Subject: Science

Chapter 8: Electrical Circuits

Section A: Simple Circuits

Objectives:

- Recognise that an electrical device will not work if there is a break in the circuit.

- Describe how a switch opens and closes a circuit.

Student's Book p.120

CHAPTER 8

Electrical Circuits

How do you turn a lamp off?

You have learnt in Stage 2 about simple circuits and using electricity safely. Look at the picture. How would you turn the lamps on and off?

Name three objects that use electricity in your school.

Student's Book p.121

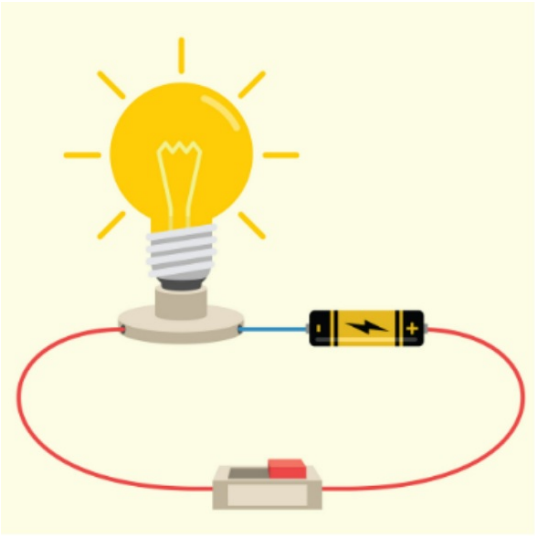
A Simple Circuits

In this section, I will

- explain that an electrical device will not work if there is a break in the circuit
- describe how a switch opens and closes a circuit
- explain why models do not fully represent an idea
- explain relationships and quantities through models
- describe the use of science where I live

Thinking cap

I wonder if a lamp can light up if the wires in a circuit are not connected properly...



- What is the purpose of the wire?

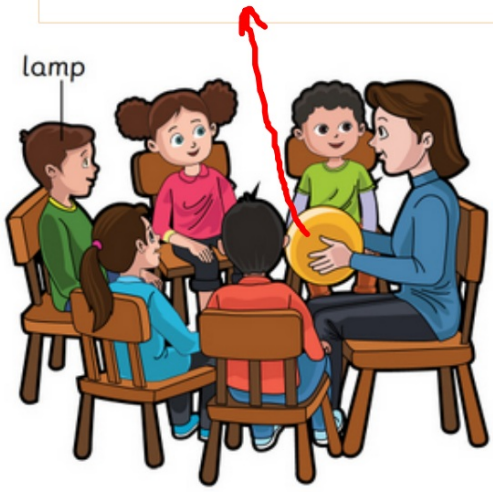
- Can we replace the wire with another object to make the lamp work?

Student's Book p.121

Let's Explore!

Let's make a circuit!

1. Sit in a circle with your chairs touching.
2. Your teacher will name someone the "lamp".
3. Your teacher will pass a ball to the student on her right.
4. You can only pass the ball to the person on your right whose chair is touching yours.
5. When the ball reaches the "lamp", the person should yell "Light!" before passing the ball to the right.
6. The teacher will name a different "lamp" in each round.
7. Predict what will happen if two of your classmates are taken away from the circle and there is a gap. Can the ball get passed all around to reach the "lamp"?
8. In what ways is the model of a circuit your class has acted out different from an actual circuit?



8.Electric current does not look like a ball.
A wire is a long continuous strand, not separated like the chairs.
Electric current moves continuously and not like the ball.

Components of a circuit:

1. the cell or battery
2. wires
3. lamp or bulb
4. switch

A **cell** is usually called a **battery**. Can you see a positive (+) end and a negative (–) end on it?

The battery is the power source of the circuit.

