

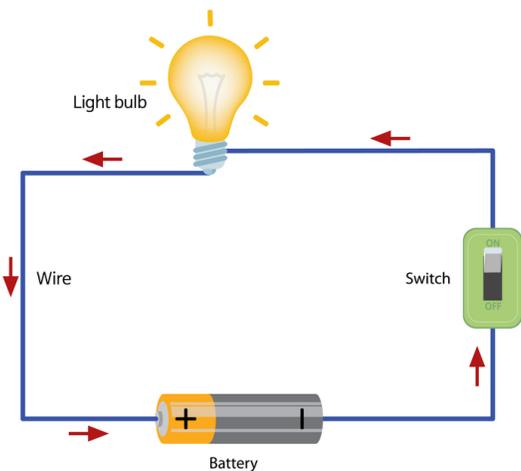
**Adventures in Science
Level 4 Student
Sample Lesson**

OPEN AND CLOSED CIRCUITS

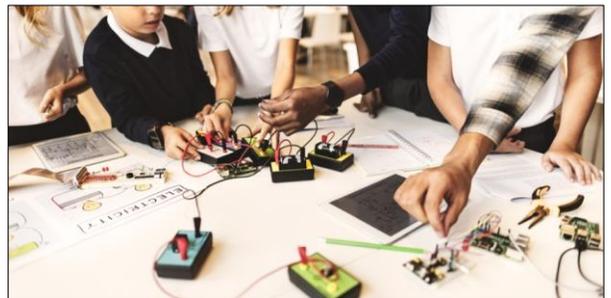
Electricity travels on paths between a power source, such as a battery, and objects requiring electricity, like a flashlight. This stream of electricity is called **current electricity**. When electrical currents flow uninterrupted between a source and appliance, it is a **closed circuit**.

What interrupts this electrical flow?

When a light switch is turned off, the electrical circuit is interrupted and the lights go out. This is now an **open circuit** because the electrical current is not complete. Electricity flows through a closed or complete circuit, but cannot flow through an open circuit because the path is broken.



What kind of switch stops the flow of electricity? A **knife switch** is able to open and close the path of electricity without removing electrical wires. With the flip of a lever, a knife switch interrupts electricity changing a closed circuit to an open circuit and back again.



Closed or Open? Activity 1

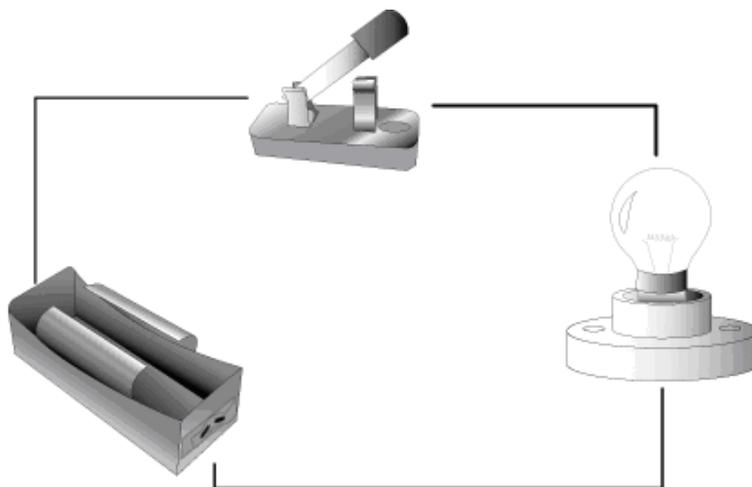
Conduct experiments and answer questions.

Student Materials:

- **KNIFE SWITCH**
- **COPPER WIRE LEADS w/ ALLIGATOR CLIPS (3**
- **SOCKET WITH BULB**
- **BATTERY HOLDER**

Student Instructions:

1. Insert a battery into the battery holder and screw the light bulb into the socket.
2. Use one of the wire leads to connect one side of the battery holder with one of the metal screws on the light socket.
3. Use another lead to connect the other side of the battery holder to the knife switch. There are no positive or negative poles on the knife switch.
4. Using the third lead, connect the socket to the knife switch with the lever in the up position. Lower the lever. If the connections are secure, the bulb will light.



