Grade 4

Answer Key

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GHAD AL AJYAL
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Spark of Science

Grade 4

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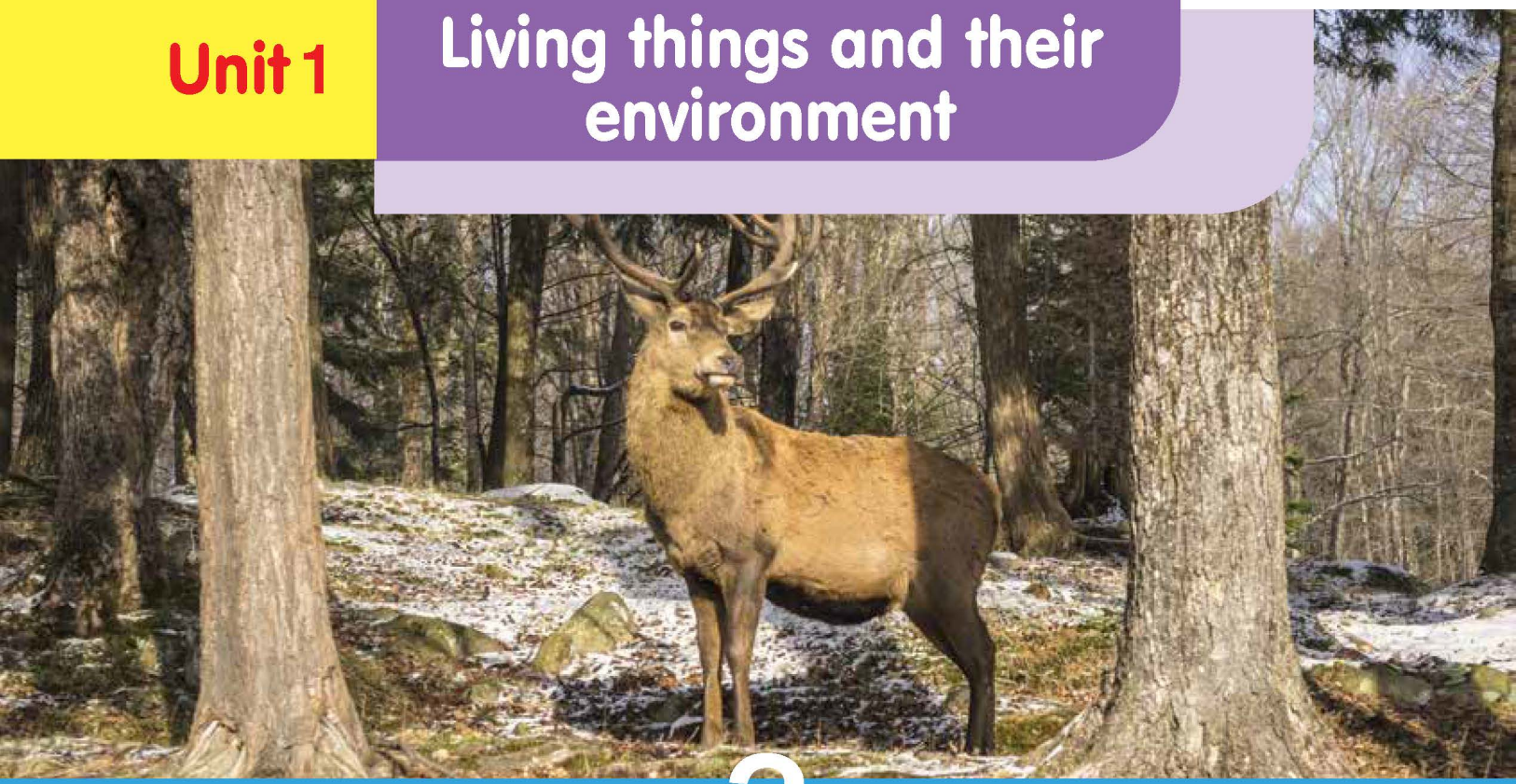
Spark of SCIENCE

Unit 1 Living things and their environment



How can living things survive ?

Vocabulary

- Food chain
- Food web
- Producer
- Consumer
- Herbivore
- Carnivore
- Omnivore
- Stimulus
- Response

Objectives

- Explain how producers and consumers are related in food chains and food webs.
- Classify animals into herbivores, carnivores, and omnivores.
- Explain how senses keep animals safe and alive.
- Describe how living things respond to stimuli.

Food chains

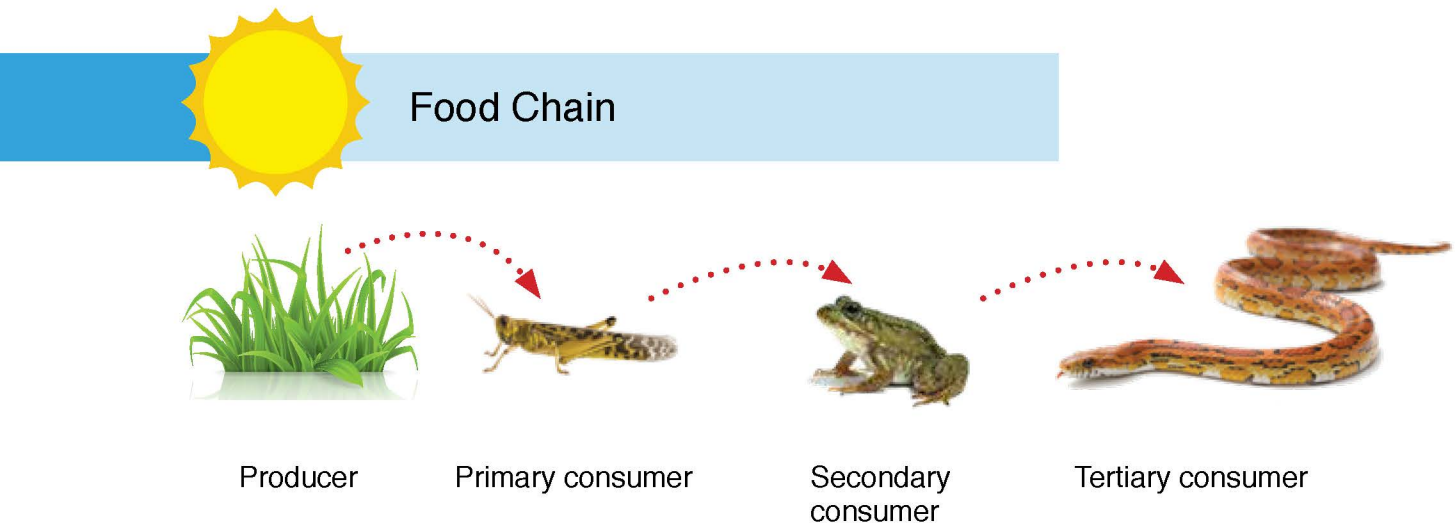
Lesson 1

All living things (organisms) need water, air, and food to survive.

They interact with each other and with their environment to get what they need. Organisms depend on each other for food.

Activity

1. The following figure shows the relationships between different organisms. Study the figure and answer the questions.



- Name the producer. ....plant.....
- What does the producer need to make its food?
  .....Sunlight, water, and air.....
- What is the difference between a producer and a consumer?
  .....Producers make their own food, while consumers rely on other organisms for food.....
- What is the difference between a primary consumer and a secondary consumer?.....Primary consumers eat producers, while secondary consumers eat primary consumers.....
- What does the figure represent?
  .....Food chain.....

Activity

1. Make cards for this activity by drawing a picture of a plant or an animal on each card. With the help of your classmates, arrange the cards to make different food chains.

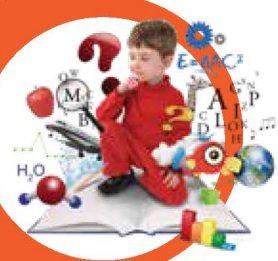
A Food chain is the way food passes from one organism to another. Food chains begin with producers. A plant is a producer because it makes its own food using air, water, and light, by a process called photosynthesis. Some animals are primary consumers; they eat plants. Some animals are secondary consumers; they eat other animals (the primary consumers). Tertiary consumers eat secondary consumers as well as primary, consumers.

Decomposers feed on plants and animals after they die. Search on the internet to find examples of decomposers and their benefits.

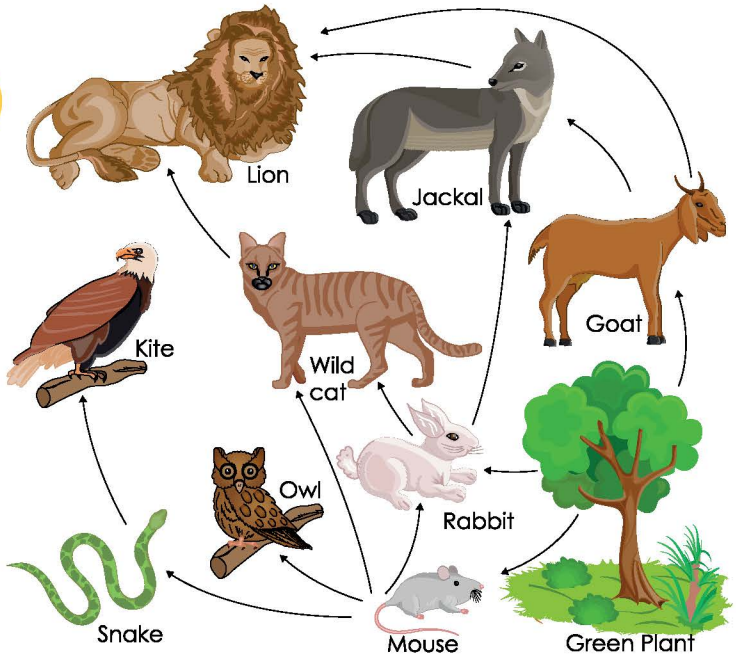
Students' own answers

Think

In one food chain, foxes eat chickens. If one fox eats 6 chickens each month, how many chickens would be eaten by 5 foxes in one month?



A food web is the interrelated food chains. So many food chains make a food web.



2. Write the words (lion, grass, rabbit, fox, grasshopper, tree) in the suitable blank.

Producers such as	Primary consumers such as	Secondary consumers such as
grass / tree	rabbit / grasshopper	fox / lion

Animals are classified according to what they eat into: herbivores, carnivores, and omnivores. Herbivores eat only plants. Carnivores eat other animals. Omnivores eat both plants and animals. Let's classify animals in the following activity.

Activity

1. Write the suitable word (herbivores, carnivores, and omnivores) in the blanks.

Cows are ....herbivores..... .

Eagles are .....carnivores..... .

Giraffes are .....herbivores..... .

Elephants are .....herbivores..... .

Lions are ....carnivores..... .

Bears are ....omnivores..... .

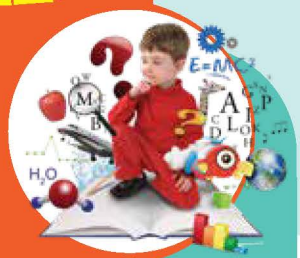
Animals are classified according to what they eat into:

- Herbivores such as sheep, giraffes, elephants, and cows, eat only plants.
- Carnivores such as lions, eagles, and tigers, eat meat (other animals).
- Omnivores such as bears, chimpanzees and squirrels, eat both plants and animals.

Write a brief report describing the effects of water pollution on food chains.

Think

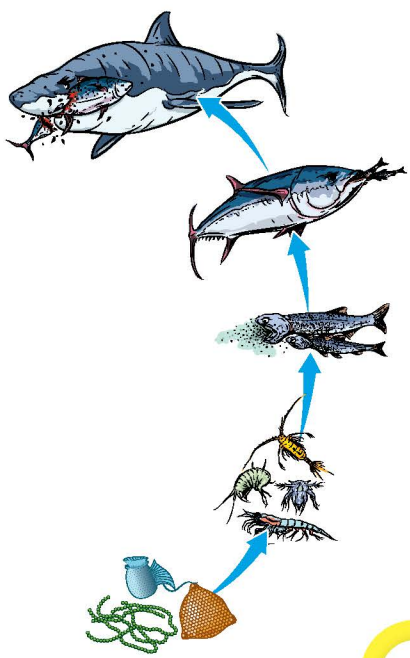
What is the classification of human beings according to their food? Give example to support your answer.



Students' own answers.....

.....

.....



Lesson 2 Senses of animals

Animals interact with their environment in order to stay alive.

Animals have senses which keep them safe and help them to continue their lives. What are these senses?

Activity

1. Fill the blanks in the following figure by writing the senses and the names of the sense organs.

The sense organ is .....ear.....

