Grade 5

Answer Key

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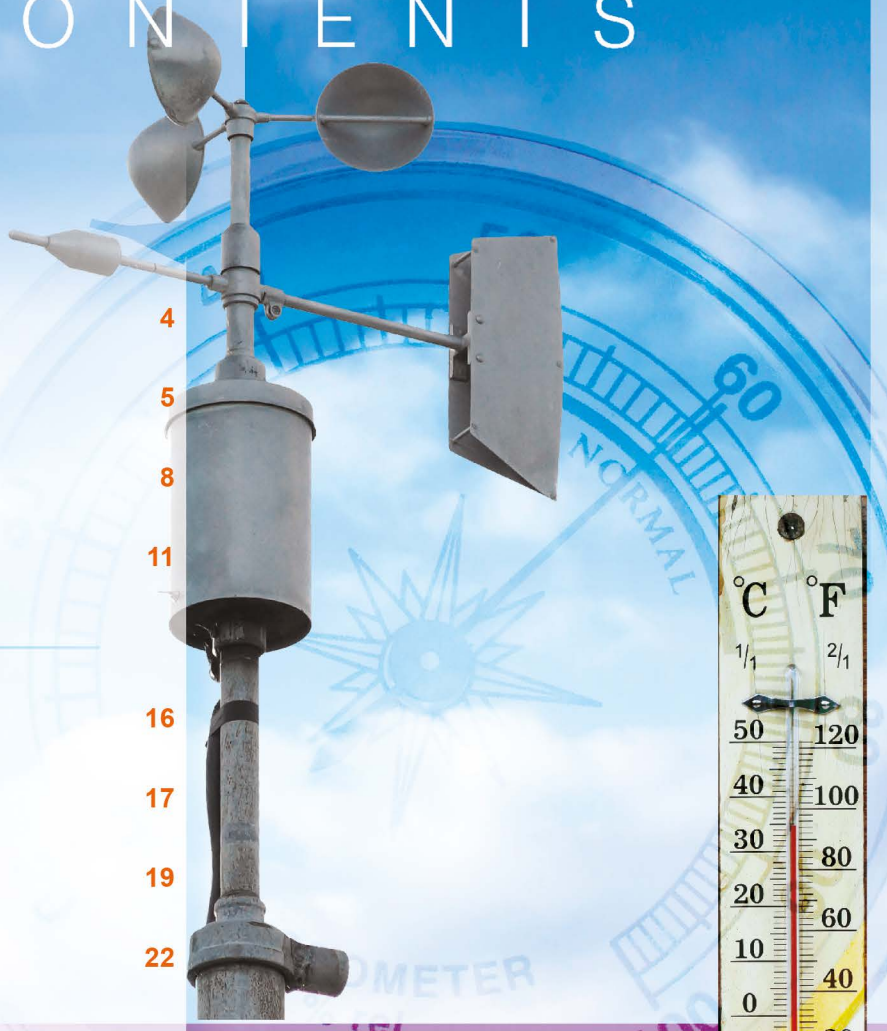

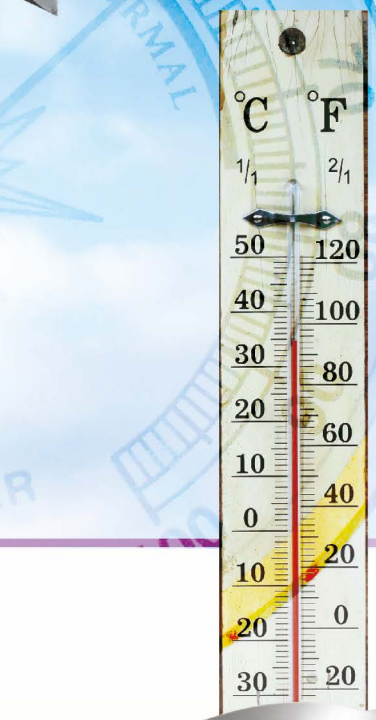

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Unit 1 Growth and heredity

Why are the two hands in the picture different in size?

