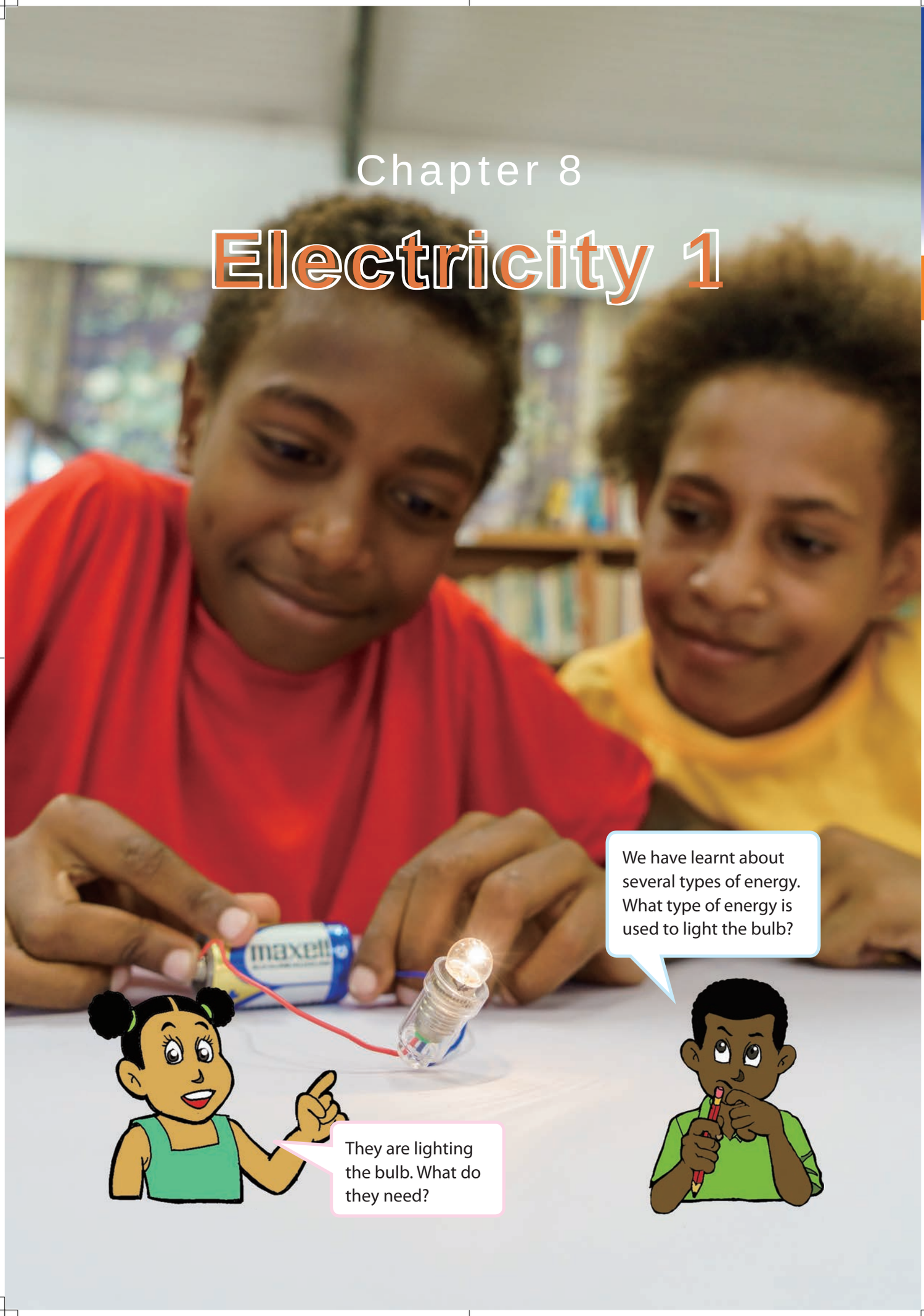
Chapter 8

Electricity 1



8.1 Electricity in Our Life

Lesson 1: "Electricity around Us"

What if we do not have electricity? Our lives would change in many more ways than we can imagine, so electricity is very useful for our lives.

What is electricity?

Activity : Finding electricity around us

What to Do:

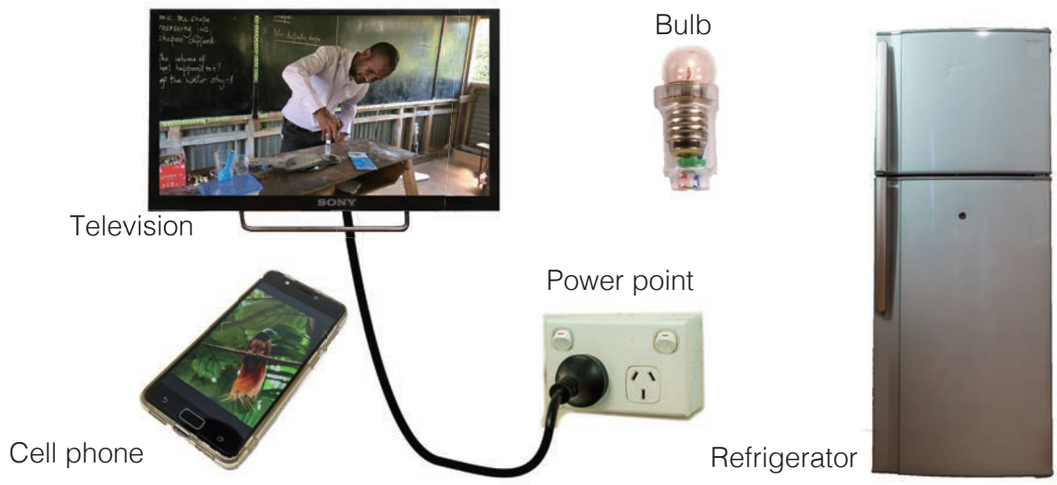
1. Draw a table like the one shown below.

Where is electricity used?	How is electricity used?

2. Look at the picture below and find how and where electricity is used. Record your findings in the table.
3. Share your findings with your classmates. Talk about what electricity can do and where electricity can be found.

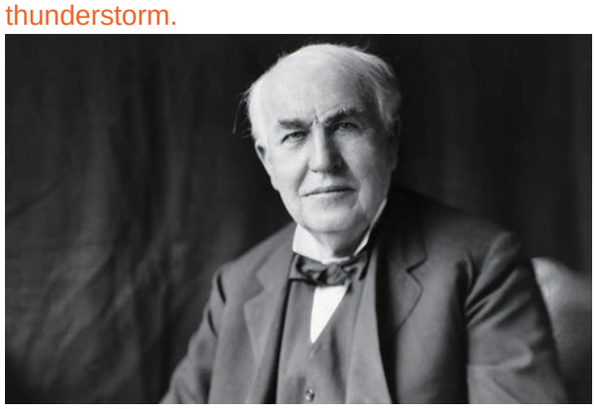
Summary

Electricity is a form of energy. It has an ability to do things. It can run electrical appliances and other machines. It lights up our homes, powers our computers, television sets and other electronic devices. Electricity also keeps our cars running and makes our flashlights shine in the dark.



Discovering electricity was a long process that involved many different scientists. In 1752, **Benjamin Franklin** proved that lightning was electricity when he flew a kite during a thunderstorm. Throughout the next hundred years, many scientists tried to find a way to use electrical power to make light. In 1879, the American inventor **Thomas Edison** was finally able to produce a long-lasting electric light bulb in his laboratory.


Benjamin Franklin flew a kite during a thunderstorm.


Thomas Edison

Lesson 2: "Getting Electricity"

When we use electrical appliances, we need electricity to make them work. Where can we get electricity from?

Where does electricity come from?

Activity : Source of electricity

What to Do:

1. Draw a table like the one shown below.

	Where do you get electricity from?
Television (TV)	
Remote Controller	
Cell phone	

2. Look at the pictures of appliances below and make a list of where you will get electricity to run each of them.
3. Share your ideas with classmates. Talk about where we can get electricity from.

TV has a power cord, but a remote controller does not have a cord. Why?

When you want to watch TV, what do you do?

Summary

Electrical appliances need electricity to work. We can get electricity from wall outlets and batteries to run the appliances.
When we use a TV, an air conditioner, a computer and a refrigerator, we plug in the power cord of the appliance into power points in the house or school. Electricity flows through the cord from an outlet to the appliance to make it work.

Another source of electricity is the battery. A **battery** is a device that makes it easy to carry electricity any where you go. There are chemicals inside a battery. Batteries are used in many ways. Batteries can run portable radios, remote controllers and cell phones. They are also used in electric toys. Cars use a battery to start an engine. There are different types of batteries. Examples of different types of batteries and their uses are shown below.

Types of batteries

Summary and Exercise

Summary 8.1 Electricity in Our Life

Electricity around us

- Electricity is a form of energy.

  Electricity has an ability to do things.

- Electricity can run electrical appliances and other machines.
- Electricity lights up our homes, powers our computers, television sets and other electronic devices.
- Electricity also keeps our cars running and makes our flashlights shine in the dark.

Getting Electricity

- Electrical appliances use electricity to work.
- We can get electricity from power points and batteries to run the appliances.

Summary and Exercise

Exercise 8.1 Electricity in Our Life

Q1. Complete each sentence with the correct word.

(1) In 1752, Benjamin Franklin proved that lightning was _____ when he flew a kite during a thunderstorm.

(2) _____ is the person who produced a long-lasting electric light bulb in his laboratory in 1879.

(3) _____ can run electrical appliances and other machines.

(4) In the house, electricity can be obtained from a _____.

(5) A _____ is a device that makes it easy to carry electricity anywhere.

Q2. Choose the letter with the correct answer.

(1) Which of the following batteries can be used in a car?

A. ①
B. ②
C. ③
D. ④

① ② ③ ④

(2) Which of the following is <u>not</u> something electricity can do?

A. Light up the light bulbs in homes.
B. Blow air in our homes.
C. Run electrical appliances in homes.
D. Power our television.

Q3. Answer the questions below.

(1) When you want to watch TV, what do you do to get electricity?

(2) TV has a power cord, but a remote controller does not have a cord. Why?

Q4. John took a new flashlight to go fishing. He switched the flashlight on but it did not light up. What do you think is the reason why the flashlight did not light?

8.2 Function of Electricity

Lesson 1: "Lighting a Bulb"

We use electricity in many ways. Light bulb is used everywhere in daily life. One of the popular sources of electricity is the battery or dry cell.

How can we light a bulb with a dry cell?

Activity : Making a bulb light

What We Need:

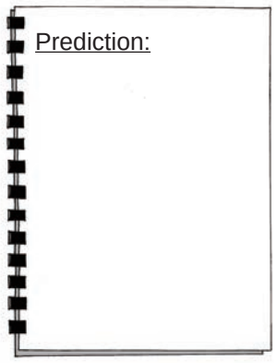
- a bulb, a bulb socket with wires, a dry cell

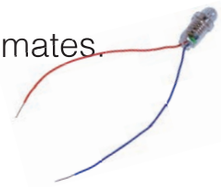
What to Do:

1. Draw a table like the one shown below.

When a bulb lights	When a bulb does not light

2. Guess how you can light a bulb using a dry cell and two wires in different ways. Record your prediction in your exercise book.
3. Try to light the bulb based on your prediction. Draw diagrams of the ways that you tried to light the bulb in the table.
4. Share your ideas with your classmates.

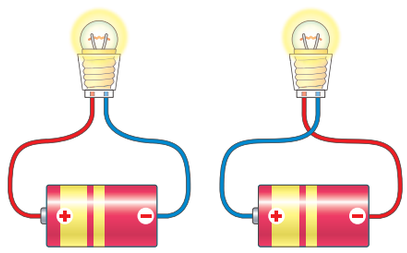




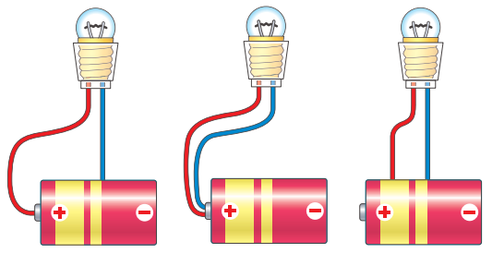
Result

The following shows some examples of the ways that a bulb can light or not.

The ways that a bulb light



The ways that a bulb does not light



Discussion

How can two wires be connected to a dry cell?

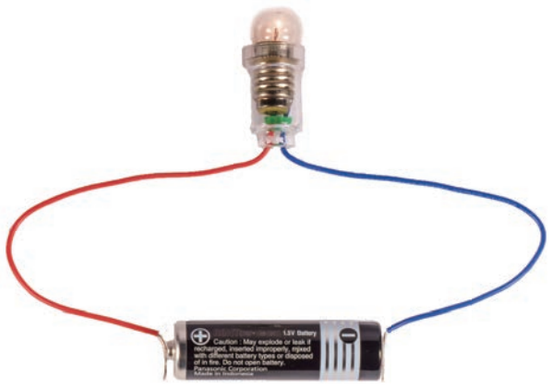
1. Think about the following questions based on the result.
   - Look at the places where the two wires are connected to a dry cell. What is the difference between the two ways to light the bulb?
2. Talk about how the two wires are connected to a dry cell to light a bulb.

Summary

To light a bulb, a wire has to be connected to the positive (+) terminal of a dry cell and another should be connected to the negative (-) terminal. The circle of the pathway that electricity flows is called an **electric circuit**.

A positive (+) terminal

A negative (-) terminal



An electric circuit

Lesson 2: "Flow of Electricity"

A bulb lights when two wires are connected to the "+" and "-" of a dry cell. Electricity can flow through an electric circuit.

How does electricity flow through an electric circuit?

Activity : Making a simple circuit

What We Need:

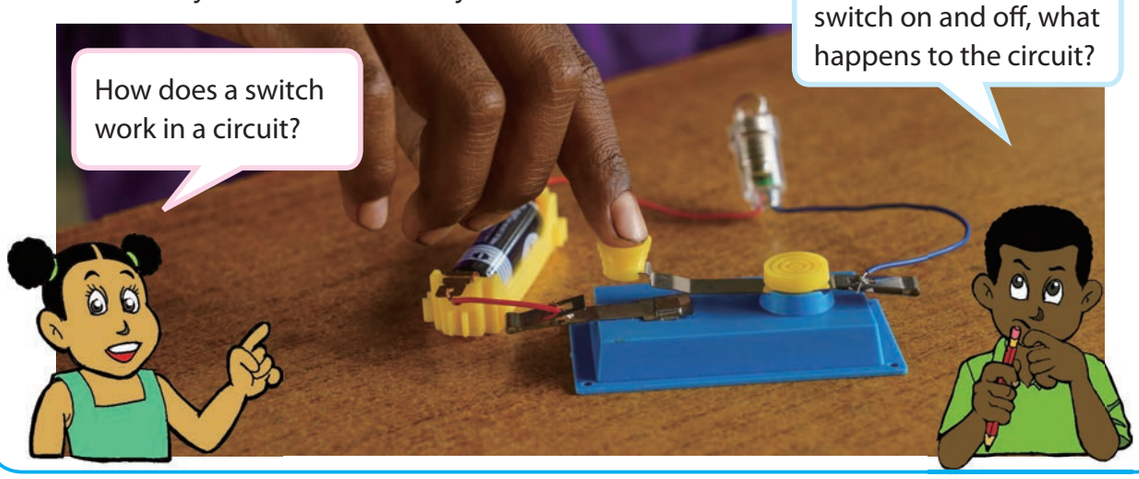
- a bulb, a bulb socket with wires, a wire, a dry cell, switch, battery holdes

What to Do:

1. Draw a table like the one shown below.

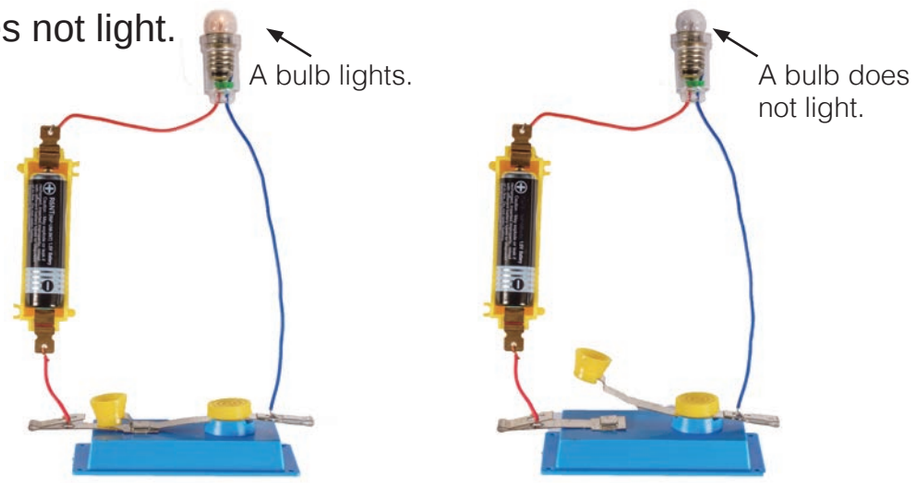
	What happens to the bulb?
Turn on the switch	
Turn off the switch	

2. Make an electric circuit as shown below using a bulb, a bulb socket with wires, a wire, a dry cell and a switch.
3. Turn on and off the switch and observe what happens to the bulb. Record your observations in the table.
4. Share your results with your classmates.



Result

A bulb lights when the switch is turned on. When the switch is turned off, the bulb does not light.