5. When the knife switch is closed, what happens to the bulb? _____

6. Why? _____

7. Raise the lever on the knife switch. What happens? _____

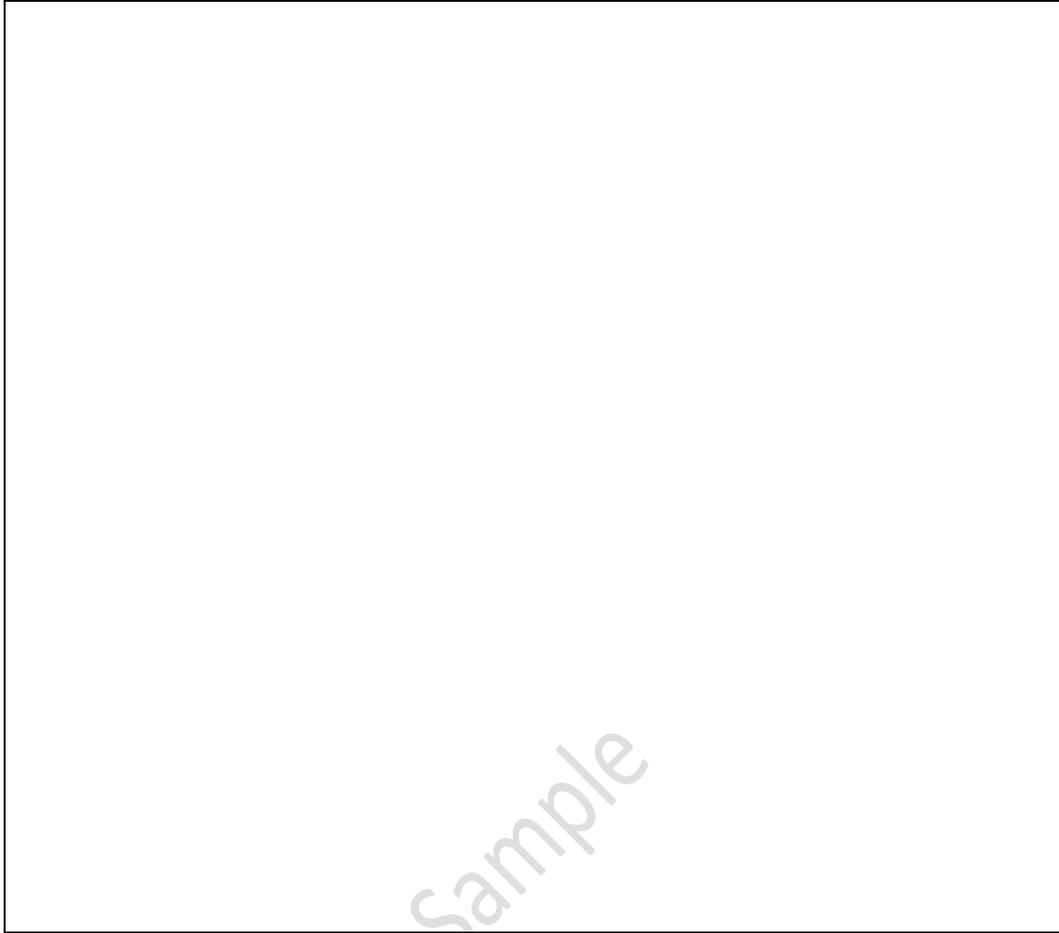
8. Why? _____

9. When the bulb is lit, is it an open or closed circuit? _____

10. When the bulb is not lit, is it an open or closed circuit? _____

11. In the box on the next page, draw a closed circuit using a lamp, a

battery and two lead wires.