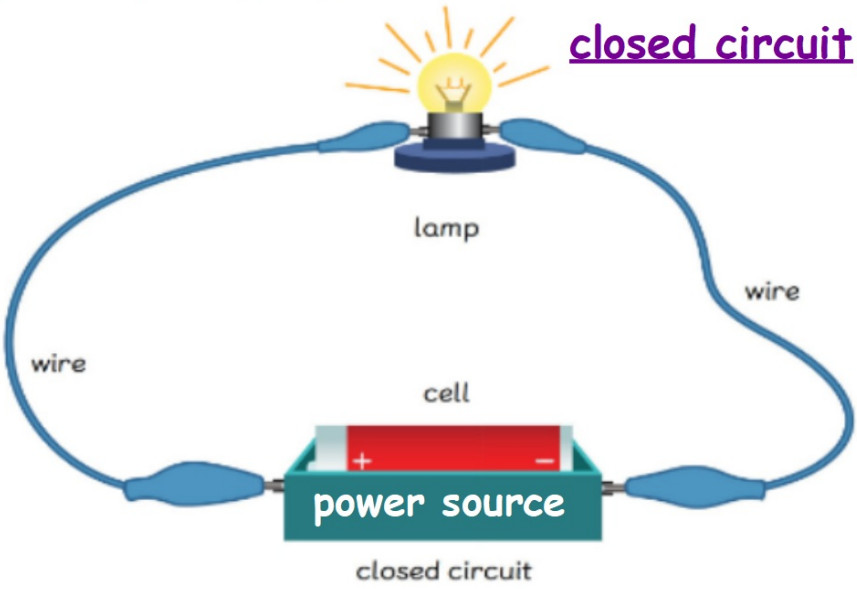
Let's Learn

Student's Book p.122

What Happens if There Is a Break in the Circuit?

Electricity travels from a power source such as a cell around the circuit through wires. The electric current flows through the wires around the circuit and back to the cell. If there is a lamp in the circuit that is connected properly, the lamp will light up.

closed circuit

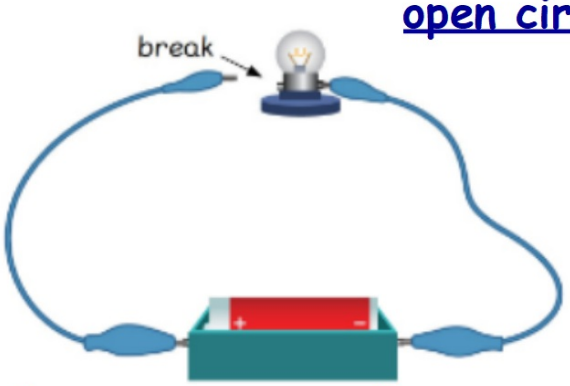


Electric current = Electricity moving through a circuit

Student's Book p.122

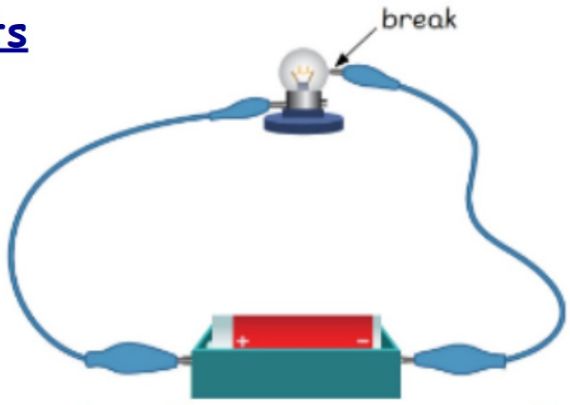
If the lamp and wires are not connected properly, the lamp will not light up. There is a break in the circuit and electric current cannot flow around the circuit.

open circuits



electric current cannot flow around the circuit

open circuits

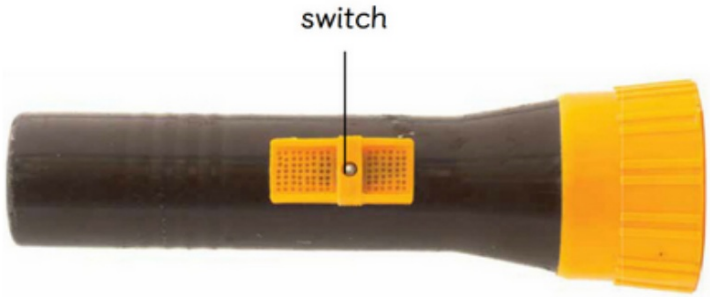


electric current cannot flow around the circuit

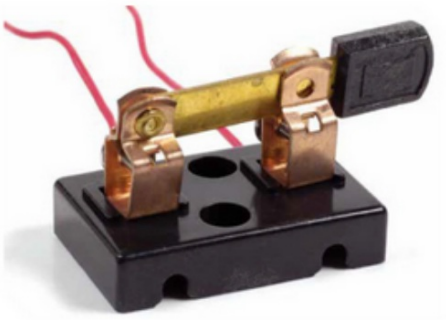
Student's Book p.123

What Is a Switch?

A **switch** is used to control the flow of electric current in a circuit. It can be used to turn an electrical device on or off.