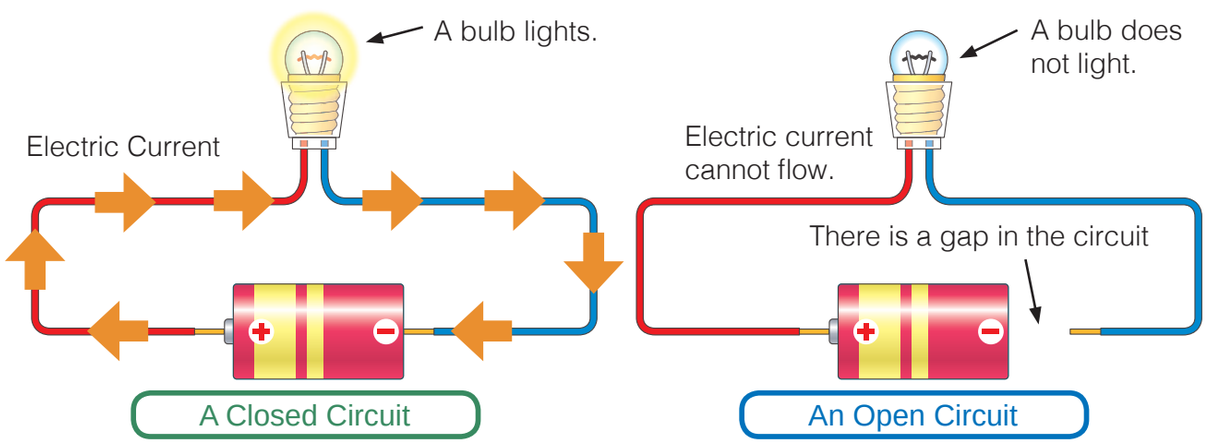


When a switch is on

When a switch is off

Summary

Electricity can flow through a circuit only if the circuit is complete. The flow of electricity is called **electric current**. When a switch is on, the circuit is complete. Electric current flows through the complete circuit, so a bulb lights. A circuit through which electric current can flow is called a **closed circuit**. When a switch is off, there is a gap in the circuit. Electric current cannot flow through the circuit, so a bulb does not light. A circuit through which electric current cannot flow is called an **open circuit**. A switch can control the electricity travelling through a circuit.



Lesson 3: "Conductors and Insulators"

Electric current can flow through an electric circuit only if the circuit is complete. Can electric current flow through a circuit if something is placed in the circuit?

Which materials can electricity flow through?

Activity : Connecting objects into an electric circuit

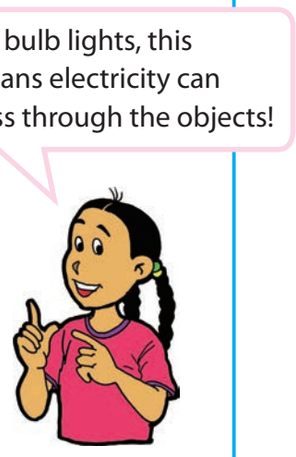
What We Need:

- a bulb, a bulb socket with wires, a dry cell, battery holder, paper clips, paper, aluminium can, glass, nail, plastic bottle, wood, any others

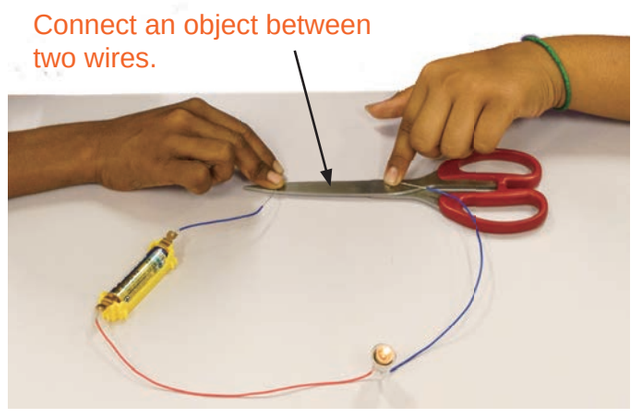
What to Do:

1. Draw a table like the one shown below.

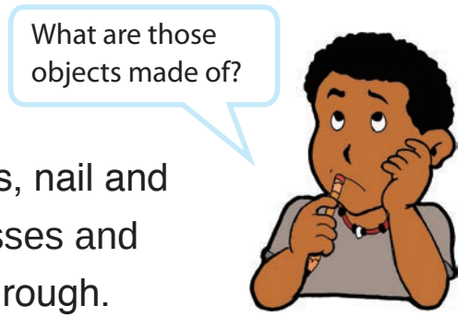
Objects	Your Prediction	Result
paper clips		
paper		
aluminium can		
……		



2. Predict which of the objects electricity can flow through and record your prediction in the table.
3. Set up a bulb, bulb socket, dry cell and wires as shown below.
4. Connect different objects between two wires and see which objects electric current can flow through. Record your results in the table.
5. Share your results with your classmates. Talk about which objects allow electricity to flow through.



Result



Electric current can flow through paper clips, nail and aluminium can. Papers, plastic bottles, glasses and wood do not allow electric current to flow through.

Objects that electricity can pass through


Clip


Nail


Steel can


Aluminium can

Objects that electricity cannot pass through


Notebook


Rubber band


Plastic spoon


Glass cup


Wood ruler

Summary

A clip, nails and steel can are made of iron. An aluminium cans is made of aluminium. Materials such as iron and aluminium are called **metals**. Gold, silver and copper are also metals.

Electric current flows through some materials. A material that electric current easily flows through is called a **conductor**. Electric current passes through metals easily. Metals are good conductors. Electric current does not flow through other materials. A material that does not allow electric current to flow through easily is called an **insulator**. Plastic, rubber, glass and wood are some examples of insulators.

Conductors

Insulators

Lesson 4: "Uses of Conductors and Insulators"

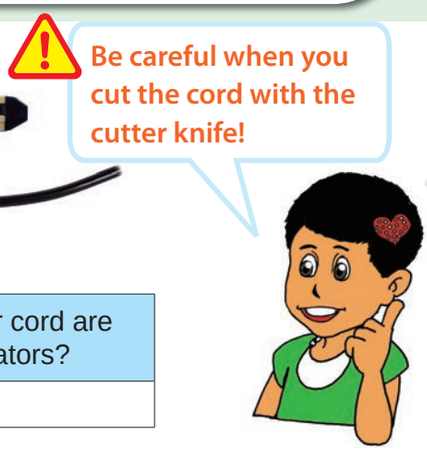
Materials can be classified into conductors and insulators. Conductors and insulators are very useful in our lives.

How do we use conductors and insulators in daily life?

Activity : Finding conductors and insulators

What We Need:

- power cord, cutter knife

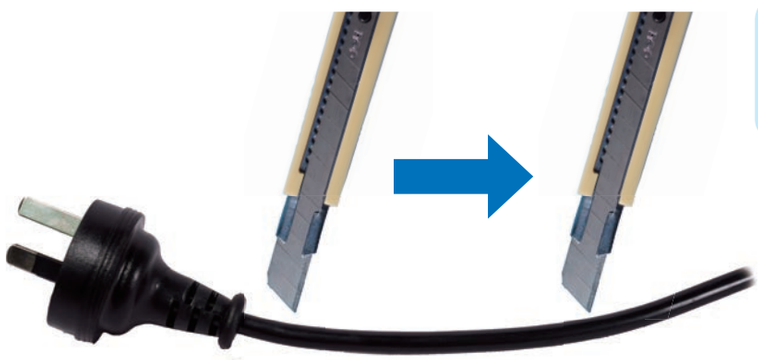


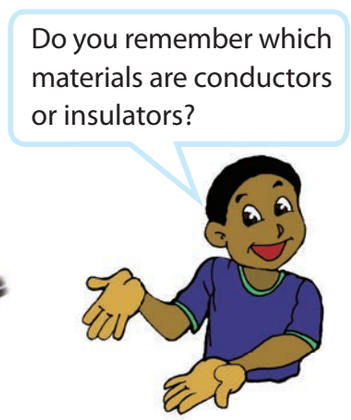
What to Do:

1. Draw a table like the one shown below.

What is a cord made of?	Which parts of the power cord are conductors and insulators?

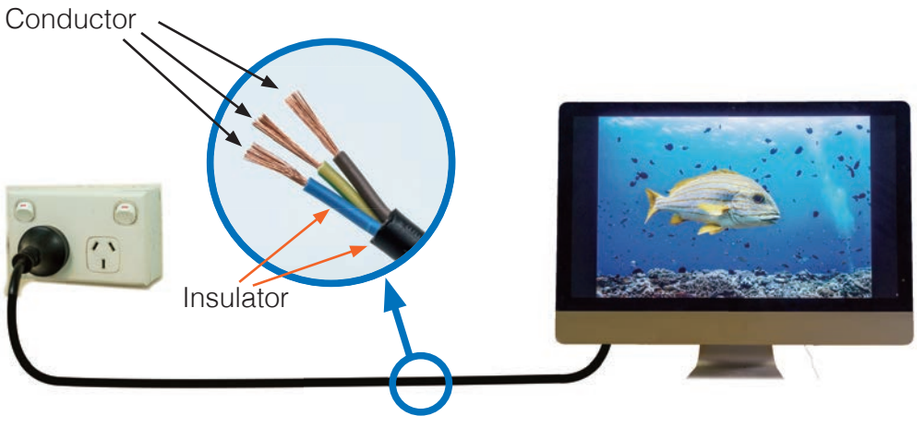
2. Cut the cord lengthwise with a cutter knife. Observe how the inside of the cord is formed.
3. Find what the cord is made of and which parts of the cord are conductors and insulators. Record your findings in the table.
4. Share your findings with your classmates. Talk about how and why conductors and insulators are used in a power cord.





Summary

Conductors and insulators are used in many ways. For example, a power cord of an appliance contains conductors and insulators. A power cord is usually made of wires surrounded by a covering. The wires are made of metals such as copper and silver. Metal wires are conductors that connect an electrical appliance to the power point. Electric current can flow through the wires. The covering is usually made of rubber or plastic. The covering is an insulator. It prevents the electric current from escaping.



Electricity is useful to us. However, electricity is very dangerous if we are not careful when we use it. Our bodies are conductors. Electricity can flow through our bodies.

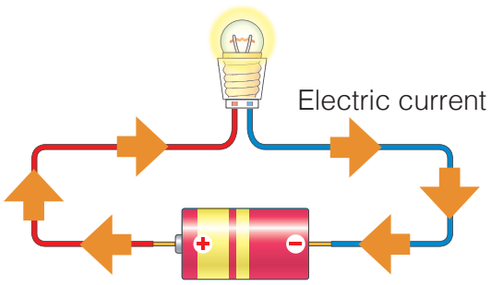
If we touch electricity directly, a lot of electricity will travel through our bodies and we will get electric shock. The shock can seriously harm or kill us. That is why insulators are used for electric appliances to avoid getting electric shocks.

Do not put your finger into power point.

Summary and Exercise

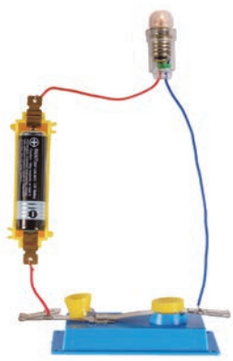
Summary 8.2 Functions of Electricity

Lighting a Bulb



- To light a bulb, a wire has to be connected to the positive (+) terminal of a dry cell and another should be connected to the negative (-) terminal.

Flow of Electricity


Closed circuit


Open circuit

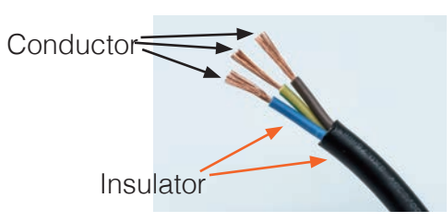
- Electricity can flow through a circuit only if the circuit is complete.
- The flow of electricity is called electric current.
- A circuit through which electric current can flow is called a closed circuit.
- A circuit through which electric current cannot flow is called an open circuit.
- A switch can control the electricity travelling through a circuit.

Conductors and Insulators

- A material that electric current easily flows through is called a conductor. Metals are conductors.
- A material that electric current does not flow through easily is called an insulator. Plastic, rubber, glass and wood are insulators.

Uses of Conductors and Insulators are insulators

- Conductors and insulators are used in many ways.
- A power cord of an electrical appliance contains conductors and insulators.



Summary and Exercise

Exercise 8.2 Functions of Electricity

Q1. Complete each sentence with the correct word.

(1) The circle of a pathway that _____ flows is called an electric circuit.

(2) A dry cell has a positive terminal and a _____ terminal.

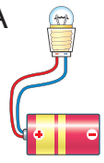
(3) Material such as iron, gold and copper are called _____.

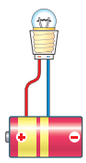
(4) Metal wires are _____ to connect an electrical appliance to the electric outlet.

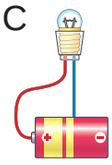
(5) The plastic or rubber covering surrounding the wires of an electrical appliance is called an _____.

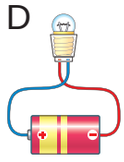
Q2. Choose the letter with the correct answer.

(1) Which of the following ways of connection will light up the bulb?

A 

B 

C 

D 

(2) Which of the following lists contain only conductors of electricity?

A. paper clip, paper, glass

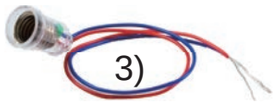
B. steel can, nail, copper

C. tinned fish, coin, stick

D. gold, rubber, plastic

Q3. Answer the question below.

Study the pictures on your right. What are the names of these parts of the electric circuit?

1) 

2) 

3)

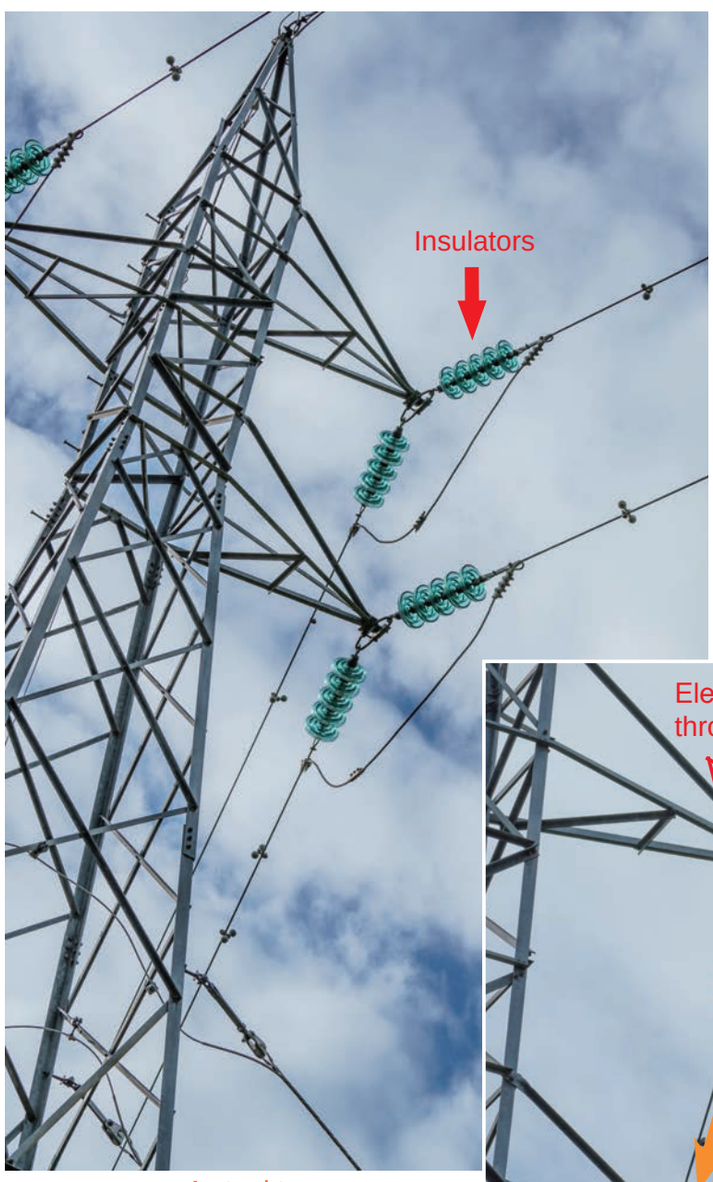
4) 

5) 

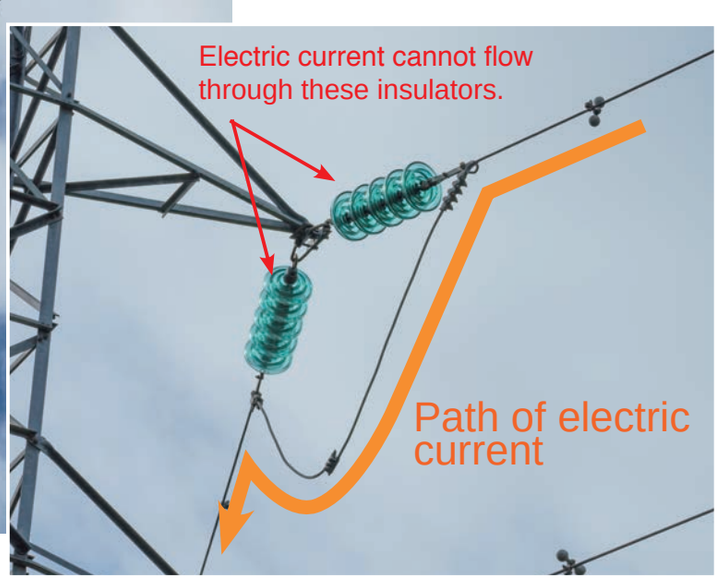
Q4. Explain why metal wires in a power cord of an electric appliance is covered with rubber?

Why doesn't electric current escape from a steel tower?

We can find electric wires hanging on a steel tower or an electric pole. Look at the picture below that shows electric wires and a steel tower. We learnt that a metal is a conductor that electricity passes through. Can you guess why the electric current does not escape to the ground through the steel tower? You can find round and thin shaped objects connected between the steel tower and electric wire. Those are insulators made of glass and ceramic. Electric current cannot pass through the insulator so the current takes another route as shown below without escaping through the steel tower.