Did you know?

A greyhound is the fastest dog with running speeds of 45mph!

The loud noise created by cracking a whip occurs because the tip is moving so fast it breaks the speed of sound!

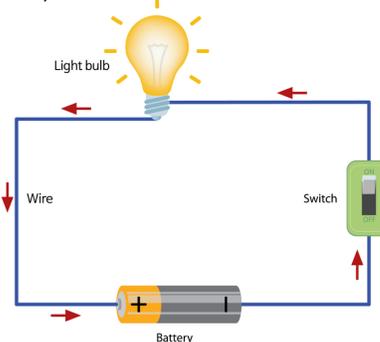
And those are science facts!

Adventures in Science Level 4 Teacher Sample Lesson

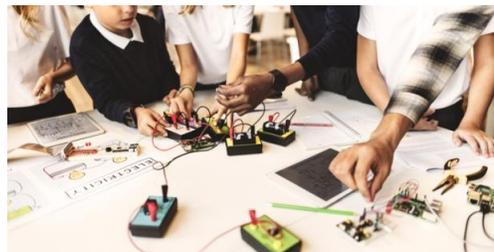
❖ OPEN AND CLOSED CIRCUITS

Electricity travels on paths between a power source, such as a battery, and objects requiring electricity, like a flashlight. This stream of electricity is called **current electricity**. When electrical currents flow uninterrupted between a source and appliance, it is a **closed circuit**. What interrupts this electrical flow?

When a light switch is turned off, the electrical circuit is interrupted and the lights go out. This is now an **open circuit** because the electrical current is not complete. Electricity flows through a closed or complete circuit, but cannot flow through an open circuit because the path is broken.



What kind of switch stops the flow of electricity? A **knife switch** is able to open and close the path of electricity without removing electrical wires. With the flip of a lever, a knife switch interrupts electricity changing a closed circuit to an open circuit and back again.



Teacher Materials

- ENERGY BALL

TEACHER NOTE: *The Energy Ball safely introduces students to electric energy and is a fun way to demonstrate open and closed series circuits without any danger of electric shocks! Turning the ball on is the fun part as you just touch the metal strips with your two index fingers. Yes, your body forms the conducting material that bridges the gap between the two metal strips and closes the circuit! When both sensors on the ball are touched, a complete circuit is formed and the ball emits a whistling noise and flashes a red light.*

Closed or Open? Activity 1
Student Workbook Page 193

Conduct experiments and answer questions.

Teacher Materials: <ul style="list-style-type: none">• BATTERY, "D" PER STUDENT	Student Materials: <ul style="list-style-type: none">• KNIFE SWITCH• COPPER WIRE LEADS w/ ALLIGATOR CLIPS (3qty)• SOCKET WITH BULB• BATTERY HOLDER
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Student Instructions:

1. Insert a battery into the battery holder and screw the light bulb into the socket.
2. Use one of the wire leads to connect one side of the battery holder with one of the metal screws on the light socket.
3. Use another lead to connect the other side of the battery holder to the knife switch. There are no positive or negative poles on the knife switch.
4. Using the third lead, connect the socket to the knife switch with the lever in the up position. Lower the lever. If the connections are secure, the bulb will light.
5. When the knife switch is closed, what happens to the bulb? **IT LIGHTS UP.**
6. Why? **THE FLOW OF CURRENT WAS COMPLETE LIGHTING THE BULB.**
7. Raise the lever on the knife switch. What happens? **THE LIGHT GOES OUT.**
8. Why? **THE FLOW OF CURRENT WAS STOPPED.**
9. When the bulb is lit, is it an open or closed circuit? **CLOSED CIRCUIT.**
10. When the bulb is not lit, is it an open or closed circuit? **OPEN CIRCUIT.**
11. In the box on the next page, draw a closed circuit using a lamp, a battery and two lead wires

