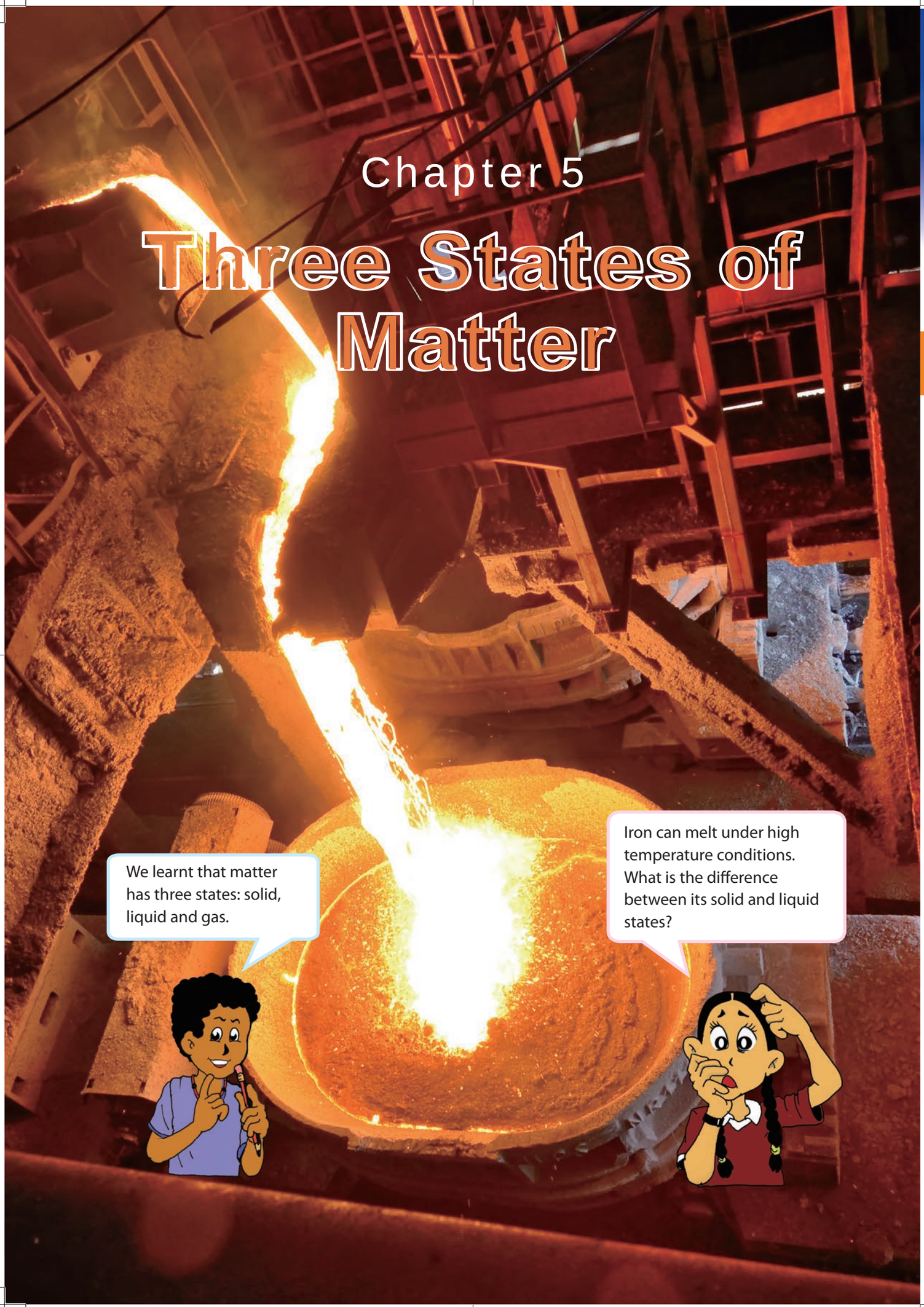

Chapter 5
Three States of Matter
We learnt that matter has three states: solid, liquid and gas.
Iron can melt under high temperature conditions. What is the difference between its solid and liquid states?

5.1 Properties of Three States of Matter

Like water, all matter can exist in three states: solid, liquid and gas. What kinds of properties do these three states of matter have?

Lesson 1 Shape of The Three States of Matter

Shape is one of the properties of matter. Is the shape of solid, liquid and gas similar or different?

How is the shape of the three states of matter similar or different?

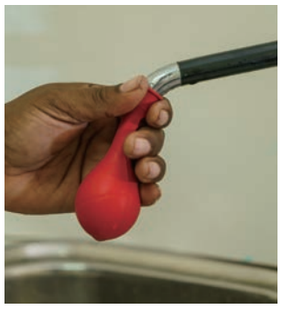
Activity : Observing the shape of a stone, water and air

What We Need:

- a stone, water, three balloons

What to Do:

1. Put the stone into the balloon and tie the top of the balloon. Fill the second balloon with water and blow up the third balloon. Tie the mouth of the balloons.



2. Press the stone, water and air in the balloons and observe the changes in their shape.
3. Based on your observations, think about the following questions:
   (1) What happened to the shape of the stone, water and air when you pressed them?
   (2) What shape do solid, liquid and gas have?
   (3) How similar or different is the shape of the three states of matter?

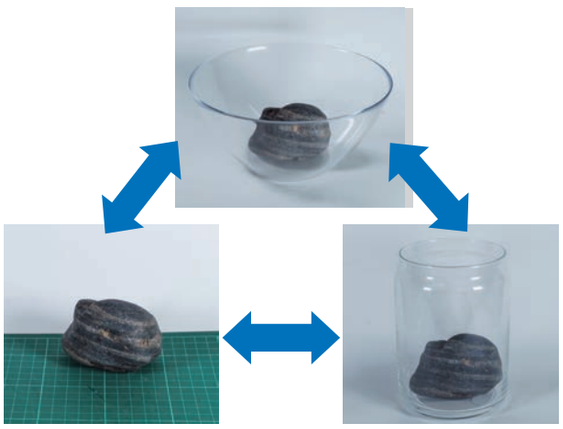
4. Share your findings with your classmates. Discuss how the shape of the three states of matter is similar or different.

Summary

Solid, liquid and gas have specific characteristics in terms of their shape.

1. Solid

A solid has **a definite shape**. The shape of solid remains the same whether it is pressed or placed into different containers. For example, a stone will keep its shape wherever we press it or put it on a desk, in a glass or in a box. This means that the shape of a solid does not change. A solid has a definite shape.



A solid does not change its shape wherever it is placed in different place.

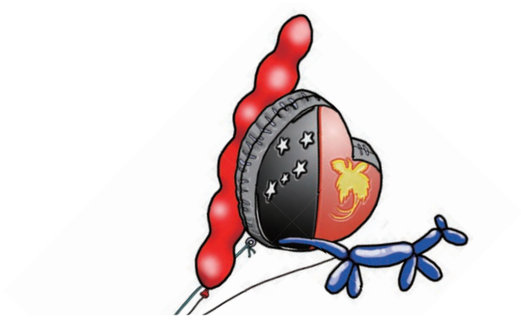
2. Liquid

Liquid has **no definite shape**. Liquid changes its shape when it is pressed. Liquid also changes its shape to match the shape of the containers. For example, liquid takes the shape of the glass when it is poured into a glass. Liquid also changes its shape when it is spilled on a table. A liquid has no definite shape.

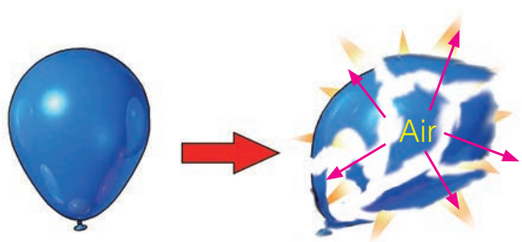
A liquid changes its shape to match the shape of the containers.

3. Gas

Gas has **no definite shape**. Gas changes its shape as it takes the shape of the container. If we fill the different shaped balloons with air, the air expands to fill the balloons and takes on different shapes. If the balloons burst, air will escape and spread out.



A gas expands to fill the balloons and takes on the different shapes.



If the balloon bursts, the air will escape.

Lesson 2 Volume of Three States of Matter

Solid has a definite shape but liquid and gas have no definite shape. How about the volume of solid, liquid and gas?

What characteristics of volume do the three states of matter have?

Activity : Heating and cooling water and air

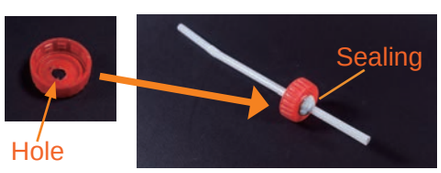
What We Need:

- cold water, hot water, plastic bottle with its cap, straw, balloon, two bowls, removable adhesive

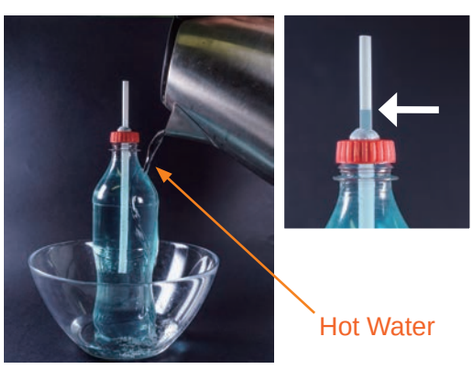
What to Do:

1. Stretch the mouth of the balloon over the top of an empty bottle. Place the bottle in the bowl of hot water for a minute and observe the size of the balloon. Then place the same bottle into a bowl of cold water for a minute and observe the size of the balloon. Record your observations.

2. Next, make a hole on the top of the bottle cap, big enough for a straw to fit through. Put a straw through the cap and seal around the hole in the cap using removable adhesive. Fill the bottle with water and screw on the bottle cap. Put the bottle in the bowl and pour hot water onto the bottle. Observe the water in the straw and record your observations.



3. Share your results with your classmates.



Be very careful when handling hot water!

Discussion

Based on your results, think about the following questions.

1. What happened to the size of the balloon when the empty bottle was heated and cooled? Explain why.
2. What happened to the water in the straw when hot water was poured on the bottle? Explain why.

Metal parts allow the bridge to change length.

Summary

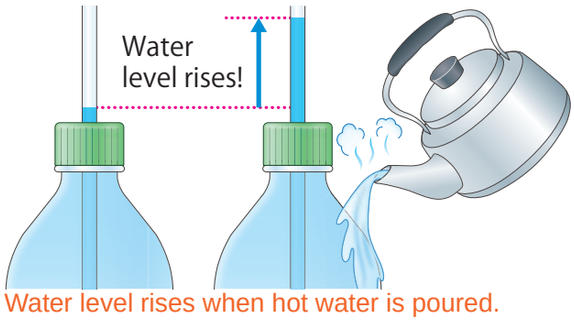
Solid, liquid and gas expand when heated. They contract when cooled. The increase in volume of matter due to an increase in temperature is called **thermal expansion**.

1. Solid

Solid expands very little when heated. Most large bridges include metal parts which look like two metal combs. There are spaces between these metal parts that allow the bridge to change length without breaking. If the bridge material expands and the bridge gets longer, the parts move closer together. If it contracts, they move further apart.

2. Liquid

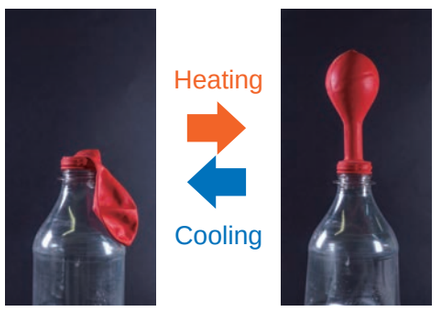
Liquid expands a little more than solid. When hot water is poured on the bottle filled with water, the water inside the bottle becomes warmer and expands. As a result of this the water level in the straw rises. The volume of water increases.



Water level rises when hot water is poured.

3. Gas

Gas expands a lot more when heated. As the air inside the bottle heats, the balloon begins to expand. This is because the air inside the bottle expands and it spreads out into the balloon.



As the air inside the bottle is heated, the balloon begins to expand.

Lesson 3 Change in State of Matter 1: Solid and Liquid

Water can change its state by heating and cooling. How about other matter?

How does matter change its state from a solid to a liquid?

Activity : Heating and cooling a candle

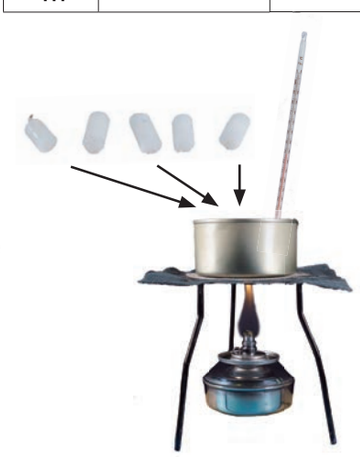
What We Need:

- thermometer, candle, burner, empty tin can, bowl with water

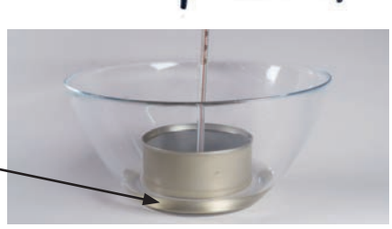
What to Do:

1. Draw a table like the one on the right.
2. Break up the candle into small pieces and put them in the empty tin can.
3. Place the thermometer in the tin and take the first reading. Heat the tin can using the burner as shown in the picture below.
4. Measure the temperature of the candle every two minutes and observe the candle until it melts completely.
5. Record the temperature and your observations in the table after every two minutes.
6. After melting, place the tin can in the bowl of water. Measure the temperature of the candle every two minutes and observe its hardness until all the candle wax hardens completely.
7. Record the temperature and your observations in the table.
8. Share your results with your classmates.

Time (mins)	Temperature (°C)	Conditions of Candle
0		
2		
4		
6		
8		
10		
12		
...		



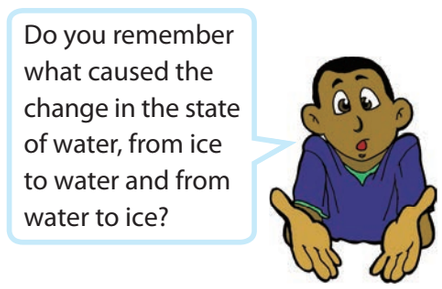
Be careful when using the hot burner and water!



Discussion

Think about the following questions based on your results.

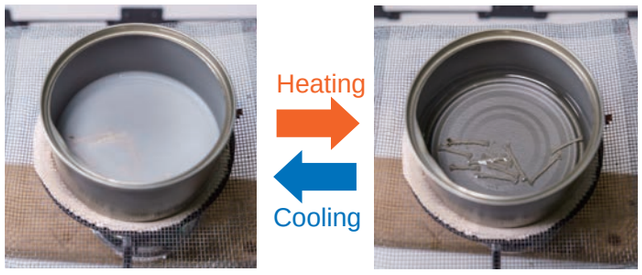
1. What was the state of the candle before and after heating?
2. How did the state of the candle change after placing it in the bowl?
3. What was the temperature of the candle when it completely melted and hardened?
4. How does the candle change its state from a solid to a liquid and from a liquid to a solid?