A steel tower



Chapter Test

8. Electricity 1

Q1

Complete each sentence with the correct word.

(1) Electricity is a form of _____ which has an ability to do things.

(2) Two main sources of electricity are power points and _____.

(3) The circle of a pathway that electricity flows is called an electric_____.

(4) A dry cell has a _____ terminal and negative terminal.

Q2

Choose the letter with the correct answer.

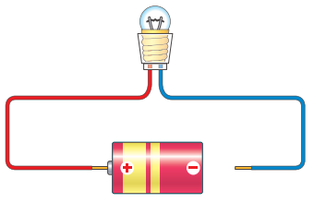
(1) Which of the sentences is correct about the circuit shown?

A. The circuit is an open circuit.

B. The bulb lights.

C. The electric current can flow in the circuit.

D. The circuit is a closed circuit.



(2) Which of the following materials is a conductor of electricity?

A. Rubber band

B. Drinking glass

C. Metal spoon

D. Wooden ruler

(3) What is the covering of the electrical cords made of?

A. Metal

B. Gold

C. Steel

D. Rubber

(4) Which is the best example of a device that runs on batteries?

A. Electric stove

B. Wrist watch

C. Television

D. Refrigerator

Q3

(1) Name two devices that use battery to work.

_____

(2) Name two materials that electric current does not flow through easily.

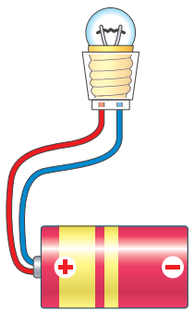
_____

(3) What is the function of a switch in an electric circuit?

_____

_____

(4) Look at the picture on the right. How do we change the connection of the wire to light the bulb?



_____

_____

_____

Q4

When we are using a computer, electric current travels through its power cord from a power point. Explain why you don't get electric shock when you touch the power cord.

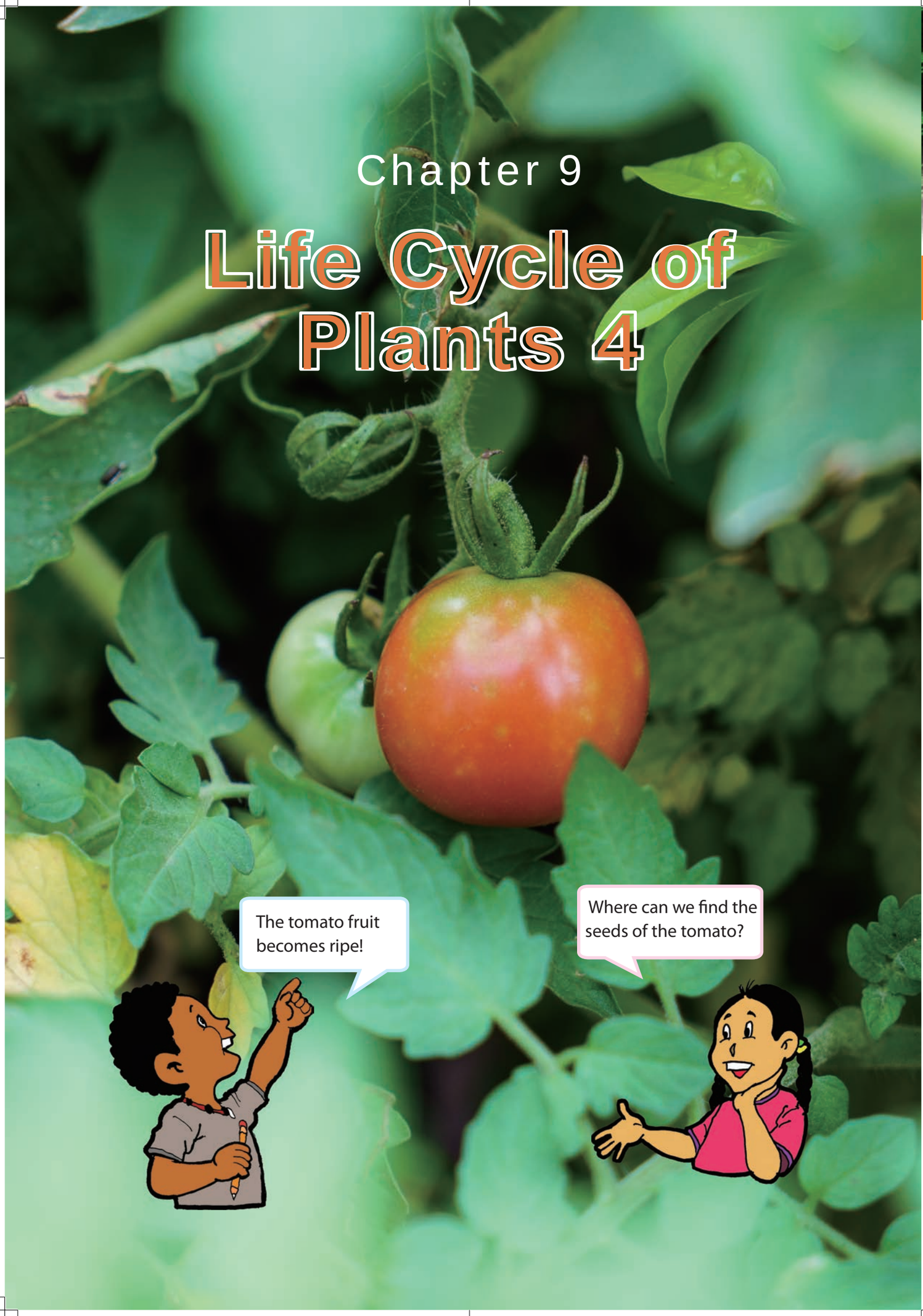
_____

_____

_____

Chapter 9

Life Cycle of Plants 4



9.1 Stages of Life Cycle of Plants 4

Lesson 1: "Fruits"

After adult plants make flowers, they make fruits. Let's observe the fruits.

What is a fruit made up of?

Activity : Observing tomatoes

What We Need:

- tomato fruit, knife

Be careful when you cut a fruit with a knife!

What to Do:

1. Draw a chart like the one shown below.
2. Go out of the classroom and pick a ripe tomato from your plant.
3. Cut the tomato in half and draw the sketch of the tomato on the chart.
4. Observe the tomato carefully and record what you found on the chart.
5. Share your findings with your classmates. Talk about what a fruit is made up of.

Date: _____

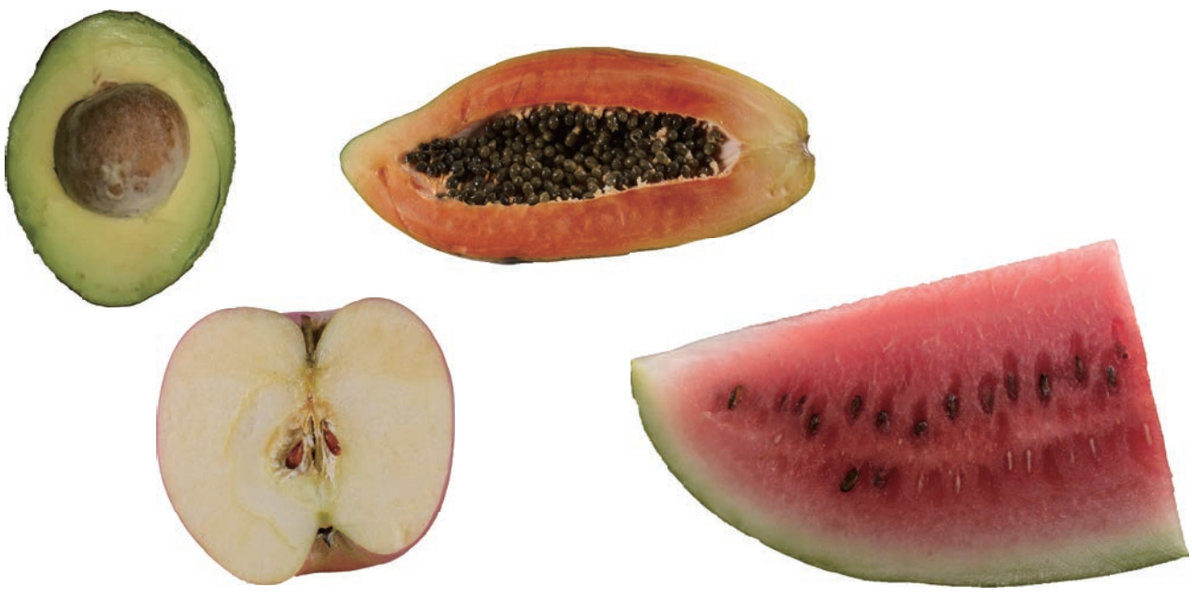
Drawing: Fruits
What you found:

Summary

The adult plants grow and produce flowers. The flowers make **fruits**. Fruits come in different shapes, sizes and colours. Some fruits are soft, juicy and some are hard.

Fruits have different shapes, sizes and colours.

A fruit is the part of a plant that has seeds. Some fruit contain many seeds. Seeds grow inside the fruit.



A fruit contains seeds.

Lesson 2: "Life Cycle of Plants"

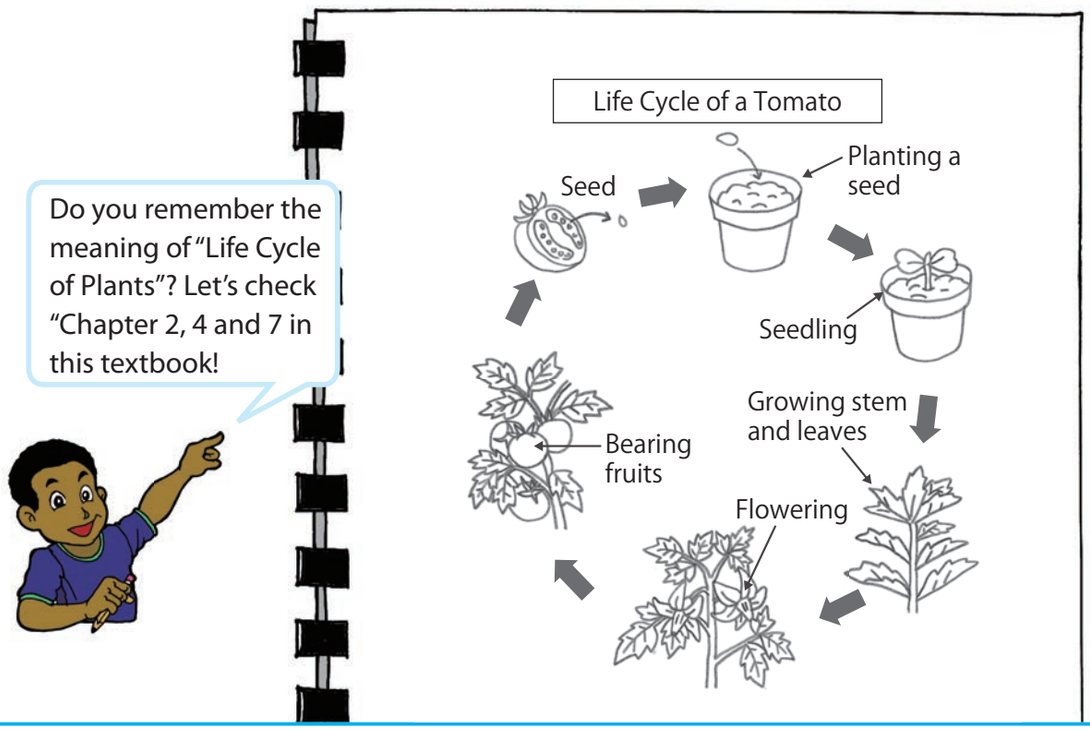
All plants grow, change and finally die. We have observed the plant growth and changes so far. Let's wrap up the life cycle of a plant!

How do plants grow and change during their life cycle?

Activity : Plant life cycle

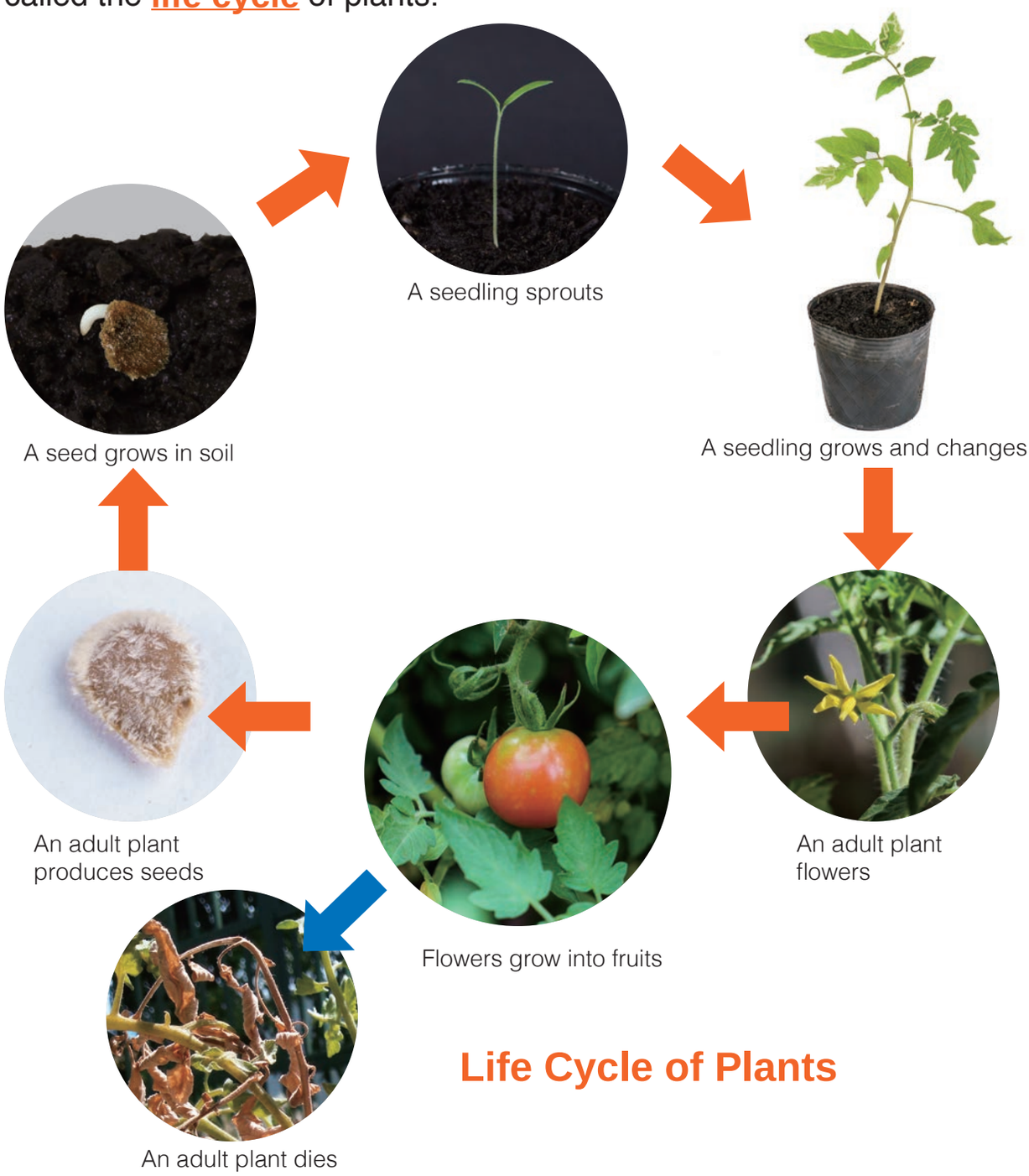
What to Do:

1. Check the records of the plant growth you have observed in your exercise book.
2. Summarise how the plant grows and changes in order in your exercise book as shown below.
3. Share your findings with your classmates. Talk about the life cycle of plants.



Summary

The plant life cycle starts from a seed. The seed sprouts and a seedling grows. The seedling changes into an adult plant as it grows. The adult plant flowers bears fruits and produces seeds. Then the adult plant finally dies. The seeds grow into new plants again. This is called the **life cycle** of plants.



Life Cycle of Plants

Summary and Exercise

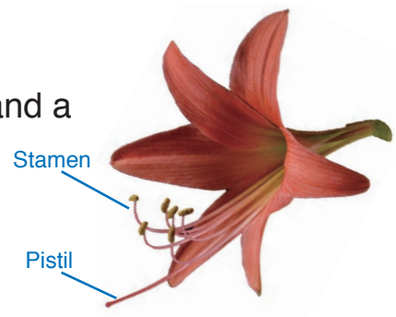
Summary

2.1, 4.1, 7.1, 9.1
Life Cycle of plants

Stages of Plant cycle

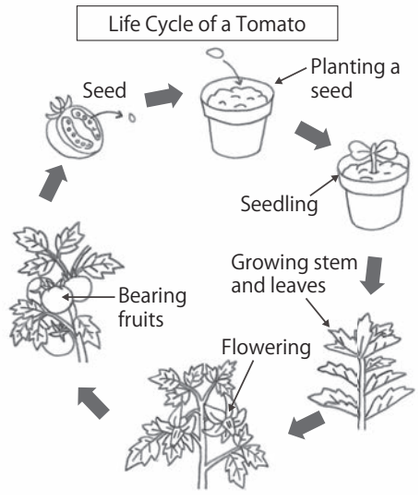
- The life cycle of most plants starts from seeds. A seed is the small part produced by plants from which new plants grow.
- A young plant that grows from a seed is called a seedling. A seedling grows and changes.
- The seedling changes to an adult plant as it grows. The adult plants flowers.
- The flowers grow into fruits. Fruits come in different shapes, sizes and colours.
- The series of changes that a plant goes through is called life cycle.

Parts of a Flower



- The flower has a male part called the stamen and a female part called the pistil.
- The stamen has a part called the anther which contains pollen.
- The pistil is made up of the stigma and ovary.