Vocabulary

- Growth
- Infancy
- Adolescence
- Adulthood
- Heredity
- Trait
- Childhood
- Aging

Objectives

- Recognise the changes that occur during the human life.
- Explain why organisms differ from or are similar to their Parents.
- Give Examples of likeness that are inherited.

Human growth

Lesson 1

Since you were born, your body has been growing and changing. What are the differences that occur while you are growing? Let's find out.

Activity

Use the information in the following table to fill in the blanks.

	Mass(kg)	Height (cm)
	28	132
	18	109
	14	94
	23	122
	32	140

3 years

Mass ...14....
Height ..94....

5 years

Mass ...18....
Height .109...

7 years

Mass ...23...
Height .122...

9 years

Mass ..28....
Height 132...

11 years

Mass ...32...
Height .140..

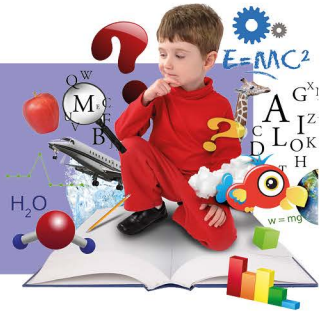
In your own words, define human growth.

...Students' own answers.....

Growth is the process of increasing in size, mass, and height. As we grow older, we learn to do more things.

Think

If the height of a man is 2 times the height of his young sister, which is 90 cm, find out his height.



There are many factors that affect human growth; here are some of these factors:

- **Heredity:** you may inherit your body size, mass or height from your parents, or grandparents (we will study heredity later).

- **Illness:** illness may reduce the weight, mass, and height.

- **Nutrition:** we must eat healthy food in order to grow normally.

- **Environment:** the clean surroundings and fresh air can affect growth.

Search for other factors that affect human growth.

Students' own answers

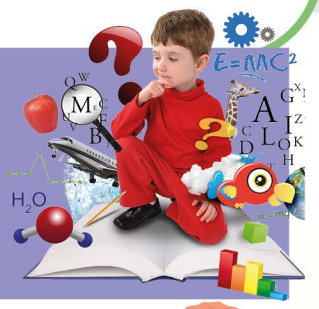
Learn More

Generally, the height stops increasing at an age of 18 to 21 in males and 16 to 18 in females.

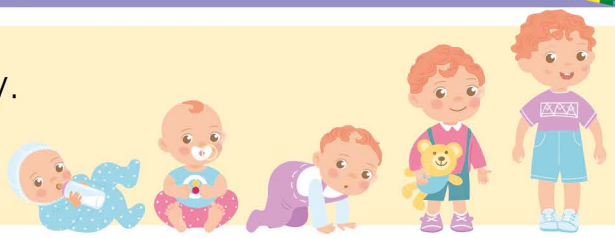
Think

How can the economic status of a family affect its children's growth?

Wealthy families can afford better food and healthcare, promoting healthy development unlike poor families.



1 Describe the growth of this baby.



2 Write (increase or decrease) on the arrow below the figure.

.....Increase..... in height and mass.

Lesson 2 Stages of human life

There are different stages in human life. What are these stages? and what are the characteristics of each stage?

Activity

Look at the following pictures that represent human life stages, and match each stage with the correct statement.

Infancy

Childhood

adolescence

Adulthood

Ageing

- The person is concerned with finding his identity. Many physical changes take place.
- The child starts to explore and develop a sense of independence, but he / she also needs guidance.
- The body becomes very weak; this stage is called the stage of wisdom.
- In the first year of life, an infant relies on others to meet most of his / her needs.
- The physical maturation is complete; develop a sort of expertise in either education or career.

In which stage are you right now? Childhood

There are different stages in human life, which are: infancy, childhood, adolescence, adulthood, and aging.

- **Infancy stage:** it is the first important stage of human life. Infants rely on others to meet most of their needs. Newborn babies cry when they feel hungry. This is how they communicate as they still cannot talk. Babies are usually fed on mother's milk.

- **Childhood:** it is the next stage of human development (2-11years old), during which children start to explore and develop a sense of independence. Children learn to make their own decisions. As they learn and grow, they develop a sense of self identify, communicate properly, read, write, and make friends.