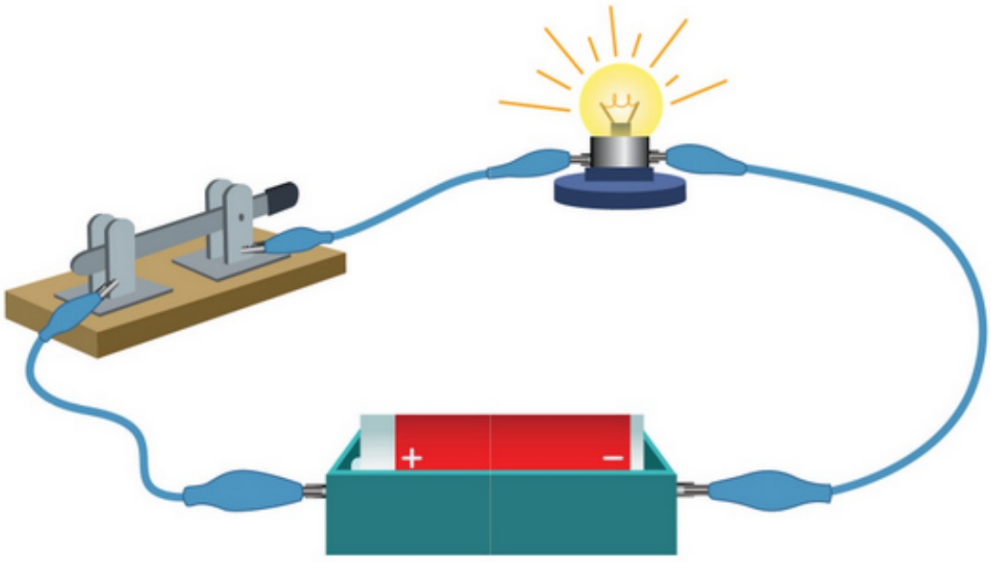
a torch with a switch



a closed switch

When we turn the switch on, the circuit is closed. There are no breaks in the circuit and electric current can flow through the circuit. The lamp in the torch will light up.

Student's Book p.123



closed circuit

Word Boost

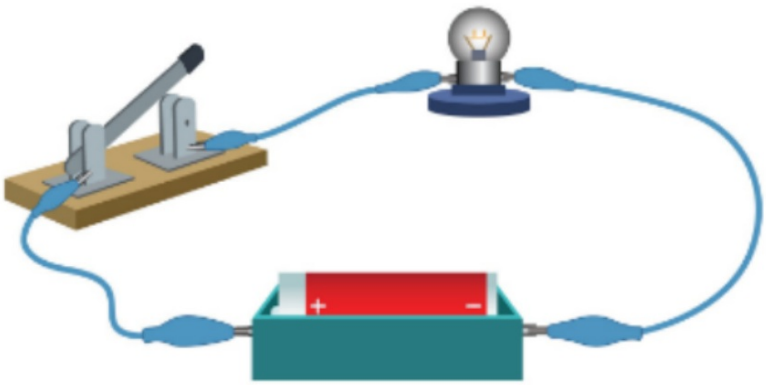
control

to direct the behaviour of something

Student's Book p.124

When we turn the switch off, the circuit is open. There is a break in the circuit and electric current cannot flow through the circuit. The lamp in the torch will not light up.