Life Cycle of Plants



- Plant life cycle starts from a seed.
- The seed sprouts and a seedling grows.
- The seedling changes into an adult plant as it grows.
- The adult plant flowers, bears fruits and produces seeds.

Summary and Exercise

Exercise

2.1, 4.1, 7.1, 9.1
Life Cycle of plants

Q1. Complete each sentence with the correct word.

(1) Most plant life begin with a _____.

(2) A _____ grows from the seed and changes into an adult plant.

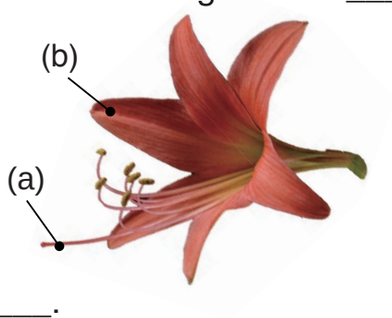
(3) Flowers grow into _____ which contains many seeds.

(4) Plants germinate, grow, change, produce seeds and new plants grow from seeds. This series of change is called the _____ of plants.

Q2. Choose the letter with the correct answer.

(a) The parts of the flower as illustrated in the diagram are _____.

A. (a) pistil and (b) petal
B. (a) stamen and (b) pistil
C. (a) ovary and (b) stigma
D. (a) pistil and (b) anther



(b) The stamen of a flower _____.

A. protects the seed.
B. holds the embryo.
C. is part of the pistil.
D. contains pollen.

Q3. Compare the fruits of peanut and water melon by their colour, shape, juicy or dry, hard or soft, using the table on the right.

	Peanut	Water melon
Color		
Shape		
Juicy or dry		
Hard or soft		

Q4. What happens in the life cycle of a herb plant after it produces seeds?

How old is the oldest tree?

A Life cycle of tomato plant begins from a seedling and ends when it is an adult. It takes less than a year for the life cycle to be completed. The trees have generally longer life span than that of herbs. Look at the picture below.The tree is one of the oldest-known trees in the world. Can you guess how old it is? The tree is estimated to be at least 1,000 years old. There are some trees living over 2,000 years!

The tree is estimated to be over 1,000 years old (Japan)

Chapter Test

2, 4, 7, 9. Life Cycle of Plants

Q1

Complete each sentence with the correct word.

(1) A fruit contains many _____which grow inside it.

(2) The female part of the flower is called the _____.

(3) A young plant that grows from a seed is called a _____.

(4) A flower pollen is stored in the _____.

Q2

Choose the letter with the correct answer.

(1) The part of a plant that bears fruit and seeds is the _____.

A. flower

B. stem

C. root

D. leaf

(2) What do we call the series of changes that a plant goes through from seedlings to bearing fruits and seeds?

A. Organ system

B. Nutrient

C. Energy

D. Life cycle

(3) The female part of the flower has two parts called the _____.

A. pistil and ovary

B. stigma and ovary

C. anther and stigma

D. ovary and petals

(4) Which of the following shows the life cycle of flowering plants?

A. adult plant ➞ seed ➞ seedling ➞ adult plant

B. seed ➞ bud ➞ fruit ➞ adult plant ➞ seed

C. adult plant ➞ seedling ➞ seed ➞ adult plant

D. flower ➞ seed ➞ spore ➞ adult plant ➞ flower

Q3

The diagram below shows the different stages in the growth of a bean seedling but they are not in the correct order. Arrange the pictures in the correct order, by filling in the letters in the boxes.

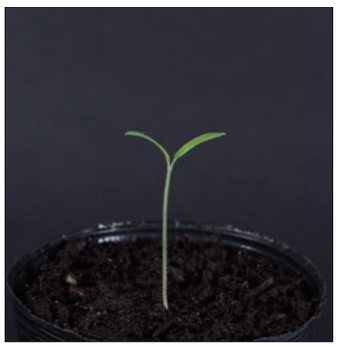
			
(A)	(B)	(C)	(D)

The stages in the correct order.

	→		→		→	

Q4

(1) The diagrams below show a seedling and an adult plant. Describe the similarities and differences between them.



Similarities: _____

Differences: _____

(2) Valerie observed the guava tree bearing flowers next to her house but there were some insects eating the flowers of the guava plant. What would she mostly observed on the guava plant in the near future? Give reasons for answer.

_____

Chapter 10

Life Cycle of Animals

10.1 Stages of Life Cycle of Animals

A **life cycle** is the series of changes that a living thing goes through during its life.

Lesson 1: "Life Cycle of Insects"

Insects are living things. All living things grow and change. How do insects grow and change during their life cycle?

What is a life cycle of an insect?

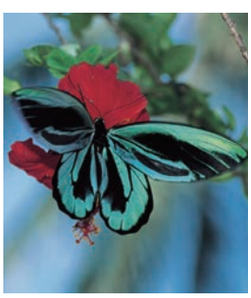
Activity : A life cycle of a butterfly

What to Do:

1. Draw a table like the one shown below.

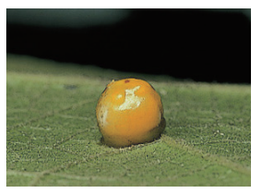
	Youngest → Oldest			
No. of Picture				

2. Look at the pictures of a growing butterfly below.
3. Put the pictures in order from the youngest to the oldest and write the number of the picture in the table.
4. Share your ideas with your classmates. Talk about how a butterfly grows and changes.


1

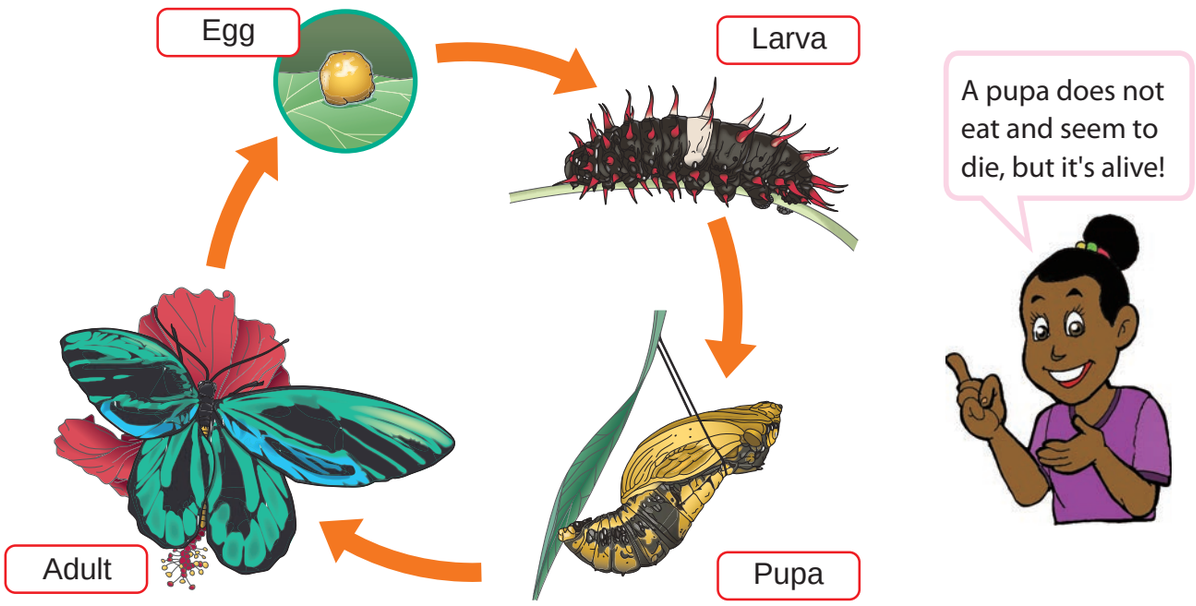

2


3


4

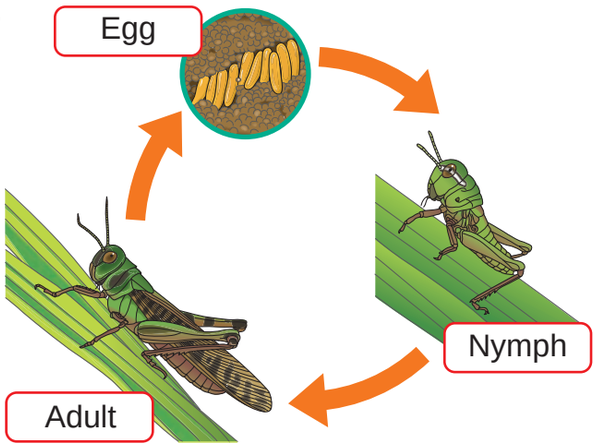
Summary

A butterfly changes its form as it grows. It has a four-stage life cycle. The life cycle of a butterfly starts from an egg. The **larva** called a caterpillar hatches from an egg. It eats plants and grows. Then it changes into a **pupa**. A pupa makes a case called **chrysalis**. During the pupa stage, a butterfly changes into an adult butterfly. A butterfly comes out of the chrysalis and becomes an adult. An adult butterfly lays eggs and a new life cycle begins.



Life cycle of a butterfly

Grasshoppers are also insects. They only have three-stages in their life cycle: egg, nymph and adult. A life cycle of a grasshopper starts from an egg. A nymph hatches from an egg. A **nymph** is a young grasshopper. It eats plants and grows. Then it becomes an adult. An adult grasshopper lays eggs and a new life cycle begins.



Life cycle of a grasshopper

Lesson 2: "Life Cycle of Fish and Amphibians"

Fish and amphibians are groups of animals. How do they grow and change? Are their life cycles alike or different?

What is the life cycle of a fish and an amphibian?

Activity : Comparing life cycles of Fish and amphibians.

What to Do:

1. Draw a table like the one shown below.

	Life cycle	How they are alike	How they are different
Fish			
Frog			

2 Look at the pictures of a growing fish and a frog below.

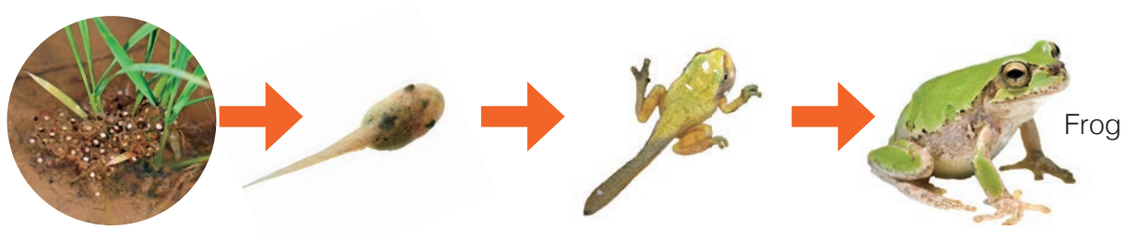
3. Observe how a fish and a frog grow and change. Write down the steps of their change in "Life cycle" column in the table.
4. Compare how the life cycles are alike or different.
5. Record your observations in the table.

6 Share your ideas with your classmates. Talk about how the life cycles of a fish and a frog are alike or different.

How are the life cycles of a fish and a frog similar or different?

What do their life cycles start from?

Fish

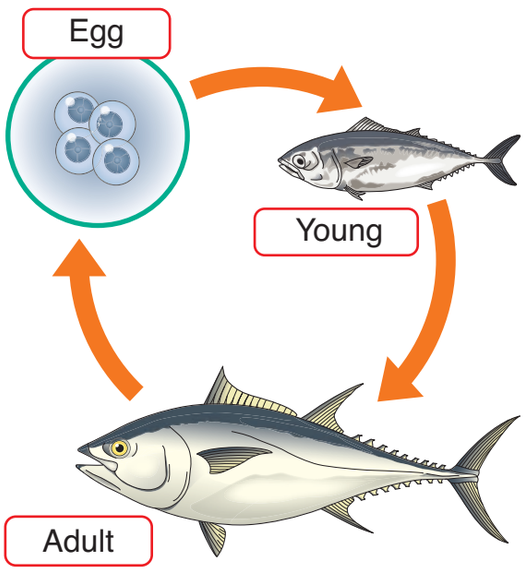


Frog

Summary

Life Cycle of Fish

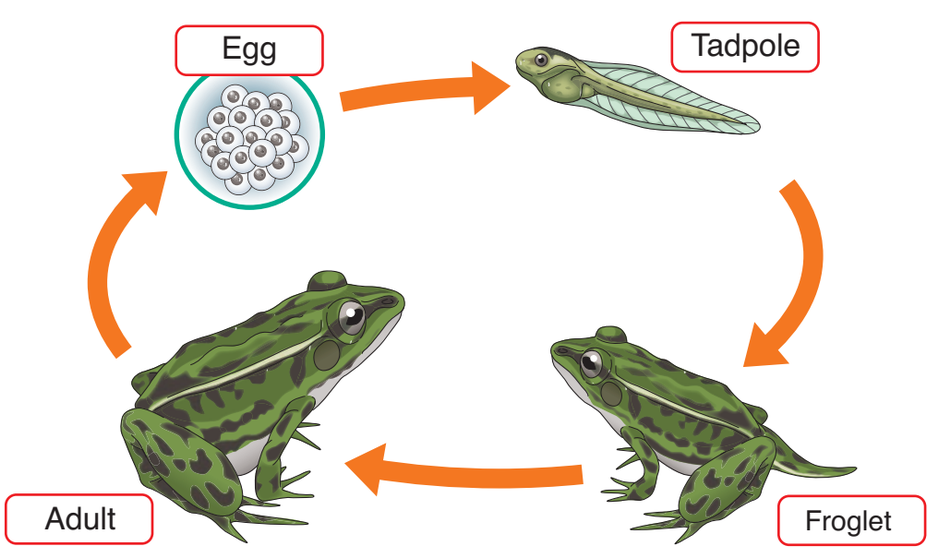
Fish do not change their form as they grow. Young fish looks similar to an adult fish. Like insects, the life cycle of a fish starts from an egg. A young fish hatches from an egg. It grows and becomes an adult fish. The adult fish lays eggs in water and a new life cycle begins.



Life cycle of a fish

Life Cycle of Amphibians

A frog is an amphibian. Unlike fish, a young frog looks very different from an adult frog. The life cycle of a frog starts from an egg. A **tadpole** hatches from the egg. It lives in water. It has gills and a tail, but no legs. The tadpole grows and changes into a froglet with legs and still has a tail. A froglet gradually grows lungs and loses its gills and tail. After a while, the froglet becomes an adult frog. An adult frog lays eggs and a new life cycle begins.



Life cycle of a frog

Lesson 3: "Life Cycle of Reptiles and Birds"

Living things have their own life cycles. How about reptiles and birds? Do they have similar or different life cycles?

What is the life cycle of a reptile and a bird?

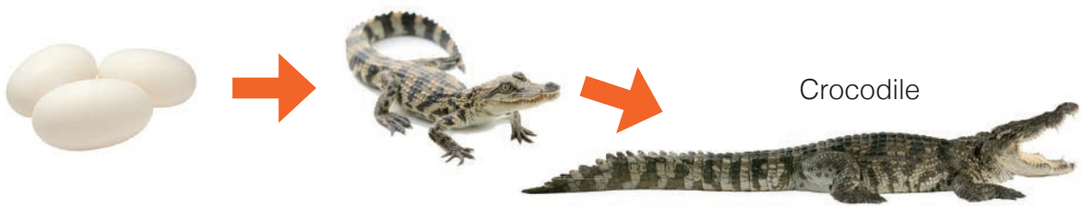
Activity : Comparing life cycles of a crocodile and a chicken

What to Do:

1. Draw a table like the one shown below.

	Life cycle	How they are alike	How they are different
Crocodile			
Chicken			

2. Look at the pictures of a growing crocodile and a chicken below.
3. Observe how a crocodile and a chicken grow and change. Write down the steps of the change in "Life cycle" column in the table.
4. Compare how their life cycles are alike or different.
5. Record your observations in the table.
6. Share your ideas with your classmates. Talk about how the life cycles of a crocodile and a chicken are alike or different.



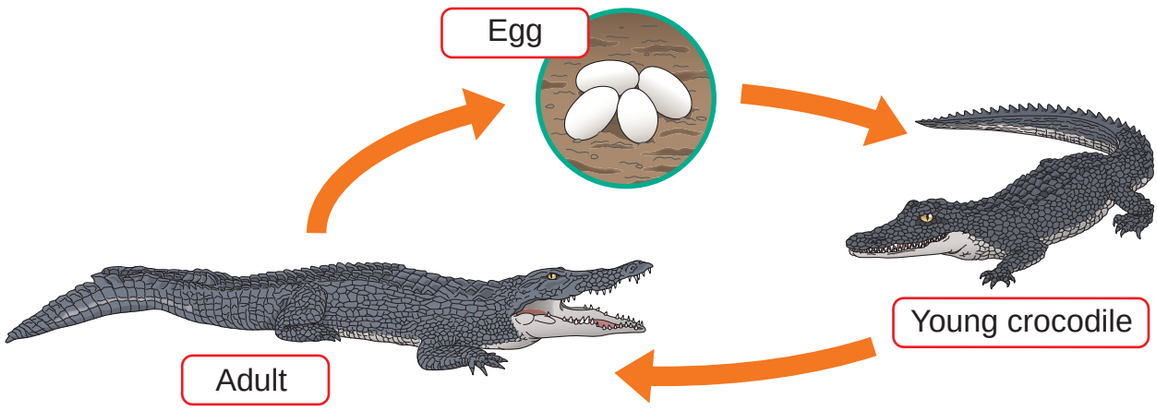
Crocodile

Chicken

Summary

Life Cycle of Reptiles

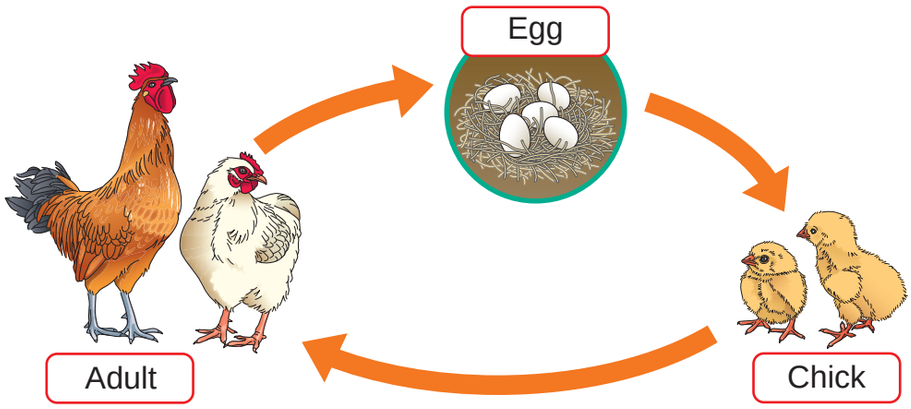
A crocodile is a reptile. Unlike frogs, the crocodile does not change its form as it grows. A young crocodile looks similar to an adult crocodile. The life cycle of a crocodile starts from an egg. The young crocodile hatches from an egg. It grows and becomes an adult crocodile. The adult crocodile usually lays eggs on land. Lizards, snakes and turtles also have the same life cycle as crocodiles.