The sense is .....hearing.....

The sense organ is .....nose.....

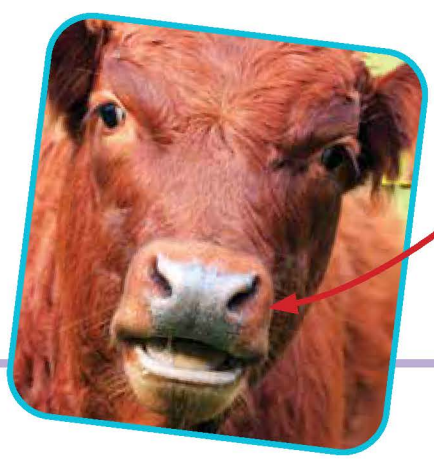
The sense is .....smell.....

The sense organ is .....eyes.....

The sense is .....sight.....

The sense organ is .....skin.....

The sense is .....touch.....



The sense organ is .....tongue.....

The sense is .....taste.....

Animals have five senses: **sight**, **hearing**, **smell**, **taste** and **touch**.

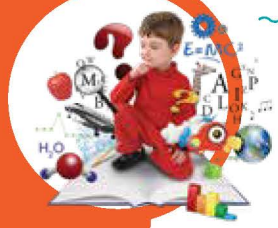
The eyes, the ears, the nose, the tongue and the skin are the sense organs.

LEARN MORE

Because owls are generally active at night, they have an excellent sense of hearing.

Think

Why do we use dogs for guarding and hunting?



Write the sense/senses to fill in the blanks.

.....taste, touch, sight...

.....touch, sight.....

.....touch, sight.....

Lesson 3 Responses of animals

When a car beeps while you are crossing the street, you feel danger.

What would you do? Let's find out what response and stimulus are.

Activity

1. Match the stimulus to the appropriate response:

Stimulus (the cause)	Response
Feeling hungry	Running away
Feeling scared	Drinking
Feeling thirsty	Eating

A stimulus is any cause or change in the environment that makes organisms react.

A response is how an organism reacts to a stimulus and results in a change in the behaviour.

When you feel hungry, you eat some food. Feeling hungry is the stimulus (the cause), and eating food is the response.

Why do small birds puff up their feathers?

when they are cold. This helps to trap air and retain heat, keeping them warm.

LEARN MORE

A stimulus is the singular, and stimuli are the plural.
Stimuli are classified into two types:
External stimuli: come from the external environment such as enemies and cold.
Internal stimuli: come from the inside of an organism such as feeling hungry and feeling thirsty.

Think

Suppose a deer loses its hearing, what will happen?

It can't detect other animals.

Many animals suffer from abuse; we should care for animals and not hurt them.

Activity

1. Circle the stimulus and underline the response in the following.

When the weather gets cooler, birds migrate.

When a crocodile feels hungry, it eats.

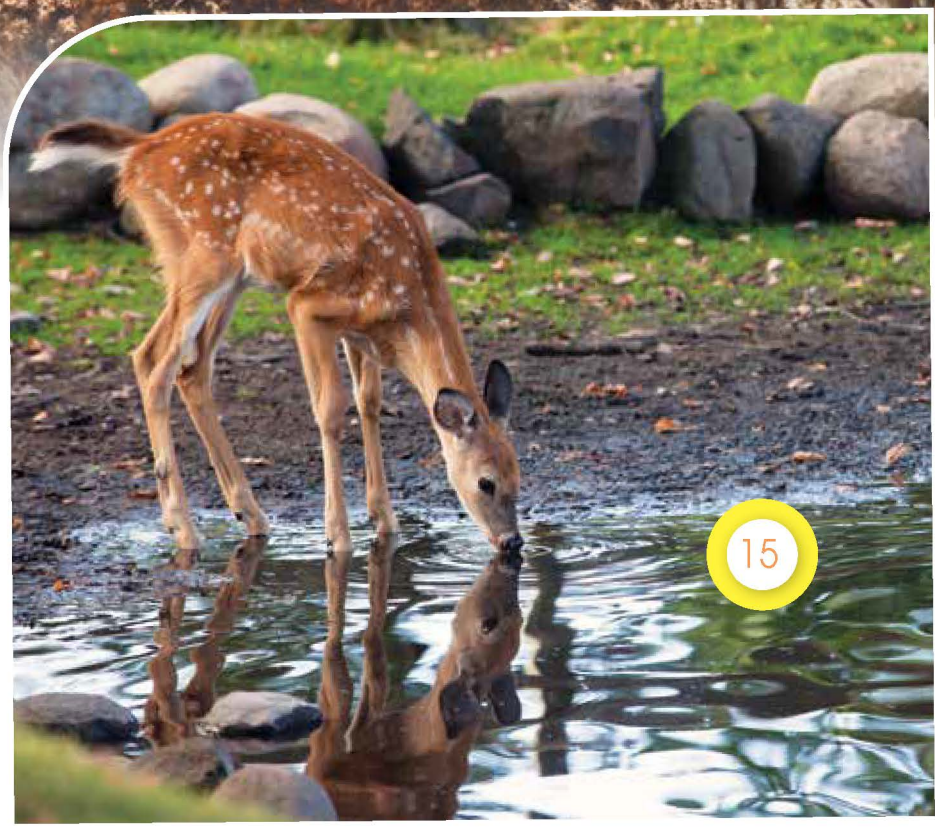
When a squirrel feels scared, it hides.

- Write the stimulus and the response to explain the following picture.

When a deer is thirsty, it drinks water.

.....

.....



Lesson 4 Responses of plants

Plants are living things. Like other organisms, plants response to stimuli. What are these stimuli? How do plants respond to stimuli?

Activity

1. Discuss with your classmates the following pictures, and then write in the blanks the stimulus and the response.

The stimulus is .....Sunlight.....

The response is The plant grows towards the light.....

The stimulus is ..Touching the plant..

The response is The plant folding its leaves.....

Plants grow towards the light source; light is the stimulus and the bending of the stem towards the light source is the response.

There is a kind of plants which folds its leaves inwards when touched.

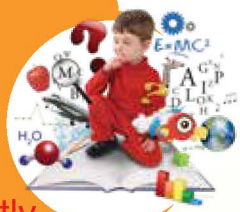
The human touch is the stimulus, and the response is the plant folding its leaves inwards.

Why do some plants shed their leaves in winter? Because there is not enough sunlight.

Think

If you want this plant to grow upwards, what would you do?

Place it under the sunlight directly.



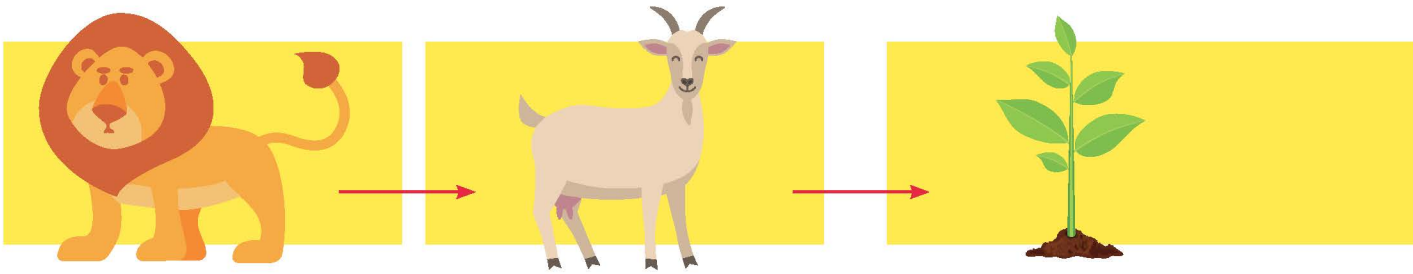
Trees are very important organisms on Earth; we should not break their branches.

Draw the result in your drawing book.

REVISION

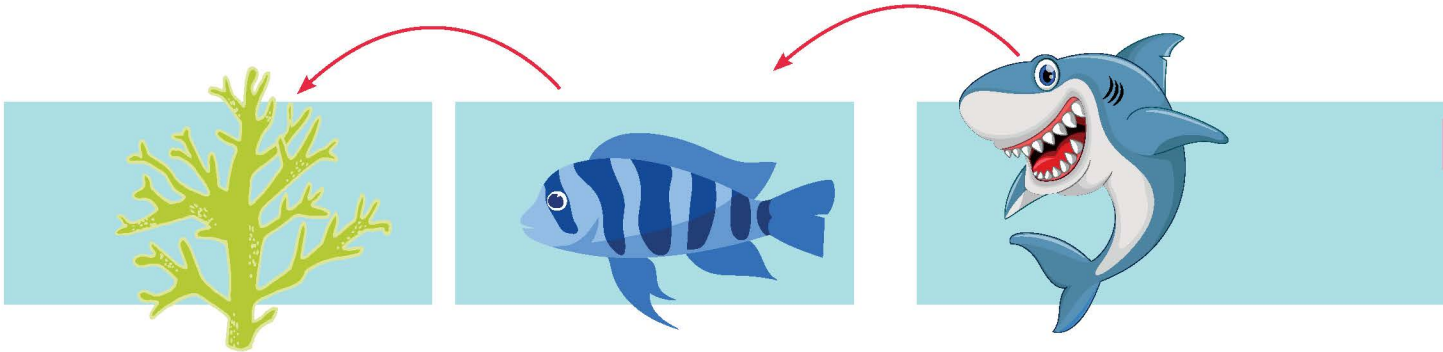
1. Draw arrows in the right direction to connect between the following organisms in a food chain.

a



Lion Goat Plant

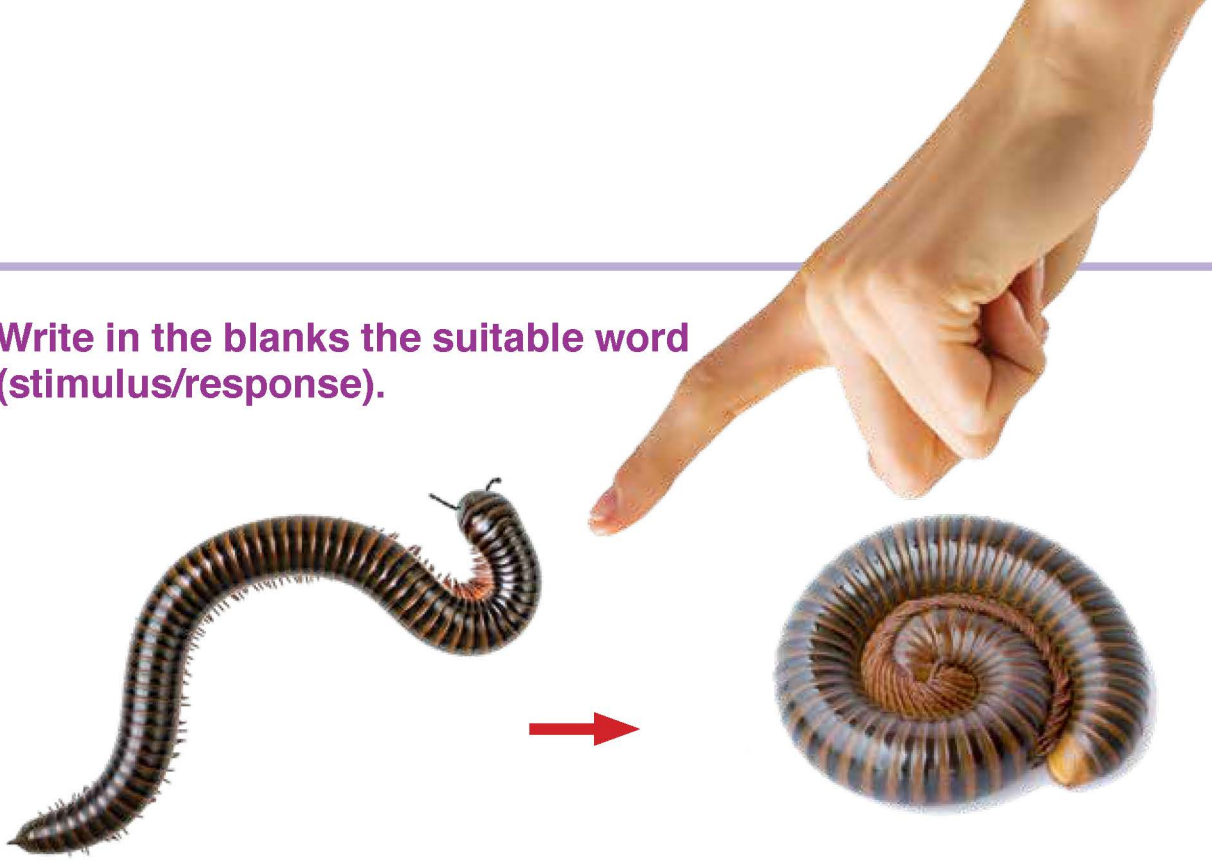
b



Seaweed Fish Shark

2. Draw the missed sense organs.

3. Write in the blanks the suitable word (stimulus/response).



.....stimulus..... .....response.....