Summary

Matter can change its state from a solid to a liquid and from a liquid to a solid when it is heated or cooled. For example, a candle is a solid because it has a definite shape. When a candle is heated, it starts to melt.

A candle changes its state from a solid to a liquid by heating. When the melted candle is cooled, it hardens. A candle changes its state from a liquid to a solid when it is cooled.



A candle changes its state by heating and cooling.

When heat is added to a solid, its temperature will rise to a certain point where the solid starts to melt. This point is called the **melting point**. When heat is removed from the liquid, its temperature drops to a certain point where the liquid starts to freeze. This point is called the **freezing point**. The melting and freezing point of water is 0°C.

Iron starts melting at about 1 500°C.

Lesson 4 Change in State of Matter 2: Liquid and Gas

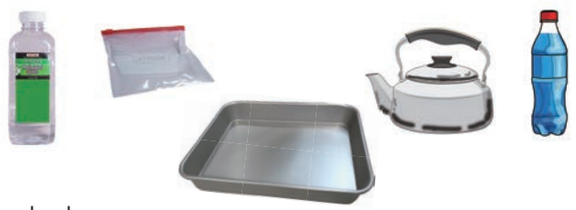
Water can change its state from water to water vapour by heating and from water vapour to water by cooling. How about other matter?

How does a matter change its state from a liquid to a gas?

Activity : Change in state of ethanol

What We Need:

- ethanol, zip lock bag, tray, hot and cold water



What to Do:

1. Draw a table like the one shown below

	What is happening to the zip lock bag and ethanol?
Before pouring the hot water	
After pouring the hot water	
After pouring the cold water	

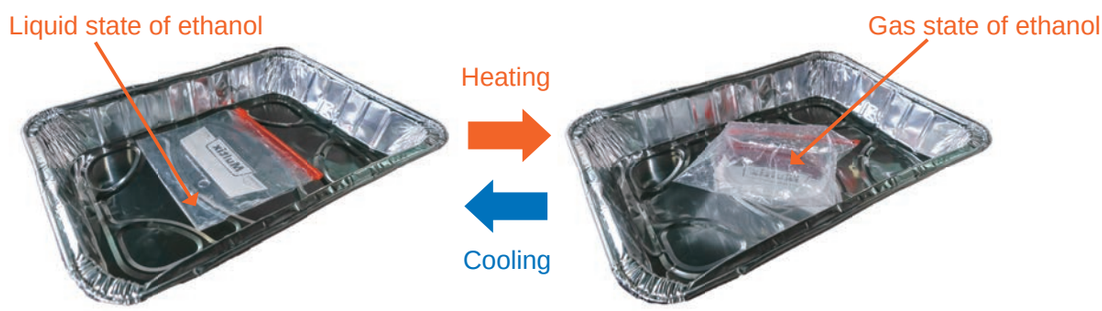
2. Pour 5 mL of ethanol into the zip lock bag, zip it firmly and observe.
3. Place the zip lock bag in the tray and pour hot water onto it. Observe the zip lock bag and the ethanol in it. Record your observations in the table.

4. Pour cold water onto the zip lock bag. Observe the zip lock bag and the ethanol. Record your observations in the table.
5. Think about the following questions based on your observations:
   (1) What happened to the zip lock bag and the ethanol after pouring the hot water? Explain why.
   (2) What happened to the zip lock bag and the ethanol after pouring cold water? Explain why.
   (3) How did the ethanol change its state?

6. Share your findings with your classmates.

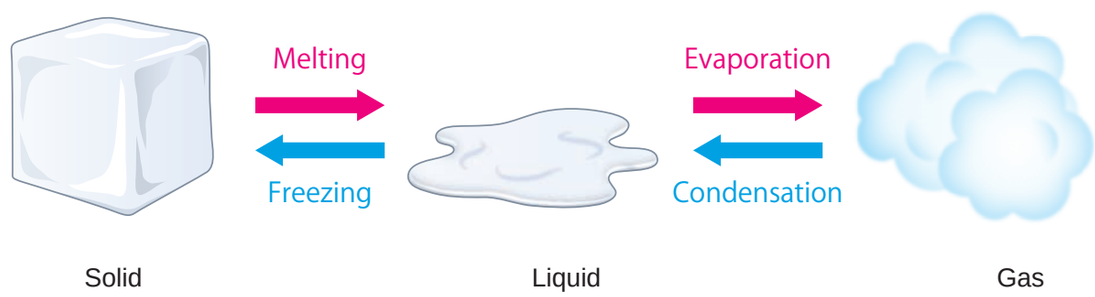
Summary

Matter can change its state from a liquid to a gas and from a gas to a liquid when it is heated or cooled. For example, ethanol is a liquid. When ethanol in a zip lock bag is heated, the zip lock bag expands and the amount of liquid ethanol decreases. This means that the ethanol changes its state from a liquid to a gas. The temperature at which a liquid changes into a gas is called the **boiling point**. When a gas state of ethanol in the zip lock bag is cooled, the zip lock bag shrinks and the amount of liquid ethanol increases. This means that the gas state of ethanol changes its state from a gas to a liquid.



Ethanol changes its states by heating and cooling.

All matter can be solid, liquid or gas depending on their temperature. Matter changes its state by heating or cooling. When heat is added to matter, it changes its state from a solid to a liquid or from a liquid to a gas. The process that causes a matter to change from a solid to a liquid is called **melting**. The change of state from a liquid to a solid is called **freezing**. When heat is removed from matter, it changes its state from a gas to a liquid or from a liquid to a solid. The change of state from a liquid to a gas is called **evaporation**. The change of state from a gas to a liquid is called **condensation**.



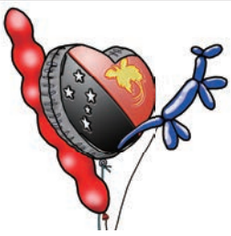
Matter can be a solid, liquid or gas depending on its temperature.

Summary and Exercise

Summary

5.1 Properties of Three States of Matter

Shape of the Three States of Matter

		
Solid has a definite shape which does not change even if it is pressed or placed anywhere.	Liquid has no definite shape. It changes its shape when pressed or placed in different kinds of container.	Gas has no definite shape. It changes its shape as it takes the shape of the container.

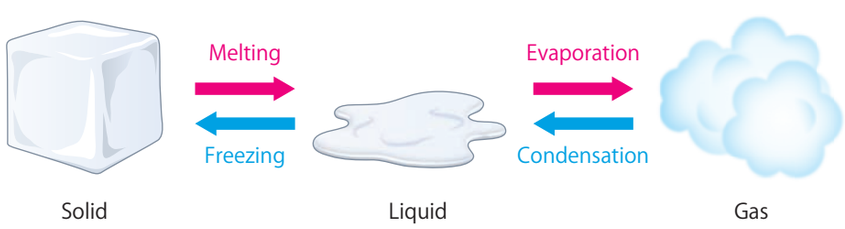
Volume of Three States of Matter

- ☑ Solid, liquid and gas expand when heated and contract when cooled.
- ☑ Thermal expansion is the increase in volume of matter due to the increase in its temperature.

Volume of Matter when Heated		
Solid	Liquid	Gas
Solid expands very little.	Liquid expands a little more than solid.	Gas expands greater than liquid and solid.

Changes in States of Matter: Solid and Liquid, Liquid and Gas

- ☑ Matter can change from one state to another by heating and cooling.
- ☑ All matter can be solid, liquid or gas depending on their temperature.



- ☑ The melting point is the point in which solid starts to melt when the temperature rises.
- ☑ The freezing point is the point in which liquid starts to freeze when the temperature drops.
- ☑ The melting and freezing point of water is 0°C.
- ☑ The boiling point is the temperature at which a liquid changes into a gas.

Summary and Exercise

Exercise

5.1 Properties of Three States of Matter

Q1. Complete each sentence with the correct word.

(1) The three _____ of matter are solid, liquid and gas.

(2) Unlike liquid and gas, _____ has a definite shape.

(3) Gas changes its _____ as it takes the shape of different kind of containers.

(4) The melting and freezing point of water is _____ °C.

Q2. Choose the letter with the correct answer.

(1) Solid, liquid and gas _____ when they are heated.

A. contract

B. expand

C. disappear

D. burst

(2) Which of the following is a property of liquid?

A. All liquids have colour.

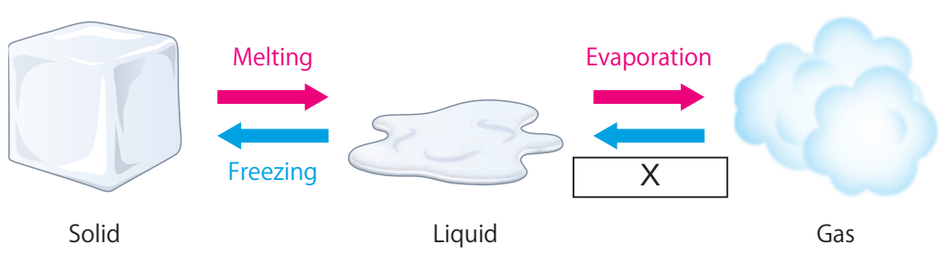
B. Liquid never expand when it is heated.

C. Liquid has a definite shape.

D. Liquid increase its volume when its temperature increases.

Q3. Answer the following question.

What process of change in the state of matter is marked **X**?

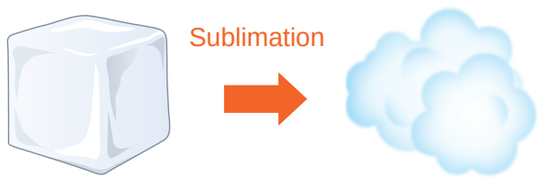


Q4. Benny wanted to open the top of a cough mixture bottle but it was too difficult to open. The top is made of metal and the bottle is made of glass. He poured some hot water over the bottle top and then he was able to open it. What made it easier for him to open the top of the cough mixture bottle?

Do all substances change their state from solid to liquid and liquid to gas?

All substances mainly have three different states at various temperatures. The change from solid state to gas state requires the change of solid state to liquid state and liquid state to gas state.

If solids have enough vapour pressure at a particular temperature then they can change directly into air. The direct change of state from solid to gas is called **sublimation**.



Examples of Sublimation

One of the example of sublimation is dry ice. It is a solid form of carbon dioxide. Its temperature is less than -78^{o}C. When dry ice gets exposed to air, it directly changes its state from solid to gas. When dry ice is placed in water, sublimation is accelerated and smoke like fog is created.The most common use of dry ice is to preserve food to keep it cool.This is because the temperature of dry ice is lower than ice and it does not make the food wet due to its sublimation process.

Another well-known example of sublimation is a substance known as naphthalene. Naphthalene is usually found in pesticides such as mothball. When mothballs sublime, they give off a pleasant fragrance which is also irritating to pests like cockroaches. For this reason they are used in drawers, shelves, wardrobes and suitcases in homes.

Solid state of carbon dioxide

Sublimation of carbon dioxide

Chapter Test

5. Three States of Matter

Q1

Complete each sentence with the correct word.

(1) Solid, liquid and gas increase its _____ when heated.

(2) A solid has a definite _____.

(3) The point at which solid starts to melt is called _____ _____.

(4) A change of state from a liquid to a gas is called _____.

(5) Gas expands much more than solid and _____.

Q2

Choose the letter with the correct answer.

(1) What happens when hot water is poured on a bottle filled with water?

A. The volume of the water will decrease.

B. The water in the bottle becomes warmer and expands.

C. The water in the bottle cools and contracts.

D. All water in the bottle evaporates.

(2) Which of the following matter has no definite shape?

A. Oxygen and candle

B. Stone and water

C. Sand and sugar

D. Air and water

(3) Which term best describes the process of change from solid to liquid?

A. Freezing

B. Evaporation

C. Melting

D. Condensation

(4) Which of the following is the correct statement about the volume of matter?

A. The volume of liquid increases when it is heated.

B. The volume of solid decreases when it is heated.

C. Gas never expands when it is heated.

D. All matter do not change their volume when heated.

Q3

(1) Danny observed and sketched the state of the candle as shown in the picture on the right. Classify the state of the candle near the flame as a solid, liquid or gas.

A burning candle

_____

(2) Study the diagram below.

← Bowl of hot water

What will happen to the balloon when the bottle is placed into the bowl of hot water?

_____

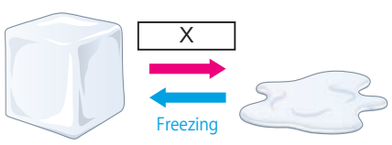
(3) Explain your answer for (2).

_____

_____

(4) Study the diagram shown on the right. What process is marked 'X'?

_____



Q4

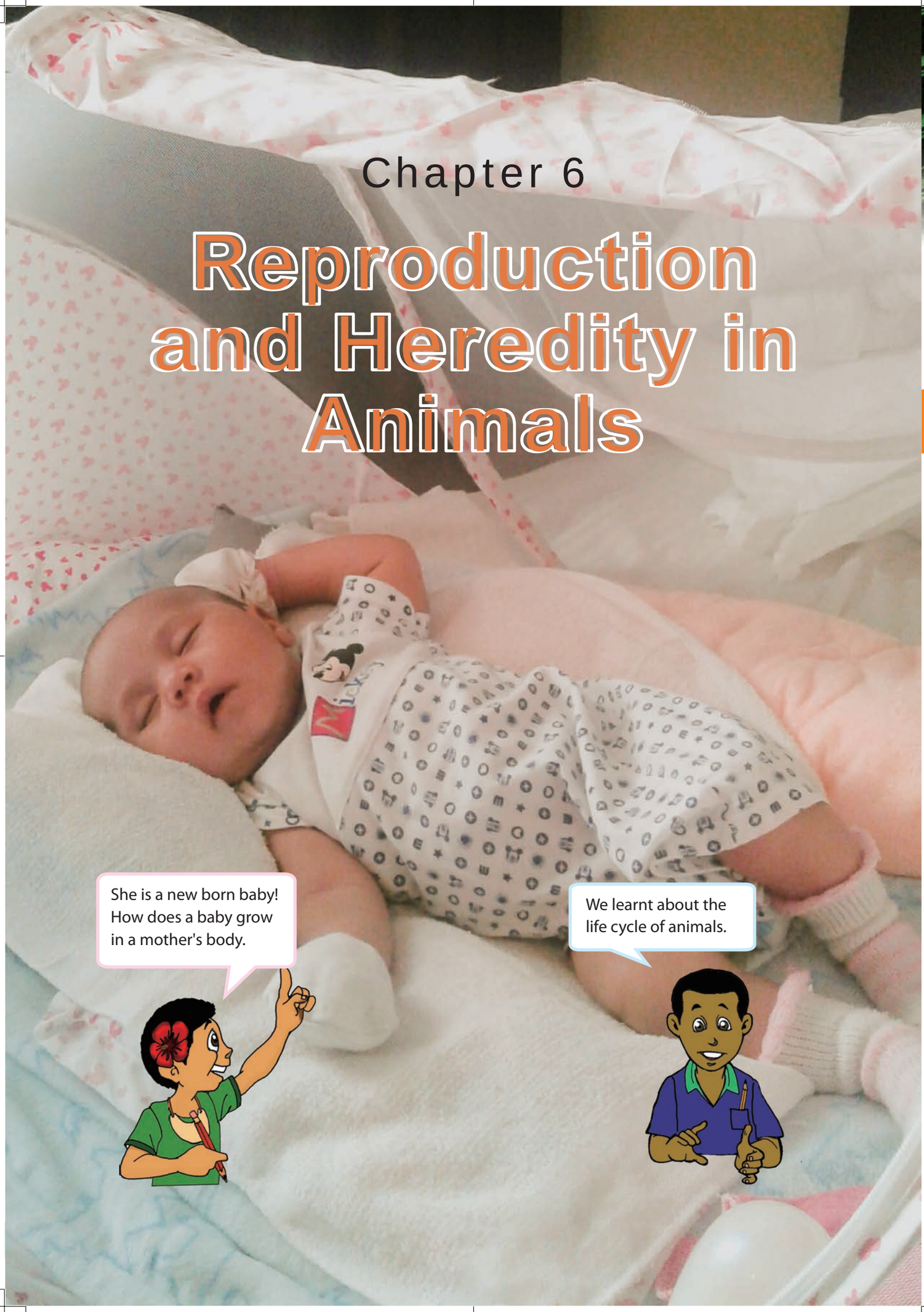
Kim placed a cup of water in a warm place. One week later, there was no water left in the cup. What happened to the water in the cup?