Life cycle of crocodile

Life Cycle of Birds

A chicken is a bird. A young chicken is called a **chick** and looks similar to an adult chicken. The life cycle of a chicken starts from an egg. The chick hatches from an egg and increases its size as it grows. Then it becomes an adult chicken. An adult chicken lays eggs and a new life cycle begins. Other birds such as a bird of paradise and a cassowary also have the same life cycle as chickens.



Life cycle of chicken

Lesson 4: "Life Cycle of Mammals"

Insects, fish, amphibians, reptiles and birds have their own life cycles. How about mammals? Do mammals have similar or different life cycle to that of the other animals?

What is the life cycle of mammals?

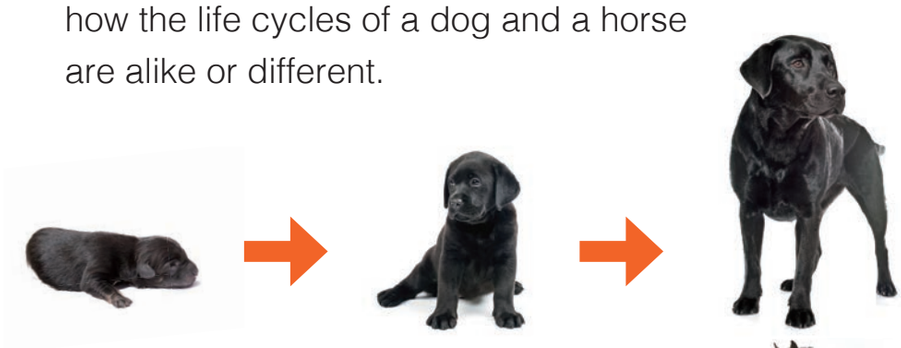
Activity : Observing life cycles of mammals

What to Do:

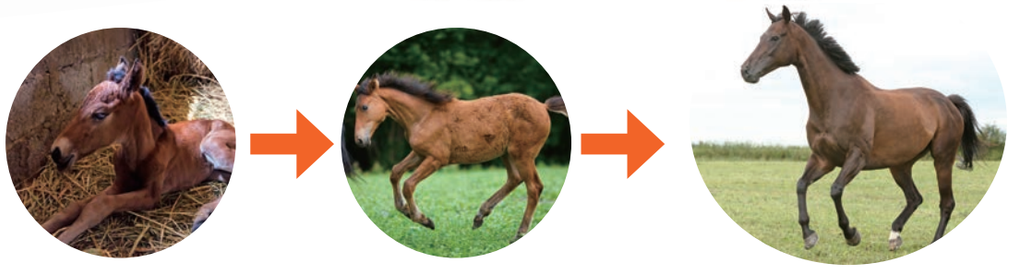
1. Draw a table like the one shown below.

	Life cycle	How they are alike	How they are different
Dog			
Horse			

2. Look at the pictures of a growing dog and a growing horse below.
3. Observe the life cycles of a dog and a horse and compare how they are alike or different.
4. Record your observations in the table.
5. Share your ideas with your classmates. Talk about how the life cycles of a dog and a horse are alike or different.



Dog



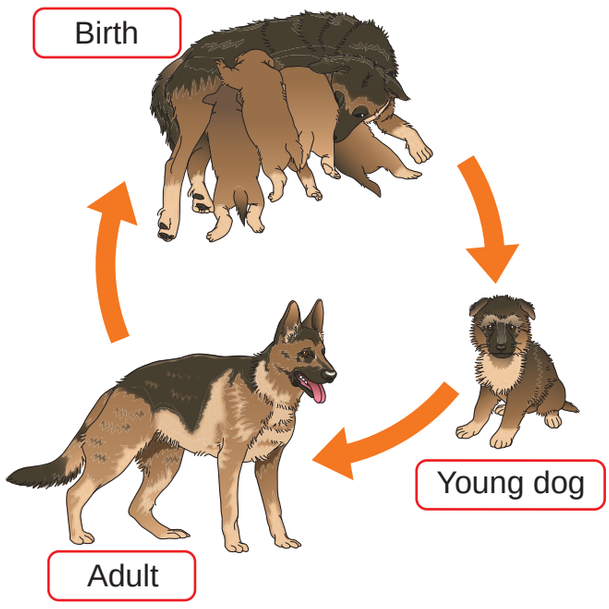
Horse

Summary

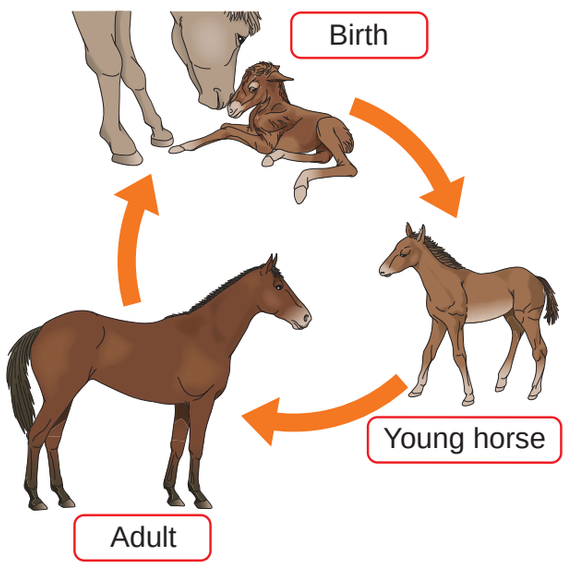
Life Cycle of Mammals

Most mammals such as a dog, cat and horse have a similar life cycle. A dolphin, whale and human also have a similar life cycle. Unlike insects, fish, amphibians, reptiles and birds, a young mammal does not hatch from an egg.

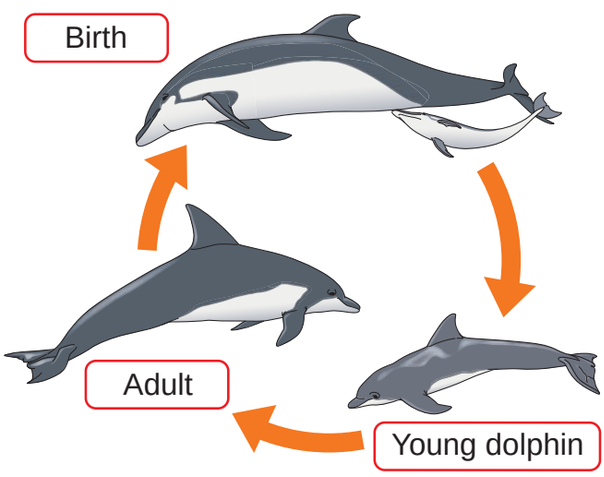
When a young mammal is born, it comes out of its mother's body. At birth, a young mammal looks similar to the adult mammal. The young mammal grows and becomes an adult mammal. The adult mammal gives birth to a young mammal and a new life cycle begins.



Life cycle of a dog



Life cycle of a horse



Life cycle of a dolphin

Summary and Exercise

Summary 10.1 Life Cycle of Animals

Animals Life Cycle

- A life cycle is a series of changes that a living thing goes through during its life.
- Animal life cycles are different in the groups that each animal belong to.

Life Cycle of Insects

- The life cycle of insects starts from an egg.
- A larva hatches from an egg and then changes into a pupa.
- During pupa stage, the insect makes a case called chrysalis, changes into an adult inside the chrysalis and comes out as an adult.
- Some insects only have three stages in their life cycle: egg, nymph and adult.

Life Ccycle of Fish and Amphibians

- The life cycle of fish and amphibians starts from an egg.
- A young fish looks similar to the adults.
- A young amphibian such as a tadpole looks different from the adults. The tadpole has gills and a tail like a fish, which disappears as it grows.

Life Cycle of Reptiles and Birds

- The life cycle of reptiles and birds starts from an egg.
- As birds and reptiles grow the young looks similar as their adults.

Life Cycle of Mammals

- Young mammals are born from their mother's body instead of hatching from an egg.
- A young mammal looks similar to the adult mammals.

Summary and Exercise

Exercise 10.1 Life Cycle of Animals

Q1. Complete each sentence with the correct word.

(1) The first stage in the life cycle of most animals is the _____.

(2) The group of animals that lay eggs in the water and their young looks similar to the adults are called _____.

(3) The second stage in the life cycle of a butterfly is called _____.

Q2. Choose the letter with the correct answer.

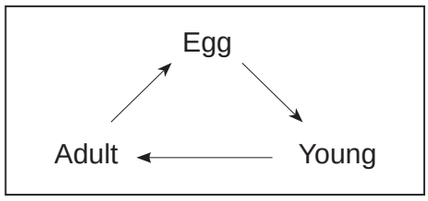
(1) The diagram shows a life cycle of some animal groups. Which of the following animals do <u>not</u> go through this life cycle?

A. Grasshopper

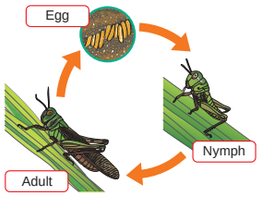
B. Chicken

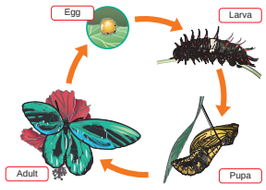
C. Fish

D. Dog



(2) Look at the diagrams below and choose the correct sentence about the difference between life cycle of a grasshopper and a butterfly.





A. The young grasshopper has antenna and wings but the caterpillar does not have both of them.

B. The life cycle of a grasshopper has three stages but the life cycle of a butterfly has five stages.

C. The butterfly becomes pupa but not the grasshopper.

D. The grasshopper lays many eggs but a butterfly lays only one egg.

Q3. What would happen if one stage of a life cycle in living things stop?

Q4. What are the similarities between a plant life cycle and an animal life cycle?

Young mammals that grow inside of mother's pouch

Marsupials are the group of mammals commonly known as pouched mammals. Many kinds of marsupials such as wallabies, cuscus, tree-kangaroos, possums and sugar gliders live in Papua New Guinea. Why are they called "pouched mammals"?

Most baby mammals spend enough time in their mother's body to grow. They come out from their mother when they are ready to live outside. For example, dogs are pregnant for about 2 months. Pregnancy in female horses is around 11-12 months.
However, marsupials have a slightly different life cycle. They give birth very early but the tiny baby continues to grow in the pouch outside of the mother's body. Female wallabies are pregnant for around 28 days and keep young wallabies for the next 7-8 months in the pouch. The gestation period for a pregnant female cuscus is only around 13 days, but the young cuscus remains in the pouch for about 6–7 months. The pouch is a flap of skin covering the nipples for the young to get milk from.

A mother wallaby and her child in the pouch

Chapter Test

10. Life Cycle of Animals

Q1

Complete each sentence with the correct word.

(1) The first stage in the life cycle of most animals is_____.

(2) When a frog first hatches from an egg, it is called a _____.

(3) A fully grown animal is called an _____.

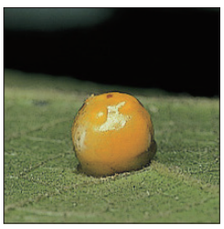
(4) When animals make their young again and again is called _____.

Q2

Look at the pictures below and answer the following questions.

1

2



3

4

(1) Choose the correct order of stages in life cycle of butterfly.

A. 3 ➡ 4 ➡ 2 ➡ 1 B. 3 ➡ 2 ➡ 4 ➡ 1

C. 2 ➡ 3 ➡ 4 ➡ 1 D. 3 ➡ 4 ➡ 1 ➡ 2

(2) Which of the following statement is about the life cycle of a butterfly?

A. A caterpillar does not have antennae and wings.

B. The pupa feeds on leaves and grows fast.

C. The adult structures develop within the pupa.

D. The young butterfly looks similar to adult.

(3) At which stage of the life cycle of a butterfly does it eat a lot of leaves?

A. 1 B. 2 C. 3 D. 4

(4) At which stage does it stop feeding?

A. 1 B. 2 C. 3 D. 4

Q3 Study the pictures of below and answer the following question.



(1) State how the chick looks like the adult chicken?

_____

(2) What is the difference between life cycle of chickens and pigs?

_____

Q4 Geraldine found many tadpoles in a pond that used their tails to swim around the pond and they also had gills like structures. After some days, he noticed that the tadpoles have disappeared from the pond but there were a lot small frogs with four legs around the pond.

(1) If the four-legged frogs came from pond, what happened to their tails?

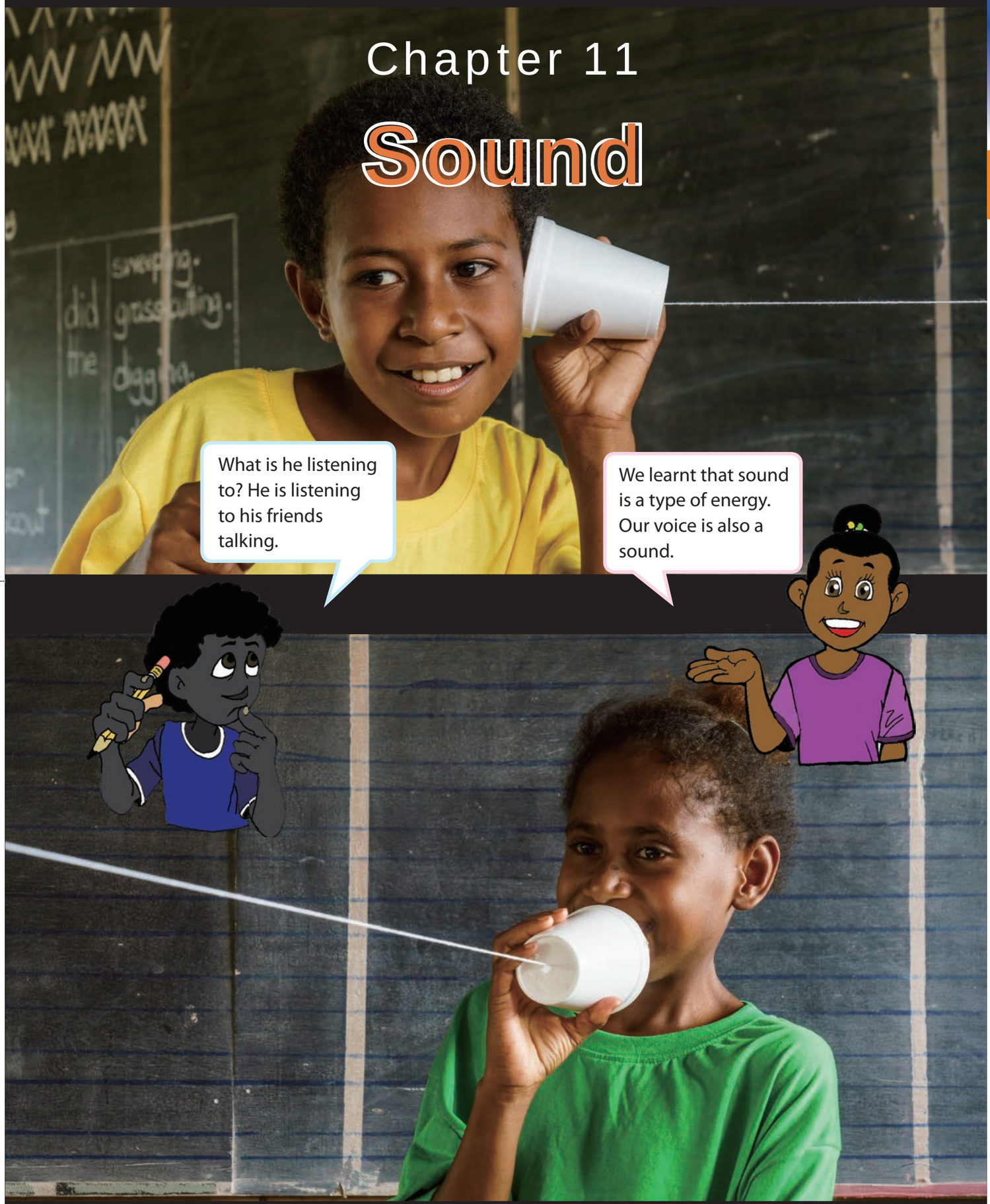
_____

(2) What would the tadpoles use their gill like structures for?

_____

Chapter 11

Sound



11.1 Properties of Sound

Lesson 1: "Sound"

Stop for a moment and just listen. We can hear different kinds of sound. Sound is all around us. But, what makes sound?

How is sound made?

