Grade 3

Answer Key

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Spark of Science

Grade 3

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Spark of SCIENCE

Unit 1 Matter

How can we make bars of chocolate from liquid chocolate?

Vocabulary

- matter
- solid
- liquid
- mass
- volume
- gas
- physical changes
- evaporation
- condensation
- chemical changes

Objectives

- Identify what matter is.
- Recognise different matters.
- Explain the properties of matter.
- Measure the mass of a matter.
- Measure the volume of a liquid.
- Classify the changes of matter into chemical and physical changes.

States of matter can be changed

Lesson 1

All living and non-living things are made up of matter.
Matter is anything that has mass, and takes up space.
The three common states of matter are: **solid, liquid, and gas.**

Let's review these states; write below each of the following pictures the state of matter.

Inside the balloons

.....gas.....

.....solid.....

.....liquid.....

Inside the glass

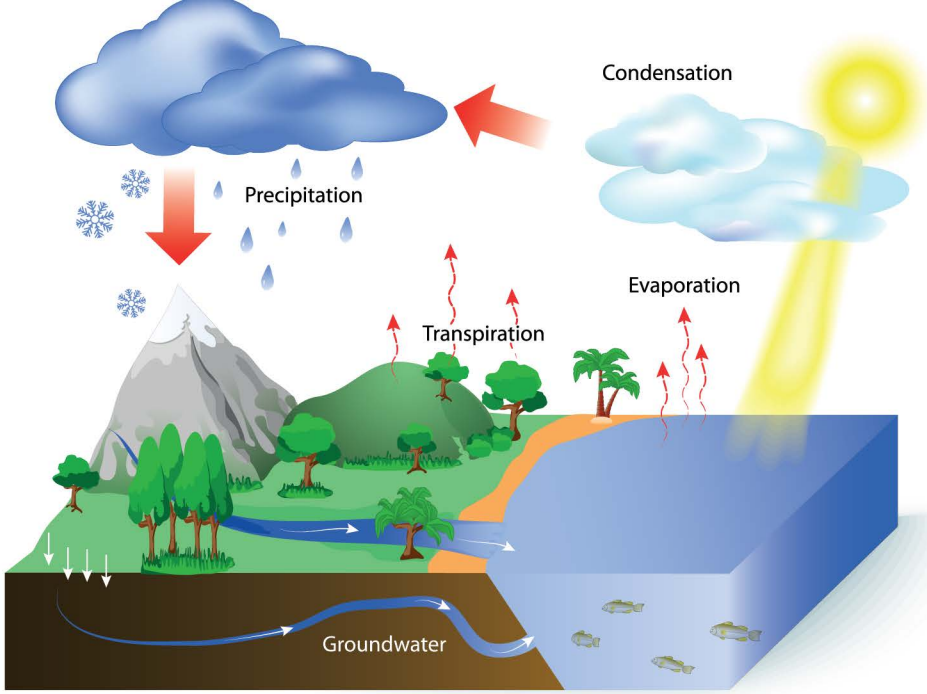
.....liquid.....

Inside the bubbles

.....gas.....

.....solid.....

Water is found in nature in all three states. How do states of water change? The following image represents the water cycle in nature.



- What are the states of water shown in the cycle?

  solid, liquid, and gas

- What causes water to evaporate? What causes water droplets to form?

  Heat causes water to evaporate, turning it into vapor (gas). Vapor condenses into water droplets, which become bigger and fall as rain (liquid).

What I have learned

- The three common states of matter are solid, liquid and gas.
- In the water cycle, the states of water change. Heat from the sun causes water (liquid) to evaporate; the water becomes vapour (gas) in the air. Vapour rises up; the higher it goes the cooler the air becomes. Vapour condenses to water droplets, which become bigger and fall as rain (liquid) or snow (solid).

Learn More

Some properties of matter are: size, colour, and shape.

- Draw the water cycle in your drawing book.

  Students' own answers

Activity

1. How can we change the state of wax?
Under the supervision of your teacher, make an experiment to change the state of wax.

Materials:

A candle, a piece of aluminum foil, and matches

Procedure:

- Put the candle on the piece of aluminum foil, and record the state of the wax.
- Your teacher should light the candle. What will happen? Record the results.

- **Your teacher should light the candle; never try it alone.**
- **You must be very careful; if you touch the hot wax, it will burn your skin.**

Lesson 2 How is matter measured?

Matter is anything that has mass, and takes up space (has a volume).

The mass is the measure of the amount of matter in an object.

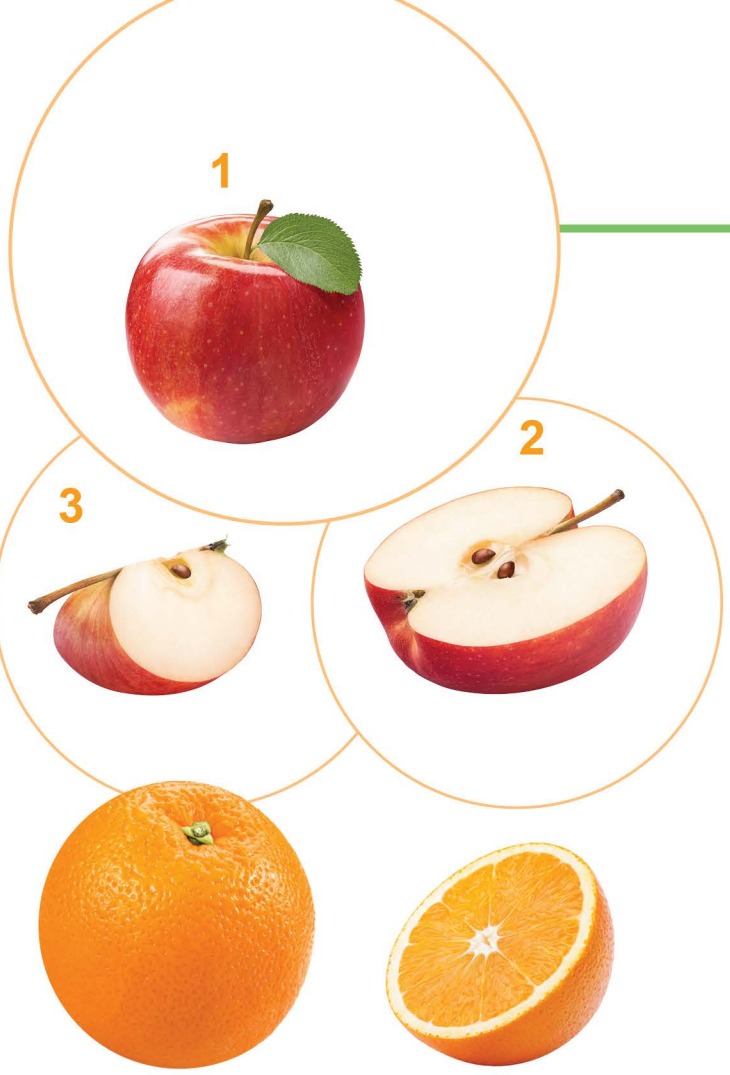
We can use a double pan balance to find the mass of an object.

Gram (g) and kilogram (kg) are the metric units of mass.

1 kg= 1000 g.

The mass of these strawberries is ....2.5.... kg.