_____

_____

Chapter 6

Reproduction and Heredity in Animals



6.1 Reproduction and Heredity

All animals have life cycles. Different animals have different life cycles, they all are born, grow and die. All living things produce young ones similar to themselves. This process is called **reproduction**.
How do animals reproduce?

Lesson 1 Reproduction in Fish

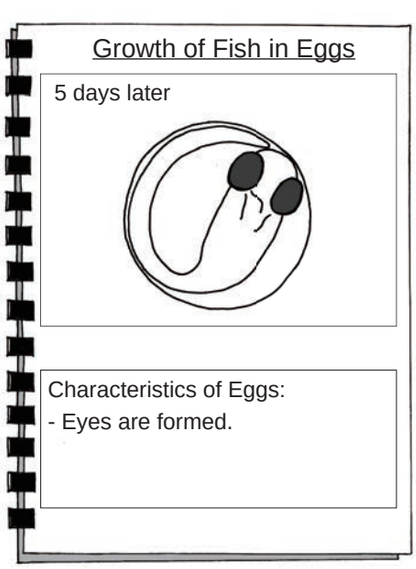
Fish are animals. They have their own life cycles which begin with eggs.

How does the life of a fish begin with eggs?

Activity : The growth of fish in an egg

What to Do:

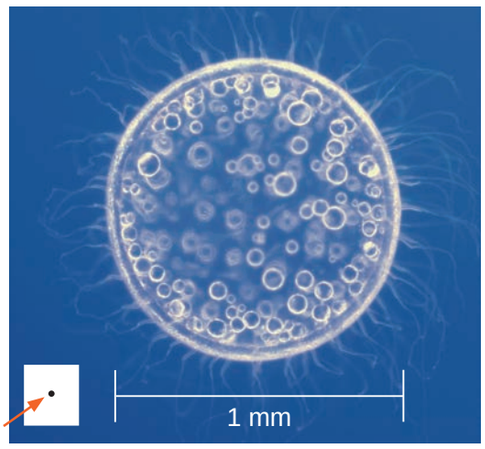
1. Study the pictures on the next page. The pictures show the growth process of a fish in an egg.
2. Observe the inside of the egg in the pictures carefully. Sketch the inside of the egg and write the characteristics in each stage.
3. Based on your observations, summarise the changes in the growth of fish in an egg.
4. Share your ideas with your classmates. Discuss how a fish grows in an egg.



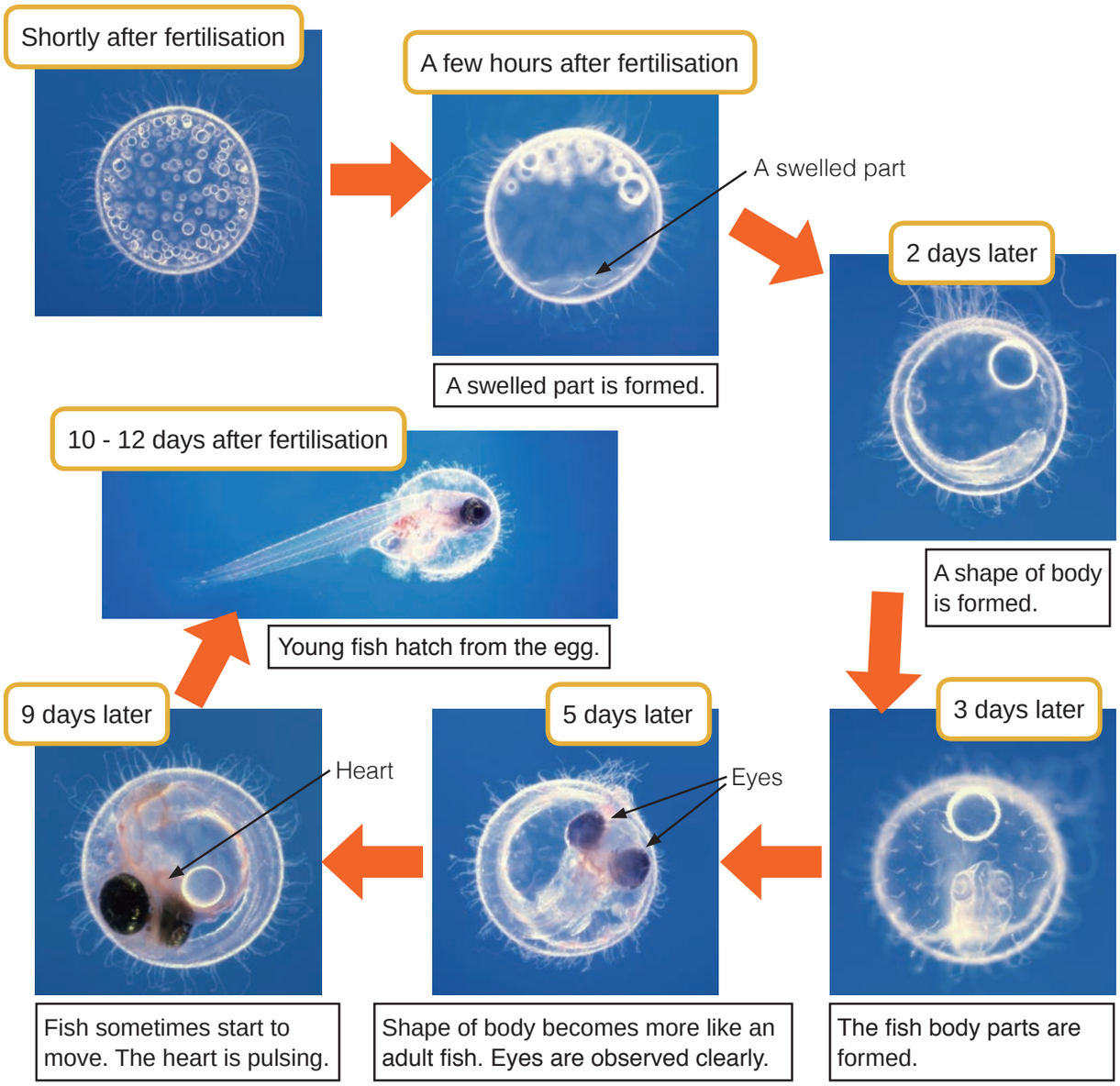
Summary

The life of a fish starts when a sperm meets with an egg and joins with it. This process is called **fertilisation**. The **egg** is made inside a female's body and the **sperm** is made inside a male's body.

After fertilisation, a fish grows in a fertilised egg. The inside of the egg changes its appearance day by day and becomes more like a fish. Young fish hatches from the egg about two weeks after fertilisation.



A fertilised fish egg



Stages of fish egg development

Lesson 2 Human Reproductive System

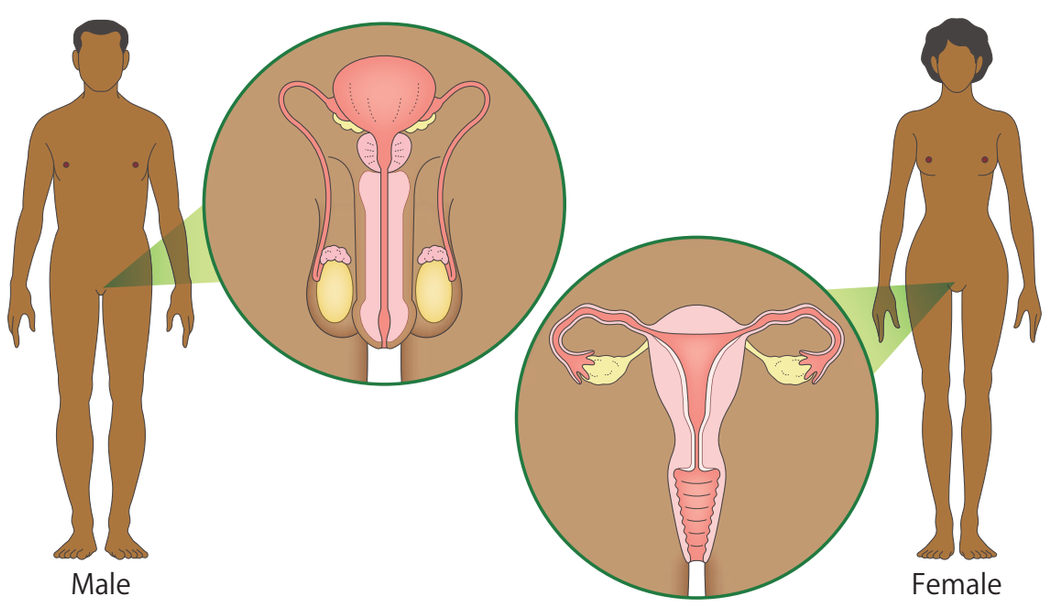
Humans use their eyes to see. They breathe air using their nose, but which body parts do humans use to reproduce?

Which body parts are used for human reproduction?

Activity : Comparing reproductive body parts

What to Do:

1. Study the pictures below. These pictures show the reproductive body parts of a male and a female.
2. Observe the pictures carefully and think about the following questions.
   (1) Name the male and female reproductive parts.
   (2) How are the reproductive parts of a male and a female different?
   (3) Can you guess in which body part is an egg and sperm produced?
3. Share your ideas with your classmates. Discuss which body parts humans use to reproduce.

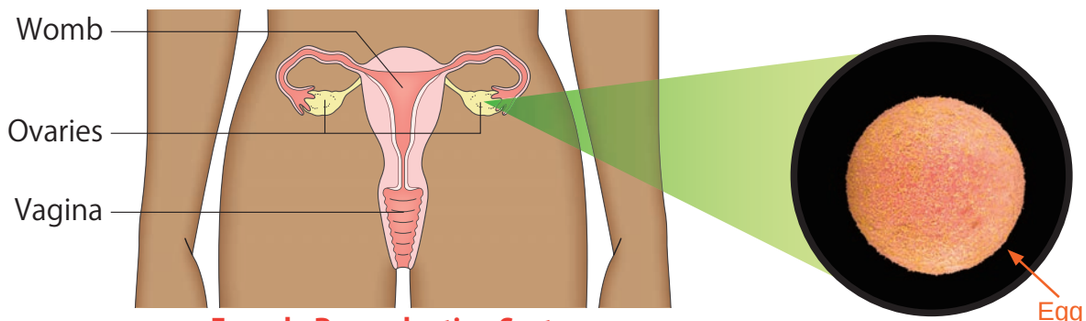


Summary

The **reproductive system** is the group of the body parts that work together for the purpose of reproduction. Males and females have different reproductive systems.

1. Female Reproductive System

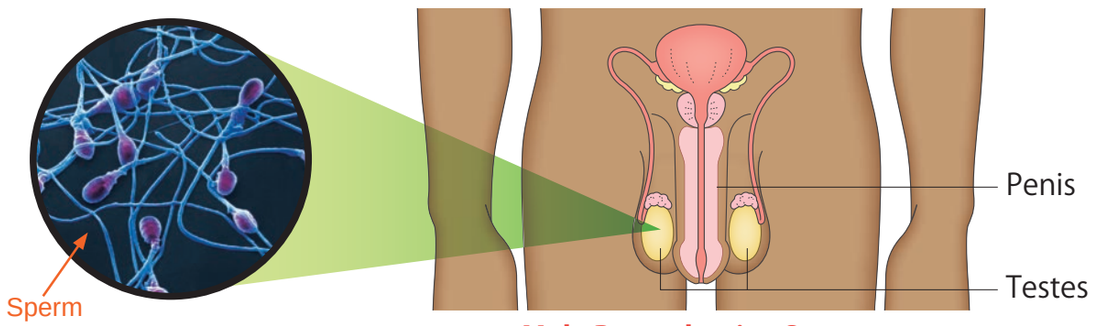
The female reproductive system is made up of the ovaries, womb and vagina. The **ovary** is a body part that contains thousands of eggs. Two ovaries are located inside the female body. The **womb** is the place where a baby grows until its birth. The **vagina** is a muscular tube that connects the womb to the outside of the body. It is the opening at the end of the path that the baby takes to leave a female body during birth.



Female Reproductive System

2. Male Reproductive System

The male reproductive system includes the testes and penis. The testes and penis are located outside of the body. The **testes** produce millions of sperms. There are two testes that are contained in a bag of skin. The **penis** is a body part that passes semen out of the man's body. **Semen** is a mixture of sperm and fluids.



Male Reproductive System

Lesson 3 Reproduction in Human

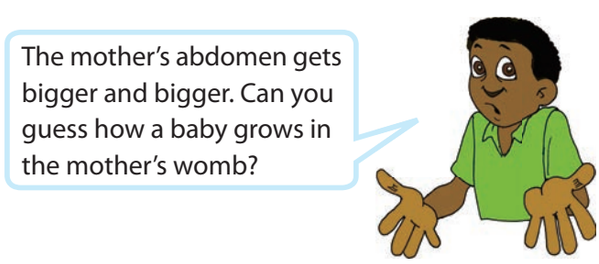
Life cycle of fish begins when fertilisation occurs. How about humans? Is human reproduction similar to or different from fish? How do humans begin their life cycle?

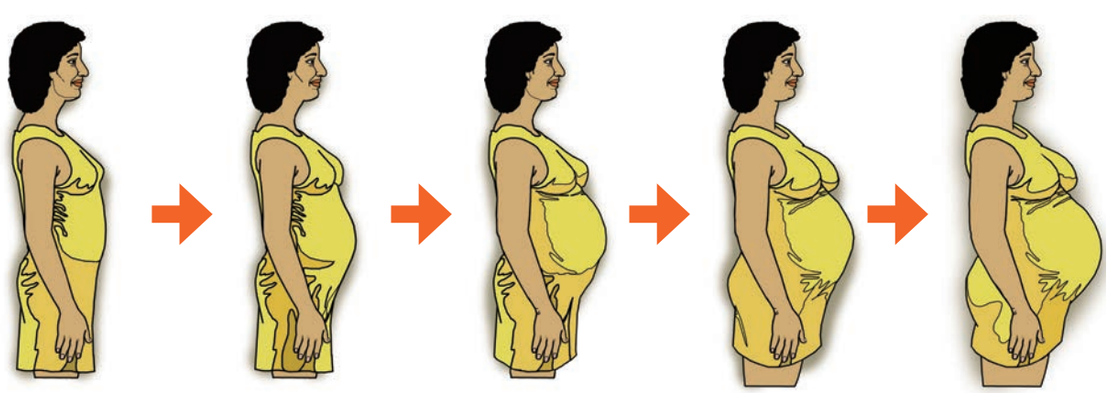
How does human life begin?