Activity : Making sound

What We Need:

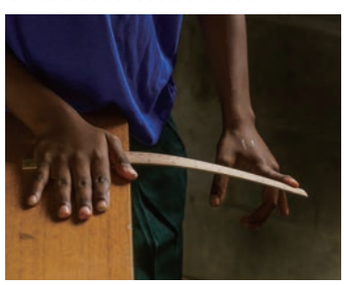
- long ruler, rubber band

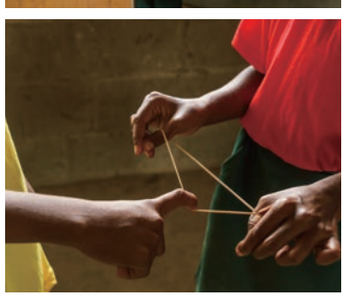
What to Do:

1. Draw a table like the one shown below.

Object	Before making sound	After making sound
Ruler		
Rubber band		

2. Place the ruler at the end of a desk and hold it down with one hand.
3. Pluck the end of the ruler with a finger.
4. Listen and observe closely what is happening to the ruler. Record your observation in the table.
5. Stretch the rubber band between your fingers. Pluck the rubber band.
6. Observe what is happening to the rubber band. Record your observation in the table.
7. Share your findings with your classmates. Talk about what happens to objects when sound is made.





Summary

Sound is a form of energy that you can hear. We can hear different sounds around us. We can hear the beat of the rain on the ground, an animal call, people speaking, music, machines running and many more.

Beat of the rain on the ground

Music and song

A dog barking

Sound is made when objects vibrate. A **vibration** is a quick movement back and forth. For example, when we pluck the end of a ruler or a rubber band with the finger we can hear the sound and see the ruler or rubber band moving back and forth. Sound is made when a ruler or a rubber band vibrates.

Sound is made when the ruler moves back and forth.

Sound is made when the rubber band vibrates.

When we put our hand around our throat and speak, we can feel vibrations.

When we speak, we feel the vibration.

When we beat a drum, sound is made and the drum vibrates.

Lesson 2: "Sound Travelling"

Sound is made when objects vibrate. But, why do we hear sound when objects vibrate?

How does sound travel?

Activity : String telephone

What We Need:

- two foam cups, 3-5m long string

What to Do:

1. Make a string telephone like the one shown on the right.
2. Pair up with a friend. Give one cup to your partner and hold onto the other.
3. Walk slowly apart until the string is straight and tight.
4. Put your cup over your ear and let your partner talk into his or her cup. Can you hear your partner talking?
5. Remove the string from the cup and repeat Step 4. Can you hear your partner talking?
6. Share your findings with your classmates.

Result

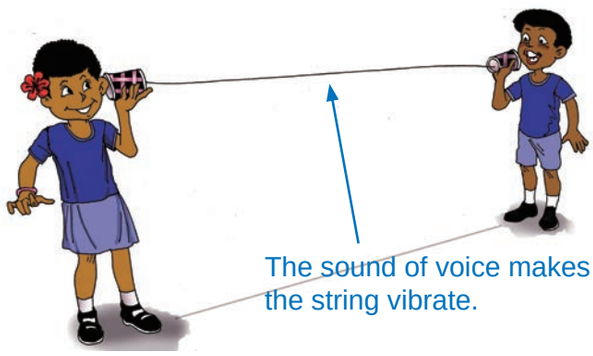
We can hear our partners talking when two cups are connected with a string. We cannot hear our partners talking when the string is removed from the cups.

Discussion

Think about the following question based on the results:

- "How does your partner's voice travel from your partner to you?"
- "What does your partner's voice need in order to travel?"

Summary

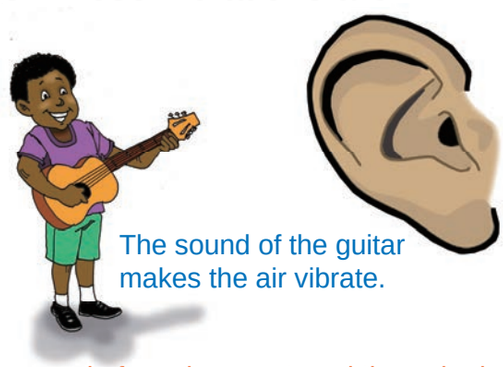


The sound of voice can travel through a string.

Sound always needs matter such as air, water and solid objects to travel through. A matter that transports sound is called a **medium**. Sound travels through a medium as vibrations.

For example, a string is a solid object. When we talk into the cup of a string telephone, our voice makes the bottom of the cup vibrate. These vibrations are transferred to the string and then into the bottom of our partner's cup. Therefore, our partner can hear our voice.

When we pluck a guitar string, it vibrates. These vibrations are transferred through the air and make the inside of our ears vibrate. Then we hear sound. Sound also travels through water. Whales make sound to communicate with each other under water.



The sound of a guitar can travel through air.

Lesson 3: "Soft and Loud Sound"

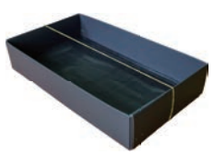
You speak out loud to call your friend from far away. You can use a soft voice in your home at night too. You can change your voice to soft or loud.

What makes sound soft or loud?

Activity : Making loud and soft sound

What We Need:

- rubber band, box

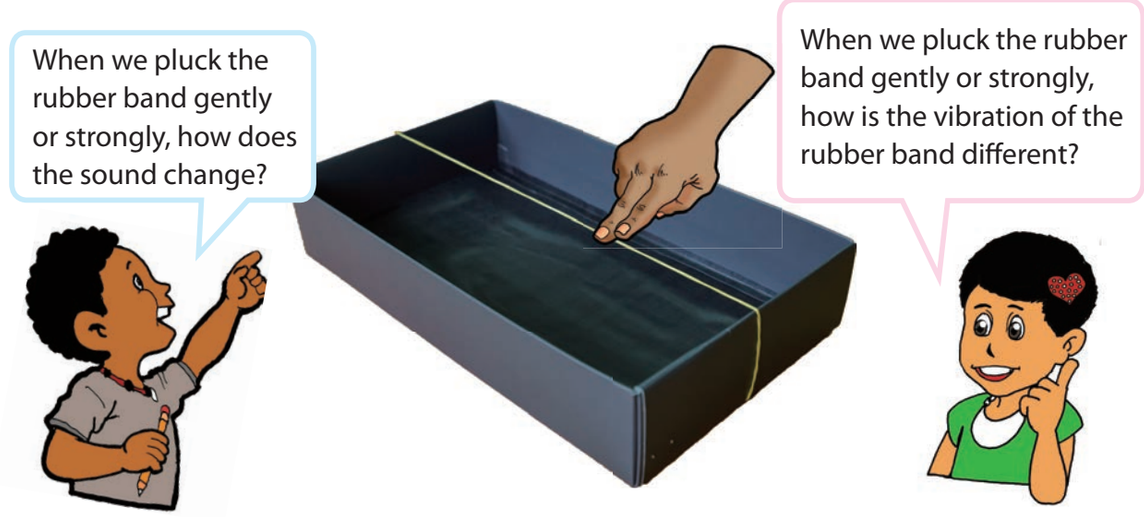


What to Do:

1. Draw a table like the one shown below.

	Soft or loud sound	How the rubber band vibrates
Pluck rubber band gently		
Pluck rubber band strongly		

2. Wrap a rubber band around the box across the open top.
3. Pluck the rubber band gently with your finger.
4. Listen to the sound and observe how the rubber band vibrates. Record your observation in the table.
5. Repeat Step 3 and 4 by plucking the rubber band strongly.
6. Share your findings with your classmates.



Result

When we pluck the rubber band gently, we hear soft sound and the vibrations of the rubber band are small. When we pluck the rubber band strongly, we hear loud sound and the vibrations of the rubber band are big.

Results of the activity

	Soft or loud sound	How the rubber band vibrates
Pluck rubber band gently	soft	small
Pluck rubber band strongly	loud	big

Summary

We can make soft and loud sounds. The **volume** of sound is how soft or loud sound is. The volume of sound depends on the amount of force used to make the object vibrate. When bigger force is used, objects vibrate bigger. Bigger vibrations produce louder sounds. When smaller force is used, objects vibrate smaller. Smaller vibrations produce softer sound.

For example, the volume of a drum depends on how hard or soft we strike the drum. When we strike a drum hard, the sound will be louder because the drum vibrates bigger. When we strike a drum softly, the sound will be softer because the drum vibrates smaller.

When we strike a drum softly, the sound will be softer.

When we strike a drum hard, the sound will be louder.

Lesson 4: "High and Low Sound"

When we play a guitar, we can hear different sounds. Some sounds are higher or lower than other sounds.

What makes sound high or low?

Activity : Making high and low sound

What We Need:

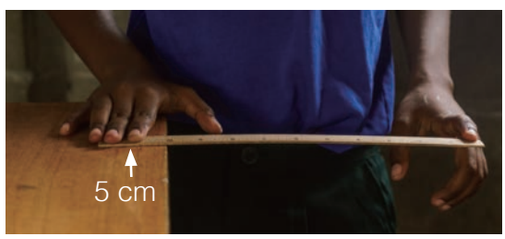
- 30 cm ruler

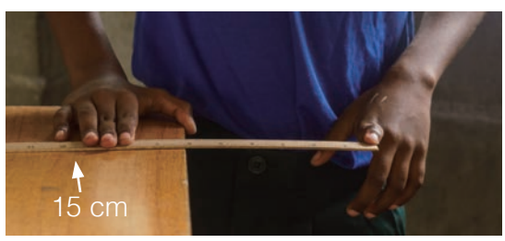
What to Do:

1. Draw a table like the one shown below.

Length of ruler on the desk	What sound did you hear	How the ruler vibrates
5 cm		
15 cm		

2. Place 5 cm length of the ruler at the end of the desk and hold it down with one hand.
3. Pluck another end of the ruler with your other hand. Listen carefully and observe how the ruler vibrates.
4. Place 15 cm length of the ruler at the end of the desk and hold it down with your hand.
5. Pluck the other end of the ruler with your other hand. Listen carefully and observe how the ruler vibrates.
6. Record your observation in the table.
7. Share your findings with your classmates.





Result

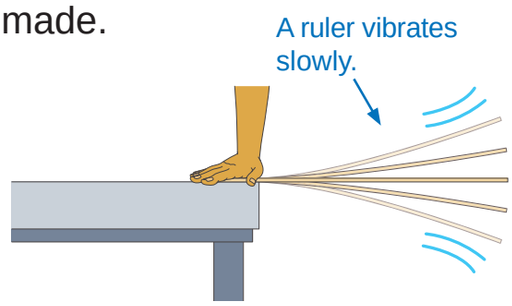
When we placed 5 cm length of the ruler at the end of the desk, we heard a low sound and the ruler vibrated more slowly. When we placed 15 cm length of the ruler at the end of the desk, we heard a high sound and the ruler vibrated more quickly.

Results of the activity

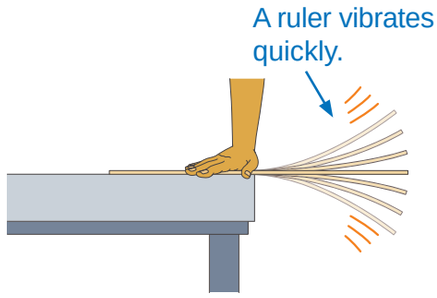
Length of ruler on the desk	What sound did you hear?	How the ruler vibrates
5 cm	Lower sound	More slowly
15 cm	Higher sound	More quickly

Summary

We can make high and low sound. The **pitch** of a sound is how high or low a sound is. The pitch of the sound depends on how fast an object vibrates. When objects vibrate more slowly, a lower sound can be made. When objects vibrate more quickly, a higher sound can be made.



When a ruler vibrates more slowly, a lower sound can be made.



When a ruler vibrates more quickly, a higher sound can be made.

Many musical instruments can produce different pitches of sound. For example, a guitar makes different pitches of sound by changing the length, thickness and tension of the string. A shorter, thinner and tighter string produces a high pitch of sound. A longer, thicker and looser string produces a low pitch sound.

The tension of strings can be changed by tuning the peg heads.

The strings can be shortened by putting a finger on the fret board.

Summary and Exercise

Summary 11.1 Properties of Sound

Sounds

- Sound is a form energy we can hear.
- Sound is made when objects vibrate.
- Vibrations are very quick motions back and forth.

Sounds Travelling

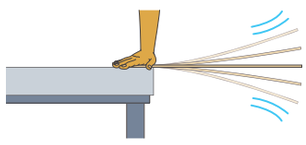
- Sound travels through a medium as vibrations.
- A matter that transports sound is called a medium.

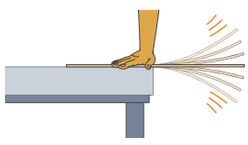
Soft and Loud Sound

- The volume of a sound is how soft or loud sound is.
- The volume of the sound depends on the amount of force used to make the object vibrate.
- Bigger vibrations produce louder sound, while smaller vibrations produce softer sound.

High and Low Sound

- The pitch of a sound is how high or low a sound is.
- The pitch of a sound depends on how fast an object vibrates.
- When objects vibrate more slowly, lower sounds can be made.
- When objects vibrate more quickly, higher sounds can be made.





Summary and Exercise

Exercise 11.1 Properties of Sound

Q1. Complete each sentence with the correct word.

(1) Sound is made when objects _____.

(2) _____ are very quick motions back and forth.

(3) _____ of sound is how soft or loud sound is.

(4) Sound travels through a _____ as vibrations.

(5) The _____ of a sound depends on how fast an object vibrates.

Q2. Choose the letter with the correct answer.

(1) What does sound need in order to travel?

A. Light

B. Matter

C. Fuel

D. Electricity

(2) Choose the correct sentence about the pitch of sound.

A. Bigger vibrations produce higher pitch of sound.

B. Quicker vibrations produce softer sound.

C. Smaller vibrations produce louder sound.

D. Slower vibrations produce lower pitch of sound.

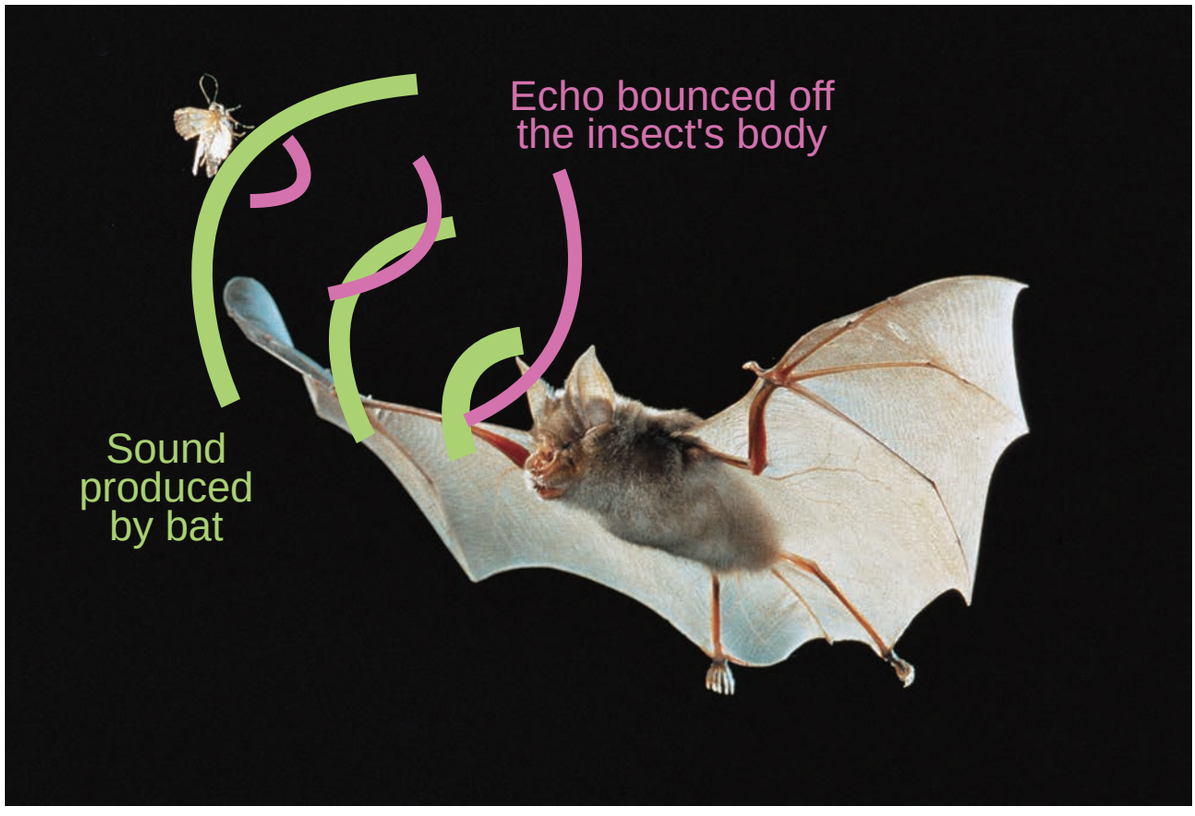
Q3. If you see something vibrate, what will you hear?

Q4. Look at the picture below. They can hear their partner's small voice when two cups are connected with a string. Explain why they cannot hear the voice when the string is removed from the cup.

How do bats find insects in the dark?

Some bats such as a fruit bat (flying fox) eat fruits. They use their eyes to find fruits. Some other bats like to eat insects. These bats are active at night because there are flying insects in the night. Do they also use their eyes to catch insects in the dark? In fact, they do not use their sight but use their sense of hearing.

One of the properties of sound is that when a sound hits an object some of the sound bounces back. The sound that bounces back is called an echo. Bats send out very high-pitched sounds from their mouth or nose. If the sound hits an insect an echo is produced. The echo bounces off the insect and returns to the bat's ears. The bat listens to the echo and figures out where the insect is, how big it is and its shape. Therefore, bats can still catch insects in the dark.



Bats use echo to catch insects.

Chapter Test

11. Properties of Sound

Q1

Complete each sentence with the correct word.

(1) A form of energy that can be heard is _____.

(2) Sound is made when objects _____.

(3) Big vibrations of sound produce _____ sounds.

