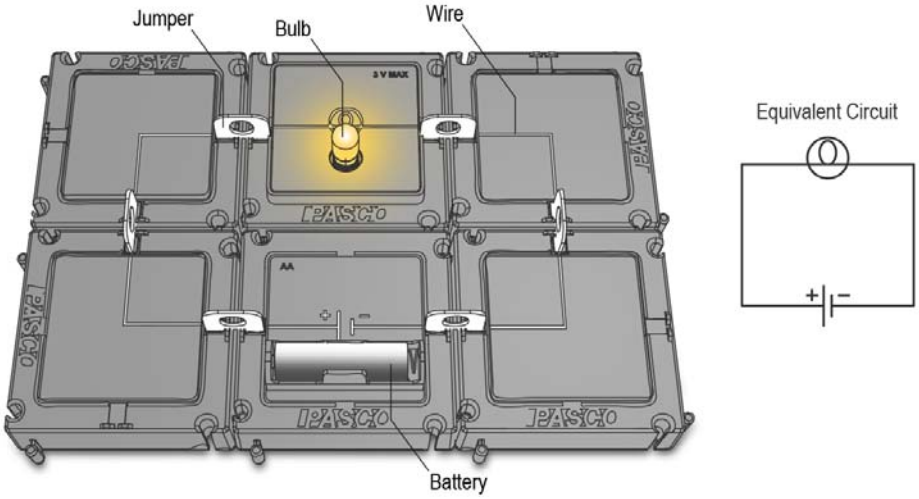
Investigation 17A: Electricity and circuits

Essential question: How do you build a circuit?

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

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

b. 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?

c. Connect the two jumpers on the bulb module with a bare wire to create a short circuit. What happens to the bulb when you create a short circuit? Try connecting jumpers on the wire and battery modules. Does connecting any two jumpers create a short circuit?

d. 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.

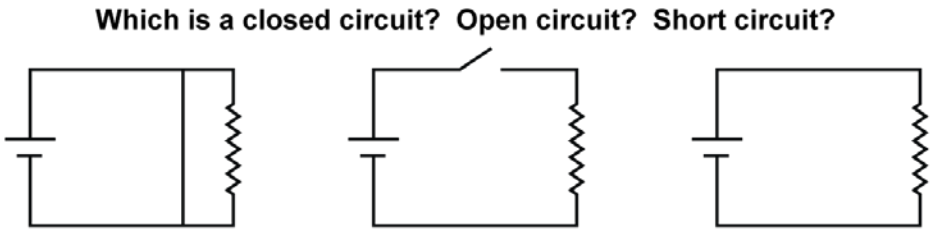
e. Describe another way you can create an open circuit without opening the switch.

Applying new knowledge

1. Define electric current and identify its unit.

2. What type of device is commonly used to measure electric current?
   A. switch B. transformer C. ammeter D. anemometer E. voltmeter

3. Identify the following kinds of circuits:



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

5. Draw the electrical symbols for the following circuit elements:
   A. resistor B. battery C. switch D. wire E. lamp