Activity : Growing baby in a mother's body

What to Do:

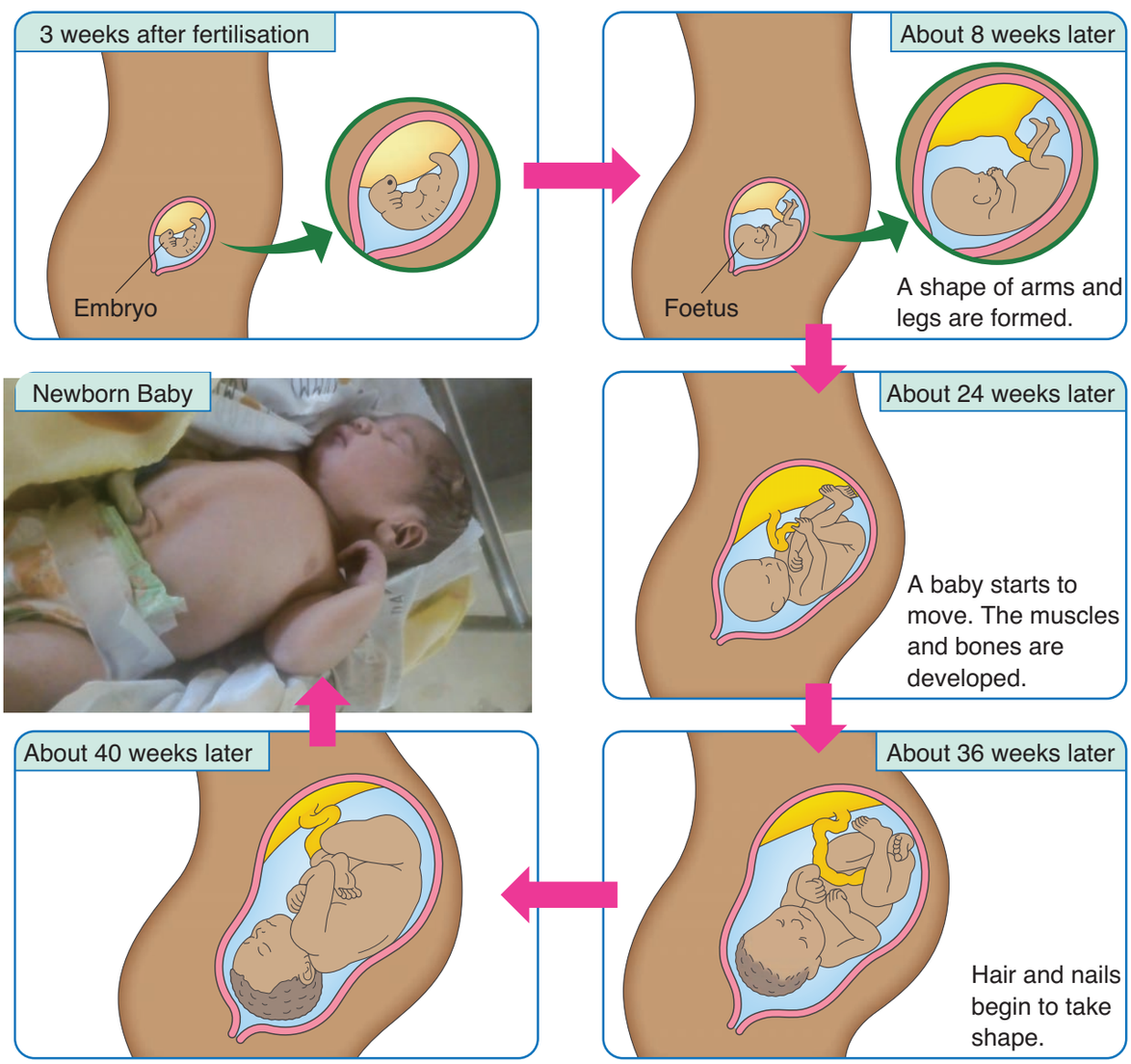
1. Study the pictures on the next page. The pictures show the stages of baby growth in the mother's womb.
2. Observe the pictures carefully and think about the following questions.
   (1) How does a baby change its size and shape?
   (2) How long does a baby grow in the mother's womb?
   (3) How similar or different is reproduction between humans and fish?
3. Share your ideas with your classmates. Discuss how human life begins and how a baby grows.





Summary

When a sperm meets with an egg, the egg becomes a fertilised egg. Human life begins with a fertilised egg. In humans, fertilisation takes place inside the body of the female, unlike fish. The fertilised egg develops and grows in the mother's **womb** (uterus) and becomes an **embryo**. The embryo gradually turns into the shape of a human being eight weeks after fertilisation. This is called the **foetus**. As the foetus grows into a baby, organs such as the spine and heart, hair and nails begin to take shape. After about thirty-seven to forty weeks in the mother's womb, the baby is born.



Growth of a baby in a mother's womb

Lesson 4 From Parents to Young

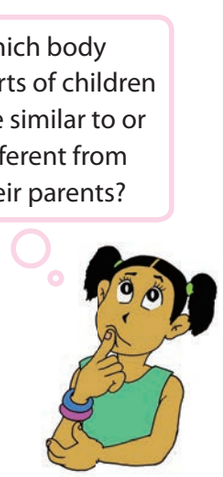
Most animals look like their parents. Humans also look like their parents.

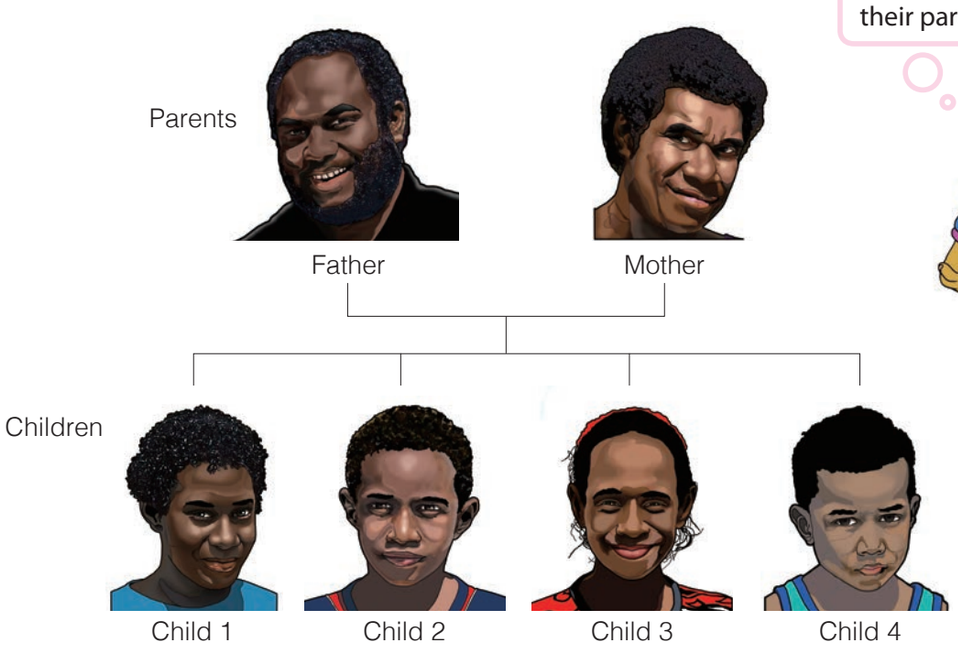
Why do young animals look like their parents?

Activity : Similarities and Differences

What to Do:

1. Study the picture below. The picture shows the members of a family.
2. Observe the picture and think about the following questions.
   (1) Which children have curly hair? From which parent did the children inherit curly hair?
   (2) Which children inherit skin colour from their father?
   (3) Which children inherit the dimple from their mother?
3. Share your ideas with your classmates. Discuss what features or characteristics children inherit from parents and why they look similar to their parents.





Summary

Young animals look like their parents because parents pass traits to their children when they reproduce. This process is called **heredity**. A **trait** is a feature or characteristic of a living thing. The eye colour, hair colour, blood type and the shape of the nose and ears are examples of the traits of humans that are inherited by the children from their parents. Traits of animals include the colour of fur and the shape of their ears or beaks.

Examples of Human Traits


Curly hair


Straight hair

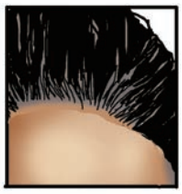

Dimples


No Dimples


Cross right thumb over left


Cross left thumb over right


Widow's peak hairline


Straight hairline


Can roll tongue


Cannot roll tongue


Detached earlobe


Attached earlobe

Young animals inherit many traits from both parents. For example, a child with curly hair has a parent or parents with curly hair. A child may have long nose if their father or mother has long nose. A kitten with striped pattern of fur usually has a parent with striped fur. If puppies have floppy ears, their parents may also have floppy ears.


A puppy and its parent have floppy ears.


Children have traits similar to their mother or father.

Summary and Exercise

Summary

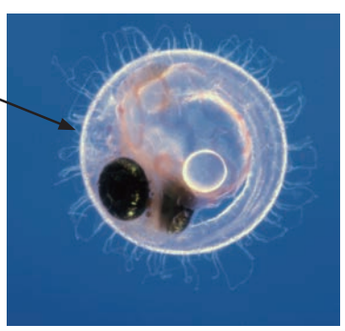
6.1 Reproduction and Heredity

Reproduction

- Reproduction is the process by which living things produce young ones similar to themselves.
- Fertilisation is the process by which joins a sperm with an egg.
- An egg is produced inside a female's body and the sperm is produced inside the male's body.

Reproduction in Fish

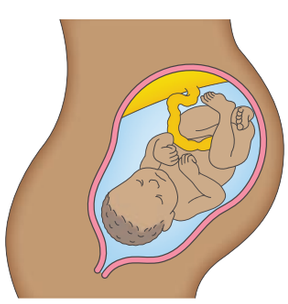
- After fertilisation, fish grows in the fertilised egg.
- The inside of the egg becomes more like a fish.
- Young fish hatch from the egg after about a few weeks.



Shape of body becomes more like adult fish in the egg.

Reproduction in Humans

- Sexual reproduction takes place in humans between a male and a female.
- Male reproductive organs are the testes and penis.
- Female reproductive organs are the ovaries, womb and vagina.
- A fertilised egg develops and grows in the mother's womb and becomes an embryo.
- The embryo turns into the shape of the human body eight weeks after fertilisation and becomes a foetus.
- A foetus grows into a baby and after about thirty-seven to forty weeks the baby is born.



The fertilised egg develops and grows in the mother's womb and becomes a foetus.

From Parents to Young

- Heredity is the process of parents passing traits to their children.
- A trait is a feature or characteristic of a living thing.
- Some examples of human traits are; eye colour, hair colour, blood type, the shape of the nose and ears.
- Young animals also inherit many traits from both parents.

Summary and Exercise

Exercise

6.1 Reproduction and Heredity

Q1. Complete each sentence with the correct word.

(1) The process that all living things produce young ones similar to themselves is called _____.

(2) The process of sperm joining with the eggs is _____.

(3) In human, a fertilised egg develops in the mother's _____.

(4) The passing of traits from parents to young is called _____.

Q2. Choose the letter with the correct answer.

(1) The picture shows a stage in the reproduction of a fish, where the egg starts to swell up. When does the swelling part of the egg form?

A. Before the egg is about to hatch.

B. After the egg is already fertilised.

C. Before the egg is ready to be fertilised.

D. When the egg is in the male fish body.

(2) In the life cycle of a fish, where does fertilisation take place?

A. In the female fish body.

B. In the male fish body.

C. Outside in the water.

D. On the land.

Q3. Answer the following questions.

(1) What makes children look like their parents?

(2) Write any two examples of human traits.

Q4. In humans, how does fertilisation occur?

How do Birds of Paradise reproduce

It is believed that Birds of Paradise are independent birds and some species defend territories. Female birds of paradise reach sexual maturity at around one year old and males at around two to three years old. Females enter the males' territories when they are interested to breed and choose the most suitable mate. After the female chooses her mate, she will lay between one depending on the species she admires.

Males build large, elaborate displays for females, perform acrobatic dances or sing long and complicated songs. The males take part in various dance rituals where they will display their additional coloured feathers. They may do this type of dance for many hours before they give up if a female isn't responsive to them. If a female does respond they will mate and then the male quickly runs off. He will try to find several other females he can mate with before the season ends.

Once mating has occurred the female will lay 2-3 eggs. They are small and brownish orange in colour. She will do her best to hide them from predators. She will only fly away from them when she has to get food. They will hatch after about 20 days of development.

Most eggs will hatch within two to four weeks. The newly hatched chicks develop quickly and will begin to learn to fly at around one month old.

Chapter Test

6. Reproduction and Heredity in Animals

Q1

Complete each sentence with the correct word.

(1) The womb, ovaries and vagina are organs found in the _____ reproductive system.

(2) Young fish hatch from the egg about two weeks after _____.

(3) Eye colour, hair colour, blood type and the shape of the nose are some examples of the _____of human that are inherited.

(4) The female body part that contains thousands of eggs is called _____.

Q2

Choose the letter with the correct answer.

(1) Which of the following is <u>not</u> part of a male reproductive system?

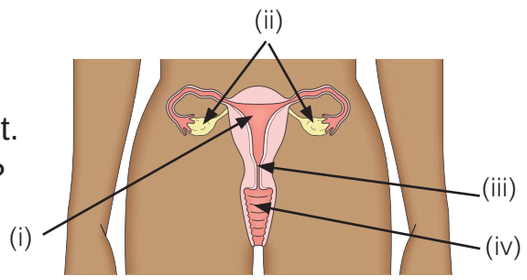
A. Testes

B. Uterus

C. Penis

D. Sperm

(2) Study the picture of the female reproductive organs on the right. Where are the eggs produced?



A. (i) B. (ii)

C. (iii) D. (iv)

(3) Which of the following is <u>not</u> a trait inherited from parents?

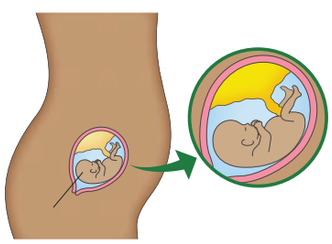
A. Scratches

B. Spots on fur

C. Shape of beak

D. Eye colour

(4) Study the picture of a foetus in a female's body. The foetus's arms and legs have been formed. How old is the baby?