(4) _____ of sound is how high or low sound is.

Q2

Choose the letter with the correct answer.

(1) What is the back and forth movement of an object called?

A. Pitch
B. Speed
C. Vibration
D. Volume

(2) What kind of sound do smaller vibrations make?

A. Lower sound
B. Higher sound
C. Louder sound
D. Softer sound

(3) Which words describe the pitch of sound?

A. Hot, cold
B. High, low
C. Big, small
D. Light, heavy

(4) Which is <u>not</u> true about how sound travels?

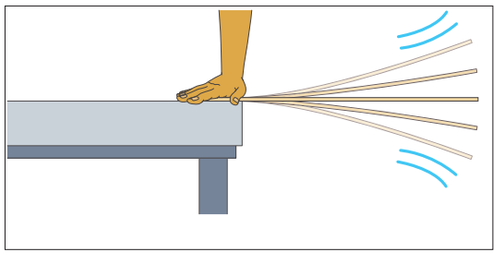
A. Sound travels through a medium.
B. Sound travels through air.
C. Sound cannot travel through water.
D. Sound travels through solid objects.

Q3

(1) What does the softness and loudness of sound represent?

_____

(2) Alice plucked a 30 cm ruler on the edge of the table about 20 cm out. After that, she placed the ruler on the edge of the table about 5 cm out and plucked it. Then, she heard higher sound.



What change would she have observed about the vibration of the ruler?

_____

(3) What can be done to change the volume of sound produced by a drum from loud to soft?

_____

_____

Q4

Jonathan was playing in a room. He was jumping off the bed onto the floor. Salome could hear the footsteps and stamping while lying on the concrete floor in the living room.
How was Salome able to hear the footsteps and the stamping?

_____

_____

Chapter 12

Matter Change

12.1 Physical and Chemical Changes in Matter

Lesson 1: "Physical Properties"

Matter has different kinds of properties; physical and chemical properties.

What are physical properties of matter?

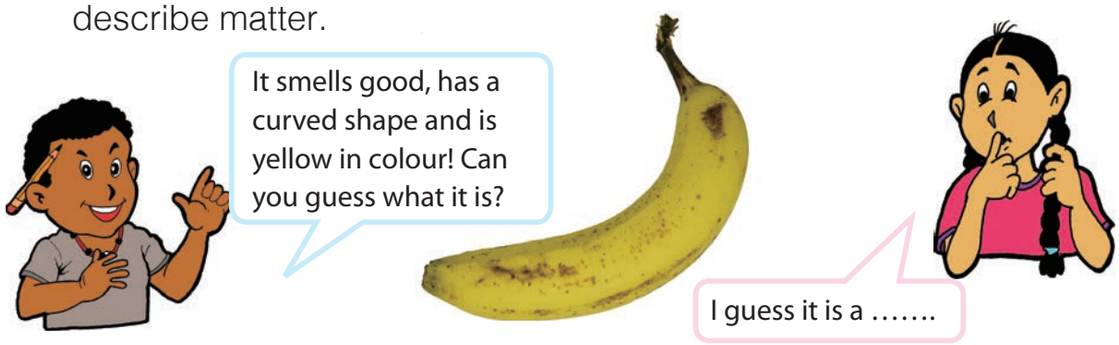
Activity : Describing matter

What to Do:

1. Draw a table like the one shown below.

Matter	Describing properties of matter

2. Find different kinds of matter around you.
3. Write the name of the matter and describe their properties in the table.
4. Try a brief quiz. Read out the properties of matter and ask your classmates to guess what the matter is.
5. Share your ideas with your classmates. Talk about how we can describe matter.



Summary

All matter have their own physical properties.

Every matter has its own properties. Properties can be used to describe and identify matter. A characteristic of matter that can be measured or observed with the five senses without changing the matter is called **physical property**.

Shape, size and colour are kinds of physical properties. Texture, smell, sound and taste are also physical properties.

Physical properties can be observed using our five senses. For example, we can observe shape and colour by seeing with our eyes. Texture or hardness can be observed by touching.

Five Senses		Types of Properties
	Sight	Shape, size, colour
	Hearing	Sound - loud, soft, high and low
	Smell	Smell, odour
	Taste	Sweet, sour, bittter and salty
	Touch	Texture - hardness, smoothness, roughness

Five senses and types of properties.

Lesson 2: "Physical Changes in Matter"

Matter has its physical properties. When matter changes its physical properties, what will happen to the matter?

How does matter change if its physical properties change?

Activity : Changing physical properties of matter

What We Need:

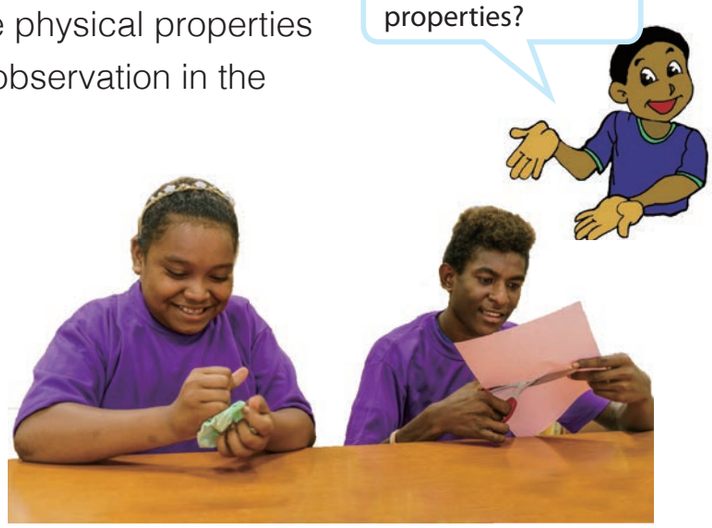
- sheets of scrap paper, different colours of marker pen, scissors

What to Do:

1. Draw a table like the one shown below.

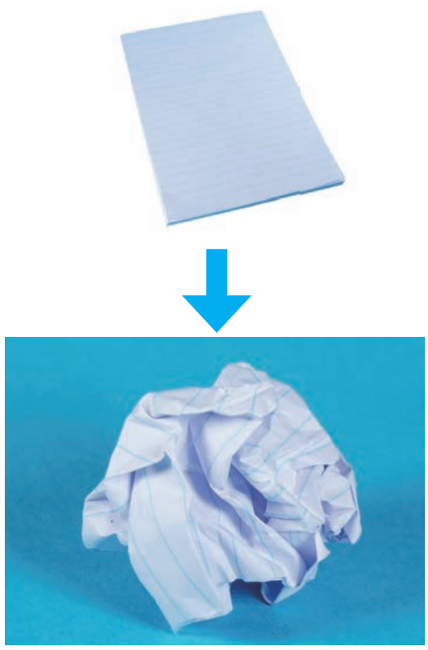
The ways to change the physical property	How the paper changes

2. Try to change the physical properties of a sheet of paper in different ways.
3. Observe how the paper changes. Record the ways to change the physical properties of the paper and your observation in the table.
4. Share your findings with your classmates. Talk about how the paper changes if it changes its physical properties.



Summary

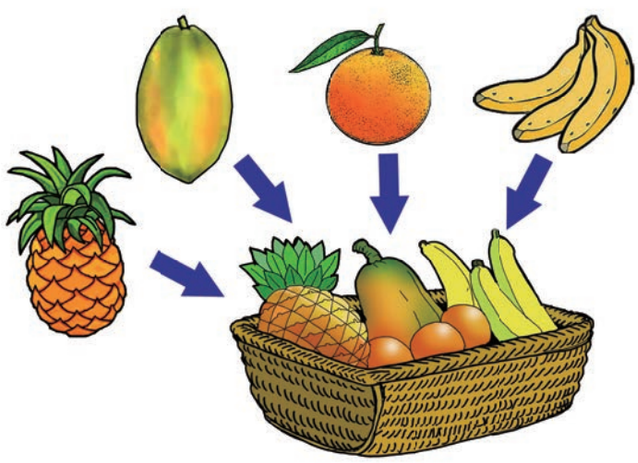
A matter can change its physical properties such as shape, size and colour. A change in the physical properties of a matter is called **physical change**. Physical changes may cause matter to look different but physical changes do not change the material of matter. For example, we can change the shape and size of a sheet of paper by folding or cutting it. But the paper is still a paper even if we change its shape or size.



Paper is still paper!

Changing the shape of clay and paper is a physical change.

A mixture is also a physical change. When we mix banana, apple and other fruits in a basket, a banana is still a banana and an apple is still an apple. Mixing different kinds of fruits does not change them into new kinds of matter.



A mixture of different kinds of fruits is a physical change.

Lesson 3: "Chemical Changes in Matter"

A physical change is a change in the way that matter looks. Is there a different way in which matter changes?

Does a matter change in a different way?

Activity : Burning a wood

What We Need:

- wooden matches, plate

What to Do:

1. Draw a table like the one shown below.

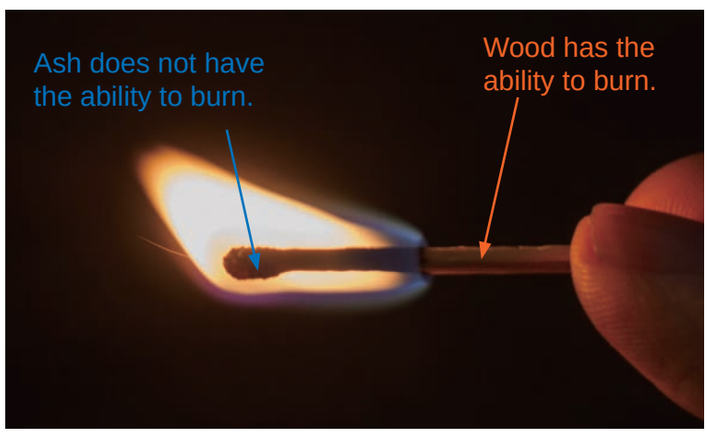
	Texture	Colour	Other properties
A match before burning			
A match after burning			

2. Observe the properties of a wooden match and record your observations in the table.
3. Light the match and put it on a plate. Observe what is happening to the match.
4. After it has burnt, observe the properties of the burnt part of the match. Record your observations in the table.
5. Share your findings with your classmates. Talk about how the wooden match is different before and after it has burnt.

Summary

The wooden match changes into ash when it burns. The wooden match can burn, but the ash cannot burn any more. This means that wood has the ability to burn. The ability to change into a new matter that has different properties is called a **chemical property**. The ability to burn, rust and explode are some chemical properties of matter.

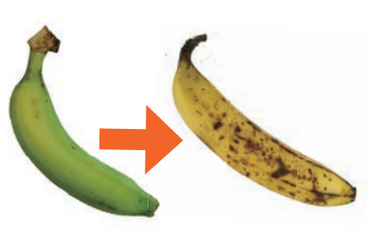
For example, the ability to burn is a chemical property of wood, paper and other kinds of matter. Iron and some other metals have a chemical property to rust. The burnt part of the match is no longer wood. The burnt part of the match is a different kind of matter because it has different properties. A change in matter in which new kind of matter is formed is called a **chemical change**. In a chemical change, the original matter and the new matter have different properties.



Wood has a chemical property to burn.

For example, burning wood and rusting nails are chemical changes. Cooking food, exploding fireworks, ripening and rotting bananas are some examples of chemical changes.


Rusting nails


Ripening bananas


Frying eggs

Lesson 4: "Comparing Physical and Chemical Change"

We have learnt about physical and chemical changes in matter. What are the differences between physical and chemical changes?

How are physical and chemical changes different?

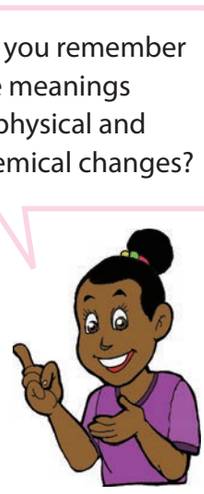
Activity : Classifying physical and chemical changes

What to Do:

1. Draw a table like the one shown below.

Physical changes	Chemical changes

2. Look at the pictures below and classify them into physical and chemical changes in the table.
3. Share your ideas with your classmates. Talk about how you classified the pictures.




Broken glass


Sliced bread


Squeezing an orange for juice


Baked cup cake


Burning wood


Crushed can

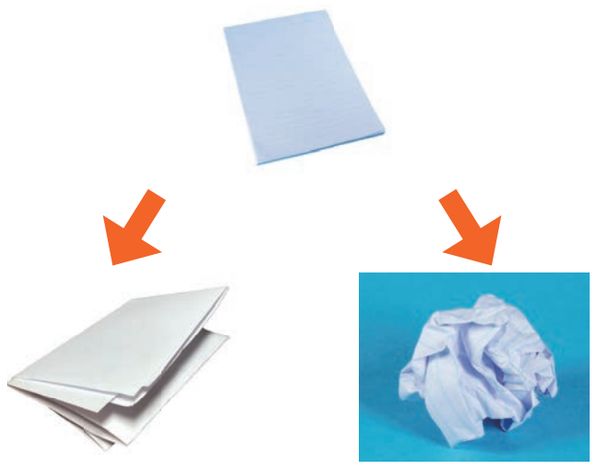

Rotten tomato


Boiling water

Summary

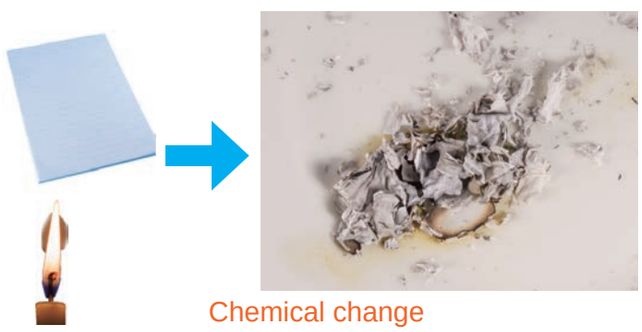
Physical changes and chemical changes are different. A physical change does not produce new kinds of matter. In a physical change the matter might look different but it is still the same as the original matter. A chemical change produces new kinds of matter. The new matter has different properties than the original matter. The new kind of matter is no longer the original matter.

For example, paper looks different when we fold or cut it but paper is still a paper even though the shape and size are different. Changing the shape and size of paper is a physical change.



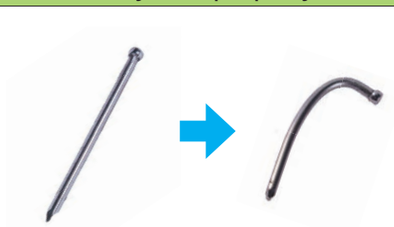
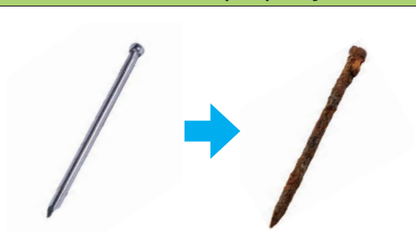
Physical change

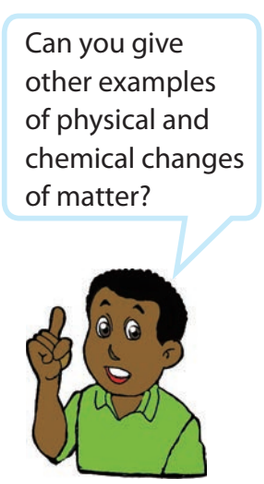
However, when paper burns, ash is formed. The ash has different properties from paper. The ash is no longer paper. Burning paper is a chemical change.



Chemical change

Comparing Physical and Chemical Change

Physical property	Chemical property
	
Changing the shape of a nail is a physical change.	Rusting nail is a chemical change.



Summary and Exercise

Summary

12.1 Physical and Chemical Changes in Matter

Physical Properties

- Physical Property of matter is a kind of characteristic that can be measured or observed with the five senses.

Five Senses		Types of Properties
	Sight	Shape, size, colour
	Hearing	Sound - loud, soft, high and low
	Smell	Smell, odour
	Taste	Sweet, sour, bitter and salty
	Touch	Texture - hardness, smoothness, roughness

Physical Changes in Matter

- A matter can change its physical properties such as shape, size and colour.
- Physical change is a change in the physical properties of matter.
- Physical changes do not change the material of the matter.

Chemical Changes in Matter

- A matter can change into a new matter.
- A chemical change is a change in matter that produces new kinds of matter with different properties.
- The ability to change into a new matter is called a chemical property.

Comparing Physical and Chemical Change

- Physical change and chemical change are different.
- Physical change does not produce new matter while chemical change produces new matter.

Summary and Exercise

Exercise

12.1 Physical and Chemical Changes in Matter

Q1. Complete each sentence with the correct word.

(1) Size, shape and colour are examples of _____ _____.

(2) The ability of matter to change into a _____ matter is called the chemical property.

(3) Physical property of matter can be measured or observed with the _____ senses.

Q2. Choose the letter with the correct answer.

(1) Which of the following shows a physical change of matter?

A. 

B. 

C. 

D. 

(2) Which of followings is <u>not</u> a physical change in matter?

A. Folding a piece of paper.

B. Breaking a drinking glass.

C. Burning wood.

D. Boiling water.

Q3. Lynn left a steel wool in an empty jar after washing the dishes. After several days, she noticed that the steel wool had changed its colour and texture. What type of change had happened to the steel wool?

Q4. A boy was given a coloured A4 paper to make a paper plane for his art homework. He then took the paper home and with the help of his parents they came up with a paper plane.

How did the boy and his parents change the physical property of the coloured A4 paper?

12.2 States of Water

Lesson 1: "Water around Us"

We can find different forms of water around us. What forms does water have?

In which forms can water exist?

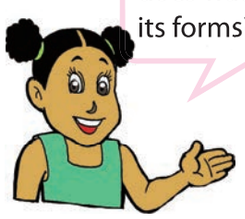
Activity : Finding water around us

What to Do:

1. Draw a table like the one shown below.

Places where water can be found

2. Look at the picture below and find places where water can be found.
3. Make a list of places where you can find water in the table.
4. Share your ideas with your classmates. Talk about how and where water can exist.