- **Adolescence:** at this stage (13-19 years old), many physical changes take place. During this stage, rapid growth and changes of the body take place. These include changes of the body shape, hair growth on some parts of the body. For example, boys grow hair on their faces, and also, boys' voices become deep and rough.

- **Adulthood:** at this stage, a person (20-65 years old), reproduces; makes his/her own family and works to earn money.

- **Ageing:** at this stage, a person is older than 65 years old. This stage is called the stage of wisdom. The body becomes very weak.

We must help the youngsters and respect the elders.

Search for other minor stages of childhood. Infancy-Toddlerhood-Preschool-Early childhood-Middle childhood

1. Fill in the following table with information about your family members; their age, their stages and the most important characteristics they have. Students' own answers

The Stage	The age	Characteristics

What is human heredity?

Lesson 3

Have you ever wondered why your ears or eyes look like those of your mother, father or one of your grandparents?

Some of our traits (characteristics), such as the eyes' colour, are inherited (passed) from parents to offspring (children). Let's explore some of the inherited traits.

Activity

Mark the trait that you have with ✓. Students' own answers

Free earlobe ○			○ Attached earlobe
V-Shaped hair line ○			○ Straight hair line
Can roll the tongue ○			○ Can't roll the tongue
Presence of cheek dimples ○			○ Absence of cheek dimples

Activity

Students' own answers

Write your name in the following table, and answer "yes" or "no". Then, write the names of your family members and complete the table.

Name	Can roll the tongue	Presence of dimples	V-Shaped hair line	Free earlobes

- Do you have a trait in common with one of your parents?

.....

- Do you have a trait that both of your parents do not have?

.....

Heredity:
is the passing of traits from parents to offspring. These traits are called the inherited traits, such as your natural hair colour, eyes' colour, the presence of dimples, and the ability to roll tongue. Heredity explains why you have common traits with your family members.

We are all beautiful.

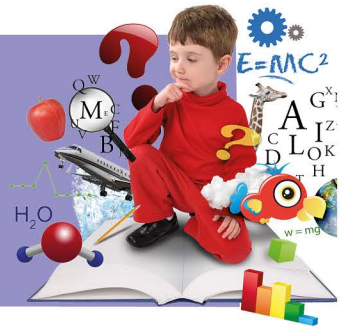
Learn More

Acquired traits develop during life and can result from interacting with the environment.
Examples of acquired traits are the ability to write, read or ride a bike.
Increasing muscle size from exercise, scars from accidents, and tanned skin that results from sun exposure are also examples of acquired traits.

Search for some inherited traits in plants. Colour or shape

Think

If someone can't roll his tongue, can he become capable of rolling it by training? Design an experiment to check your answer.



Why do brothers and sisters often have similar traits?

Because they have the same parents.

List extra examples of your inherited traits.

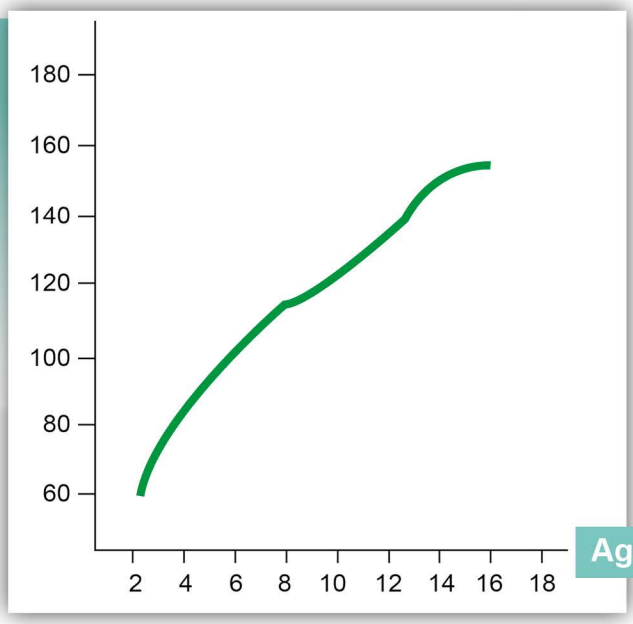
hair and eye colour

If a person becomes blind from an accident will he inherit blindness to his children? Explain your answer?