A. 3 days

B. 1 week

C. 8 weeks

D. 36 weeks

Q3

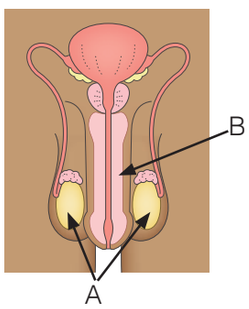
(1) Explain the work of the parts labeled A and B of the male reproductive system?

A._____

_____

B._____

_____



(2) What is the difference between the ovary and the testes?

_____

_____

_____

(3) Where are the testes located?

_____

(4) What is the name of the process in which a sperm joins with an egg?

_____

Q4

(1) Explain the process of heredity.

_____

_____

_____

(2) Study the two pictures on the right. Explain how the growths of fertilised eggs are different between fish and human.

_____

_____

_____

_____

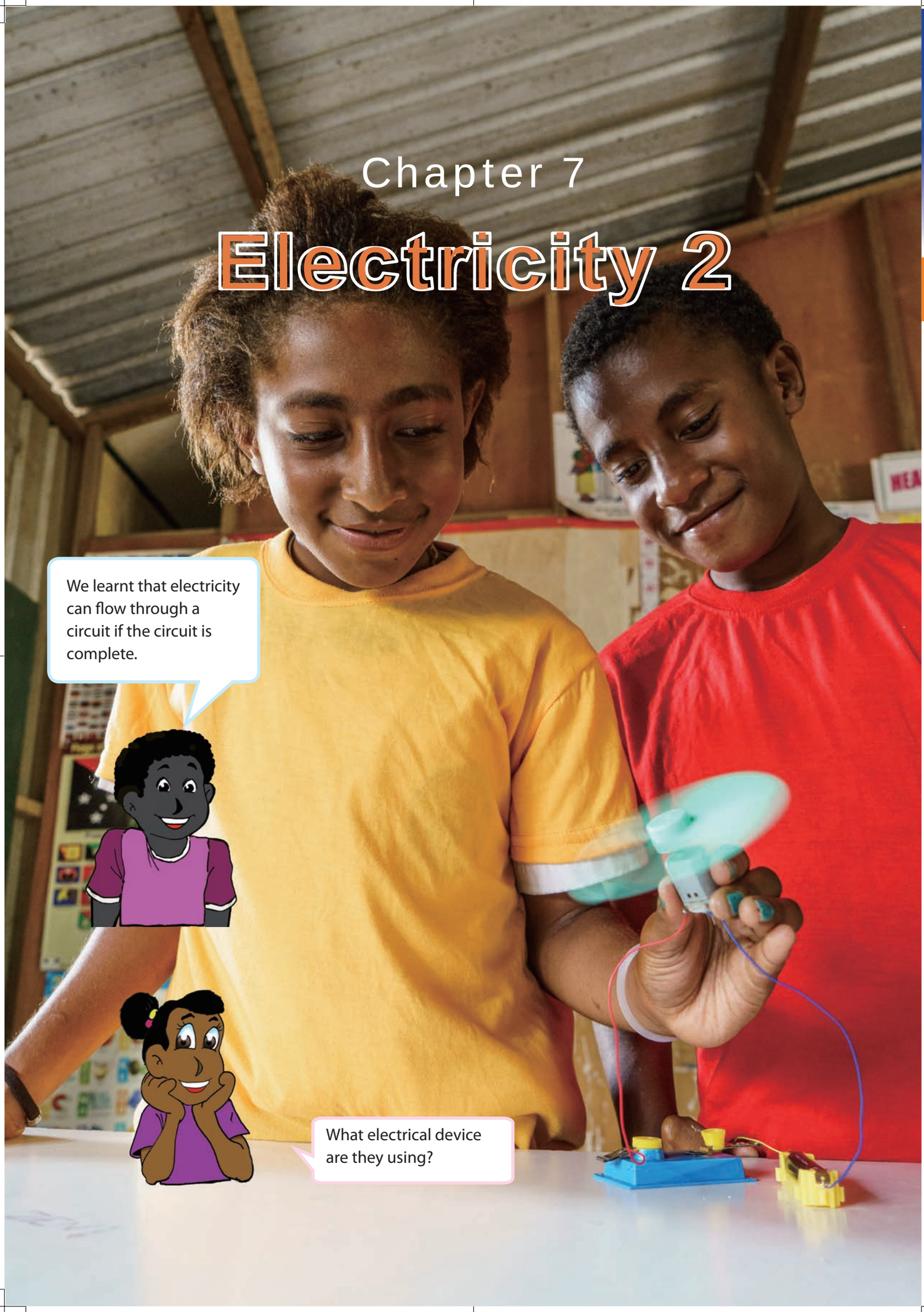
_____

Fertilised eggs of fish

Foetus of human

Chapter 7

Electricity 2



7.1 Electrical Circuit

Lesson 1 Direction of Electric Current

Electricity can make a light bulb glow when electric current flows through a complete circuit. A **motor** is an electrical device that produces power to rotate things using electricity. What happens when electric current flows through a motor?

How does electric current work in a circuit?

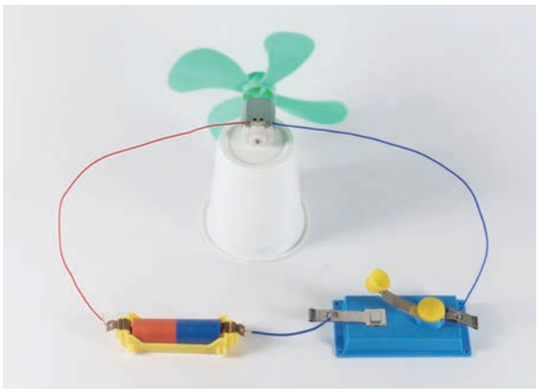
Activity : Rotating a propeller with a motor

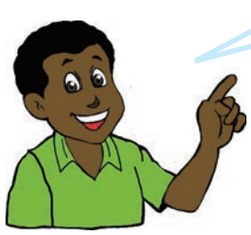
What We Need:

- motor, propeller, dry cell, switch, cell holder, pieces of electrical wire and pieces of paper

What to Do:

1. Cut a paper into thin strips and stick them onto the propeller. Attach the propeller to the motor.
2. Make the electric circuit as shown in the picture below.
3. Switch on and observe how the propeller moves.
4. Repeat Step 3 by changing the direction of the dry cell.
5. Share your results with your classmates.



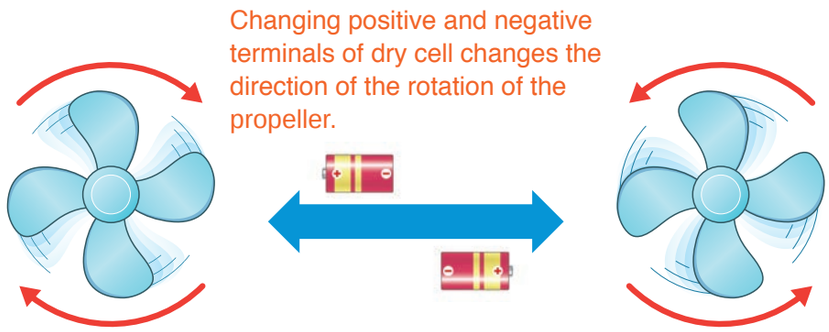


Let's predict how the propeller moves when the direction of the dry cell changes.

Do not touch the propeller when it's spinning.

Result

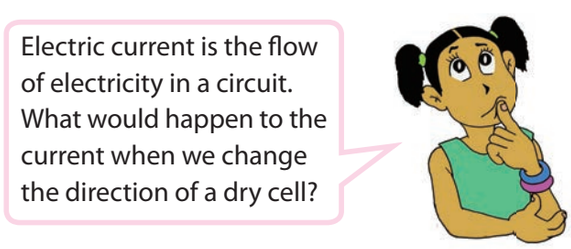
We found out that when we reversed the direction of the dry cell, the propeller rotated in the opposite direction.



Discussion

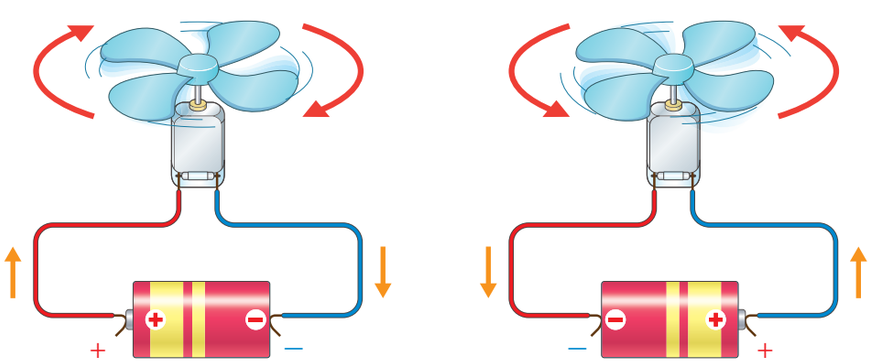
Based on your results, think about the following questions.

1. Why did the propeller rotate in the opposite direction when the direction of the dry cell was reversed?
2. What did you find out about the characteristics of electric current?



Summary

The flow of electricity is called **electric current**. Electric current has a definite direction. In the circuit with the dry cell, the electric current flows from the positive terminal to the negative terminal. When positive and negative terminals of the dry cell are reversed in the circuit, the electric current flows in the opposite direction.



Electric current flows from the positive to the negative terminal.

Lesson 2 Series and Parallel Circuit

Electric current flows from the positive to the negative terminal in dry cells. When we use two dry cells, how should we connect them to make a motor rotate?

How can we connect two dry cells to make a motor rotate?

Activity : Spinning a motor using two dry cells

What We Need:

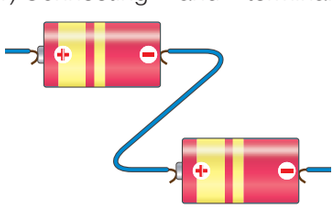
- 2 dry cells, switch, motor, propeller, electrical wire

What to Do:

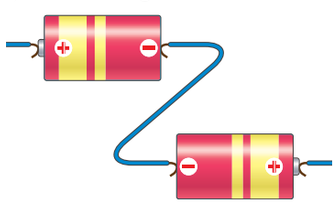
1. Study the diagrams below. Predict which connections of two dry cells will make a motor rotate. Record your prediction.

Electric current flows from the positive to the negative terminal. If we connect two dry cells, what would happen to the direction of electric current?

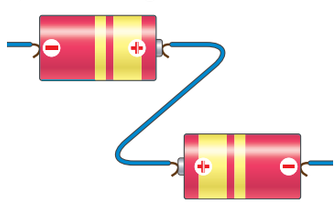
1) Connecting + and - terminals



2) Connecting - and - terminals

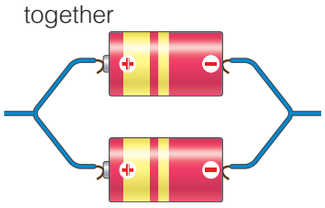


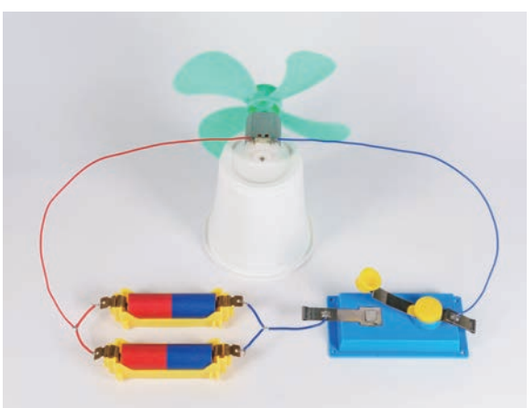
3) Connecting + and + terminals

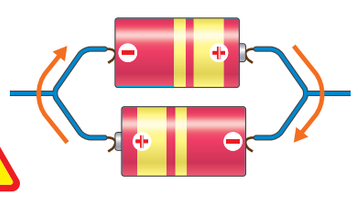


2. Connect two dry cells according to the diagrams and try to rotate the motor.
3. Record your results in your exercise book.
4. Share your results with your classmates.

4) Connecting same terminals together





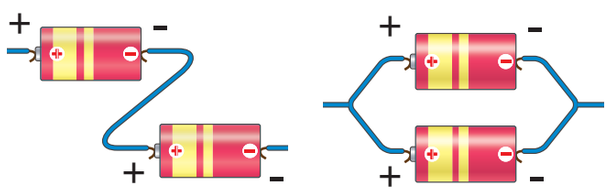


The connection in this picture is called a short circuit that would make cells and wire hot. In this case, disconnect the wire.

Result

We found out that the correct ways of connecting two dry cells to make the motor rotate are shown in the diagrams on the right.

Connection of two dry cells which can make motor rotate



Discussion

Based on your results think about the following question.

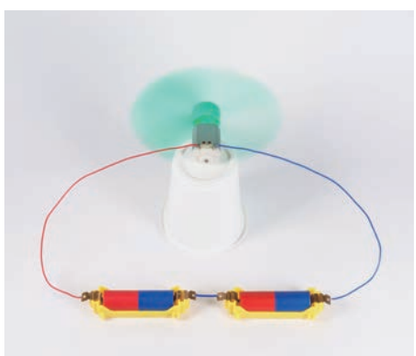
1. How does the electric current flow in a circuit?

Summary

The ways to connect two dry cells where electric current flows in a circuit are classified as series circuit and parallel circuit. Electric current always flows from positive to the negative terminal in both the series and parallel circuit.

Series circuit

A **series circuit** is a circuit in which the electric current flows in one path. When we connect two dry cells in series, the positive terminal on one dry cell is connected to the negative terminal on the other dry cell.



Parallel circuit

A **parallel circuit** is a circuit in which the electric current flows in two or more paths. The current can split into several paths at the junction and then join again together at the other junction. When we connect two dry cells in parallel, positive terminals of both dry cells connect together as well as the negative terminals.

Lesson 3 Comparing Series and Parallel Circuits

The path of electric current in a series and parallel circuit is different. What would be the difference between the connections of two dry cells in series and parallel circuits?

How is the amount of electric current different between series and parallel connection of two dry cells?

Activity : Comparing brightness of bulbs

What We Need:

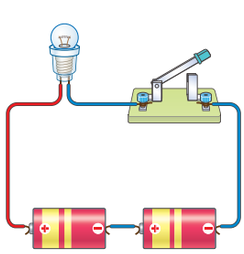
- 2 light bulbs, 4 dry cells, 4 cell holders, 2 switches, electric wire

What to Do:

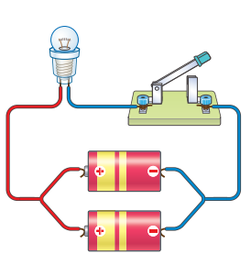
1. Draw a table like the one shown below in your exercise book.

Comparison of brightness of bulbs	Which one is brighter?
(1) and (2)	
(1) and (3)	
(2) and (3)	

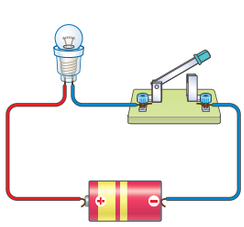
2. Make circuits (1) and (2) as shown in the diagrams below by connecting a bulb and dry cells and compare the brightness of the bulbs. Record your observations in the table.
3. Make circuit (3) and compare the brightness of the bulb between (1) and (3), (2) and (3).
4. Record your observations in the table.
5. Share your results with your classmates. Discuss the difference in the brightness of the bulbs in the different circuits.