Summary

Water can exist in different forms such as ice, water and steam.

Ice Water Steam

Different forms of water

Different forms of water can be found in different places.

Ice can be found in cold places. For example, we can find it in a freezer and at the polar zones such as the Arctic and Antarctic.

Water can be found in many places. We can find it in rivers and the ocean. It can also be found in lakes and ponds.

Steam can be found in some places at a higher temperature such as the hot springs. When water boils, we can see steam coming out from a kettle or a pot.

Lesson 2: "Heating Water"

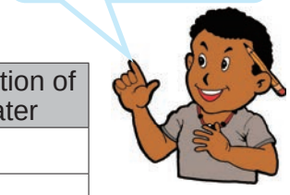
Water can be found around us. What happens if water is heated?

How does water change its form when it is heated?

Activity : Change in water by heating

What We Need:

- water, thermometer, small sized pan, stove, watch(clock)



What to Do:

1. Draw a table like the one shown on the right.
2. Heat water in a pan on a stove.
3. Measure the temperature of the water every two minutes until water boils and record the temperature in the table.
4. Observe the condition of water and record your observation in your exercise book.
5. Share your findings with your classmates. Talk about the temperature when water boils and what happens to water when it is heated.

Time (mins)	Temperature (°C)	Condition of Water
0		
2		
4		
6		
8		
...		

Result

When water is heated, its temperature increases. Bubbles gradually come out from the bottom and the steam rises from the surface of the water. Then bigger bubbles are formed in the water actively when the temperature of water reaches 100 degrees Celsius (°C). The hot water keeps this temperature.

Time (mins)	Temperature (°C)	Condition of Water
0	22	No change
2	32	No change
4	50	Small bubbles appeared
6	68	Many small bubbles appeared
8	85	Bigger bubbles appeared Steam rose
10	100	Many big bubbles appeared
12	100	Many big bubbles appeared
14	100	Many big bubbles appeared

Summary

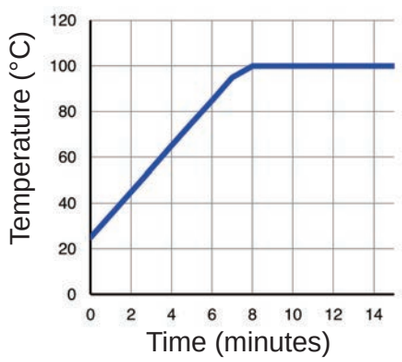
When water is heated, its temperature increases and the steam rises from the surface of the water. After that, large bubbles are formed in the water actively when the temperature of water reaches 100 degrees Celsius (°C). This is called the **boiling** of water.

The temperature of water does not exceed 100 degrees Celsius (°C) while water is boiling.

The temperature of 100°C at which water boils is called the **boiling point** of water.

When water boils, the temperature of the water is at 100 degrees Celsius (°C).

When water boils, bubbles and steam are formed.



The temperature of water does not exceed 100 degrees Celsius (°C) while water is boiling.

Lesson 3: "What is Steam?"

When water is heated, steam rises from the surface of the water. What is steam?

What is steam made of?

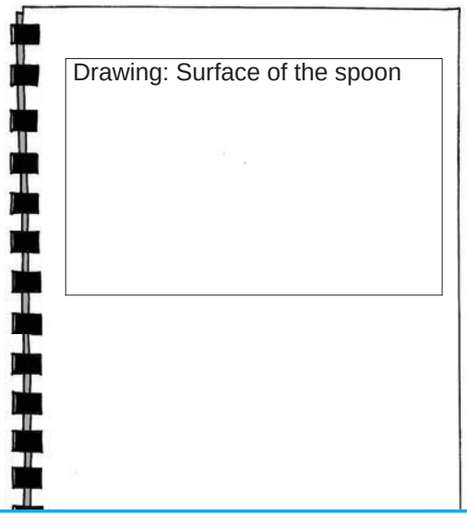
Activity : Observing steam

What We Need:

- kettle, stove, spoon, water

What to Do:

1. Draw a picture of a kettle in your exercise book.
2. Boil water in a kettle on a stove.
3. After boiling, observe how the steam rises from the kettle.
4. Sketch your observation.
5. Place a spoon in the steam. Then take it out of the steam and let it cool.
6. Observe the surface of the spoon and record your observation.
7. Share your observation with your classmates. Talk about how the steam is formed and what steam is made of.



Summary

Water droplets on a spoon

When we take the spoon out of the steam, we can observe some water droplets on the spoon. This means that steam is made of water. Steam changes into water when it cools down.

When water boils, steam rises from the kettle. We can observe two parts of steam; invisible and visible parts.

The part near the kettle is invisible. The invisible part is made up of **water vapour**. Water changes into water vapour when it is heated. Water vapour is made of water.

The visible part is **steam**. Steam is made of tiny water droplets floating in the air. When water vapour cools down in the air, it changes into steam. Steam becomes water vapour in the air again and then gets out of sight.

Lesson 4: "Melting Ice"

When water is placed into a freezer, it changes into ice because water is cooled down. What happens if ice melts?

How does ice change its form when it melts?

Activity : Observing a melting ice

What We Need:

- ice cubes, thermometer, glass cup, stick (for mixing water), watch (clock)

What to Do:

1. Draw a table like the one shown below.
2. Put ice cube and water into a glass cup and stir it with a stick.
3. Set the thermometer as shown in the picture below.
4. Predict how temperature of ice water changes as time goes on.
5. Keep mixing ice water all the time and measure its temperature every two minutes. Observe how the ice changes its form. Record the temperature and your observation in the table.
6. Share your observation with your classmates. Talk about the temperature of ice and how ice changes its form.

Time (mins)	Temperature (°C)	Conditions of Ice cubes
0		
2		
4		
6		
8		
10		
12		
14		
16		
18		
20		

Result

Ice changed its form during the experiment. It got smaller and finally disappeared. The temperature of ice water remained at 0 degrees Celsius (°C) while ice was there in water.

Time (mins)	Temperature (°C)	Condition of Ice cubes
2	0	Ice and water mixed
4	0	Ice is getting smaller
6	0	Some ice disappeared
...	...	...
12	0	Some ice disappeared
14	0	Most ice disappeared
16	0	Ice completely melted
18	3	No ice in water
20	6	No ice in water

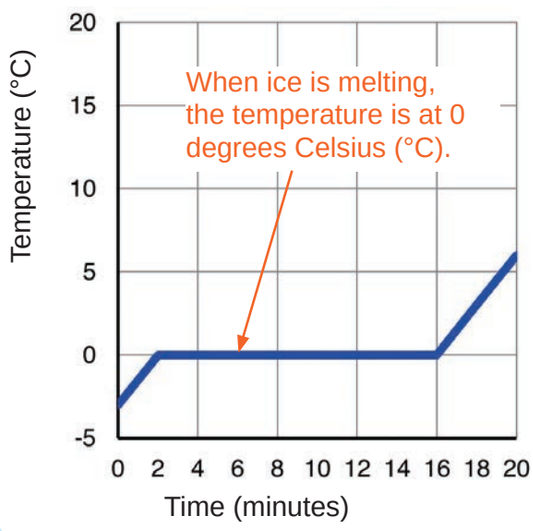
What happened when the temperature started to increase?

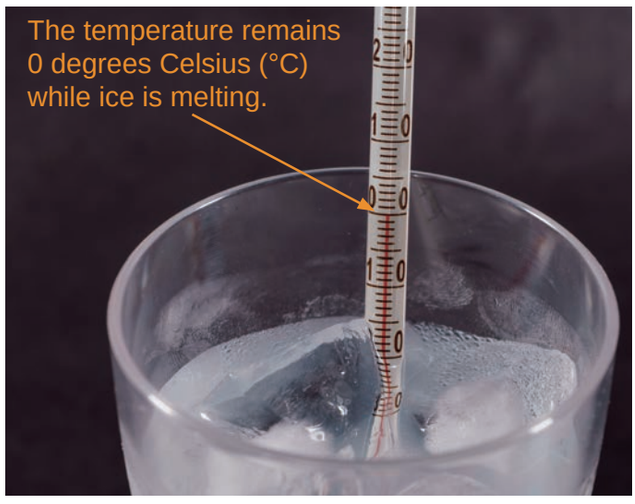
Summary

When ice is heated, it starts to melt. Then ice becomes water. This is called melting. **Melting** is the process of solid changing into liquid.

Change in form of ice

Even if ice water is put in a warm place, the temperature remains at 0 degrees Celsius (°C) while ice is melting. The temperature of 0°C at which ice changes to water is called the **melting point** of water.





Lesson 5: "Changes in States of Water"

Water can exist in three forms as ice, water and water vapour.

How does water change in its form?

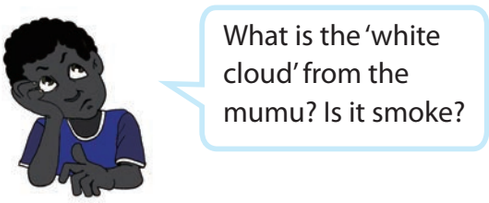
Activity : Changing forms of water

What to Do:

1. Draw a table like the one shown below.

	What is happening to water?	What causes it to happen?
Picture 1		
Picture 2		
Picture 3		

2. Look at the pictures below.
3. Describe what is happening to water and what causes it to happen in the table.
4. Share your ideas with your classmates. Talk about how water changes its form and what causes the changes.



Picture 1

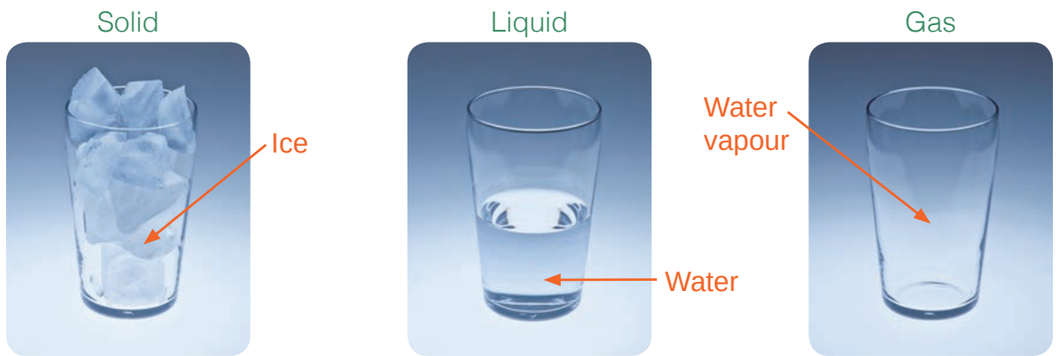
Picture 2

Picture 3

Summary

Three States of Water

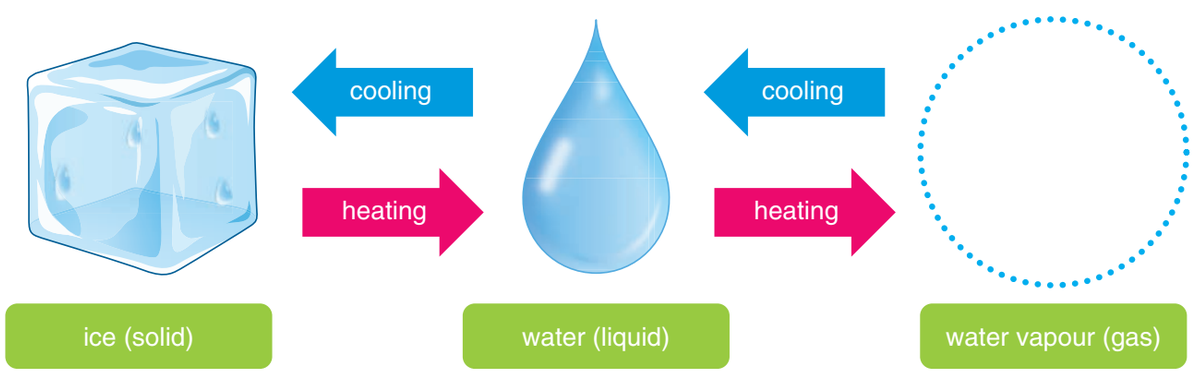
There are three forms of water such as ice, water and water vapour. Ice is the frozen form of water. This form of water is called **solid**. Ice is the solid state of water. Water is the form of water in which we are most familiar with. This form of water is called **liquid**. Water is the liquid state of water. Water vapour is an invisible form of water. This form of water is called **gas**. Water vapour is the gaseous state of water. The state is a property of matter. Solid, liquid and gas are three states of matter.



Three states of water

Changing States of Water

Water can change its states by heating and cooling. When heat is added to water, it changes to water vapour. As water vapour cools down, it changes back to water. When water cools, it changes to ice. Ice changes to liquid water as heat is added. Whether it is solid, liquid or gas, water is still water.



Changes in states of water

Summary and Exercise

Summary 12.2 States of Water

Water around Us

- Water can exist in different forms such as ice, water and steam.
- Different forms of water can be found in different places. For example, in cold places, rivers and ocean and in places at higher temperature.

Heating Water

- Large bubbles are formed in the water actively when the temperature of water reaches 100 degree Celsius (^{o}C).
- The boiling point of water is 100 degrees Celsius (^{o}C).
- The temperature does not exceed 100 degrees Celsius (^{o}C) when water is boiling.

What is Steam?

- Steam rises from the surface of water when water is heated.
- Steam is visible and made up of tiny water droplets floating in the air.
- Water vapour is invisible and is made of water.

Melting Ice

- Ice starts to melt when its temperature reaches 0 degrees Celsius (^{o}C).
- The melting point of water is 0 degrees Celsius (^{o}C).
- Temperature remains at 0 degrees Celsius (^{o}C) when ice is melting.

Changes in States of Water

- Water can exist in three different states such as Solid (ice), Liquid (water) and Gas (water vapour).
- Water can change its states by heating and cooling.

Summary and Exercise

Exercise 12.2 States of Water

Q1. Complete each sentence with the correct word.

(1) Water can change its _____ such as solid, liquid and gas by heating and cooling.

(2) The_____ point of water is at 0 degrees Celsius (^{o}C).

(3) _____ _____ is the invisible part of water in the gas state of water.

Q2. Choose the letter with the correct answer.

(1) The melting point of ice _____ the boiling point of water.

A. is lower than C. is equal to

B. is higher than D. is the result of

(2) Look at the diagram shown below. Which form of water is marked letter A?

A. water C. steam

B. Ice D. liquid

A

B

C

Q3. What is the boiling point of water in degree Celsius (^{o}C)?

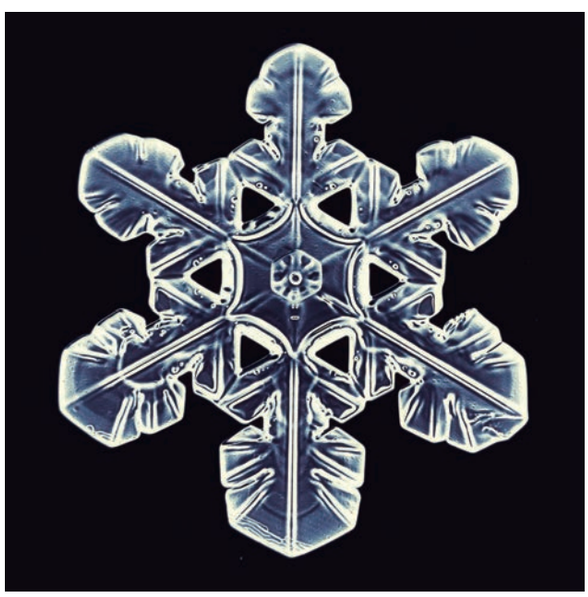
Q4. Jenny placed a mirror over the spout of a kettle of boiling water as shown below. What would she observe on the mirror after a few seconds?

Shapes of snowflakes

Snow is a type of precipitations as water falls from clouds at very cold temperature. Look at the pictures below. You can find beautiful shapes of snow in the nature by observing using a magnifing lens.

These pieces of snow are called snowflakes. A snowflake is a small piece of ice produced in cold sky and falls to the ground. Snowflakes are made up of crystals of ice that have formed around bits of dirt in the air.

The different shapes of snowflakes are created at different temperatures and humidity.



Different shapes of snowflakes

Chapter Test

12. Matter Change

Q1

Complete each sentence with the correct word.

(1) A change in colour, size, shape and texture of matter is called _____ change.

(2) In a chemical change, the original matter and the new matter have different _____.

(3) The process which liquid water becomes solid is called _____.

Q2

Choose the letter with the correct answer.

(1) Which of the following is <u>not</u> an example of a chemical change?

A. Exploding fireworks
B. Cutting paper
C. Burning match
D. Rusting iron

(2) Baking is a chemical change. What is the reason?

A. It is because it changes a material of matter.
B. It is because it changes a shape of matter.
C. It is because it changes a size of matter.
D. It is because it changes a taste of matter.

(3) Water can exist in three states; solid, liquid and gas. Which is a solid form of water?

A. Bubbles
B. Ice
C. Steam
D. Water

(4) To change water to water vapour, which of the followings would be added for the change?

A. Cool
B. Freeze
C. Heat
D. Melt

Q3

(a) A beaker with water is being heated. When it reaches a temperature at 100 degrees Celsius (°C), it starts to boil. What is the name of the temperature at which water boils?

_____

(b) What happens if the beaker is continuously heated?

_____

_____

Q4

Compare the two pictures on the right. Which one of these is a physical change? Explain the reason why you choose it.

Crushed can

Rusting nail

_____

_____

Q5

(a) When water is heated and boiled in a kettle, steam rises from the kettle. Explain the process steam rises from the kettle, using the following three words. [bubbles, water vapour, steam]

_____

_____

(b) Describe a physical change that you observe every day. Explain how this physical change is useful.

_____

_____