A mass of an object does not change unless we add matter to it or remove matter from it.



- **Write the correct numbers.**

.....3..... has the least mass value.

.....1..... has the biggest mass value.

Volume is the amount of space that matter takes up.

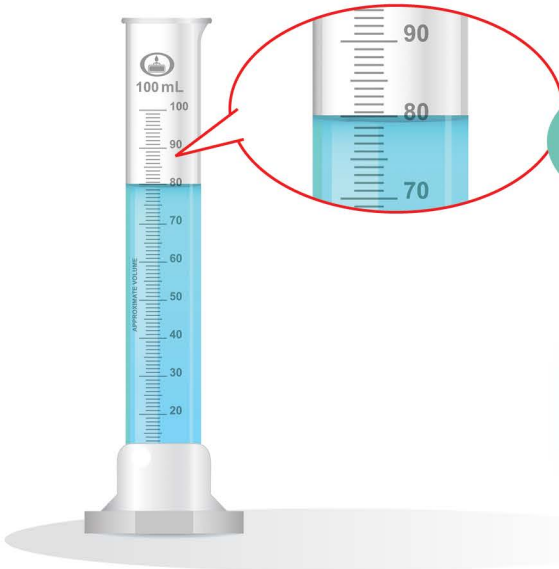
Draw a circle around the object that has the larger volume.

To measure the volume of a liquid we need to put it in a measuring container, such as a graduated cylinder.

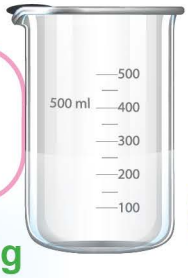
Milliliters (ml) and liters (L) are the metric units of volume of liquids.

1 (L)= 1000 (ml).

The volume of water is .....80..... ml.



Learn More



A beaker is also a measuring container.

- Matter is anything that has mass, and takes up space (has a volume).
- We can use a double pan balance to find the mass of an object. Gram (g) and kilogram (kg) are the metric units of mass.
- Volume is the amount of space that matter takes up. We can use a measuring container, such as a graduated cylinder to measure the volume of a liquid. Milliliters (ml) and liters (L) are the metric units of volume of liquids.

- In your house, do you measure (mass or volume) when you use a cup to measure milk for a cake? Students' own answers

Activity

1. Does the mass of an object change if its shape changes?
With the help of my classmates, try to answer the previous question.

Materials:

Cookies	Toothpicks	A digital balance

Steps:

- Using the balance, find the mass value of a cookie.
- Using a toothpick, smash the cookie on the pan of the balance and record the mass value.

Lesson 3 Physical and chemical changes

Matter can be changed. The changes of matter can be classified into physical and chemical changes.

• Physical changes

A physical change is a change in a substance that does not change its identity; it does not become a new kind of matter.

Here are some examples of physical changes:

Melting ice

Slicing bread

Tearing a paper

Dissolving sugar in water is also an example of physical changes; when we evaporate water, we can get the sugar again.

.....Dissolving sugar..... is also an example of physical changes.

Dissolving sugar in water

Chemical changes

A chemical change is a change in which a new kind of matter results. Usually chemical changes cannot be changed back.

Here are some examples of chemical changes:

Burning wood

Baking dough

Frying eggs

Iron rusting

.....Boiling an egg..... is also an example of chemical changes.

What I have learned

- The changes of matter can be classified into physical and chemical changes.
- A physical change is a change in a substance that does not change its identity; it does not become a new kind of matter.
- A chemical change is a change in which a new kind of matter results. Usually chemical changes cannot be changed back.

Learn More

Burning is a fast chemical change; rusting is a slow chemical change.

- Classify the following changes into physical and chemical changes:

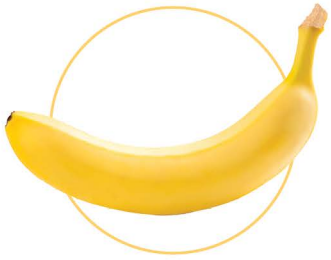
- Slicing a lemon physical
- Souring milk chemical
- physical physical
- Boiling water physical

Activity

1. Chemical and physical changes

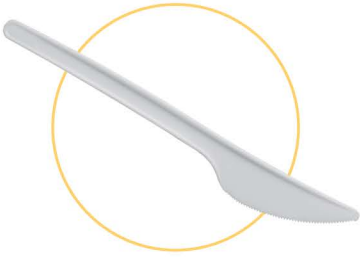
With the help of your classmates, make an experiment to recognise chemical and physical changes.

Materials:



A banana

A plastic plate



A plastic knife

Procedure:

- Using the plastic knife, cut up the banana; what is this kind of change? Record your observations to answer the question.
- Leave the pieces of the banana for a while; what will happen?
- Record your observations, and determine what is this kind of change?

REVISION

1. Write (True) if the statement is correct and (False) if it is not.

- Heat from the sun evaporates water. (True)
- Water condensation is a chemical change. (False)
- Gram and kilogram are the metric units of mass. (True)
- Volume is measured using a balance. (False)

2. Rearrange the letters of the bold words, and rewrite them in the blanks.

- A chair is **ttamre** .....matter..... .
- The cup will measure the **uelvmo** .....volume..... of orange juice.

3. Classify the following by writing physical or chemical changes.

Baking a cake.	Melting wax.	Shredding paper.
.....chemical.....	.....physical.....	.....physical.....

4. Which of the following is the mass of a car? Circle the answer.

2000 kg or 2000 g.

Unit 2 Parts of a plant

How are different plants similar?

Vocabulary

• stem	• leaves
• flower	• roots
• petals	• sepals
• pistil	• stamen

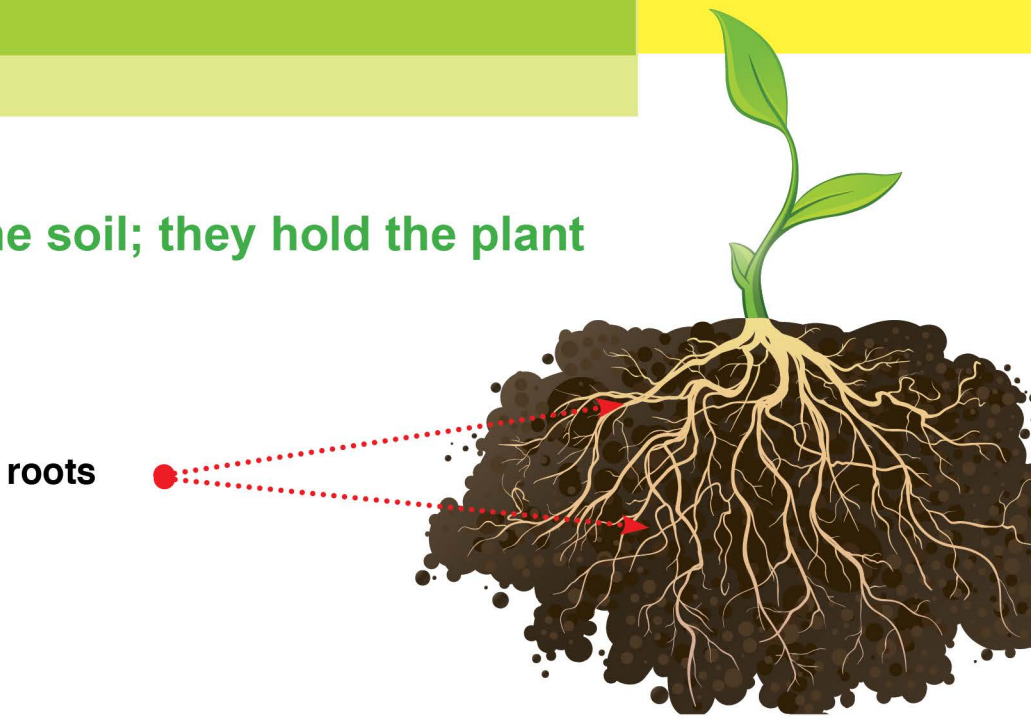
Objectives

- Recognise different plants parts.
- Identify the function of each plant part.
- Recognise different types of roots.
- Explain what plants need to make their food.
- Identify the parts of the flower.