(1) Two dry cells in series



(2) Two dry cells in parallel



(3) Single dry cell

Result

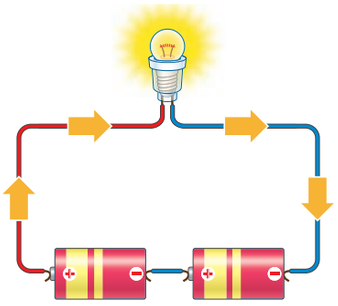
	Which one is brighter?
(1) and (2)	(1) is brighter
(1) and (3)	(1) is brighter
(2) and (3)	The brightness is same

We found out that the bulb in the circuit using two dry cells connected in series is brighter than that in parallel or in the connection using a single dry cell. The brightness of the bulb in the circuit using two dry cells in parallel and the one connected with a single dry cell is the same.

Summary

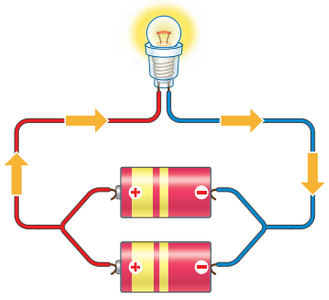
Series Connection

Compared to a single dry cell, a series connection of two dry cells increases the electric current in the circuit. Therefore the bulb glows brighter.



Parallel Connection

Compared to a single dry cell, a parallel connection of two dry cells does not change the amount of electric current in the circuit. Therefore the brightness of the bulb does not change.

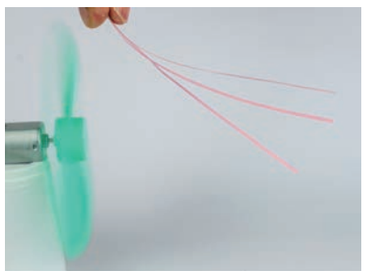


When you connect dry cells in parallel, it lasts longer than those connected in series.

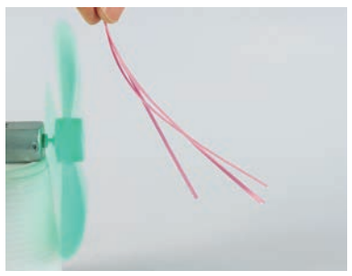
Try it!

Think about the following question.

How would the motor rotation be different when two dry cells are connected in series and parallel?



Series connection



Parallel connection

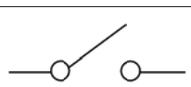
Lesson 4 Circuit Components and their Symbols

To draw an electric circuit, you have to draw the **electric circuit components** such as dry cell, bulb, switch and motor. Electric circuit components are basically made of various parts and are very difficult to draw.

How can an electric circuit be represented?

1. Symbols of circuit components

Using symbols of components helps us to simply draw within a shorter time. Each component that is used in an electrical circuit can be drawn as a symbol as shown in the table.

Component	Symbol	Examples
Bulb		
Dry cell (Battery)		
Open Switch		
Close Switch		
Wire		

(1) Bulb

A bulb is represented as a circle with an 'X' in the middle and two lines connecting on either side.

(2) Dry cell

The long line on the symbol of dry cell represents the positive terminal and the short line represents the negative terminal.

(3) Switch

An open switch is generally represented by providing a break in a straight line by lifting a part of the line upward.

(4) Wire

A straight line is used to represent a connecting wire between any two components of the circuit, even if wires in actual circuit are bending.

2. How to draw a circuit diagram

A diagram representing an electrical circuit drawn with symbols is called a **circuit diagram**. The following are some tips to draw a circuit diagram.

(1) All components in an actual circuit such as a dry cell, a switch and a light bulb are shown in a circuit diagram.

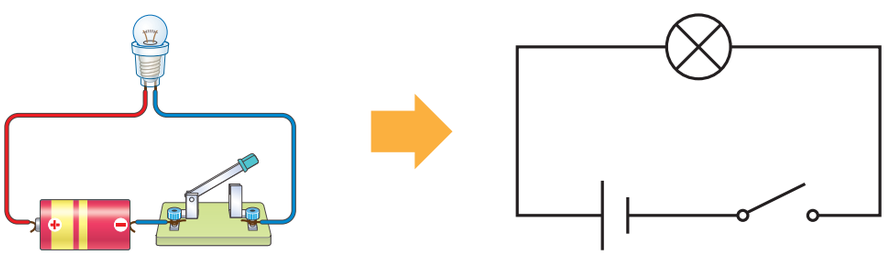
(2) Check the direction of the dry cells. It should be the same as the actual circuit.

(3) Corners in a circuit diagram are drawn as right angles.

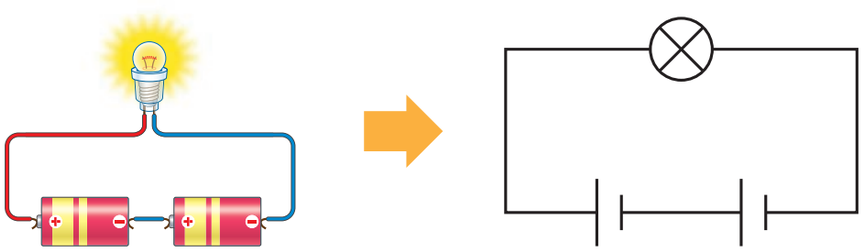
(4) Number of junctions in a circuit diagram should be the same as the one in the actual circuit.

Actual Circuit | Circuit Diagram

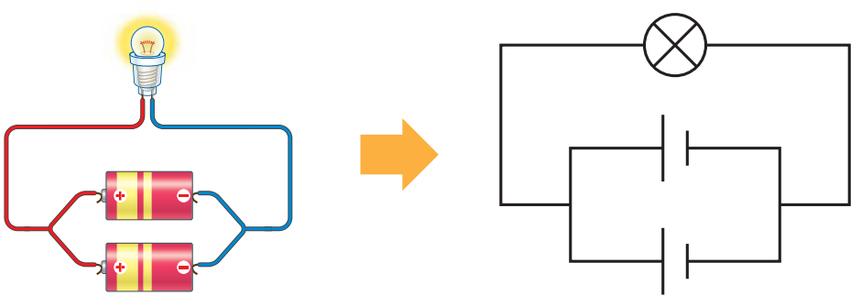
(a) Single dry cell circuit



(b) Series circuit



(c) Parallel circuit



Lesson 5 Daily Use of Electric Circuit

We learnt about electric circuit but where can we find electric circuit in our daily lives?

Where are electric circuits used in our daily lives?

Activity : Let's investigate an electric circuit of a flashlight

What We Need:

- flashlight with dry cells

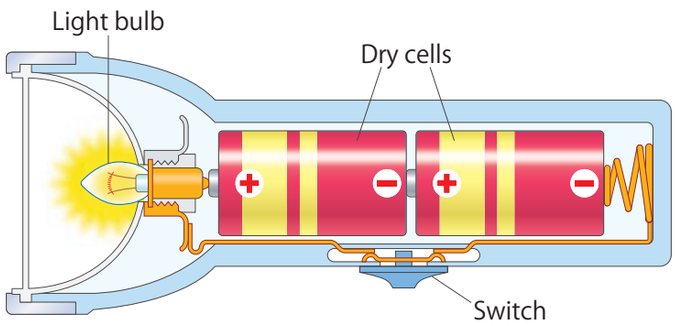
What to Do:

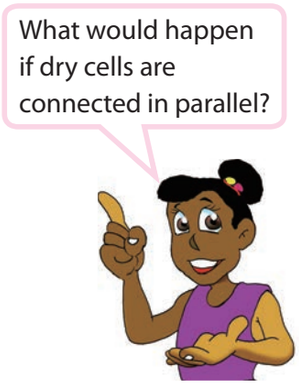
1. Predict the components of a flashlight and how they are connected to each other.
2. Take apart the components of the flashlight.
3. Observe and investigate how each component connects with the other components to make the bulb light up. Pay attention to:
   (1) What components do you find in the flashlight?
   (2) How does electric current flow in a bulb?
   (3) Are the dry cells connected in series or parallel?
4. Draw a circuit diagram of the flashlight in your exercise book.
5. Share your ideas about the circuit in the flashlight with your classmates.

Summary

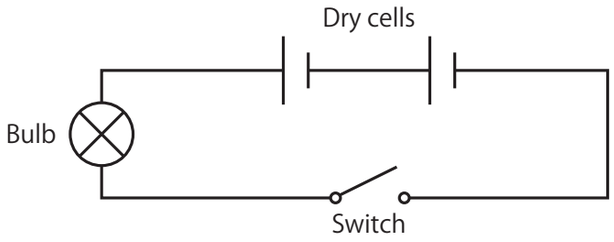
A flashlight has a simple electric circuit connecting the main components such as light bulb, switch and dry cells. We can turn the light on and off by using a switch to control the flow of electric current in the circuit. Connecting several dry cells in series can provide brighter light because more electric current flow through the bulb.

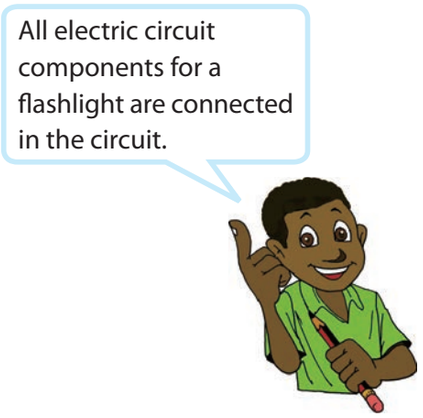
Cross section of a flashlight





Circuit diagram





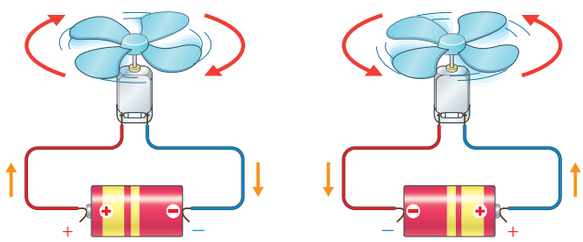
All electrical appliances used in our daily lives such as a flashlight, radio, cell phone, television, computer and refrigerator contain electric circuits. Room lights on the ceiling in a house are also parts of a large electric circuit. All components are connected in series or parallel in the circuit according to their own purpose.

Summary and Exercise

Summary 7.1 Electrical Circuit

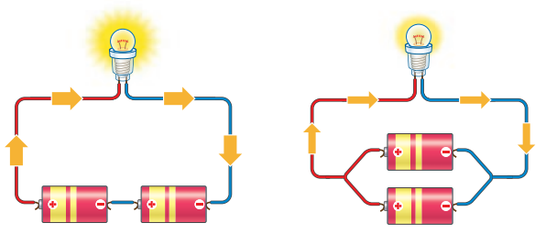
Electric Current

- In the circuit with the dry cell, the electric current flows from the positive terminal of the dry cell to the negative terminal.



Series and Parallel Circuits

- A series circuit is a circuit in which the electric current flows in one path.
- A parallel circuit is a circuit in which the electric current flows in two or more paths.

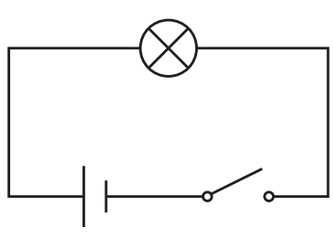


Comparing Series and Parallel Circuits

- Series connection of two dry cells increases the electric current in the circuit, causing the bulb to light up brightly.
- Parallel connection of two dry cells does not change the amount of electric current in the circuit and therefore the brightness of the bulbs does not change.

Circuit Components and their Symbols

- Each component that is used in the electrical circuit can be drawn as a symbol.
- Circuit diagram is a diagram representing an electrical circuit drawn using circuit symbols.



Daily Use of Electric Circuit

- All electrical appliances used in our daily lives contain electric circuit. Some examples are flashlight, radio and room lights on the ceiling in a house.

Summary and Exercise

Exercise 7.1 Electrical Circuit

Q1. Complete each sentence with the correct word.

(1) A _____ circuit is a circuit in which the electric current flows in one path.

(2) Each component that is used in the electrical circuit can be drawn as a _____.

(3) All electrical _____ used in our daily lives contain electric circuit.

(4) The electric current flows from the _____ terminal of the dry cell to the negative terminal.

Q2. Choose the letter with the correct answer.

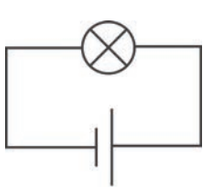
(1) If we connect two dry cells with a motor and a propeller to an electric circuit, which connection would make the motor rotate?

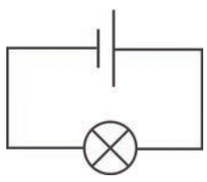
A. Connecting + and – terminals of dry cells

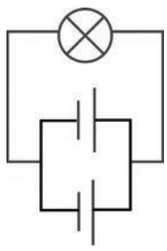
B. Connecting – and – terminals of dry cells

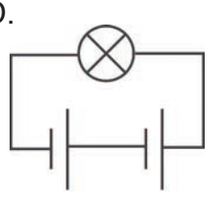
C. Connecting + and + terminals of dry cells

(2) In which circuit is the bulb brighter than others?

A. 

B. 

C. 

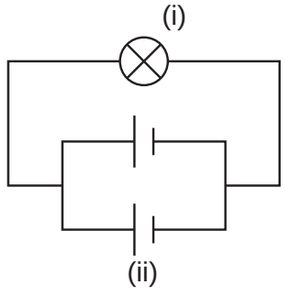
D. 

Q3. Study the circuit diagram on the right and answer the following questions.

(1) What type of circuit is shown in the diagram?

(2) What is the symbol labeled (i)?

(3) What is the symbol labeled (ii)?

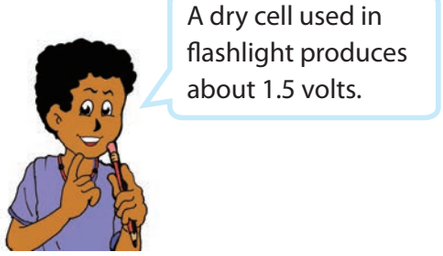


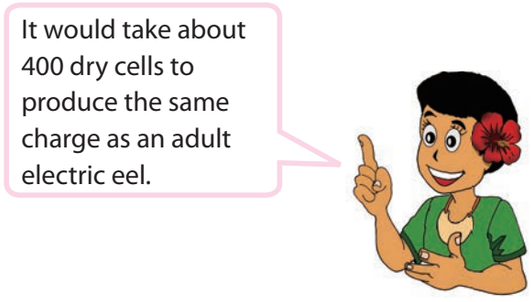
Q4. Ahmed set up three circuits. He connected one dry cell in a circuit, then two dry cells in series and two dry cells in parallel. His aim is to compare the brightness of the three connections. Which circuit has the brightest light?

Nature's Living Battery

You wouldn't want to bump into an electric eel while swimming. It can jolt other animals with over 600 volts of electricity! That's more than enough to stun or even kill its prey.