4. Circle the correct answer.

Producers are:

- Animals.
- Humans.
- Plants.

Herbivores, carnivores, and omnivores are:

- Producers.
- Consumers.
- Responses.

5. Complete the following statements with the correct responses.

- When an animal feels thirsty, it .....drinks water..... .
- When an animal sees its enemy, it .....runs away..... .
- When you try to catch a bird, the bird will .....fly away..... .

6. Choose the suitable word from the following to complete each statement. (Omnivores, Producers, Herbivores, food chain, Running away, organism, Carnivores).

- A .....food chain..... is the way food passes from one organism to another.
- ....Herbivores..... eat plants.
- ....Carnivores..... eat other animals.
- ....Omnivores..... eat both plants and animals.
- An .....organism..... is a living thing.
- .....Producers..... are living things that make food.
- .Running away... is the response of a scared animal.

7. Suppose that all of the plants in an area die, how would this affect the food chain?

.....Plants are producers; if they die, consumers will starve and die, disrupting.....
.....the food chain.....
.....

8. look at the following photo, label the sense organs, and write the sense that is related to each organ.

...Eye - Sight.....
...Ears - Hearing.....
...Tongue - Taste.....
...Skin - Touch.....
...Nose - Smell.....

Light

Unit 2

Imagine our world without light, how would it be?

Students' own answers

Vocabulary

- Light
- Shadow
- A plane mirror
- Regular reflection
- Irregular (diffuse) reflection
- Spherical mirror
- A convex mirror
- A concave mirror

Objectives

- Investigate how light travels in straight lines.
- Identify the difference between regular and irregular reflections.
- Investigate images in flat and spherical mirrors.

Lesson 1 How does light travel?

Light is very important for the continuity of life on Earth.

Sun is the main source of light; what is the importance of sunlight for living things? Discuss with your classmates its importance.

How does light travel?

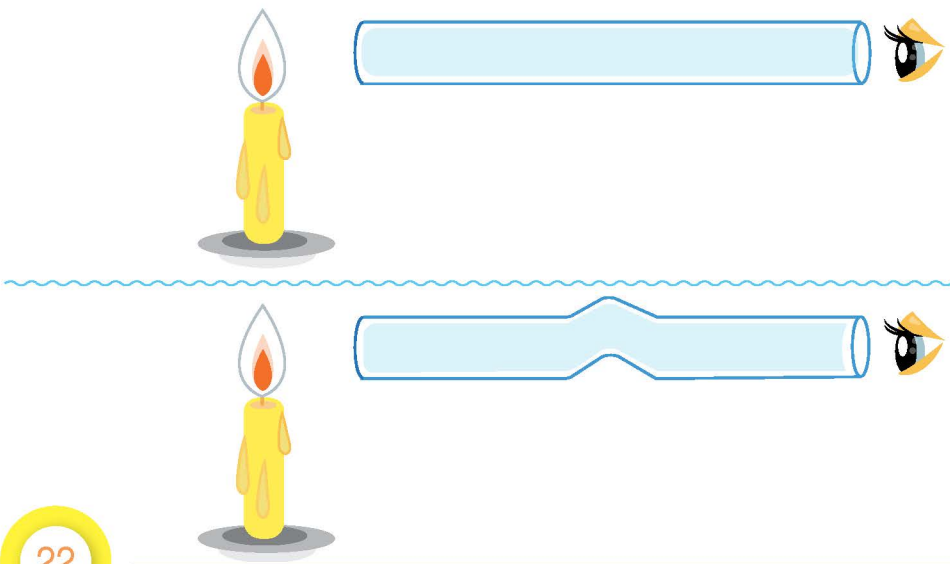
Activity

Materials:

2 Cardboard tubes, a candle, matches

Procedure:

- Bend one of the cardboard tubes.
- Carefully light the candle.
- Look at the flame of the candle through the straight cardboard tube, as shown in the following figure. Record your observation.
- Look at the flame of the candle through the bent cardboard tube. Record your observations. What do you conclude?



Sun is the main source of light on Earth.

Light travels from its source in straight lines. We see the light source because light travels from the light source to our eyes.

LEARN MORE

Nothing can travel faster than light.

Ibn Al-Haytham is a Muslim scientist who studied light. Search about this scientist and record the findings.

Think

The shadow formation is evidence that light travels in straight lines. Explain how.

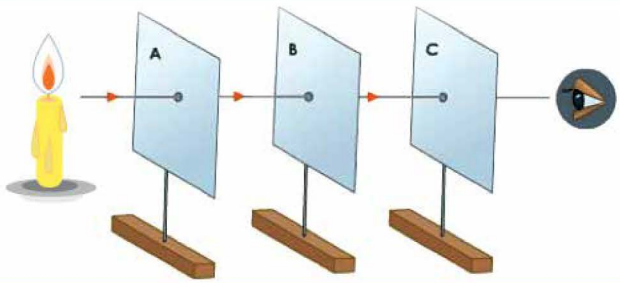
Shadows form because light travels in straight lines, blocking light from reaching the area behind an object.

Which of these is false?

- Light travels in straight lines. (.....True.....)
- Light travels very fast. (.....True.....)
- Light can pass through any material. (.....False.....)

A, B and C are three cardboards with a pinhole at their centers. If we slightly displace one of the cardboards, can we see the flame? Explain your answer.

We won't see the flame because light travels in a straight line.

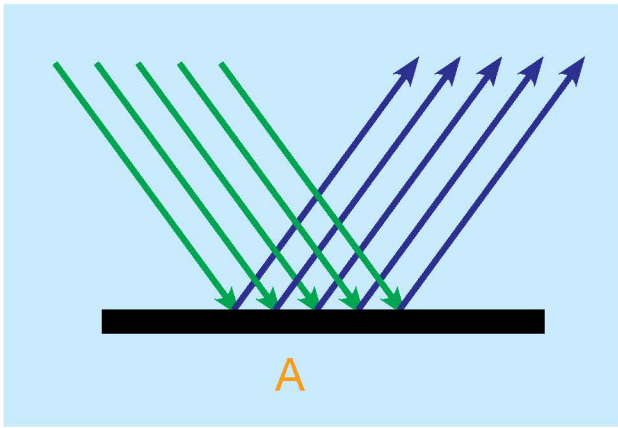


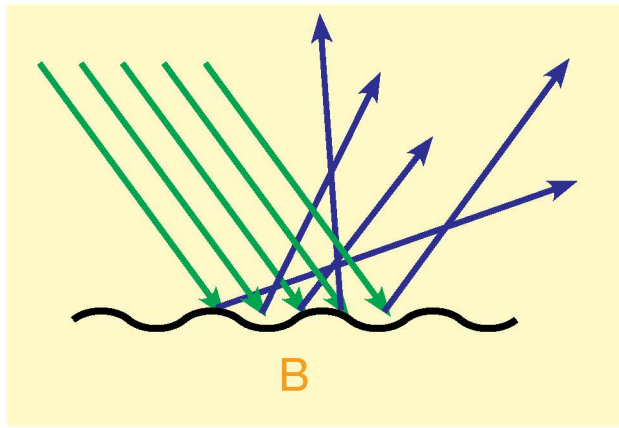
Lesson 2 Light reflection

When you switch off the lights in your bedroom, you will not be able to see any of the objects in the room, and you can't even see your image in the mirror. Light is very important to see things. Why can't we see in the dark?

Activity

1. Observe the following drawings which represent types of light reflection, and answer the questions.





- Is the surface of the object in (A) smooth or rough?.....smooth.....
- Is the surface of the object in (B) smooth or rough?.....rough.....
- In which case (A or B) do light rays reflect in one direction? .....A.....
- Which drawing represents regular reflection, and which represents diffuse (irregular) reflection?.....A: regular..B:irregular.....
- Draw the two types of reflection in your drawing book. Students' own answers

We can see objects because light rays enter our eyes after reflecting off the objects.

Reflection is the bouncing of light off objects.

Light reflection has two types:

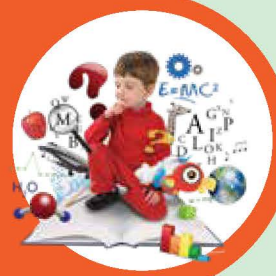
- **Regular reflection:** It happens when rays of light are reflected off a smooth surface in a single outgoing direction. This type of reflection is the reason why we see the images in mirrors and some polished objects.
- **Diffuse (irregular) reflection:** It happens when rays of light are reflected off a rough surface, such as wood, stone, paper, in many outgoing directions.

LEARN MORE

Regular reflection is also called specular reflection.

Think

Why can you see your image in a still pool of water but you can't see your image in a wind-blown pool?



- Classify the objects in your bedroom in the following table according to the type of light reflected off them.

Regular reflection	Diffuse reflection
.....Students' own answers.....	.....Students' own answers.....
.....	.....
.....	.....

Lesson 3 Plane and spherical mirrors

Have you ever thought about the car mirrors? Are they all the same type? Are the images formed similarly?

There are two main types of mirrors: plane (flat) mirrors and spherical mirrors. Let's explore the images of these mirrors.

Activity

Materials:

A plane mirror, a candle, a ruler

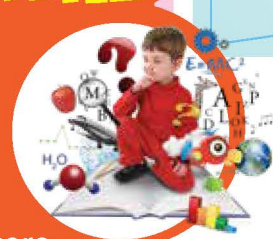
Procedure:

- Hold up the plane mirror in front of you.
- Raise your right hand. Which hand is being raised in the mirror? Record your observation.
- Set the candle in front of the plane mirror (15 cm away from the mirror). Notice the image, and record your observations.

When a mirror reflects light, it forms an image. **An image** is a copy of an object formed by a reflection.
The image formed by a plane mirror is the same size as the object and upright.
The left and the right of the image are reversed.

Think

Write your own name in a way so that it appears right way when you look at it in a mirror?
Students' own answers



Activity

Materials:

A spoon, a concave mirror, a convex mirror, a candle

Procedure:

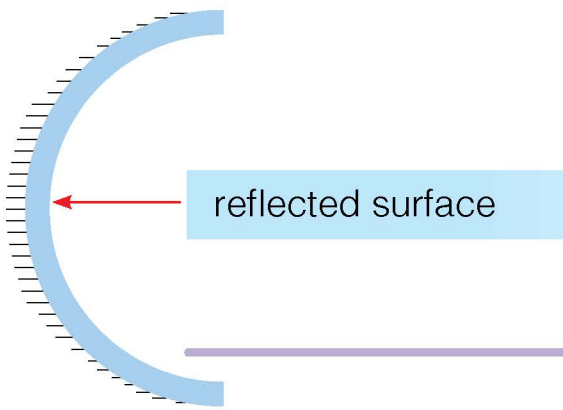
- Hold the spoon in your hand, and point to its concave surface and convex surface.

- Observe your image in both spoon surfaces, and record your observations.
- Set the candle in front of the convex mirror. Observe the image. Record your observation.
- Hold the mirror close in front of you. What do you see?
- Observe the image. Hold the mirror as far away from you as you can, with your arm fully stretched. What do you see?
- Set the candle in front of the concave mirror. Observe the image. Record your observation.
- Hold the mirror close in front of you. What do you see?
- Observe the image. Record your observation.
- Hold the mirror as far away from you as you can with your arm fully stretched. What do you see?

There are two types of spherical mirrors, **(convex and concave).**

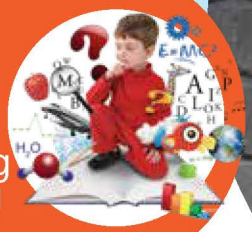
- The reflected surface of the **convex mirror** is outwards.
- A **convex mirror** forms images that are upright and smaller than the actual object.
- The side mirrors of cars are **convexs mirrors** because these mirrors allow you to see a larger area than you can with a plane mirror.

- The reflected surface of the **concave mirror** is inwards.
- How the image appears in a **concave mirror** depends on how close it is to the mirror.
- The image may be upside down and smaller than the actual object, or it may be upright and enlarged.



Think

What is the type of the mirror at the entrance of a garage? Explain.



Convex mirrors provide a wider field of view, allowing drivers to see approaching vehicles and pedestrians from a distance.