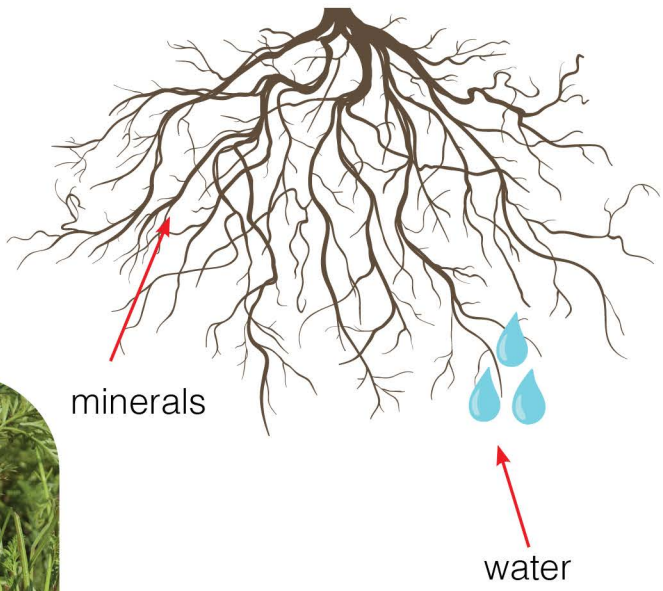
Roots

Lesson 1

Roots grow in the soil; they hold the plant in the soil.



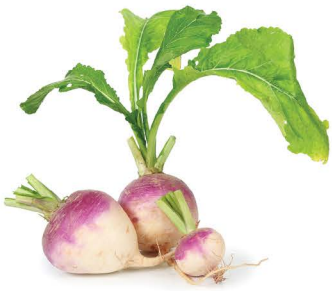
Roots take in water and other minerals from the soil.



Some roots store food.

Carrots are roots that store food.

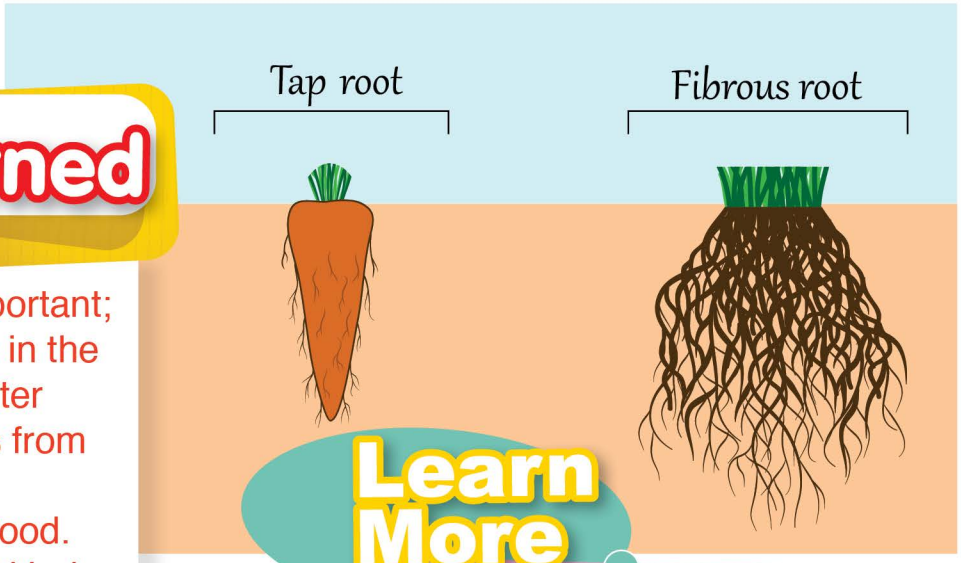
We eat roots that store food; they are delicious.



There are different kinds of roots, such as tap root, and fibrous root.

What I have learned

- Roots are very important; they hold the plant in the soil and take in water and other minerals from the soil.
- Some roots store food.
- There are different kinds of roots such as: tap root, and fibrous root.



Learn More

Roots vary in size. The roots of trees are thick and grow deep in the ground.

- Why are roots important for a plant?

Roots are very important; they anchor the plant in the soil and absorb water and essential minerals from it.

Activity

Growing roots

1. Grow an onion in your class.

Materials:

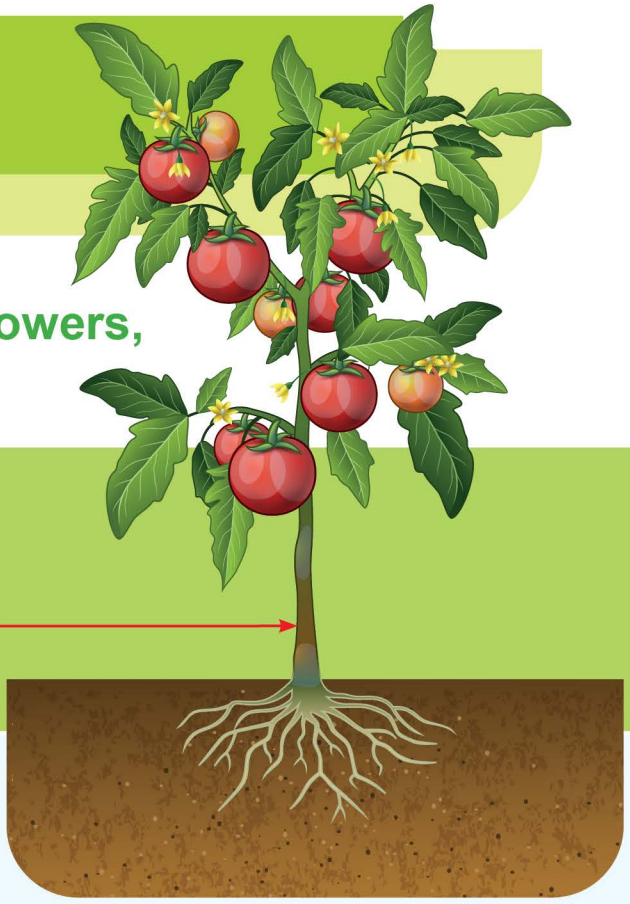
- An onion
- A glass cup, or a jar
- Water

Procedure:

- Fill 2/3 of the jar with water.
- Put the onion in the jar as shown in the picture.
- Check it daily and record your results.

Lesson 2 Stems

The stem holds up the leaves, flowers, and fruits.



Stem carries water and minerals from the roots to the leaves.