an open switch

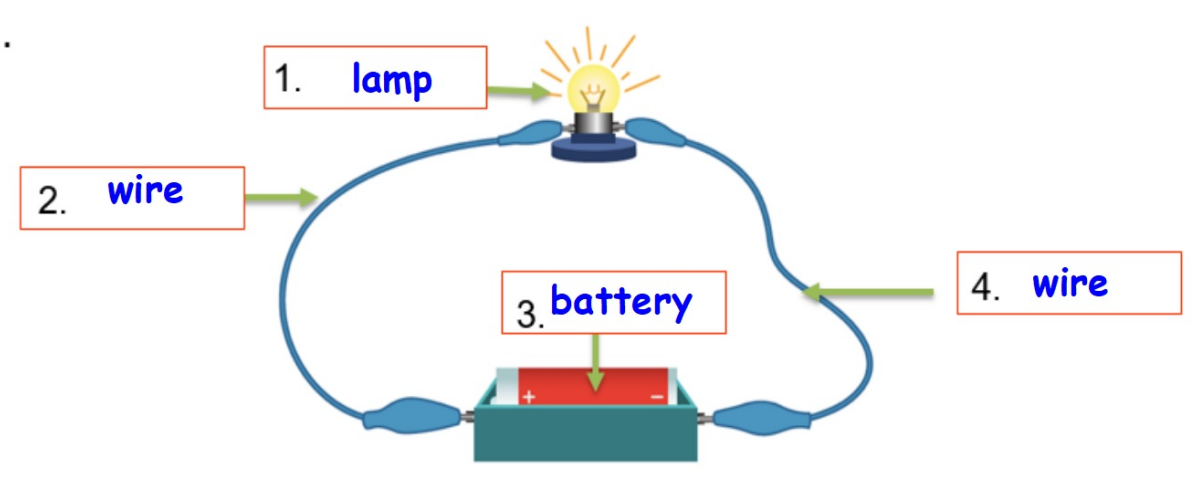


open circuit

In a circuit with two switches, will a lamp light up if only one switch is closed? Try this experiment and share with your class what you observed.

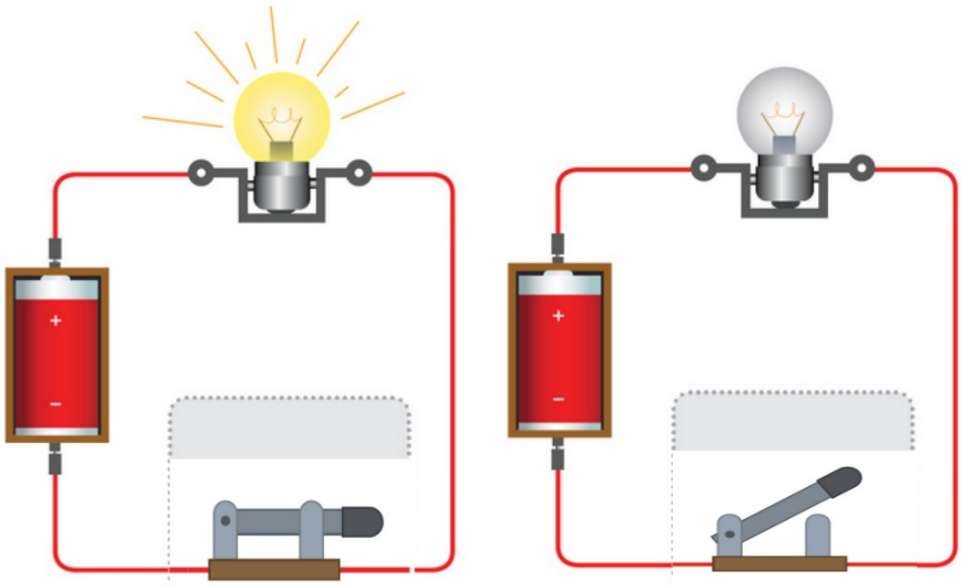
ACTIVITY

Label the simple circuit.
Move the words to the matching circuit parts on the diagram.



Use the stickers at the back of the book to complete the circuits.

Student's Book p.125



closed circuit

open circuit

Check Your Learning

What happens to the lamp if there is a break in the electrical circuit?

The lamp will not light up.

Student's Book p.125

Check Your Learning

What happens to the lamp if there is a break in the electrical circuit?

Tick (✓) to show what you can do.

- ☐ I can explain how circuits will not work if there is a break in the flow of electricity.
- ☐ I can describe the use of switches in an electrical circuit.
- ☐ I can explain why models do not fully represent a situation or idea.
- ☐ I can explain relationships and quantities through models.
- ☐ I can describe the use of science where I live.

WRAP-UP

Match the words to the correct definitions.

Lamp Circuit Battery Switch

1.	A complete path around which electricity can flow
2.	A device that opens or closes an electric circuit
3.	A device used to convert electricity into light
4.	A device that can store electricity

CHAPTER 8

Electrical Circuits

Activity Book p.73

Activity 8A Make Your Own Paper Clip Switch

Skills: Do practical work safely, analyse results to answer a scientific question

Materials:

- Scissors
- Small cardboard
- Two paper fasteners
- Paper clip
- 1.5V cell
- Cell holder
- 1.5V lamp
- Lamp holder
- Three alligator clip wires

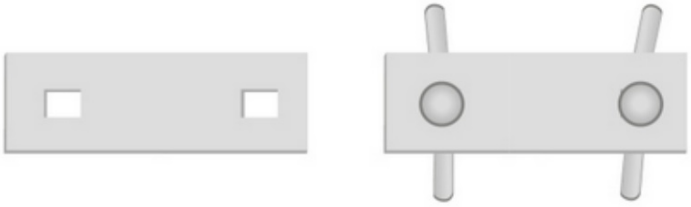
Activity Book p.73

Method

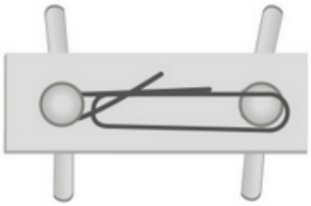
1 Use the scissors to cut the cardboard into a rectangle of size 3 cm by 1 cm. Be careful when using the scissors. Ask your teacher for help if you cannot cut the cardboard.