Search.

Where are different types of mirrors being used?

Different types of mirrors are used in personal grooming, vehicles, security, optical instruments, and solar cookers.

1. What is the type of this spherical mirror?

concave

REVISION

1. What is the type of the front mirror in a car?

plane mirror

2. Name the type of the mirror in the following photos.

A

B

A concave

B convex

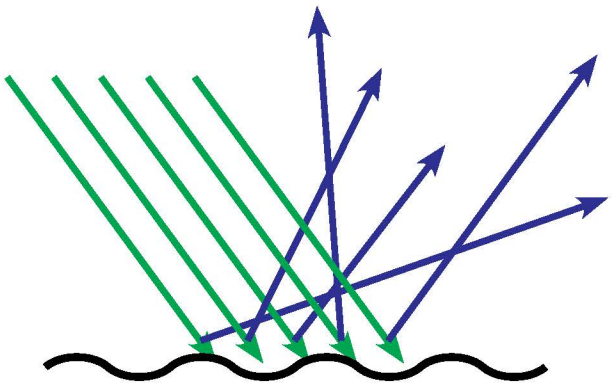
3. Circle the correct answer.

In which direction does light travel from its source?

- Curved line.
- Back and forth.
- Straight line.

What is this type of reflection?

- Specular.
- Regular.
- Diffuse.



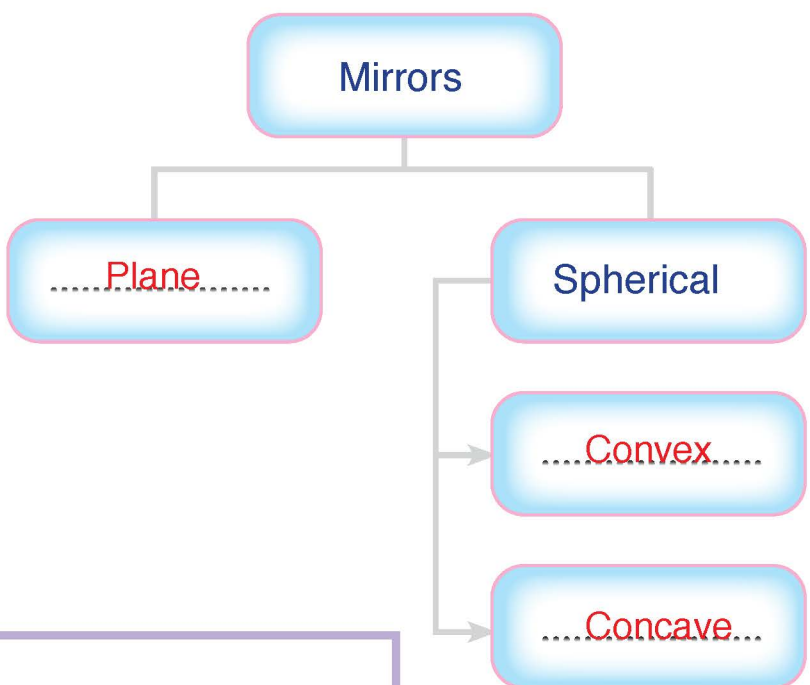
Why do scissors look shiny?

- Because they are sharp.
- Because they reflect light.
- Because they give out light.

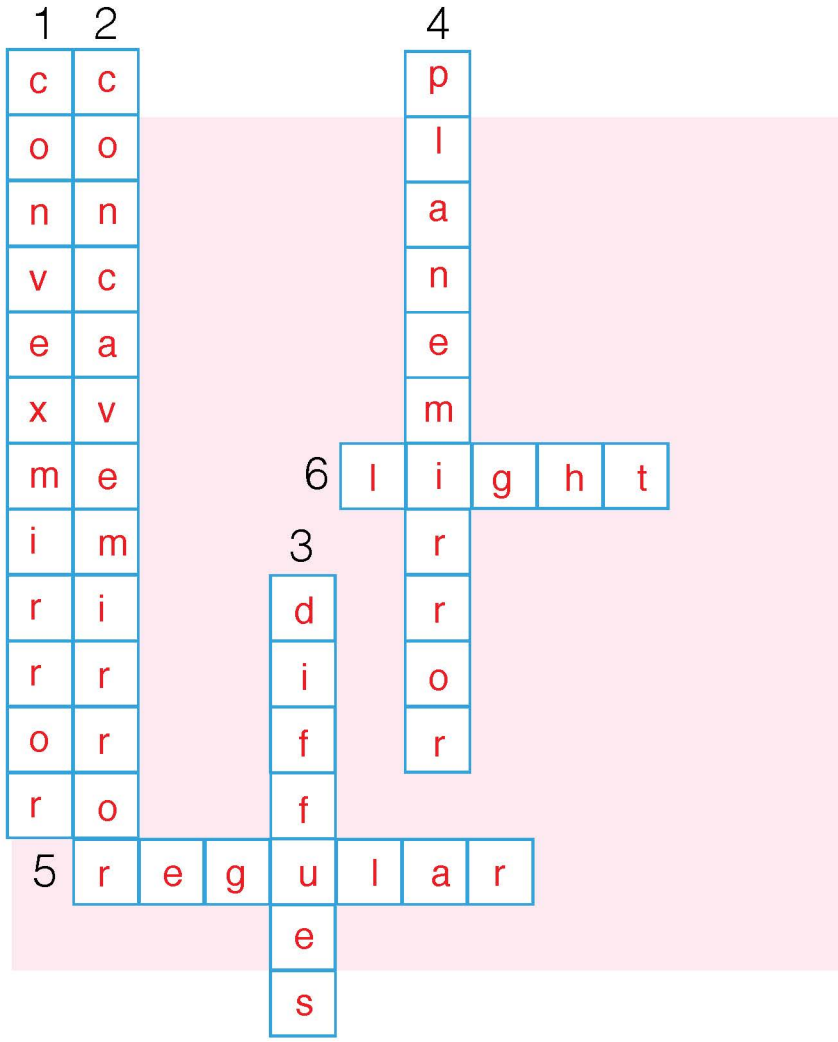
How do we see a tree?

- By light reflecting off the tree and entering our eyes.
- By light travelling from our eyes and reflecting off the tree.
- By light reflecting off our eyes and entering the tree.

4. Complete the following chart.



5. Do the cross word puzzle.



Vertical

1. A mirror forms images that are upright and smaller than the actual object.
2. A mirror that either forms an upside down and smaller than the actual object image; or it forms an upright and enlarged image.
3. A reflection in which rays of light are reflected off a rough surface, such as wood, stone.
4. A mirror that forms the same size as the object and upright image; the left and the right of the image are reversed.

Horizontal

5. A reflection in which rays of light are reflected off a smooth surface in a single outgoing direction.
6. Travels from its source in straight lines

Electricity and magnets

Unit 3

Electromagnets are used to separate magnetic objects from others in scrap.
What are electromagnets?

Vocabulary

- Electric charge
- Electric current
- Electric circuits
- Magnetic field
- Pole

Objectives

- Explore the effect of electric charges on objects.
- Build a simple circuit.
- Explain how electric current flows.
- Summarise some rules for using electricity safely.
- Investigate how magnets act.
- Investigate how to make an electromagnet.

Lesson 1 Static electricity

Have you ever dragged your feet on a carpet?

What will happen when you touch something such as a door knob afterward? Have you ever received a shock when you touched something? This happens because of the static electricity; let's explore it.

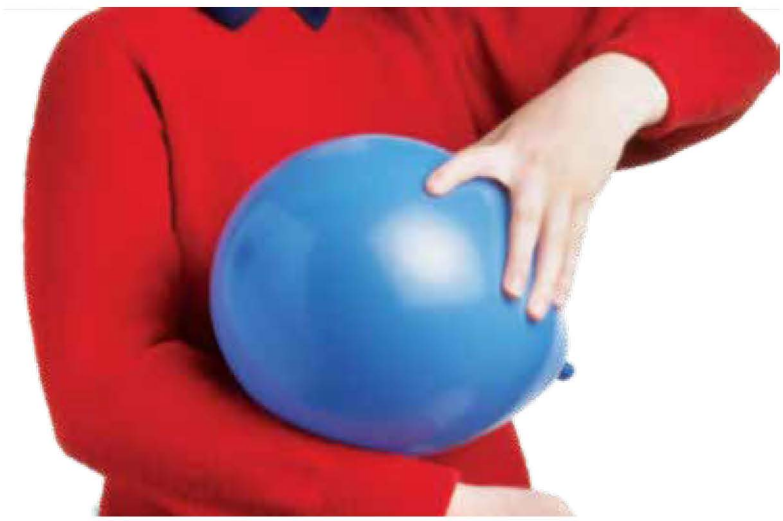
Activity

Materials:

2 balloons, a piece of wool

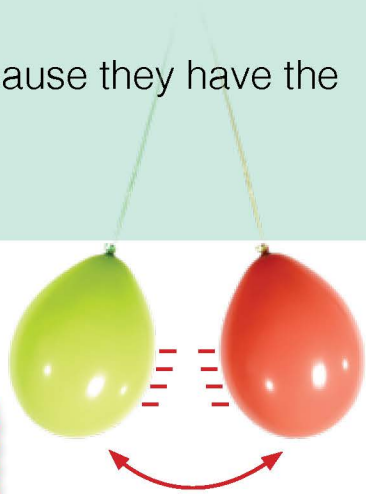
Procedure:

- Blow up the balloons and rub them with the piece of wool.



- Hold one of the balloons next to the piece of wool; observe what happens. **Record your observations.**
- Hold the two rubbed balloons next to each other, and observe what happens. **Record your observations.**

- **Static electricity** is the build-up of an electrical charge on the surface of an object.
- When we rub a balloon with a piece of wool, the balloon becomes negatively charged and the piece of wool positively charged.
- The rubbed balloon will attract the piece of wool when they are placed next to each other.
- Opposite charges always attract.
- The two rubbed balloons repel each other because they have the same charge.



LEARN MORE

When a glass rod is rubbed with a piece of silk, the glass rod becomes positively charged, and the piece of silk becomes negatively charged.

Complete the following statements with the suitable word (repel or attract):

- Opposite charges .....attract..... .
- Same charges .....repel..... .
- The two rubbed balloons .....repel..... each other.

Define static electricity.

It is the build-up of an electrical charge on the surface of an object.....

.....

Lesson 2 Electric current and electric circuit

Electricity is very important; it powers the microwave, light the house, lets you watch TV and so much more. As you know, static electricity is the buildup of charges on the surface of an object, but those charges don't flow continuously. When electrical charges flow through a wire for example, they produce an electric current. Let's explore the Electric current and the electric circuit.

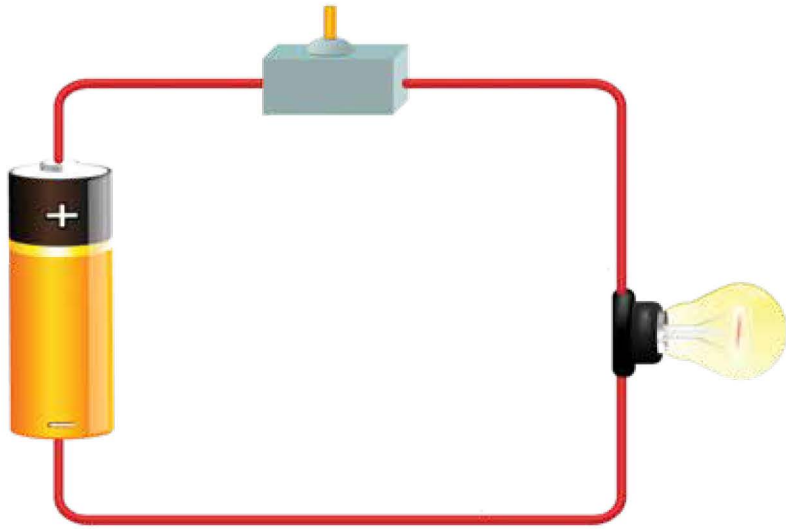
Activity

Materials:

A battery, copper wires, switch, and a light bulb

Procedure:

- Build an electric circuit using the material as shown in the following figure.



- Open the switch and observe the light bulb. Record your observations.
- Turn off the switch and observe the light bulb. Record your observations.
- If we use rubber bands instead of copper wires, what will happen?