Let's make an experiment to demonstrate stem function in water transportation.

Materials:

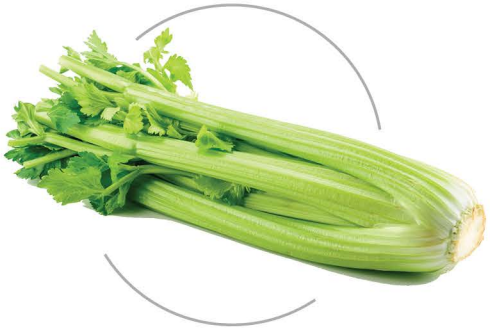
Celery plant, half-filled glass of water, and food dye

Procedure:

- Add the food dye to the water in the glass.
- Place a piece of celery plant with leaves still attached into the coloured water and keep an eye on it for a day or two.
- Record your results.

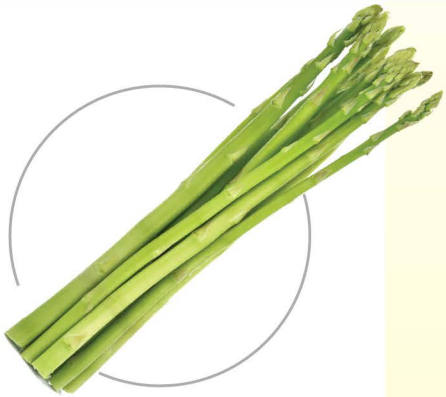
How can we dye the same plant with two colours?

We can eat the stems of:



Celery

Sugar Cane



Asparagus

What I have learned

- The stem holds up the leaves, flowers, and fruits.
- Stem carries water and minerals from the roots to the leaves.

Learn More

Stem carries food from leaves to all plant parts.

- What will happen to a plant whose stem has been cut? Explain your answer.

The plant will die because stems transport water and minerals from the roots to other parts of the plant.

Lesson 3 Leaves

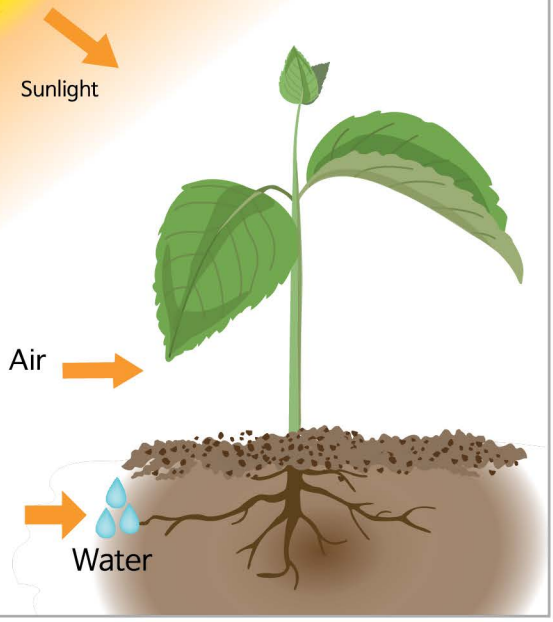
Photosynthesis

Leaves are very important to the plant.

Leaves make food for plants.

What do plants need to make their own food?

Sunlight, water, and air



Leaves have many shapes and sizes.

Here are some different shapes of leaves.

We eat the leaves of many plants, such as:

spinach

cabbage

lettuce

What I have learned

- Leaves make food for plants.
- A plant needs air, water, and sunlight to make its own food.
- Leaves have many shapes and sizes.

Learn More

Some leaves are needle like.

- Draw different shapes of leaves in your drawing book.
  Students' own answers
- Give extra examples of plants that have leaves we eat.

Kale.....

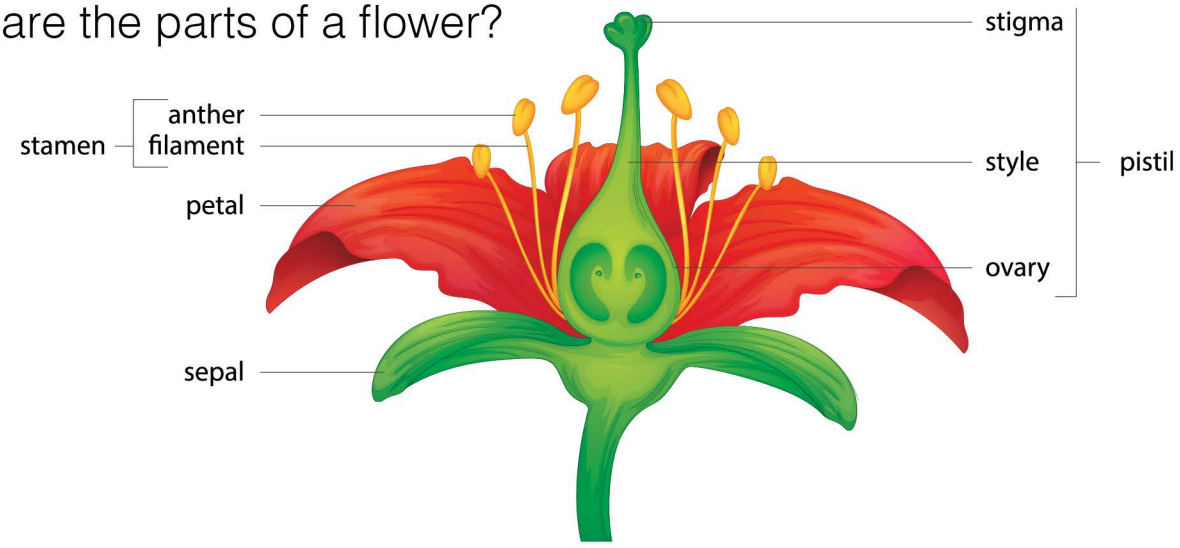
Parsley.....

Mint.....

Lesson 4 Flowers

Flowers in the flowering plants produce fruits and seeds.

What are the parts of a flower?



Which part of the flower is colourful?

- Point and name the parts of a flower.
- Some flowers contain pistils or stamens, and some flowers contain both pistils and stamens.

- Flowers in the flowering plants produce fruits and seeds.
- Petals, sepals, pistil, and stamen are parts of a flower.

We can make from chamomile flowers and hot water a very tasty drink.

- If you were a bee, which type of flowers will you select?

Students' own answers

Activity

1. How can we change the colour of white flowers?
With the help of your classmates, you can change the colour of white flowers.

Materials:
Glass jars or test tubes half filled with water, white flowers, and food dyes

Procedure:
As we have learned previously

REVISION

1. Write (True) if the statement is correct and (False) if it is not.

- Stem holds the plant in the soil. (True)
- Leaves make food for the plant. (True)
- There are different kinds of roots. (True)
- Leaves have many shapes and sizes. (True)
- Some roots store food. (True)

2. Complete the following sentences using the following words: (water, leaves, air, roots, sunlight)

- Stem carries water and minerals from the .....roots..... to the .....leaves..... .
- Plants need .....air..... , ...water..... , and .....sunlight..... to make their food.

3. Rearrange the letters of the bold words, and rewrite them in the blanks.

- The **lfower** .....flower..... produces fruits and seeds.
- The **oorts** .....roots..... take in water and other minerals from the soil.
- The **tems** .....stem..... holds up the leaves, flowers, and fruits.