2 Make two holes in the cardboard for your paper fastener to go through.

3 Put a paper fastener in each hole as shown.



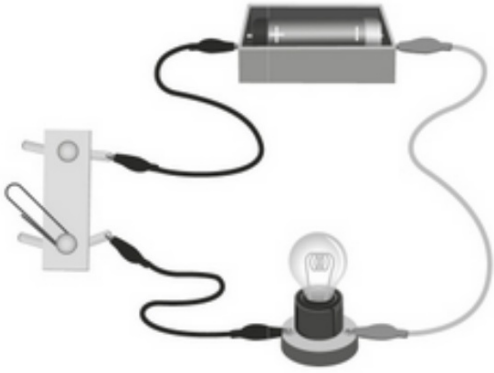
4 Open the paper clip slightly and place it around the fasteners.



5 Build the circuit using the cell, lamp and wires as shown.

Activity Book p.74

6 Attach the alligator clips to the fasteners.



Activity Book p.74

7 What happens when the paper clip touches only one fastener?

_____

8 Move the paper clip down to touch both fasteners. What happens now?

_____

9 Fill in the blanks with the following words to complete the conclusion.

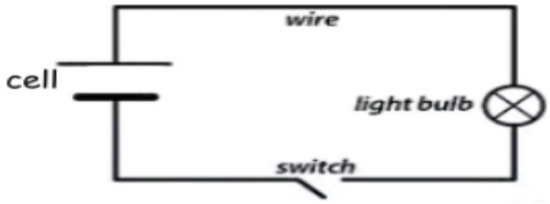
break	circuit	switch

The paper clip acts as a _____. It controls the flow of electric current in a _____. A circuit will not work if there is a _____ in it.

Date: _____

Chapter 8, lesson A: Simple circuits (8.A.1)

1. The components of a simple electrical circuit are:



Each component can be represented by a symbol.
Each component has a function in the electrical circuit.

Fill in the blanks.

The_____is the **source** of the electric current (electricity) in the electrical circuit.

_____ The_____are responsible for **connecting** the electrical components that form an electrical circuit. The electric current **flows through** the wires.

The _____ **controls the flow** of the electric current. It opens or closes a circuit.

The _____ is an electrical component that **indicates the presence of the electrical current** by lighting up.

2. Three students are having a discussion about switches.

Aki: A switch can close a circuit to allow electricity to flow.

Kim: When we turn the switch off, the circuit is closed.

Ren: Switches are not useful because they break a circuit.

Only **one** student is correct.

Circle the name of the student who is **correct**.

Aki **Kim** **Ren**

3. Mary wants to make a circuit. She uses a lamp.

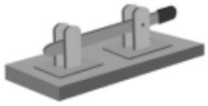
Which other parts should she use so that the lamp lights up?

Tick (✓) the **two** correct answers.

- ☐ cell
- ☐ wires
- ☐ open switch

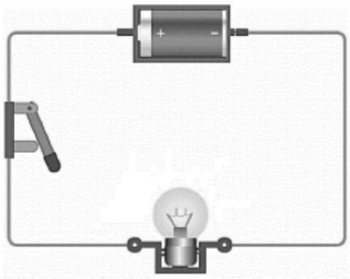
4. Which diagram shows a **closed** switch?
Tick (✓) the correct box.

☐



☐

5. Sanad makes a circuit.



a. He notices that the lamp does not light up.
Explain why.

_____

_____

b. What can Sanad do to make the lamp light up?
Suggest **one** way.

_____

_____

6. Looking at this circuit, Tia notices a break in the electric circuit.

a. **Circle** where this break is.

b. **Explain** how a break affects the electric <u>current</u>.

_____

_____

_____

Remember

The electric current is the electric energy that flows throughout the components in the electrical circuit.

The **electric current flows out of the cell** and moves through the wires, the switch and the lamp then back through the wires to the cell.


THANK
YOU!