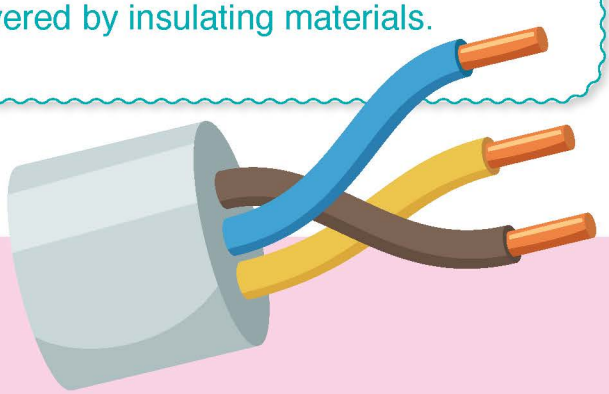
Current is the flow of electric charge in an electric circuit.
An electric circuit is a closed path through which an electric current flows.

To make an electric circuit, we need: a battery, pieces of copper wire, light bulb, and a switch.

When we close the switch, the electric current flows and the bulb lights up.

LEARN MORE

Wires are made of metals; metals such as copper and iron conduct electricity (carry electricity).
Wires are covered by insulating materials.



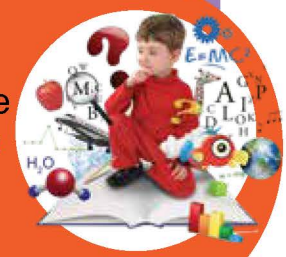
Rubber and plastic are insulating materials (they can't carry electricity).

A switch is often included in a circuit to control the current.

By using a switch, you can turn a device on or off by closing or opening the circuit.

Think

Give three reasons that may prevent the electric current from flowing in a circuit.
Open circuit / Insulation / Short circuit

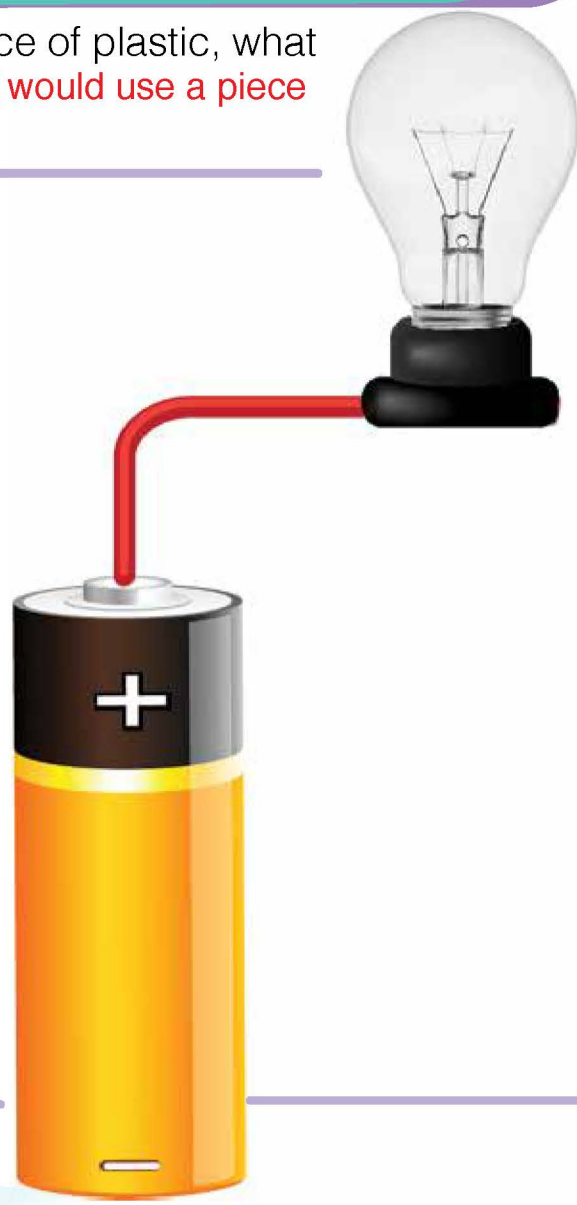


Define the electric circuit and the electric current.

An electric circuit: A closed path for electric current to flow.

An electric current: The rate of electric charge passing a point.

- If you have a piece of iron and a piece of plastic, what would you use to light up the bulb? I would use a piece of iron because it conducts electricity.



Using electricity safely

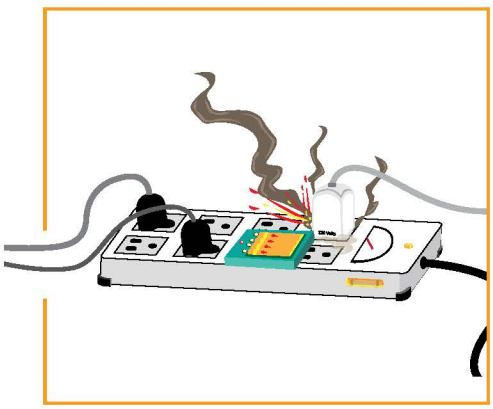
Lesson 3

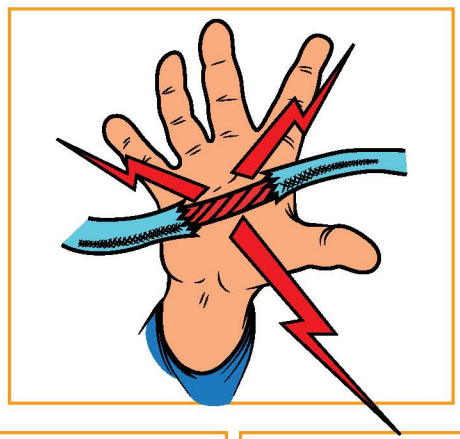
Electricity is very useful, but it can also be very dangerous.

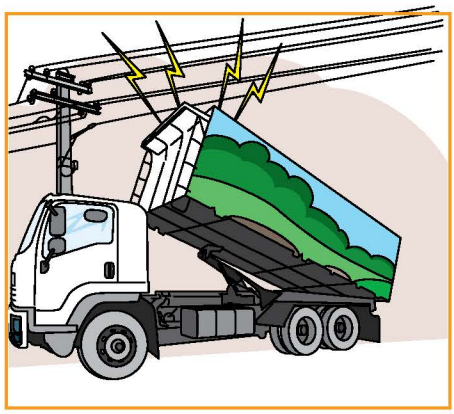
Can you mention some of the rules for using electricity safely?

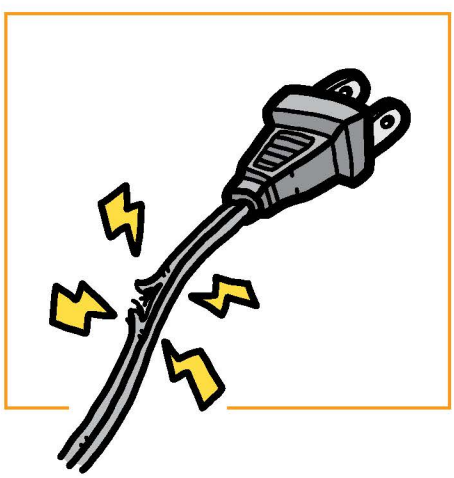
Activity

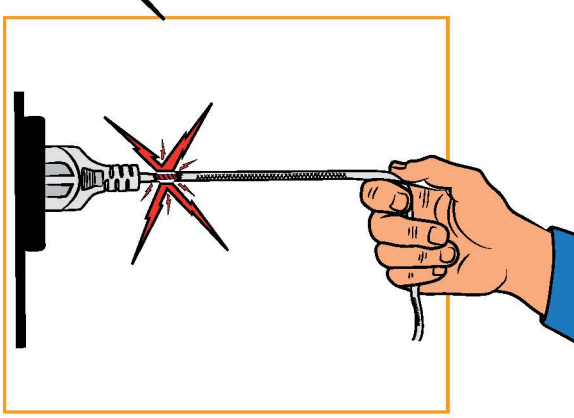
1. Discuss with your classmates the wrong actions illustrated in the following drawings. Students' own answers









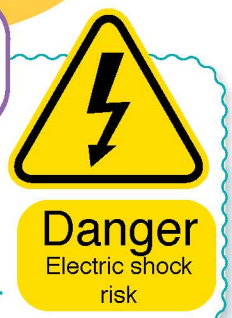


Electricity is very useful, but it can also be very dangerous. Here are some of the rules for using electricity safely:

- Never touch the bare metal parts of plugs.
- Never touch bare wires.
- Do not plug too many things into one socket.
- Do not unplug an electrical appliance by pulling its power cord.
- Stay away from power lines.
- Keep electricity away from water and don't touch wires with wet hands.

LEARN MORE

We must obey warning signs. This sign, for example, warns us to stay away from the area.
Electricity can cause shock or start a fire.



- **Design a poster to remind people how to use electricity safely.**

- Explain why this child is in danger.

Water and metals are conductors of electricity, so if he plugs the screwdriver into the outlet, electricity could pass through him.

Magnets

Lesson 4

Magnets are found in many things that we use daily such as the kitchen cabinets, some types of wallets and in many appliances. What is a magnet?

Activity

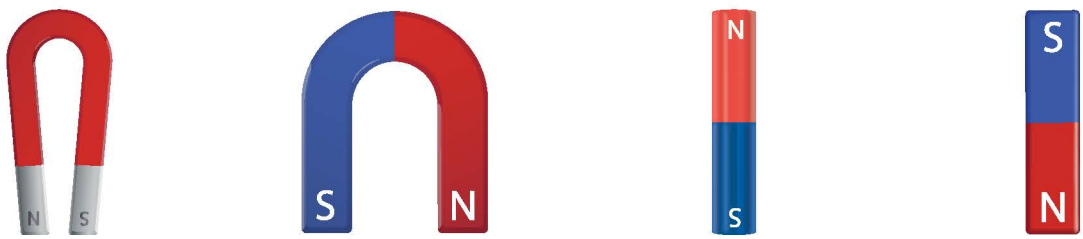
Materials: a magnet, a nail, a pencil, a pin, sand, a key

Procedure:

Using the magnet, sort the materials in the following table.

Magnetic objects (attracted to magnets)	Non-magnetic objects (not attracted to magnets)
pin / nail / key / magnet	pencil / sand

- **What are the shapes of the magnets?** U-Shaped / Horseshoe / Bar Magnet / Rod
- **Match each figure to its shape.**



Each magnet has two ends called poles, what is the main property of the magnet's poles?

Activity

Materials:

A bar magnet, metal paper clips

Procedure:

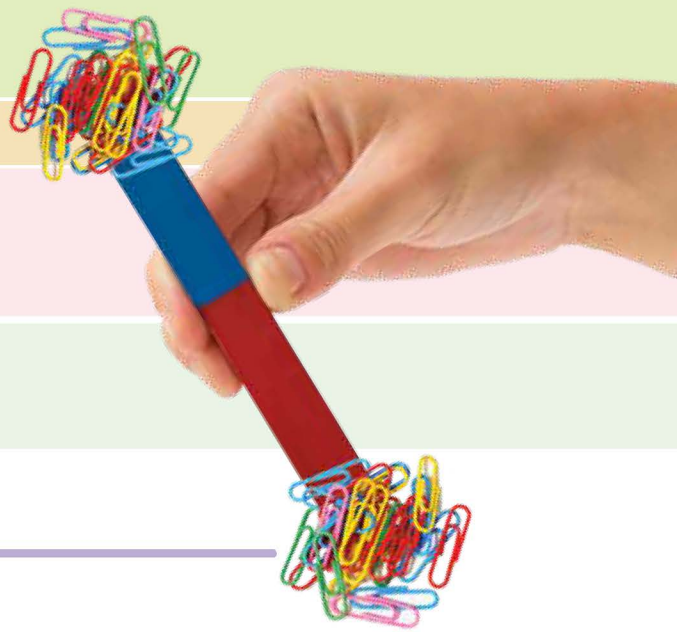
- Put the whole magnet on the paper clips.
- Slowly lift the magnet; what do you notice?
- Count the number of the paper clips attracted to each pole (end) of the magnet.
- Count the number of the paper clips attracted to the middle of the magnet.
- What do you conclude?

A magnet is anything that attracts or pulls iron and certain other metals.

There are many shapes of magnets.

A magnet has two ends called poles; South (S) and North (N).

A magnet's force is the strongest at its poles.



- **What would happen if a magnet is placed near another one?**

Activity

Materials:

Two magnets

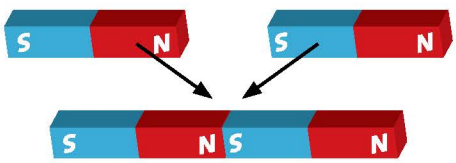
Procedure:

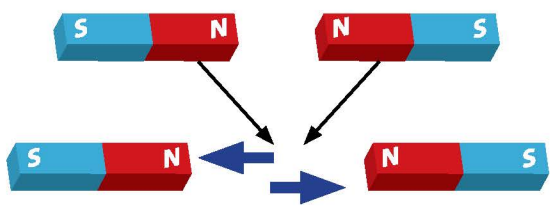
- Look at the magnets, how many poles' ends does each magnet have?
- Put the magnets near each other as in the following figure, what do you observe? Record your observation.