4. Give an example of:

- A root that we can eat. .....carrot.....
- A stem that we can eat. .....celery.....

Classification of animals

Unit 3

How are animals classified?

Vocabulary

- mammals
- amphibians
- reptiles
- feathers
- scales
- fins
- birds
- fish
- fur
- lungs
- gills

Objectives

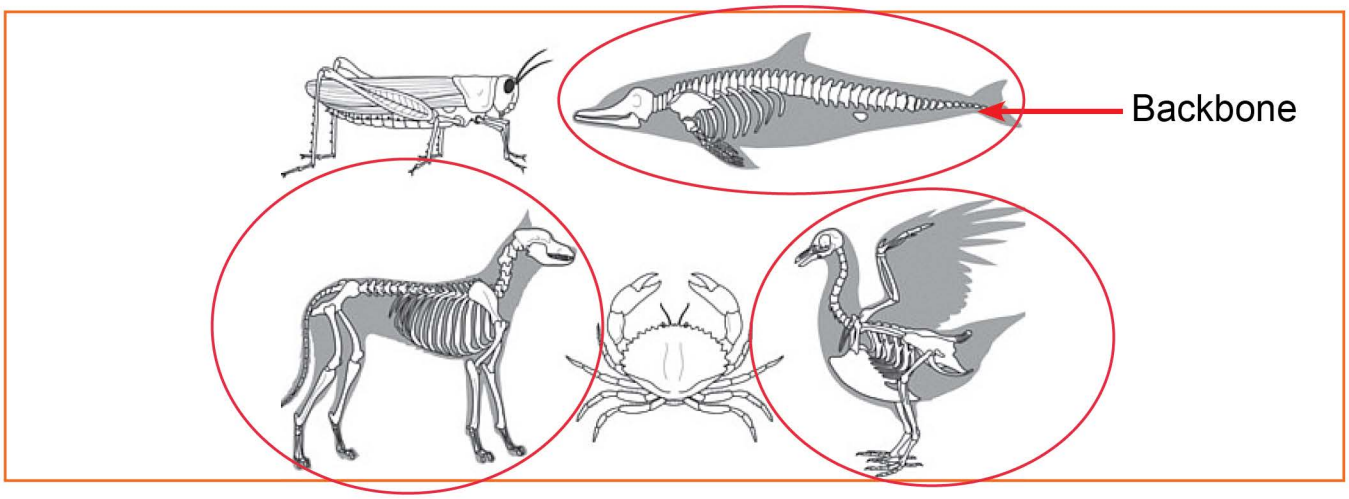
- Classify animals with backbones into groups.
- Recognise the main characteristics of mammals, birds, amphibians, fish, and reptiles.

Lesson 1 Groups of animals

Animals are sorted in groups according to their features.

Animals that have backbones are grouped in one major group, and animals that do not have backbones are grouped in another major group.

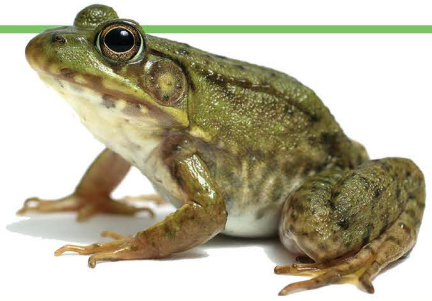
Circle the animals that have backbones:



Animals that have backbones are classified into five groups:

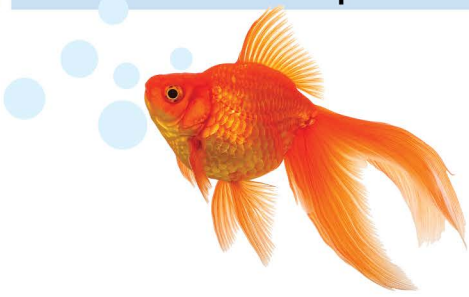
1. Mammals

2. Birds



3. Amphibians

4. Reptiles



5. Fish

What I have learned

- Animals that have backbones are grouped in one major group, and animals that do not have backbones are grouped in another major group.
- Animals that have backbones are classified into five groups: mammals, birds, amphibians, reptiles, and fish.

Learn More

Snakes have backbones.

Earthworms do not have backbones.

- Do we have backbones?

  Yes

- Name the five groups of animals that have backbones.

  1. mammals 2. birds 3. amphibians

  4. fish 5. reptiles

Lesson 2 Mammals and birds

• Mammals

Mammals vary in size and shape, but they have common features.
What are these features?
Their bodies are covered with hair, fur, or wool.

Horse

Sheep

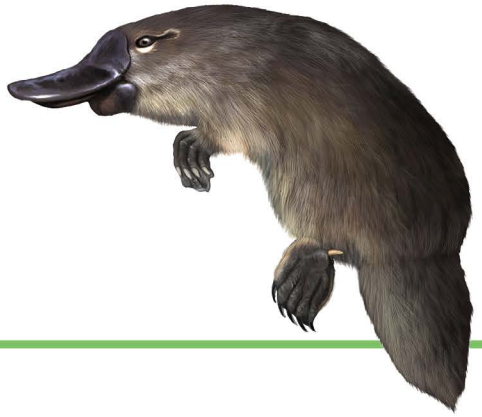
Bear

Mammals give birth to babies.
The mothers feed milk to their babies.

A chimpanzee with its baby

Learn More

Few mammals lay eggs, such as a platypus.



Gull

Parrot

• Birds

A bird has
a beak, two wings,
and two legs.
The body is covered
with feathers.

Most birds can fly.

They lay eggs.

A hen with its eggs

A penguin with its egg

What I have learned

- Mammals are covered with hair, fur, or wool.
- They give birth to babies. The mothers feed milk to their babies.
- A bird has a beak, two wings, and two legs.
- Its body is covered with feathers. Birds lay eggs.

Learn More

Although bats fly, but they are mammals not birds; they give birth to babies.

- What are the differences between mammals and birds?

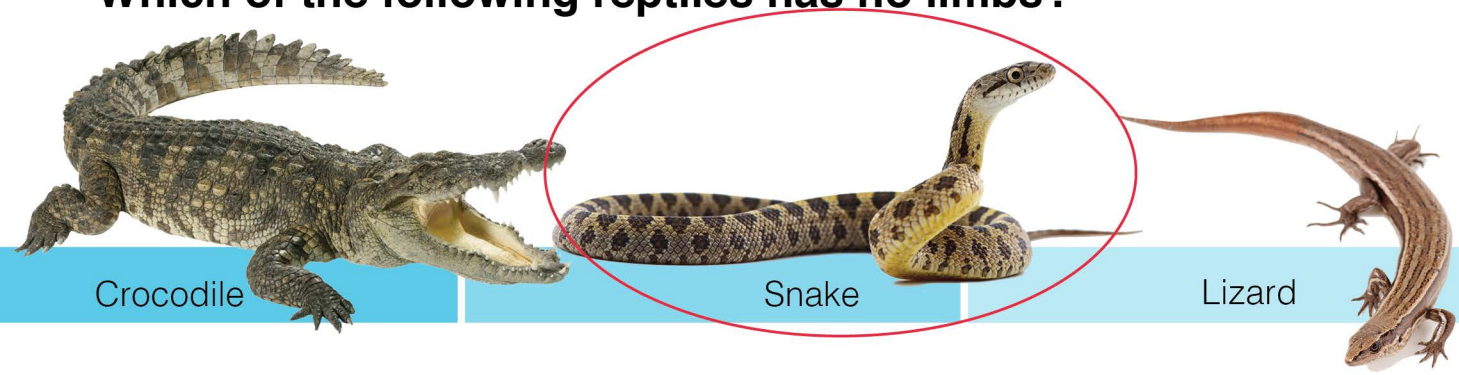
Mammals are covered with hair or fur, give birth to live young, and nurse their babies with milk, while birds have feathers, lay eggs, and possess a beak, wings, and legs.

