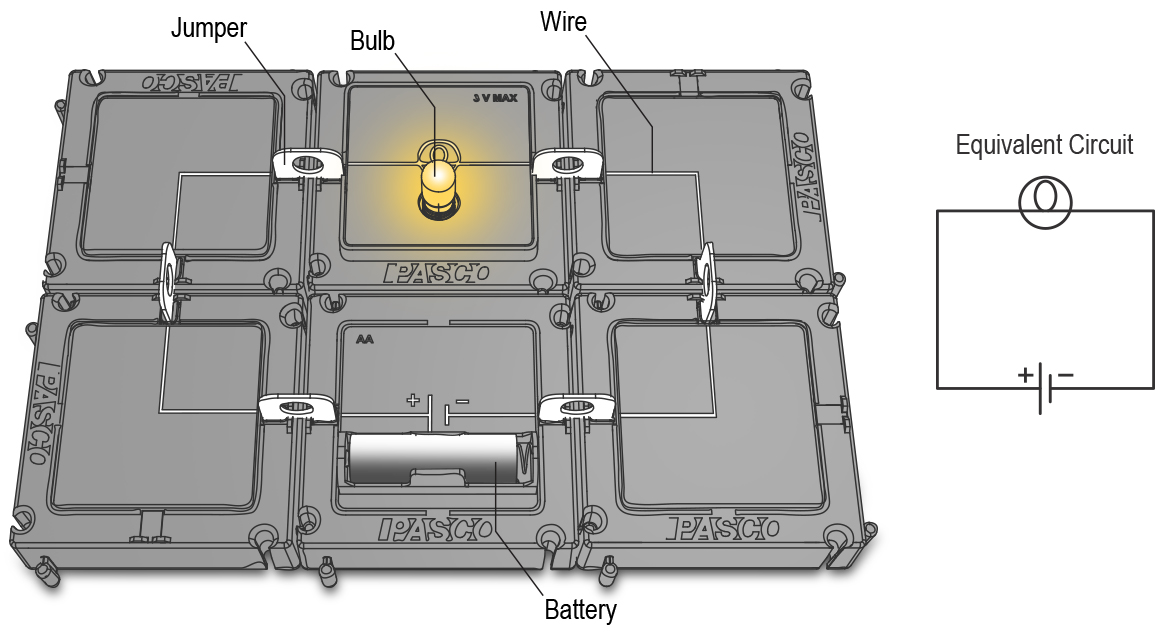
# **Electricity and circuits**

**Investigation 17A: Simple circuits**

The Modular Circuits kit provides an easy and quick way to prototype and design electronic circuits. This investigation explores how to build simple circuits using the kit and to relate the circuit to a comparable equivalent circuit diagram.



1. Connect a battery, bulb, and four wire corners together to create the circuit in the diagram.
2. Add six jumpers to your circuit to connect the components together and make the bulb light up.

Questions

1. Remove a jumper. Why does the bulb not light up when the jumper is removed?

Answer: Removing the jumper opens the circuit, preventing the current to flow.

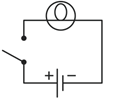
1. Remove the battery module from the circuit, turn it around so it is reversed, and reconnect it. Does the bulb still light up? What do you think reversing the battery changes in the circuit?

Answer: The bulb will still light up. Reversing the battery reverses the current, which could be observed with a current sensor module.

1. Connect two jumpers with a bare wire to create a short circuit (try connecting different jumpers). Which two jumpers did you need to connect in order to create a short circuit? What happens to the bulb when you create a short circuit?

Answer: Any two jumpers connected on opposite sides of the bulb will create a short circuit. This will cause the bulb to either dim or turn off completely.

1. Add a switch and any necessary wire modules to your circuit so that you can turn on the light by closing the switch (closed circuit), and turn off the light by opening the switch (open circuit). Draw a circuit diagram of your new circuit, using the circuit symbols.



Answer:

1. Describe another way you can create an open circuit without opening the switch.

Answer: Answers can include removing a jumper, removing a wire, unscrewing the bulb, removing the battery, etc.

Applying new knowledge

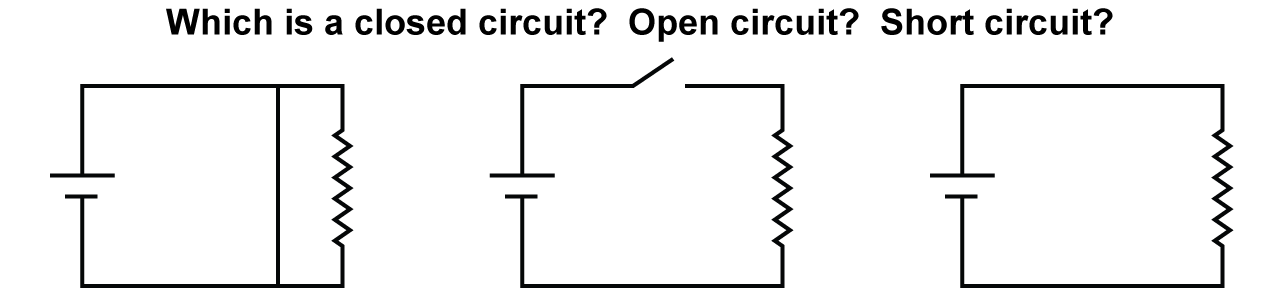
1. Define electric current and identify its unit.

Answer: Electric current is the flow of charge through the wire. Its unit is the amp or Ampere.

1. What type of device is commonly used to measure electric current?

A. switch B. transformer C. ammeter D. anemometer E. voltmeter

1. Identify the following kinds of circuits:



short circuit open circuit closed circuit

1. Which type of circuit shown above is most likely to cause a fire? Why?

Answer: A short circuit allows so much current to flow that wires can overheat.

1. Draw the electrical symbols for the following circuit elements:

A. resistor B. battery C. switch D. wire E. lamp