- Reverse the first magnet as the following figure, record your observation.

- What do you conclude?

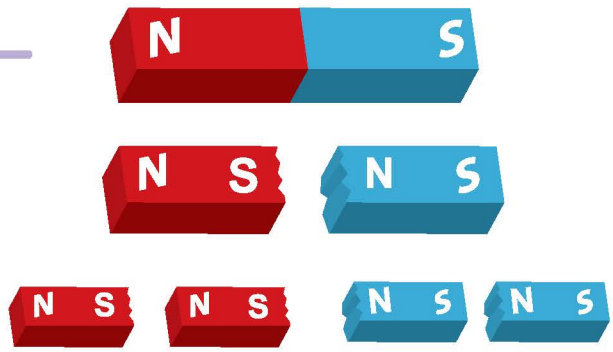
Unlike poles attract. Like poles repel.





LEARN MORE

If you break a magnet into two pieces, you will have two magnets, each with its own (N) and (S) poles.



Do you think that magnets have fields around them that you can't see? Let's find out the answer.

Activity

Materials:

A bar magnet, iron filings, a white paper

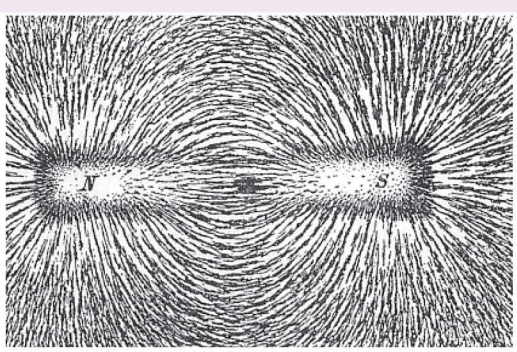
Procedure:

- Put the paper on the magnet.
- Sprinkle the iron filings on the paper. What do you see?
- Draw the result.

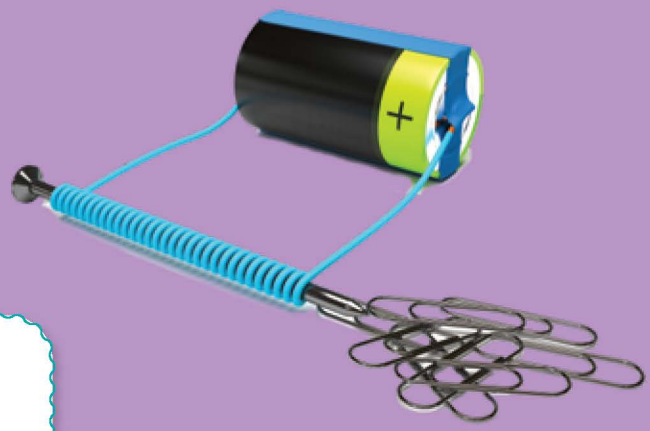
The magnetic field is the space around a magnet where a magnetic force acts.

We can use the iron filings to detect the magnetic field.

The magnetic force is always stronger at the magnet's poles.



LEARN MORE

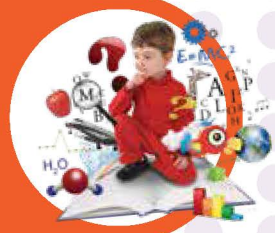


You can make an electromagnet. An electromagnet is a coil of wire wrapped around an iron core. A current moves through the wire; this will create a magnetic field that surrounds the electromagnet.

Search.
How does Earth behave like a magnet?
The Earth's center is composed of iron, and as it spins, the alignment of iron particles generates a significant magnetic field.

Think

Is a big magnet stronger than a small one? Design an experiment to check if your answer is correct. A large magnet is stronger.



1 Suppose you have two magnets as in the figure below, how can you find the unknown poles?

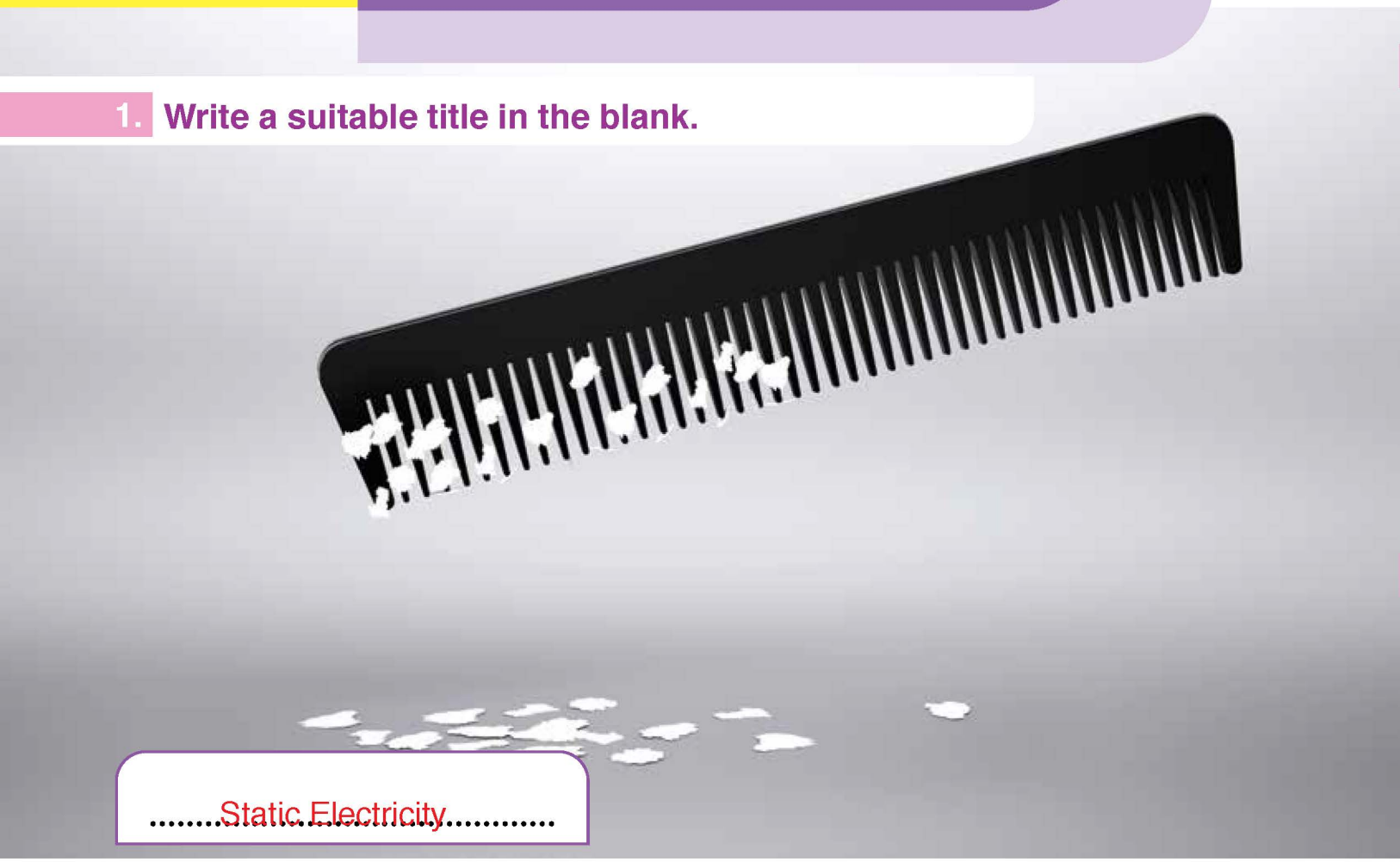
Place them near each other; unlike poles will attract, while like poles will repel.

2 What is the shape of this magnet?

U- shaped

REVISION

1. Write a suitable title in the blank.



.....Static Electricity.....

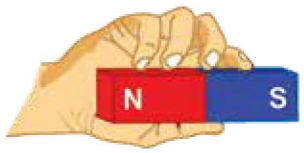
2. Write ✓ or ✗.

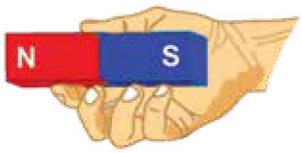
- It is safe to hold the bare metal parts of plugs. ✗
- We must not touch bare wires. ✓
- Do not unplug an electrical appliance by pulling its power cord. ✓
- We can plug the fridge, microwave, and the electric oven into one socket. ✗

3. Complete the following statements using the suitable word (static electricity, negatively charged, positively charged, attract, repel).

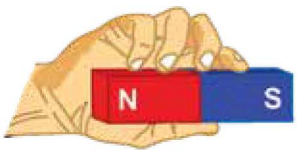
- ...Static electricity.... is the build-up of an electrical charge on the surface of an object.
- When we rub a balloon with a piece of wool, the balloon becomes negatively charged and the piece of wool ...positively charged. .
- Opposite charges always .....attract..... .
- The two rubbed balloons .....repel..... each other because they have the same charge.

4. Write (attract or repel).

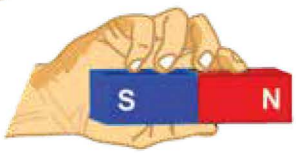


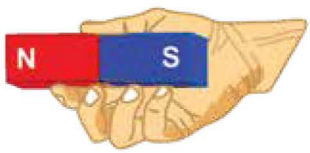


.....attract.....



.....repel.....





.....repel.....

5. Circle (Yes) if the object is magnetic and (No) if it is non-magnetic.

 Yes No	 Yes No	 Yes No	 Yes No	 Yes No	 Yes No
 Yes No	 Yes No	 Yes No	 Yes No	 Yes No	 Yes No

Unit 4 The solar system

Why do we study the solar system ?

Vocabulary

- Solar system
- Moon
- Sun
- Planets
- Orbit
- Rotation
- Eclipse

Objectives

- Explain the components of the solar system.
- Describe the movement of the planets around the sun.
- Explore Earth's movements in the solar system.
- Summarise the phases of the moon.
- Recognise the solar eclipse and the lunar eclipse.

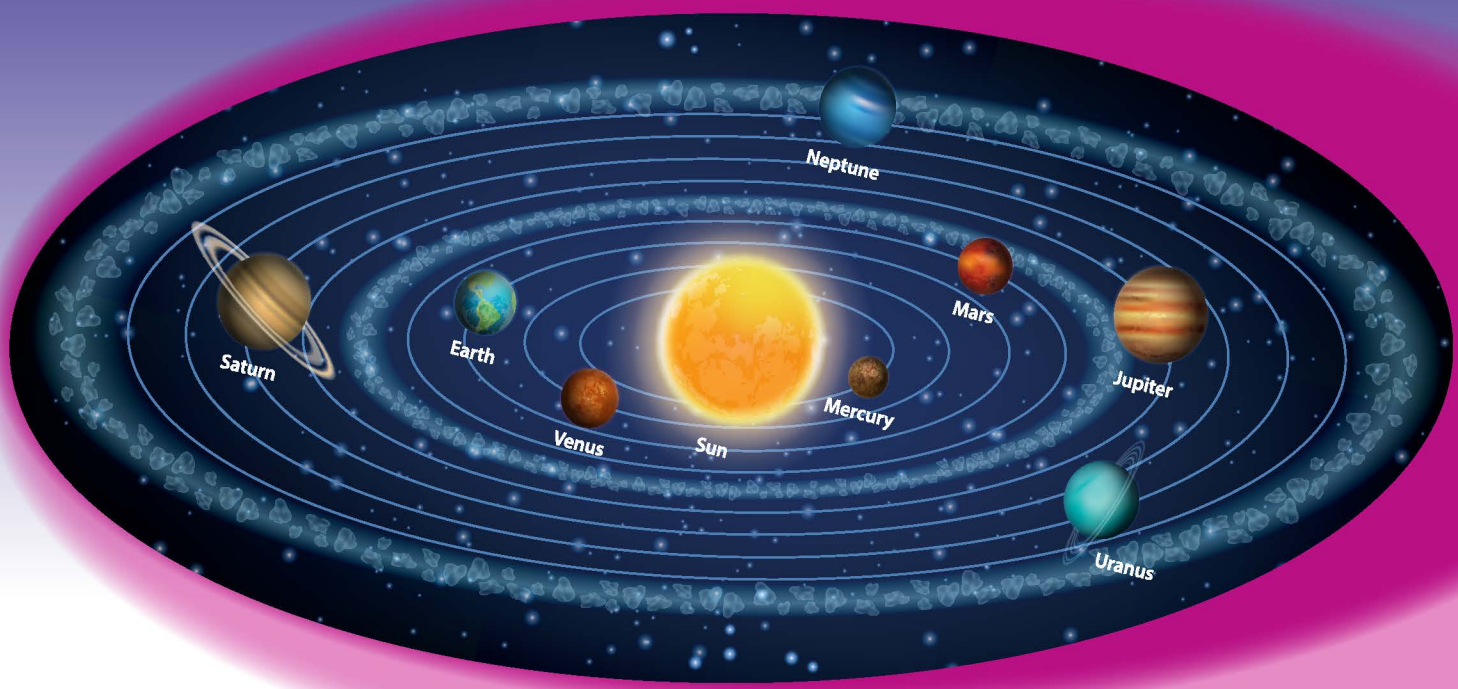
The components of the solar system

Lesson 1

Look up at the sky, what do you see?