Lesson 3 Reptiles and amphibians

• Reptiles

A Reptile is an animal that crawls on its belly. Most reptiles have four limbs and a tail.

Which of the following reptiles has no limbs?



Their bodies are covered with scales.

Reptiles lay eggs.

Learn More

Turtles have shells.

• Amphibians

An amphibian is an animal that lives part of its life in water and part of its life on land.

They are covered with moist skin.

They lay eggs.

A salamander

A frog with its eggs

What I have learned

- A Reptile is an animal that crawls on its belly. Most of them have four limbs and a tail. Their bodies are covered with scales and they lay eggs.
- An amphibian is an animal that lives part of its life in water and part of its life on land. They are covered with moist skin, and they lay eggs.

Learn More

The young amphibians such as tadpoles have gills to breathe in water.

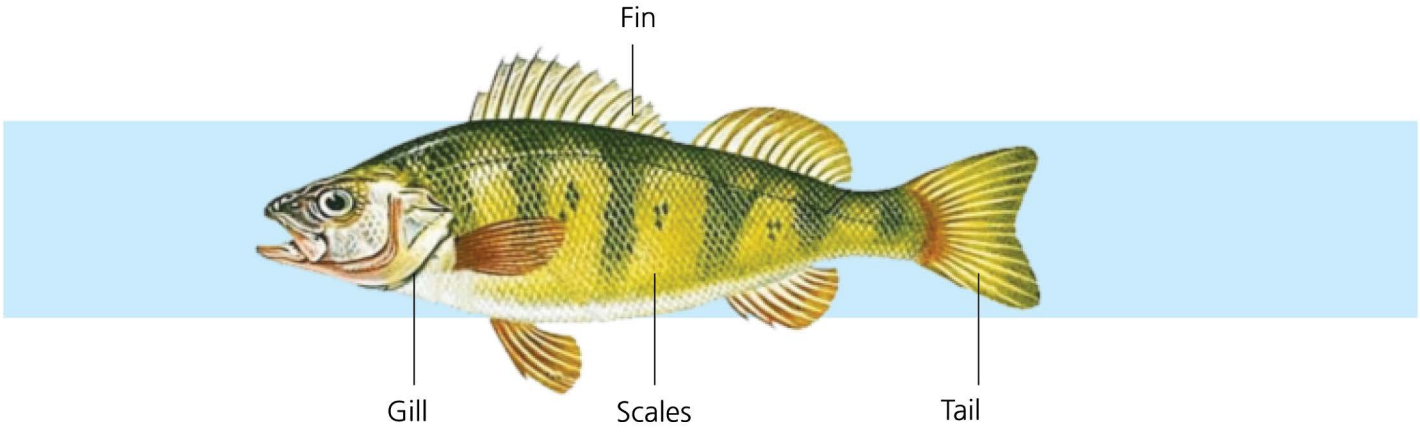
• What are the differences between reptiles and amphibians?

A reptile is an animal that crawls on its belly, usually has four limbs and a tail, has scaly skin, and lays eggs. An amphibian lives part of its life in water and part on land, has moist skin, and also lays eggs.

Lesson 4 Fish

Fish live in water; their bodies are covered with scales.

Name the parts of the fish shown in the following picture.



The gills allow the fish to breathe under water.

What I have learned

- Fish live in water; they have fins and gills.
- Their bodies are covered with scales. They lay eggs.

Learn More

Although whales live in water, they do not belong to fish; they are mammals.

- Draw a fish and label its parts in your drawing book. Students' own answers

Activity

The mystery animal

1. Play a game with your classmates.

Collect pictures of different animals, and glue each picture on a cardboard piece.

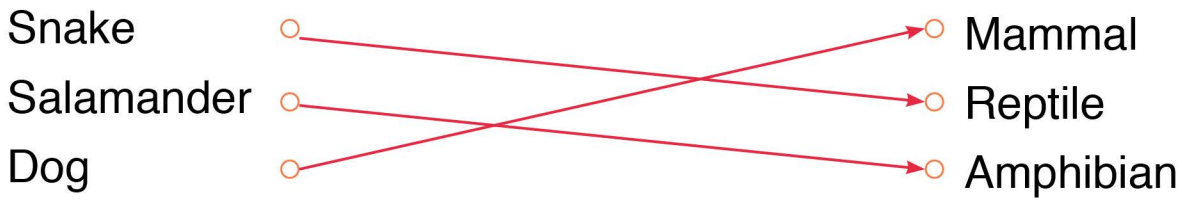
Flip the cards so that the animal images are hidden.
One of you will choose a card, and the others will try to guess the name of your mystery animal.
They can ask (yes or no) questions only, such as:
Is your mystery animal a mammal? Does your mystery animal live in water? The winner will choose a new card to play again.

REVISION

1. Write (True) if the statement is correct and (False) if it is not.

- Some animals start their lives as eggs. (True)
- When mammals are born, they drink milk from their mothers. (True)
- Reptiles are covered with moist skin. (False)
- All birds can fly. (False)
- A frog lives part of its life in water and part of its life on land. (True)

2. Match each animal with the correct group.



3. Circle the correct answer.

- There are ..... groups of animals that have backbones.

• five • three • four

- The main feature of birds is that their bodies are covered with:

• Scales • Feathers • Fur

The Earth's surface

Unit 4

How does the Earth's surface change?

Vocabulary

- crust
- outer core
- core
- earthquake
- wind
- water
- mantle
- inner
- volcano
- erosion
- flow

Objectives

- Recognise the Earth's layers.
- Identify how volcanoes and earthquakes change the Earth's surface.
- Recognise how different living things change the Earth's surface.
- Explain how flowing water causes erosion and deposition.

Lesson 1 The layers of the Earth

You may think that Earth is made up of one big solid layer, but it is really composed of many layers. What are these layers?