The electric eel uses thousands of specialised muscles to produce its charge. These muscles cause a powerful electric current to flow from the eel's body through the water and through whatever it wants to zap. Electric eels use their electrical power to hunt small fish, shrimps, frogs and water birds.





The head of the eel is the positive terminal and the long tail is the negative terminal.

Chapter Test

7. Electricity 2

Q1

Complete each sentence with the correct word.

(1) Electric current flows from the positive to the _____ terminal of the battery.

(2) Electric circuits can be classified as _____ and parallel circuits.

(3) A straight line is used to represent a connecting _____ in a circuit diagram.

(4) A flashlight generally has a simple _____ circuit.

Q2

Choose the letter with the correct answer.

(1) From which direction does the electric current flow?

A. Negative to positive terminal

B. Negative to negative terminal

C. Positive to negative terminal

D. Positive to positive terminal

(2) How would a motor's rotation be different when connected in series and parallel with two dry cells? The motor in

A. series will be faster than the one in parallel.

B. series will be slower than the one in parallel.

C. parallel will be faster than the one in series.

D. both connections will turn with the same speed.

(3) Which of the following symbol represents a bulb?

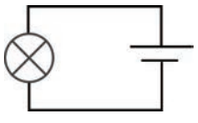
A. 

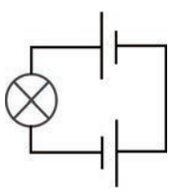
B. 

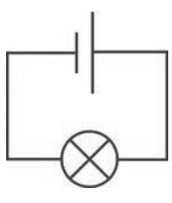
C. 

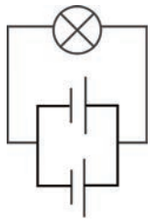
D. _____

(4) Which of the following connection has a much brighter light bulb?

A. 

B. 

C. 

D. 

Q3

(1) Stefan took apart a flashlight to investigate how the electric circuit components are connected in it. What are the four components he would find in the flashlight?

_____

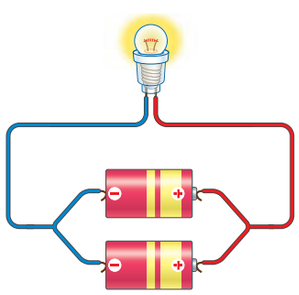
(2) Why are symbols and circuit diagrams used?

_____

_____

_____

(3) Study the picture on the right.
Draw the circuit diagram of the electrical circuit below.



Q4

(1) What is the difference between a series and a parallel circuit?

_____

_____

_____

(2) What happens when more dry cells are added in a series circuit?

_____

_____

Chapter 8

Rocks, Minerals and Fossils

8.1 Rocks and Minerals

Lesson 1 Rocks

We can find different kinds of rocks around us. Why do rocks look different? What are rocks made up of?

What is a rock?

Activity : Grouping rocks

What We Need:

- hand lens, different types of rocks, markers

What to Do:

1. Draw a table like the one shown below.

Properties	Rock 1	Rock 2	Rock 3	Rock 4	Rock 5
Colour					
Texture					
Pattern (regular or irregular)					
Property of grains					
Others					

2. Go out of the classroom and collect 5 different rocks. Number the rocks using the marker.
3. Observe the properties of each rock with your eyes first. Record your observations in the table.
4. Observe the properties of grains in the rocks again using the hand lens. Record your observations in the table.
5. Classify the rocks into some kinds of groups based on their properties.
6. Share your findings with your classmates. Discuss the properties of rocks and how you can tell rocks apart.

Summary

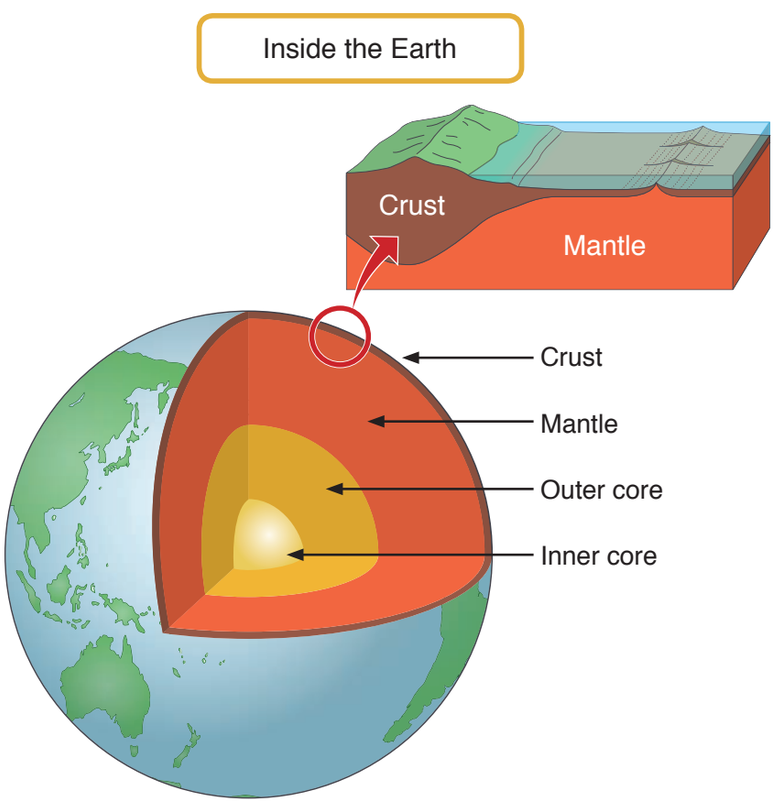
A **rock** is a naturally formed, non-living material of the Earth. A rock is made up of one or more minerals. A **mineral** is a material that is found in nature such as gold and copper. Some rocks may be made of one mineral type. Other rocks may be made of a mixture of different mineral types.

There are many kinds of rocks. Limestone and sandstone are examples of rocks. Rocks can be identified by the types, size and colour of mineral grains they contain. The mineral grains in a rock may be white and tiny or they may be red and as big as your fingernail.

Rocks form within the Earth and make up a large part of our Earth. Earth is made of three layers; crust, mantle and core. The **crust** is the thinnest outer layer of the Earth. The **mantle** is the thick, hot layer of the Earth. The **core** is the hottest, innermost layer of the Earth. The crust is made of rocks.

Quartz is made of one mineral.

This rock contains several different colours and textures of minerals.



Lesson 2 Minerals

Rocks are made up of one or more types of minerals. What types of minerals are there? What properties do minerals have?

How can we classify minerals?

Activity : Properties of minerals

What We Need:

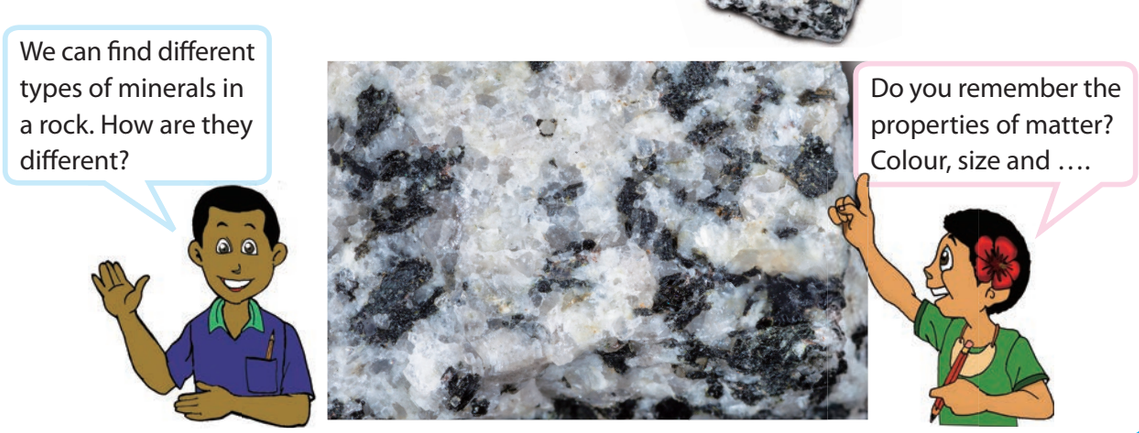
- rock that includes different types of minerals, hand lens, steel nail

What to Do:

1. Draw a table like the one shown below.

Properties	Mineral 1	Mineral 2	Mineral 3	…
Colour				
Glitter				
Texture				
Hardness				

2. Observe the rock with the hand lens and find different types of minerals.
3. Record the colour, glitter and texture of each mineral in the table.
4. Test each mineral to see if you can scratch it with a steel nail. Record the results in the table.
5. Share your findings with your classmates. Discuss how you can tell minerals apart.



Summary

A **mineral** is a solid non-living material that is found in nature. Minerals make up rocks.

There are many kinds of minerals on the Earth. Salt that we put on food is a mineral. Metals such as gold and copper are also minerals. The graphite in our pencil is a mineral too. Each mineral has its own properties such as colour, lustre and hardness. We can use the properties to identify minerals.

Colour - Minerals come in many colours. Most minerals come in just one colour. Some minerals such as quartz come in many colours.

Lustre - Lustre describes how light reflects off the surface of a mineral. Some minerals are shiny like silver. Some are dull.

Hardness - The hardness of a mineral describes how easy it is to scratch the surface of a mineral. Some minerals are soft and others are much harder. Diamond is the hardest mineral on the Earth.

Gold

Rock salt

Copper

Graphite

There are many kinds of minerals.

Different colours of quartz

Some minerals are shiny and others are dull.

Diamond is the hardest mineral on the Earth.

Lesson 3 Types of Rock

Look around us. We can find many different types of rocks. What types of rocks are there on the Earth? How can we tell them apart?

What types of rock are there?

Activity : How rocks are formed

What We Need:

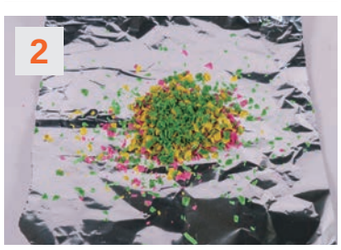
- three different colours of crayons, cutter, aluminium foil, mug, boiling water

What to Do:

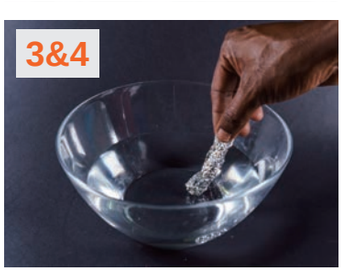
1. Make crayon shavings with the cutter.

To shave the crayons with the cutter, be careful with its sharp blade.

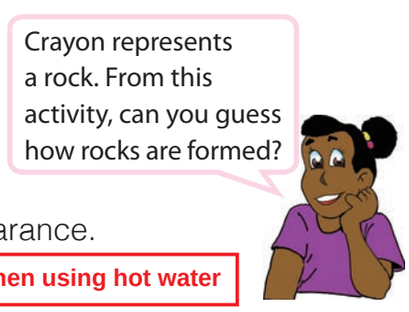
2. Sprinkle a layer of each colour crayon on the aluminium foil. Fold up the foil and press down on it very hard. Unfold the foil and observe the crayon to represent a rock.



3. Wrap the crayon that you made in Step 2 with the aluminium foil. Put it in very hot water for 15 to 20 seconds until the crayon starts to melt. Remove it from the hot water and squeeze it. Let it cool and observe the crayon to represent a rock.
4. Wrap the crayon that you made in Step 3 with aluminium foil. This time put it in the very hot water for the crayon to melt completely. Remove it and let the crayon cool. Observe the crayon that represent a rock.



5. Share your findings with your classmates. Discuss how they are formed and their appearance.



Be careful when using hot water

Summary

A rock can be grouped according to how it is formed. There are three kinds of rocks on the Earth; Sedimentary, Metamorphic and Igneous rocks.

Sedimentary Rock

A **Sedimentary rock** is formed when sediments are glued together and become hard. **Sediment** is sand particles of rock and small bits of soil. It is piled up over time, usually as layers at the bottom of lakes and oceans. Sandstone, limestone and conglomerate are examples of sedimentary rocks.

Sediment piled up as layers.

Limestone

Metamorphic Rock

A **Metamorphic rock** is formed when a rock inside the Earth has been changed by heat and pressure. Metamorphic rocks are often made from other types of rocks. For example, limestone can be changed into marble. Slate and soapstone are examples of metamorphic rocks.

Marble

Igneous Rock

An **Igneous rock** is formed when melted rock from inside the Earth cools and hardens. Melted rock is called **magma**. This can happen in many different places on the Earth but one of the most common places is at a volcano. Granite and basalt are examples of igneous rocks.

Granite

Lesson 4 Uses of Rocks and Minerals

We have learnt about the properties of rocks and minerals. Each rock and mineral has its own properties. How are rocks and minerals useful for our lives?

How do we use rocks and minerals in daily life?

Activity : Finding uses of rocks and minerals

What to Do:

1. Draw a table like the one shown below.

Location	How are rocks and minerals used?
In classroom	
Outside classroom	
Others	

2. Look at your classroom and find how rocks and minerals are used in the classroom.
3. Go out of the classroom and find how rocks and minerals are used.
4. Record your findings in the table.
5. If you have any ideas on the uses of rocks and minerals, write your ideas in the table.
6. Share your ideas with your classmates. Discuss where and how we use rocks and minerals.

Summary

Rocks and minerals are used to make products in many ways. The properties of rocks and minerals help us decide how they can be used to make products.

Uses of Rocks

We use rocks in many ways. Rocks are used for building roads, houses and statues. Rocks are also used for cooking. Limestone is used to make cement. Coal is burnt for heat. We use marble for building, sculpture and manufacture.

Stone is used for cooking.

Limestone is used for making cement.

Marble is used for building and sculpture.

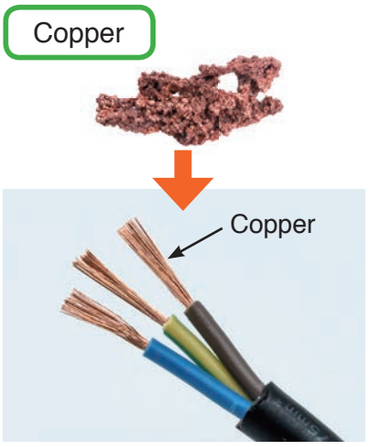
Uses of Minerals

Minerals are also useful for us. Papua New Guinea is rich in gold, silver, copper and nickel. We use gold and silver for jewellery and coins. Copper is used in electric cables and wires. Nickel is mainly used in making alloys such as stainless steel. An **alloy** is a mixture of two or more metals. Quartz is used in making glasses, watches, radios and electrical instruments.

Gold

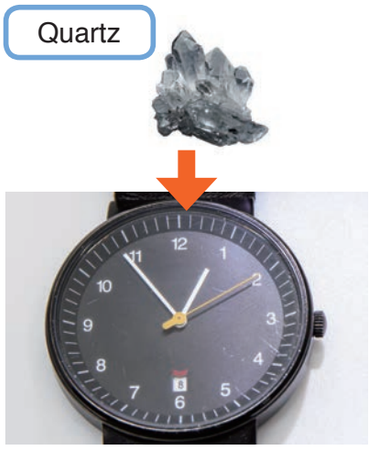
Gold is used for jewellery and coins.