At day time, you may see the sun and some clouds, and at night, you may see the moon and the stars. But actually thousands of objects are found.

- The solar system includes the Sun, Earth and other planets. Our solar system consists of eight planets which all orbit around the Sun. Look at this picture.

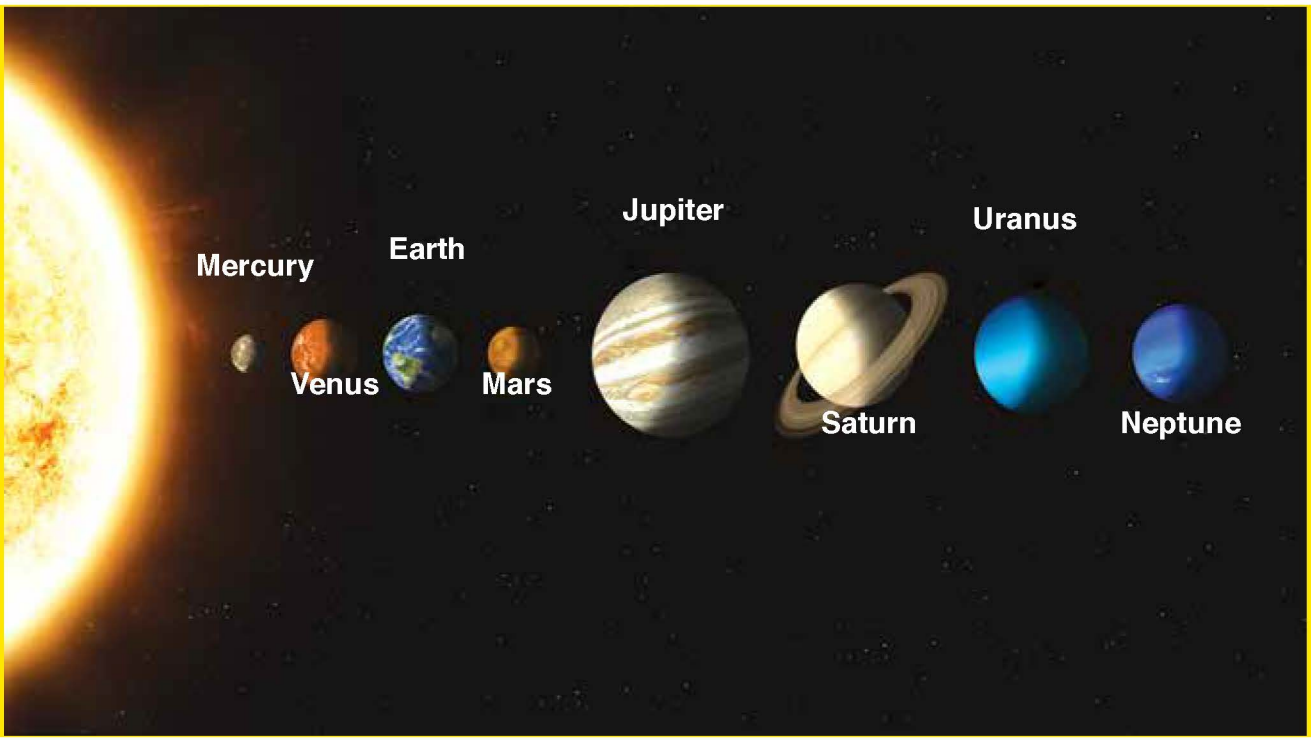


- Pluto was one of these planets, but because it is a dwarf planet, scientists stopped considering it as a planet.
- Each planet orbits around the sun in an ellipse orbit.
- Ellipses are circles that have been flattened a little.

- Which planet is the closest to the sun, and which is the farthest from the sun? Closest to the Sun: Mercury
  Farthest from the Sun: Neptune

Activity

1. Look at the following picture, and name the planets from the closest to the farthest planet from the sun. Mercury / Venus /Earth / Mars / Jupiter / Saturn / Uranus / Neptune



2. Sequence the planets in order according to size. (From largest to smallest).

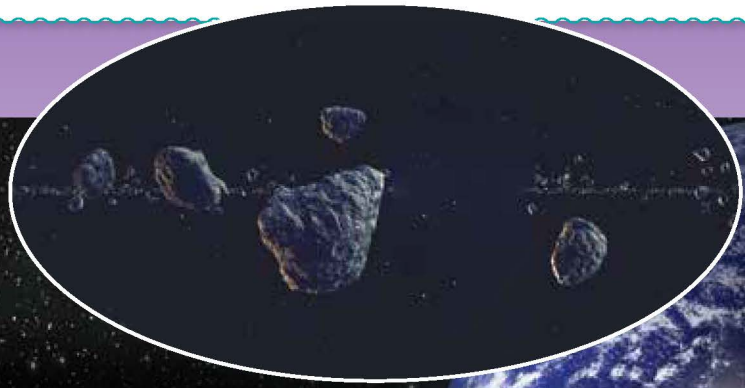
1. ...Jupiter.....
2. ...Saturn.....
3. ...Uranus.....
4. ...Neptune.....
5. ...Earth.....
6. ...Venus.....
7. ...Mars.....
8. ...Mercury.....

Activity

1. Design a solar system as the figure below, or make a model of your own.

Our solar system consists of eight planets which all orbit around the Sun in ellipses orbits. These eight planets are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.
Pluto was one of these planets, but because it is a dwarf planet, scientists stopped considering it as a planet.
Jupiter is the largest planet in the solar system.
Mercury is the closest to the Sun, and Neptune is the farthest from the Sun.

Asteroids are chunks of rocks orbiting around the sun. Some are nearly as large as small planets. Some scientists believe that asteroids represent matter that failed to form a planet.



Comets are balls of ice and rock orbiting around the sun, and they have tails of gas.

- **Describe and draw the orbits of the planets in your notebook.**
- **Compare between Jupiter and Uranus according to:** Students' own answers

A- The size.

Jupiter is bigger than Uranus.....

B- The distance from the sun (closer, farther).

Jupiter is closer to the sun than Uranus.....

The Sun

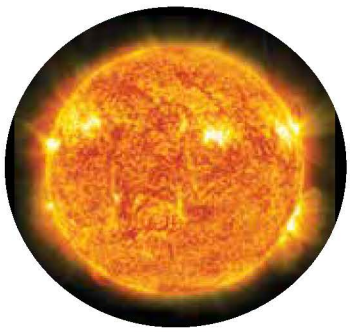
Lesson 2

The sun is the star at the center of our solar system.

What is the sun? What are its benefits?

Activity

1. The following figures illustrate some facts about the sun; match each with the suitable statement.



Plants use the sun's sunlight to make its food.

It is a huge ball of very hot gases.

It is the source of heat on Earth.

2. Write another fact that you know about the sun.

The Sun rises in the east and sets in the west.

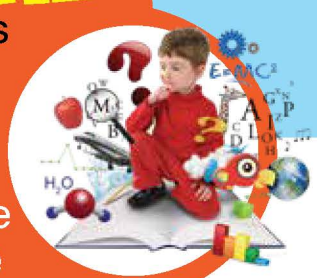
.....

Search about the gravity force of the sun and its benefit in the solar system. The sun's gravity keeps the planets in orbit around it.

The Sun is the star at the center of our solar system. It is a huge ball of very hot gases. It is the main source of light and heat on Earth. Plants use the sunlight during photosynthesis.

Think

Do you think that astronauts can visit the sun? Explain your answer.
No, astronauts cannot visit the sun because its extreme heat and radiation would be fatal.



- How does life on Earth depend on the sun?

  Life on Earth relies on the sun for energy, warmth, and weather patterns.

- Define in your own words what the sun is.

  Students' own answers

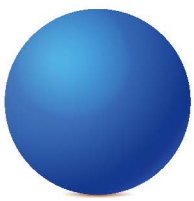
Earth rotation

Lesson 3

Our Earth is one of the eight planets that revolve around the sun in the solar system. It is the third-closest planet to the sun. Earth is always moving; let's explore its movement.

Activity

Materials:



foam ball

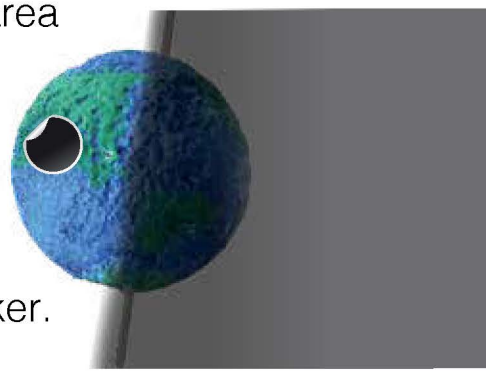
wooden stick

sticker

flashlight

Procedure:

- Make a model of Earth as in the photo, and mark an area by the sticker.



- Shine the flashlight on the model of the Earth. Observe. Is it day or night at the sticker area?
- Turn the model counter clockwise and notice the sticker. Is it day or night at the sticker time?
- Record your observations.

Earth rotates around its axis. The part of Earth facing the sun is lit (daytime). The other part not facing the sun is dark (nighttime).

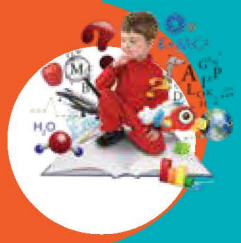
It takes Earth a day (24hours) to complete a rotation.The Earth's rotation causes day and night.

LEARN MORE

The length of daytime is longer in summer than in winter.

Think

What would happen if Earth stops rotating?
If Earth stops rotating, one side would be in constant daylight and heat, while the other would be in perpetual darkness and cold.

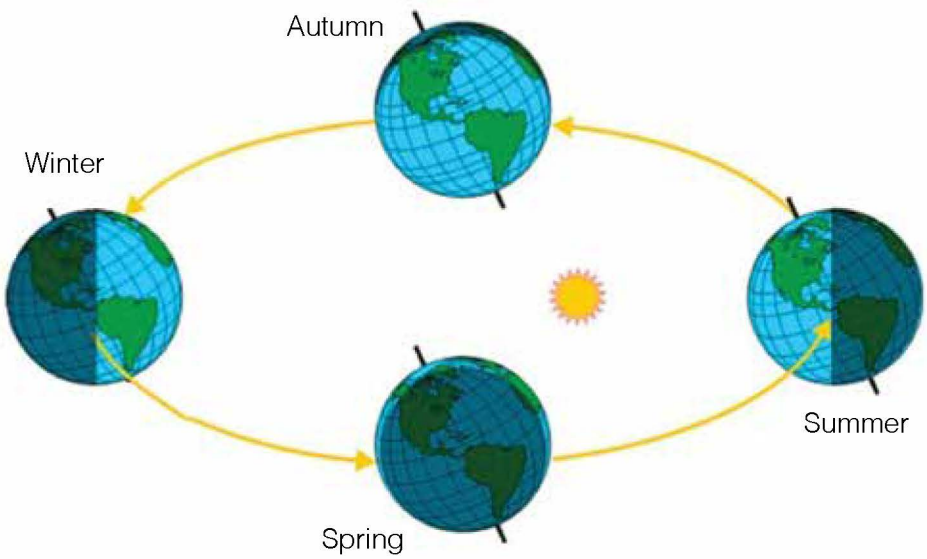


- Earth orbits around the sun; what does this cause? The four seasons

Activity

1. Look at the following figure and answer the questions; name the four seasons.

.....Winter..... .....Autumn..... .....Summer..... .....Spring.....



Compare between summer and winter according to the position of the Earth in its orbit. In summer, the Earth tilts toward the sun; in winter, it tilts away.