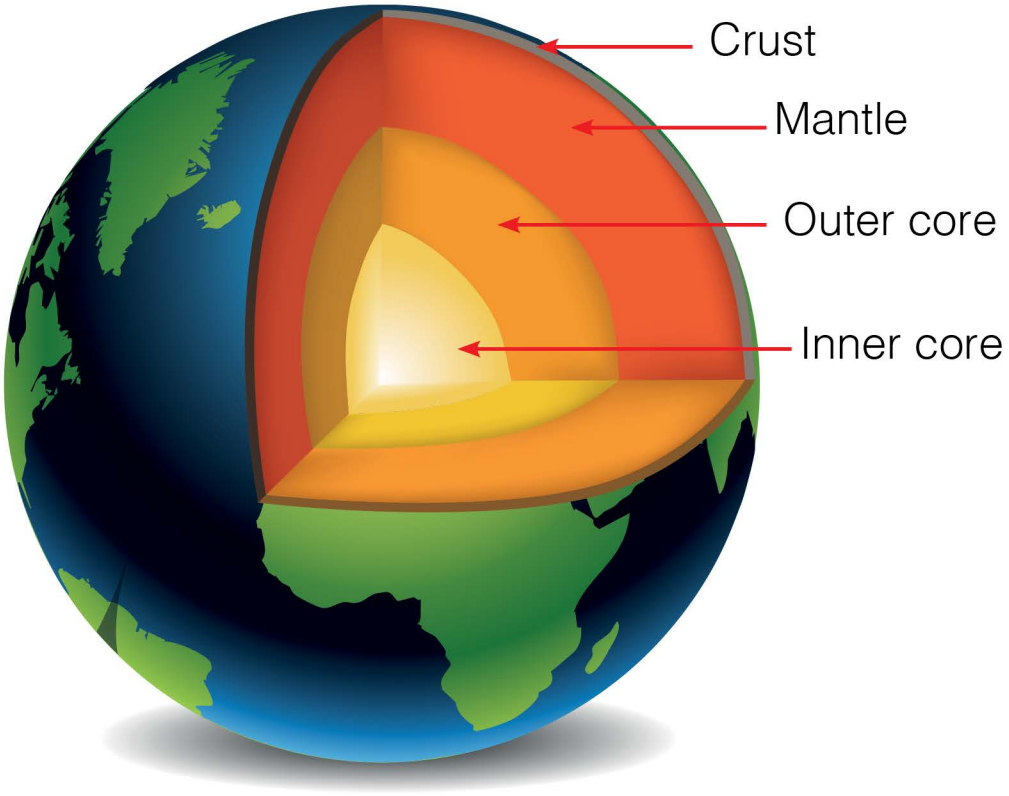
The four main layers of the Earth are:

1 . Crust:

The crust is the outer layer of the Earth.

It is a thin solid layer of rock upon which we live.

Mountains, valleys, hills, and plains are some of the landforms of the crust.



Plains

Hills

Valley

Mountain

2. Mantle:

The mantle is the second layer of the Earth; it is the thickest layer.

3. Outer core:

It is a liquid layer, and it is very hot.

4. Inner core:

The inner core is the centre, and it is the hottest part of the Earth. It is a solid layer.

What I have learned

- The four main layers of the Earth are: crust, mantel, outer core, and inner core.

Learn More

No one can get in a rocket to study the inner layers of Earth.

"The core of the Earth is completely liquid."

- Discuss with your classmates if this statement is true or not.

Students' own answers

Activity

Modeling the layers of the Earth

1. Make a model showing the layers of Earth.

Materials:

Play dough in five different colours: (green, blue, yellow, orange, and red), dental floss

Procedure:

- Roll a small ball of red dough for the inner core.
- Make a small patty in your hand with orange dough. This will be the outer core. Place the inner core in the middle and wrap the outer core around it.
- Repeat the previous step with the yellow dough. This will be the mantle.
- Finally, use both the green and yellow dough to make the crust.
- Use the dental floss to cut the model into two halves.

Lesson 2

Volcanoes and earthquakes change the Earth's surface

The Earth's surface changes over years. How do volcanoes cause some of these changes?

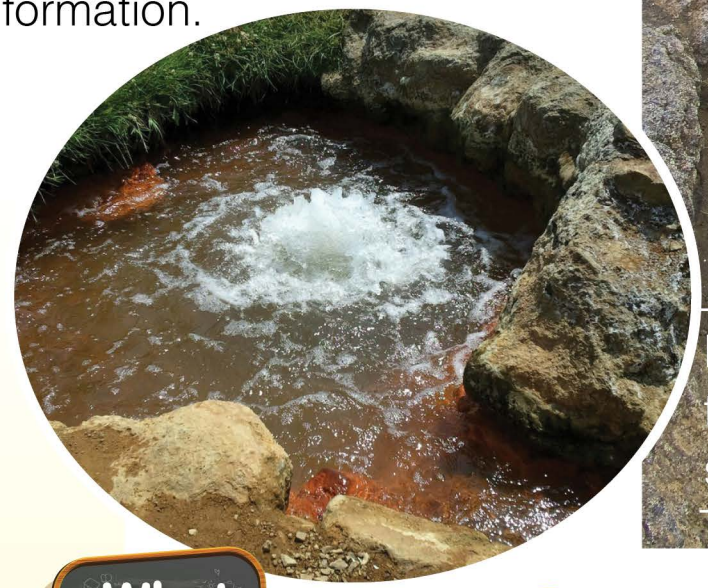
A volcano is an opening in the Earth's crust.

When a volcano erupts, hot gases and melted rock (magma) come out of the volcano.

Volcanic eruptions can cause damage hundreds of miles away killing trees and animals but also create new landforms.

An earthquake is the shaking of the surface of the Earth.

Earthquakes cause spring formation.



Earthquakes may cause damages to the buildings and cracks in the surface of the earth.

What I have learned

- A volcano is an opening in the Earth's crust. A volcano erupts with hot gases and melted rock (magma).Volcanic eruptions create new landforms.
- An earthquake is the shaking of the surface of the Earth. Earthquakes cause cracks in the surface of the Earth and spring formation.

Learn More

Some, but not all, earthquakes occur because of volcanic erruptions.

- How do volcanoes and earthquakes change the Earth's surface?

A volcano is an opening in the Earth's crust that erupts hot gases and melted rock (magma), creating new landforms. An earthquake is the shaking of the Earth's surface, causing cracks and the formation of springs.

Living things change the Earth's surface

Lesson 3

Plants, animals, and humans change the Earth's surface.

Plants can grow in cracks. As they grow bigger, the roots push open the cracks and make them wider and deeper.

Animals such as rabbits can burrow into a crack in a rock, making it bigger and splitting the rock.

Humans dig the ground and break the rocks while building or mining.

What I have learned

- The roots of the plants that grow in cracks make the cracks wider and deeper.
- Animals such as rabbits can burrow into a crack in a rock, making it bigger and splitting the rock.
- Humans dig the ground and break the rocks while building or mining.

Learn More

Many forests were burned by humans.

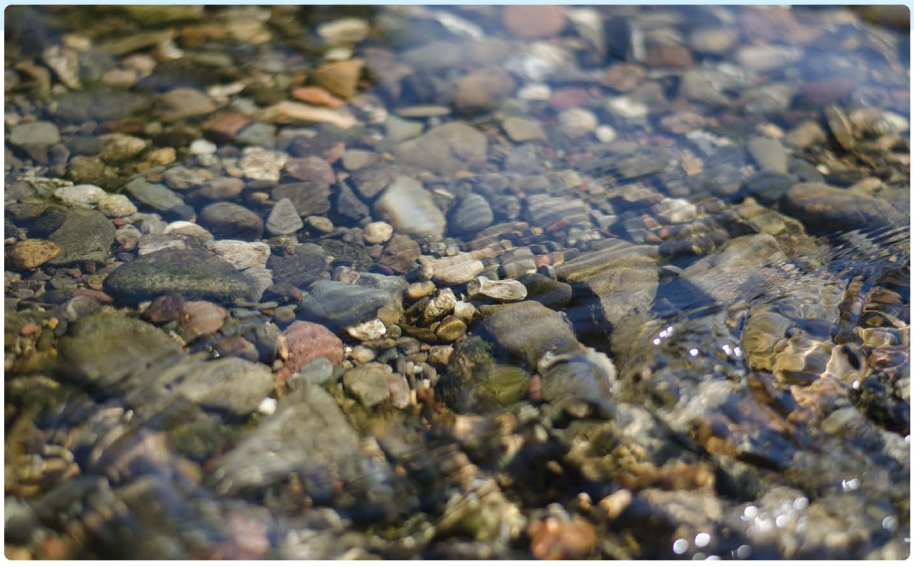
- Which can change the Earth's surface faster: plants or humans? humans
- How do animals change the surface of the Earth? Animals change the surface of the Earth by burrowing into cracks, which makes them larger and can break down rocks.