Copper



Wires made from copper.

Quartz



Quartz is used in the glass that covers the watch.

Summary and Exercise

Summary 8.1 Rocks and Minerals

Minerals

- There are many kinds of minerals on the Earth such as salt, gold and granite.
- Each mineral has its own properties such as colour, lustre and hardness.

Colour	Lustre	Hardness
Different colours of minerals.	Some minerals are shiny others are dull.	Some minerals are hard such as diamond.

Rocks

- A rock is made up of one or more minerals.
- Rocks can be identified by the types, size and colour of mineral grains they contain.
- The Earth is made of three layers; crust, mantle and core. The crust is made of rocks.

Types of Rocks

- Rocks can be grouped according to how they are formed.
- The three types of rocks are sedimentary, metamorphic and igneous.

Sedimentary rock	Metamorphic rock	Igneous rock
		
It is formed when sediments are glued together and become hard.	It is formed when a rock inside the Earth has been changed by heat and pressure.	It is formed when melted rock from inside the Earth cools and hardens.

Uses of Rocks and Minerals

- Rocks are used for building roads, house, statues, for cooking and making cement.
- Minerals are used to make jewellery, coins, electric cables and wires, glasses, watches, radios and electrical instruments.

Summary and Exercise

Exercise 8.1 Rocks and Minerals

Q1. Complete each sentence with the correct word.

(1) The thinnest outer layer of the Earth made of rock is _____.

(2) A melted rock inside the Earth is called _____.

(3) The three types of rocks are; igneous, sedimentary and _____ rock.

(4) A _____ rock is formed when sediments are glued together and become hard.

Q2. Choose the letter with the correct answer.

(1) Which of the following lists contains the correct order of the Earth's layers.

A. Crust, inner core, outer core, mantle

B. Mantle, outer core, inner core, crust

C. Outer core, mantle, inner core , crust

D. Crust, mantle, outer core, inner core

(2) Which of the following is <u>not</u> a correct explanation about minerals?

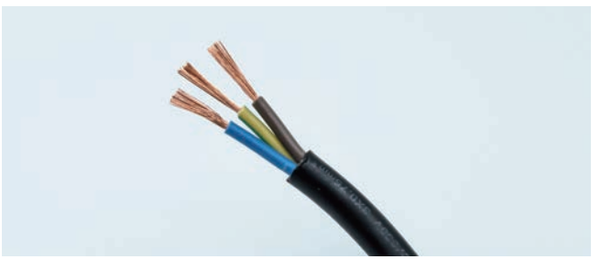
A. Minerals can be identified by its properties such as colour, lustre and hardness.

B. Salt and gold are examples of minerals.

C. All minerals have the same colour.

D. Minerals make up rocks.

Q3. Study the picture below. What type of mineral was used to make the wires in the electric cables?



Q4. What type of rock is formed when hot magma cools and hardens?

8.2 Fossils

Lesson 1 A Fossil

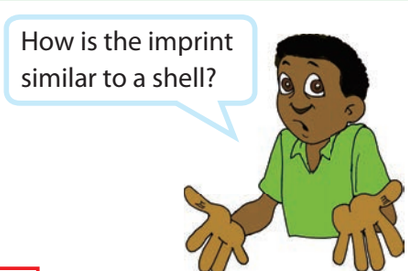
Look at the picture of the fossil on the right.
What does it look like? How was it formed?

What is a fossil?

Activity : Make a fossil

What We Need:

- clay, plate, objects such as shell, candle, tin-can

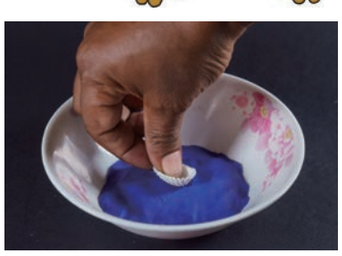


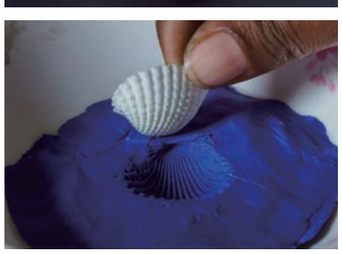
What to Do:

1. Flatten clay on a plate and press an object into the clay.

Be careful when you pour melted candle onto the clay. It is very hot.

2. Slowly and carefully pull the object out of the clay.
3. Put some candle into the-tin can and heat it until the candle melts completely. Pour the melted candle over the imprint of the object in the clay.
4. Let it cool and dry. Remove the candle from the clay carefully. The candle is your fossil.
5. Observe the imprint in the clay and the fossil and think about how they are similar or different.
6. Share your findings with your classmates. Discuss how fossils are formed.





Summary

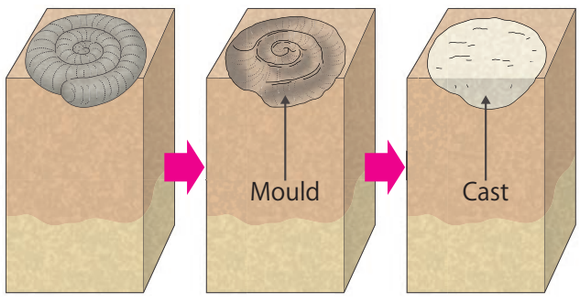
A **fossil** is the remains of a once living thing. Studying fossils helps scientists learn about the past history of life on Earth. Most fossils are found in sedimentary rocks such as shale, limestone and sandstone.

Tyrannosaurus

Trilobite

Plant fossil

Fossils form in different ways. When a living thing dies, it is buried in sediments such as sand and soil. The living thing presses down in sediment and it leaves a shape in the sediment. The sediment turns into a rock. The hard parts of the living thing dissolves completely and the shape is left in the rock. The shape of a living thing found in a rock is called a **mould**. If sediments or minerals fill the mould's empty space, a cast forms. A **cast** is the opposite of its mould.



Formation of fossil

Mould and cast of ammonite

Some fossils are hard parts of living things such as bones, teeth, shells and leaves. After living things die, sediments cover them. The soft parts rot away and the hard parts turn into rocks.

Bone fossil

Shark tooth fossil

Lesson 2 Learning from Fossils

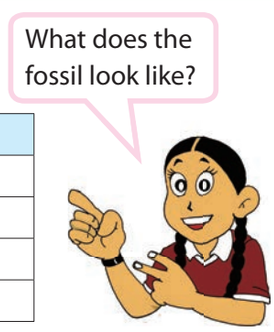
Scientists study about fossils. What do they learn from fossils? What kind of information do fossils give us?

What do fossils tell us?

Activity : Getting information from fossils

What to Do:

1. Draw a table like the one shown below.



Information	Your answer
Types of animal	
Its food	
Its habitat	
Other ideas	

2. Study the picture of the animal fossil below.
3. Think about the following questions.
   (1) What kind of animal is it? Is it a mammal, bird, fish, amphibian or reptile?
   (2) What did it eat?
   (3) Which habitat did it live in?
   (4) What else can you infer from this fossil?
4. Write your answers in the table.
5. Share your ideas with your classmates. Discuss what kinds of information a fossil gives us.

Summary

Some animals no longer live on the Earth.

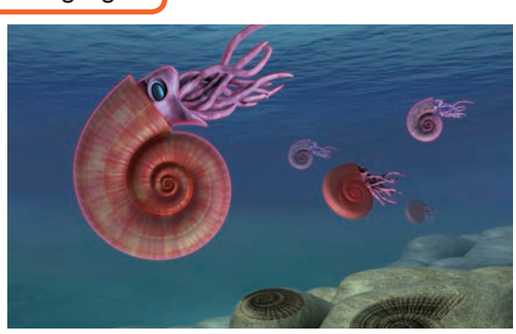
Fossils give us so many clues. Studying fossils helps us to learn about the past history of life and environments on Earth. Fossils give us information about organisms that lived long ago. Moulds and casts show what kinds of plants and animals might have lived and how they looked. Some fossils look like animals and plants that are living today. Most of them such as dinosaurs no longer live on the Earth. Fossil bones tell us about how large animals were. Fossil teeth show what they ate.

Some fossils are similar to ferns alive today.

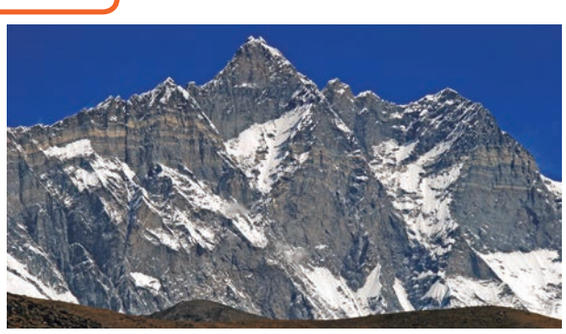
The body size of tyrannosaurus was bigger than humans. Look at the shape of its teeth. Can you guess what food it ate?

Fossils also tell us about the environments in which they lived. For example, an ammonite lived in the sea. When a fossil of an ammonite is found in the mountains, we can infer that the mountains were once covered by the sea.

Long Ago



Now



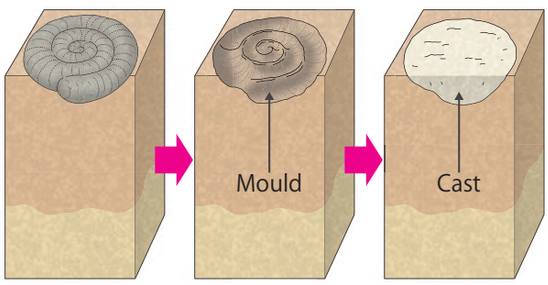
Ammonite is found in the Himalaya Mountains. The mountains were once covered by the sea.

Summary and Exercise

Summary 8.2 Fossils

What is a fossil?

- Fossils are the remains of a once living thing.
- Most fossils are found in sedimentary rocks such as shale, limestone and sandstone.
- A mould is an empty shape of a living thing found in rocks.
- A cast is formed when sediments fill the mould's empty space.
- Mould and cast are both fossils.



- Some fossils are the hard part of living things such as bones, teeth, shells and leaves.

Learning from Fossils

- Studying fossils help scientists learn about the past history of life on Earth.
- Fossil bones tell us about how large animals were.
- Fossil teeth show what they ate.
- Fossils also tell us about the environment which the animal once lived in.

Summary and Exercise

Exercise 8.2 Fossils

Q1. Complete each sentence with the correct word.

(1) The remains of a once living thing is called a _____.

(2) An empty shape of a fossil found in rocks is called a _____.

(3) Fossil _____ tells us about how large animals were.

(4) Fossil _____ show what type of food animals ate.

Q2. Choose the letter with the correct answer.

(1) What type of rocks often contain fossils?

A. Sedimentary

B. Metamorphic

C. Igneous

D. Basalt

(2) Why do scientists study fossils? It helps scientists learn about

A. living things that live on Earth today.

B. the past history of life on the Earth.

C. sedimentary rocks.

D. the environment of today.

Q3. Answer the following questions.

(1) What type of fossil is shown in the picture on the right?

(2) Study the picture showing the fossil bones on the right. What is the name of this type of animal that no longer lives on Earth?

(3) Explain how a mould is formed.

Do rocks float?

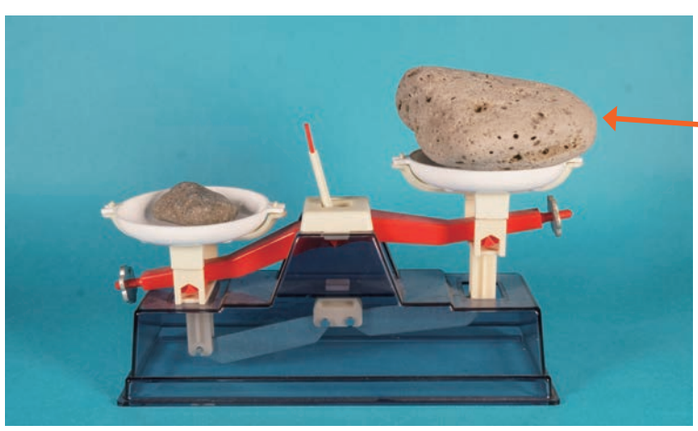
We know that heavy objects sink and light objects float. Rocks of course, do not float on water. They sink into water. But there is a special type of igneous rock that floats on water. This rock is called Pumice. It is typically light coloured rock that is formed during volcanic eruptions when lava and water mix, which causes a rapid change in the material's pressure. As it hardens, gases dissolve into the lava and leave behind small air pockets (holes) in the pumice structure. This caused the rock to have a low density due to the air bubbles inside of it. The less dense air offsets the more dense rock, causing it to float. This makes pumice very light. It usually floats for a while but when water gets into it, it starts to sink.

It is ground up and is used today in soaps, polishes, pencil erasers and abrasive cleaners.

The pumice rock from Mount Pago in West New Britian Province.

A Pumice rock with small air pockets

Floating Pumice in the water



A pumice rock has a lighter weigh than other rocks.

Chapter Test

8. Rocks, Minerals and Fossils

Q1

Complete each sentence with the correct word.

(1) A rock that is formed inside the Earth that has been changed by heat and pressure is called _____ rock.

(2) Granite and basalt are examples of _____ rock.

(3 The remains of a once living thing is called a _____.

(4) The rock that is used for building and making sculpture is called _____.

Q2

Choose the letter with the correct answer.

(1) Which type of rocks are formed when sediments are pressed and cemented together?

A. Igneous
B. Metamorphic
C. Sedimentary
D. Fossils

(2) Which of these is <u>not</u> a mineral property?

A. Colour
B. Luster
C. Temperature
D. Hardness

(3) Which of the following is formed when a fossil mould is filled?

A. Bones
B. Fossil cast
C. Tar pit
D. Plants

(4) Which of the following animal parts would most likely form a fossil?

A. Blood
B. Fur
C. Bones
D. Skin

Q3

Study the diagram on the right.

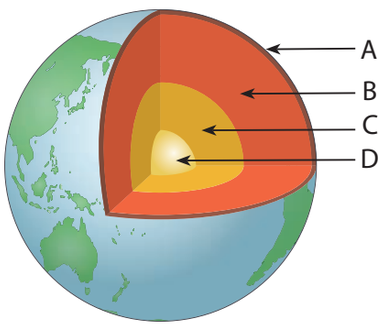
(1) Write the letter A, B, C or D for the correct layer of the Earth in the space provided.

Mantle _____

Inner core _____

Crust _____

Outer core _____



(2) Which part of the Earth layers is made of rocks?

_____

Q4

(1) Scientists found fossils of shellfish in rocks on the land. What can we infer about the place?

_____

_____


Shellfish

(2) A group of students oberved five rocks samples with magnifying hand lens. Study the table below and answer the following questions.

Sample	Lustre	Hardness	Colour	State	Grain
1	Shiny	Hard	White	Solid	Cannot be seen
2	Shiny	Hard	Gold	Soild	Cannot be seen
3	Dull	Hard	Several colours	Solid	Can be seen with different colour
4	Shiny	Hard	Transparent	Solid	Cannot be seen
5	Shiny	Non	Transparent	Liquid	Cannot be seen

Which of the above samples would not be classified as minerals? Explain your answer.

_____

_____

_____

_____