

# Circuits

Materials	Amount per Trial
Tin Foil	1
Pencils	1
Wire	1
Nickel	1
Penny	1
Circuit Board (Premade)	1
Piece of Wool	1
Mylar Strands	3
Paper Folder Strand	1
Cardboard Strand	1
Plastic Spoon	1
Metal Utensil	1

## Discussion (~10~15 minutes):

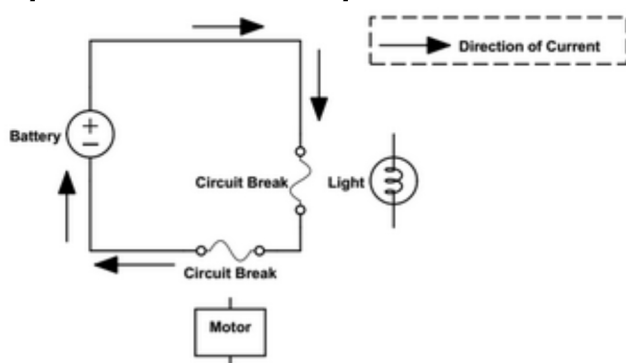
**Have you ever ridden on a rollercoaster? What would happen if a section of the track were missing?**

A roller coaster only works if the track is “closed” in a giant loop. If any part of the track is missing, the roller coaster cars will never make it to the end. Like these tracks, **circuits** need to be closed.

### What is a circuit?

A **circuit** is a closed loop around which electricity flows. Extending the rollercoaster analogy, if the tracks represent the circuit, then the rollercoaster cars represent the **electricity**.

**Draw this diagram on the board and explain what each component does.**



**Energy Source:** This is the battery that stores electrical energy

**Load:** Anything that will use energy from the battery.

**Wire:** This is the “track” that connects the battery to the load and allows electricity to flow around the circuit. This can be a metal rod, foil, or any other conductor.

**The circuit in front of you has two breaks. These are the “missing rollercoaster tracks.” What should be put in these breaks to close them?**

Only certain materials can move electricity from one place to another. These are called **conductors**. Things that do not move electricity are called **insulators**. They prevent the flow of electricity.

### What is the difference between a conductor and insulator?

Simply put, **conductors** transfer electricity. These are objects with **low resistance**.

**Insulators** block electricity.

These are objects with **high resistance**. By analogy, they put brakes on your rollercoaster cars and stop/slow them down.

## Procedure: (10~15 minutes):

**Scouts should spread out among the tables. As students test different materials, help them identify the materials as either a conductor or an insulator. Have them explain why, does the material “close the loop”?**

1. Pass out the circuit boards to groups of three
2. Hand out various materials
3. Ask the kids to fill in the first broken circuit
4. Ask the kids to fill in the second broken circuit
5. Rank which items let the motor spin
6. Discuss the results
7. If time, use wires or other conductors in your and explain how it works, what is a circuit, and what each component does

## Review Questions:

**What is the difference between a conductor and an insulator? Out of your materials, which were which?**

Record these on your worksheet.

**If you are outside during a lightning storm, is it better to be holding an umbrella with a metal handle or a wooden handle? Why?**