Earth orbits around the sun. It takes about 365 days and 6 hours (one year) for Earth to complete its orbit. The position of Earth in its orbit and the tilt of its axis cause the change of seasons.

Design a calendar. Divide the calendar into months and days.

Complete the following statements with the correct words.

1 Earth .....rotates..... around its axis. This rotation of Earth causes ..day and night.. .

2 The position of Earth in its orbit and the tilt of its axis causes the ....seasons..... .

3 Earth orbits around the sun. It takes about .....365..... days.

Lesson 4 The phases of the moon

The moon orbits around Earth. It has no light of its own, but it reflects light from the sun. The moon does not always look the same. Why does the shape of the moon change?

Activity

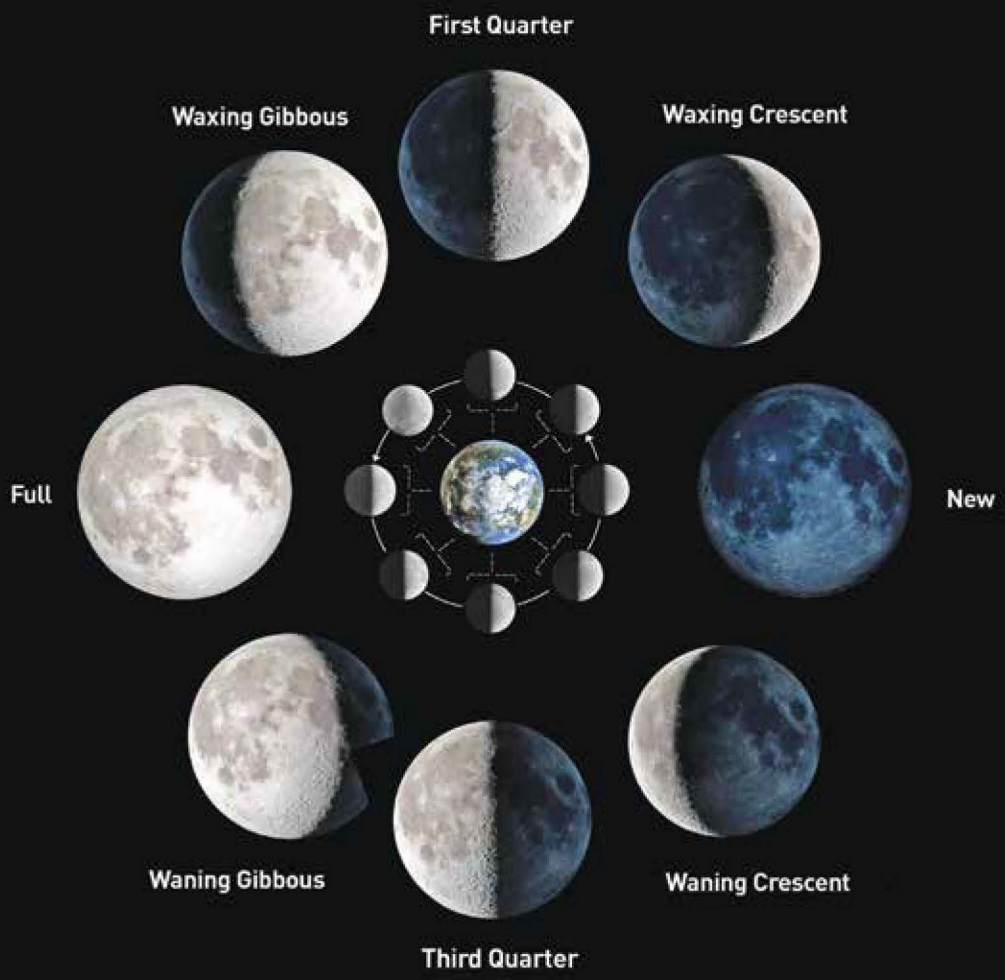
Materials:

A light source (a lamp), a model of Earth (that you made in a previous activity)

Procedure:

- Place the lamp in the middle of the room.
- Hold the Earth model.
- Face the lamp and extend the model directly in front of you, raising the sphere high enough. This view simulates a new moon.
- Turn your body as in the picture, and record your observations each time.

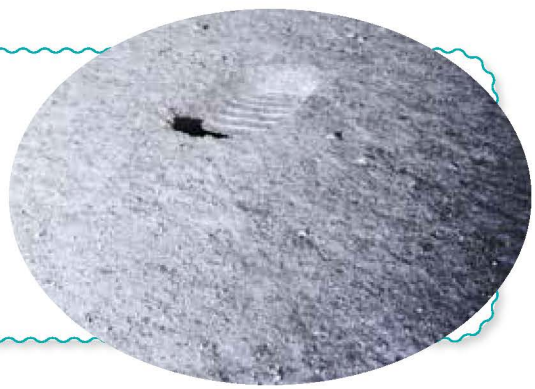
The following picture illustrates the phases of the Moon:



The moon takes about 29 days to orbit around the Earth.

LEARN MORE

The surface of the moon has many craters. Since the moon has no wind or rain, foot prints left by astronauts will remain on its surface millions of years.



- **Why can't we see the moon on some nights?**

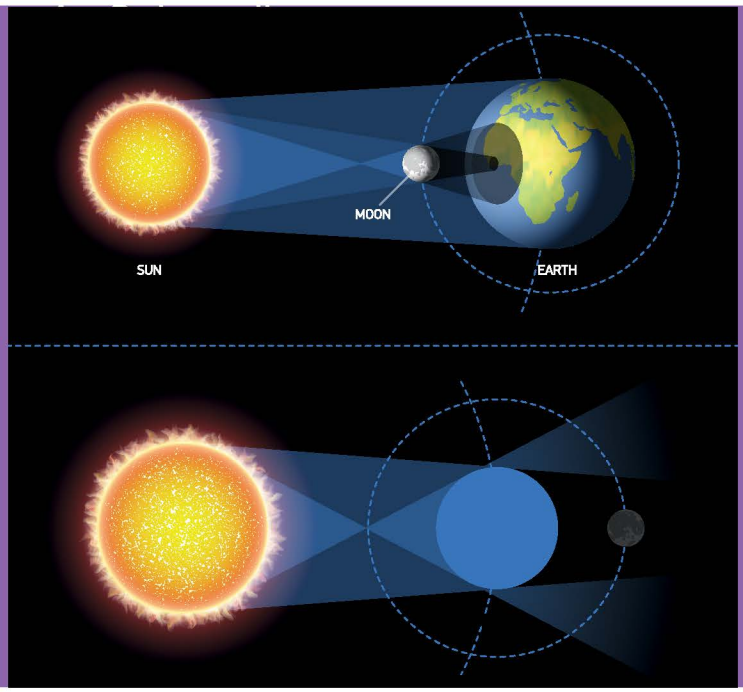
..because it is in a new phase, where it is positioned between the.....
..Earth and the sun, making it less visible from our perspective.....

Lesson 5 Eclipses of the Moon and the Sun

The Earth and the Moon are always moving in their orbits.

What happens when the moon comes between the sun and the Earth?
And what happens when the Earth comes between the moon and the sun?
Let's explore.

1. Look at the following figures, and answer the questions.



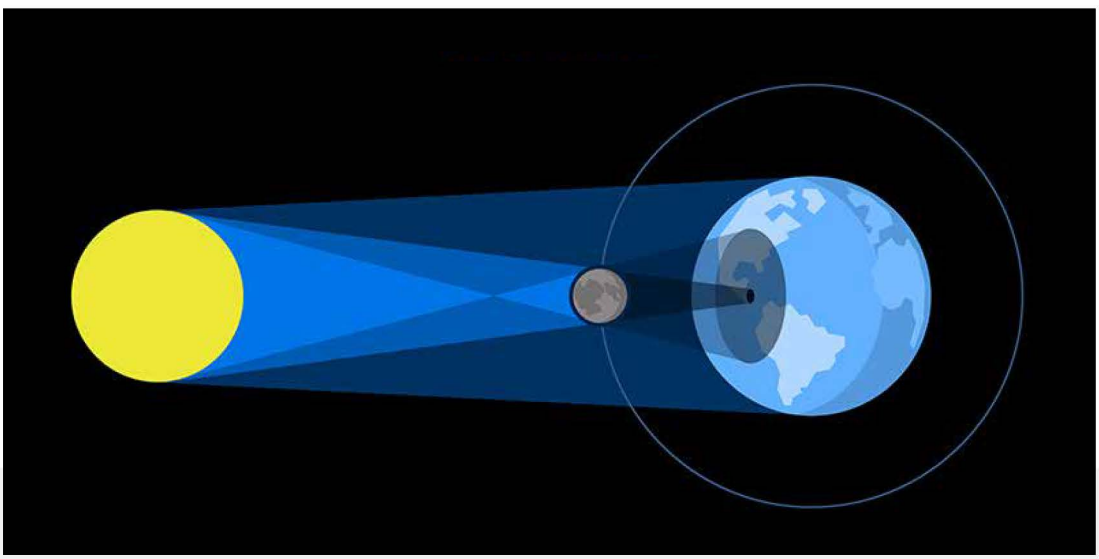
- The solar eclipse or the lunar eclipse occurs when the Earth, the sun, and the moon line up.
- A solar eclipse occurs when the moon makes a shadow on the Earth.
- A lunar eclipse occurs when the moon passes through the shadow of the Earth.

LEARN MORE

A total lunar eclipse occurs when the moon is fully covered by the Earth's shadow.
A partial lunar eclipse occurs when only part of the moon is covered by the Earth's shadow.

- What does the following figure represent?

Solar eclipse



You should never look at the sun directly even during the solar eclipse because it will hurt your eyes.

REVISION

1. Write ✓ or ✗.

- The Earth orbits around the Sun. ✓
- Sometimes the Earth stops moving. ✗
- It takes the Earth 24 hours to orbit around the sun. ✗
- The Earth's orbit is an ellipse. ✓

2. Circle the correct answer.

During the new moon phase, we can't see the moon because the sun is shining:

- On the far side of the moon.
- On the Earth.
- On the near side of the moon.

The only known planet that has air is:

- Mars
- Earth
- Jupiter

The closest planet to the sun is:

- Venus
- Mercury
- Earth

3. Write a paragraph about the seasons, mention the main features of each season, and explain what causes the seasons.

..Seasons.arise.from.Earth's.tilted.axis..Summer.occurs.when.the.Northern.....

..Hemisphere.tilts.toward.the.Sun,.leading.to.warm.weather..Winter.happens...

..when.it.tilts.away,.causing.cold..Spring.and.autumn.are.transitional..Each.....

.season.has.distinct.weather.due.to.sunlight.angle.changes.....

4. Use the information in this table to answer the questions below.

Planet	Length of day (in Earth time)	Number of moons
Mercury	59 days	0
Venus	243 days	0
Mars	25 hours	2
Jupiter	10 hours	At least 16
Saturn	11 hours	At least 18
Uranus	17 hours	17
Neptune	16 hours	8

- Which planets don't have moons? ...Mercury and Venus.....
- Sequence the planets according to the length of day time from (longer to shorter day length). ....Venus, Mercury, Mars, Uranus, Neptune..... ..Saturn, Jupiter.....

5. Complete the following statements with the suitable word: (Neptune, planets, gases, Jupiter, sun)

- The solar system consists of .....planets... and .....Sun..... .
- The farthest planet from the sun is ...Neptune.... .
- ....Jupiter..... is the largest planet in the solar system.
- The Sun is a huge ball of very hot ....gases..... .

6. Write in the blanks the names of the planets.

..Mercury.. ...Venus.... ....Earth.... .....Mars....

..Jupiter..... ...Saturn... ...Uranus... ..Neptune..

Glossary

- **Current:**
  is the flow of an electric charge in an electric circuit.
- **Electric circuit:**
  is a closed path through which an electric current flows.
- **Food chain:**
  is the way food passes from one organism to another.
- **Image:**
  is a copy of an object formed by a reflection.
- **Magnet:**
  is anything that attracts or pulls iron and certain other metals.
- **Magnetic field:**
  is the space around a magnet where a magnetic force acts.
- **Producer:**
  is an organism that makes its own food using air, water, and light, by a process called photosynthesis.
- **Reflection:**
  is the bouncing of light off objects.
- **Response:**
  is how the organism reacts to a stimulus and results in a change in the behaviour.
- **Static electricity:**
  is the build-up of an electrical charge on the surface of an object.
- **Stimulus:**
  is any cause or change in the environment that makes organisms react.
- **Sun:**
  is the star at the center of our solar system. It is the main source of light and heat on Earth.