wiring diagrams, have students physically model circuits by holding hands in a circle (closed circuit) and then breaking the circle (open circuit). This concrete experience helps them understand electricity's need for a complete path before moving to abstract circuit boards.

UDL Suggestions:

Multiple Means of Representation: Provide circuit diagrams alongside real circuit photos. Use consistent color coding (e.g., red always means power, black always means ground) to support visual learners and students with color blindness. Include tactile models or raised-line diagrams for students who are blind or have low vision.

Multiple Means of Engagement: Allow students to choose their own materials for circuit-building activities—some may prefer pre-assembled kits, while others may explore with wire and batteries independently. This choice supports autonomy and motivation.

Discussion Questions

1. What do you think will happen if we remove one of the colored wires from this circuit board? (Bloom's: Predict | DOK: 2)
2. Why do you think the wires in this circuit are colored differently? How might the different colors help us? (Bloom's: Analyze | DOK: 2)
3. If you wanted to build a circuit to light up a lamp in your bedroom, what parts would you need, and how would you connect them? (Bloom's: Create | DOK: 3)
4. How is a circuit similar to a path or road you might walk or drive on? (Bloom's: Analyze | DOK: 2)

Extension Activities

1. Circuit Challenge Game: Provide students with battery packs, LED lights, and copper wire. Challenge them to build a simple circuit to light up an LED. Have them predict what will happen if they remove one wire, then test their prediction. This hands-on exploration reinforces the concept of open vs. closed circuits.
2. Circuit Mapping: Give students a large poster board and ask them to draw the "path" that electricity takes through an imaginary home (from the power source to lights, appliances, and back). Have them use colored markers and discuss where switches would interrupt the circuit and why that's important.
3. Story of a Spark: Have students create a short picture book or comic strip showing the "journey" of electricity through a circuit from start to finish. They can personify the electricity as a character traveling along the wire roads, stopping when it hits an open switch, and arriving at a "destination" (light, buzzer, fan) when the circuit is closed.

NGSS Connections

Performance Expectation:

3-PS2-3: Ask questions to determine the effect of placing objects in the path of an apparent source of motion. (This PE connects to understanding how circuits can be interrupted or completed.)

Disciplinary Core Ideas:

* 3-PS2.A - Forces and Motion: Electricity flows through closed circuits and can be interrupted by opening the circuit.

Crosscutting Concepts:

* Systems and System Models - A circuit is a system of connected parts working together.

* Cause and Effect - Closing or opening a circuit causes devices to turn on or off.

Science Vocabulary

- * Circuit: A closed loop that electricity travels through, like a circle with no breaks.
- * Conductor: A material (usually metal) that lets electricity flow through it easily, like copper wire.
- * Electricity: A form of energy that flows through wires and powers devices like lights and toys.
- * Switch: A device that opens or closes a circuit to turn something on or off.
- * Power Source: The thing that provides electricity, like a battery or outlet.

External Resources

Children's Books:

Electricity Everywhere* by Wendy Pfeffer (Illustrated by Paul Meisel) – A beginner-friendly book explaining electricity in nature and homes.

Up and Down with Mr. Gravity* by Necia H. Apodaca – Includes simple explanations of how electricity powers everyday devices.

YouTube Videos:

* "Simple Electric Circuits for Kids | Science Lesson" – Explains open and closed circuits with clear visuals and demonstrations. https://www.youtube.com/results?search_query=simple+electric+circuits+for+kids

* "How Do Circuits Work? | National Geographic Kids" – Uses animations and real-world examples to show electricity flowing through circuits. https://www.youtube.com/results?search_query=how+do+circuits+work+national+geographic+kids

Teacher Tip: Start with conceptual understanding before introducing schematic symbols. Real circuits and tactile exploration are the foundation for third graders. Safety reminder: Use low-voltage circuits (batteries, not wall outlets) for all student activities, and always supervise electrical activities closely.