Flowing water and wind change the Earth's surface

Lesson 4

Flowing water moves pieces of rocks; this movement is called erosion.

The pieces rub against each other. They slowly get smaller.



Winds also cause erosion.

Flowing water or wind carries pieces of rocks and soil from one place to another.

Pieces of rocks and soil are laid down on the Earth's surface; this is called deposition.

Wind deposition forms sand dunes.

Erosion can be controlled by growing plants. The roots of the plants hold the soil in place.

What I have learned

- The movement of pieces of rocks or sand by flowing water or wind is called erosion.
- Pieces of rocks and soil laid down on the Earth's surface become deposition.
- The roots of the plants hold the soil in place and prevent erosion.

Learn More

Some caves result from water erosion.

- Define erosion and deposition.

Erosion is the movement of rocks or sand by water or wind.

Deposition is the accumulation of rocks and soil on the Earth's surface.

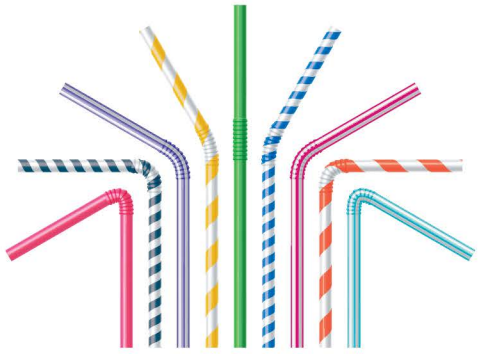
Activity

Erosion and deposition

1. With the help of your classmates, you are going to demonstrate erosion and deposition.

Materials:

Sand



Straws

Water

A plastic container

Procedure:

- Mix the sand with some water in the container to make a sand castle.
- Take a turn blowing at the same point of the castle formulating wind. What will happen?
- Record your results. (Blow from the side not from the top).

REVISION

1. Write ✓ if the statement is correct and ✗ if it is not.

- Mountains, hills, valleys, and plains are landforms. ✓
- The outer core is the hottest part of the Earth. ✗
- A volcano is an opening in the Earth's crust. ✓
- Flowing water causes soil loss by erosion. ✓
- People do not change the surface of the Earth. ✗

2. Complete the following sentences using these words:

(Erosion, burrow, always, mantle, crust)

- The second layer of the Earth is .....mantle..... .
- The .....crust..... is the outer layer of the Earth.
- Landforms .....always..... change.
- .....Erosion..... is the movement of pieces of rocks by wind or flowing water.
- Animals such as rabbits can .....burrow..... into a crack in a rock, making it bigger and splitting the rock.

3. Circle the correct answer.

The plant is held in place by the:

- flowers
- roots
- leaves

Earthquakes cause:

- cracks
- springs
- both

Forces

Unit 5

What causes things to move?

Vocabulary

- force
- gravity
- motion
- speed
- direction
- friction
- magnetism
- position
- attracts

Objectives

- Identify what force is.
- Recognise different types of force.
- Recognise types of motion.
- Describe how force can change motion.

Lesson 1 What is force?

A force is any push or pull upon an object. It can result from two objects coming in contact.

Force can make an object start or stop moving.

Force can make a moving object speed up.

Force can slow down a moving object or change its direction.

What I have learned

- A force is any push or pull upon an object. It can result from two objects coming in contact.
- Force can make an object start or stop moving. It can make a moving object speed up, slow down, or change direction.

Learn More

Some forces can cause objects to move without touching them. The force of gravity, for example, pulls a ball that you throw back to the Earth.

- Classify the following actions; write push or pull in the blank.

.....push.....

.....push.....

.....pull.....

Lesson 2 Types of forces

There are many types of forces. Let's learn some of them.

• Friction

When two surfaces rub together, friction can slow or stop moving objects.

Rough surfaces cause more friction than smooth ones.

It is harder to move something over a rough surface than over a smooth one.

• Gravity

When pencils roll off a desk, they fall to the ground. A force acts on the pencils to make them fall; that force is gravity.

Gravity is a force that pulls things towards the earth.

Gravity is what keeps us on the ground and not floating in the air.

• Magnetism

A magnet attracts things made of iron and certain other metals.
Magnetism is the name of the force that pulls iron and certain other metals towards a magnet.

What I have learned

- When two surfaces rub together, friction can slow or stop moving objects. It is harder to move some thing over a rough surface than over a smooth one.
- Gravity is a force that pulls things towards the earth.
- Magnetism is the name of the force that pulls iron and certain other metals towards a magnet.

Learn More

Astronauts float around in space because there is a small amount of gravity.

- Name the force that pulls the knives.

  .....Magnetism.....

- Which force keeps us on the ground?

  .....Gravity.....

- Which is easier: to move a box on the ground covered with a carpet or not covered?

  .....Not covered is easier because there is less friction.....

Activity

1. Play with magnets.

Materials:

- paper plate
- markers, crayons
- 12-inch length of dowel
- 2 small magnets
- glue gun
- glue stick

Procedure:

- Print and cut out a maze.
- Draw a flower or whatever you like at the centre of the maze.
- Using the glue stick, glue the maze to the centre of the plate.
- Glue one magnet to the end of the dowel using the hot glue gun and the second magnet to your cut-out.
- The magnets must be aligned properly so that they attract through the plate.

Be careful while using the glue gun.

Lesson 3 Motion

Motion is the change in a position of an object because of a force.

Objects can move in different ways.

Objects can move in a straight line.

Objects can move in a curved path.

Objects can move back and forth.

Objects can move up and down.

What I have learned

- Motion is the change in a position of an object because of a force.
- Objects can move in different ways.

Learn More

Position is the place where something is.

- Match the picture with the suitable words.

Curved path

Up and down

Back and forth

REVISION

1. Write  if the statement is correct and  if it is not.

- Friction slows moving objects. ✓
- Force is always a pull. ✗
- Force can make objects start moving. ✓
- Objects move easily on rough surfaces. ✗
- Magnets attract wood. ✗

2. Complete the following sentences using the words.
(speed up, Gravity, slow down, Motion, change direction)

- .....Gravity..... can cause objects to move without touching.
- Force can make a moving object .....speed up..... , ...slow down.....
  and .....change direction..... .
- .....Motion..... is the change in the position of an object because of a force.

3. Write push or pull.

- Opening a drawer (.....pull.....)
- Moving a trolley (.....push.....)
- Sending back a tennis ball (.....push.....)
- Writing (.....push.....)