No, because accidental blindness is not hereditary.

REVISION

1. Study the graph below, which shows the relation between someone's height (cm) and age (years), then answer the questions.



- Compare the heights of this person when he was 8 years old and 14 years old.

  8 yrs = 110 / 14 yrs = 140

- Will his height continue to increase at the age of 25 ?

  No

- What does any person need to grow normally?

  Nutrition, good healthcare

- Name the stage of life when he is:

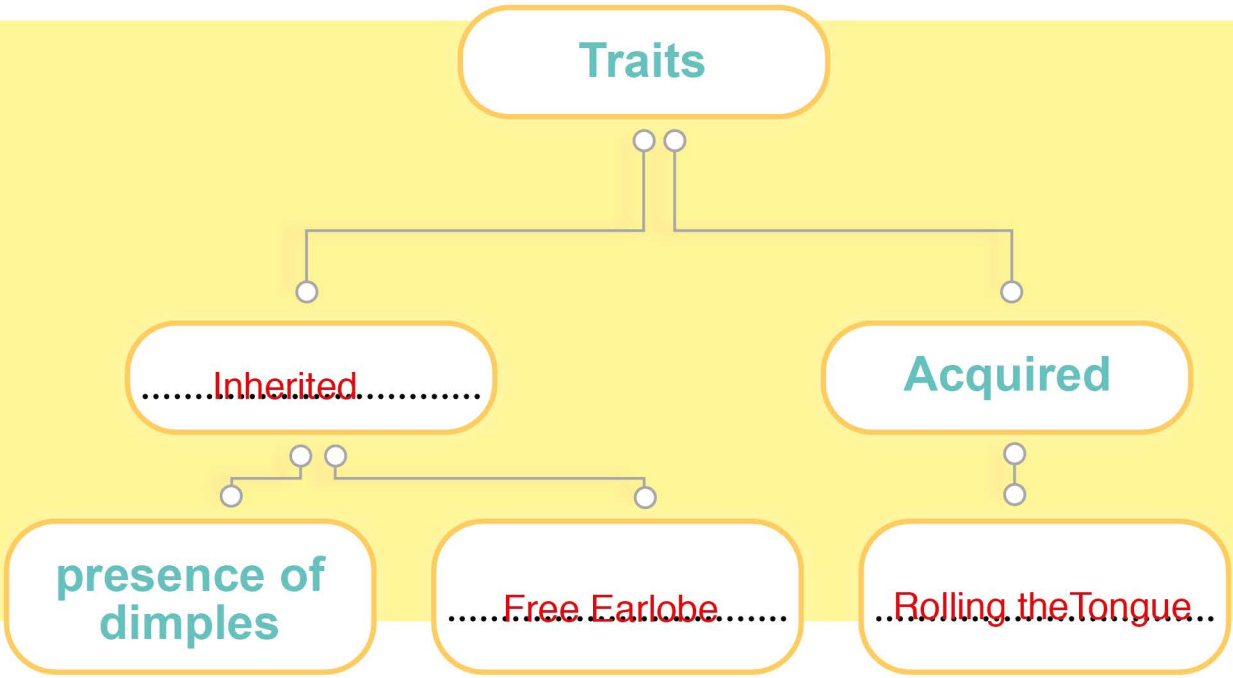
  A- (9) years old: Childhood

  B- (16) years old: Adolescence

- Which stage of life is the stage of wisdom?

  Aging

2. Complete the following chart.



3. Choose the correct word (Adolescence, Infants, Heredity) to fill in each blank.

Heredity is the passing of traits from parents to offspring.

Adolescence is the stage in which young men and women are primarily concerned with finding their identity and expressing who they are in the world.

Infants rely on others to meet most of their needs.

Unit 2 Motion and forces

How are motion and force related?

Vocabulary

- Motion
- Distance
- Force
- Position
- Speed
- Friction

Objectives

- Define what motion is.
- Describe the position of different objects relative to a reference point.
- Calculate the speed of an object.
- Explain the effect of a force on an object.
- Explain how friction affects the motion of objects.

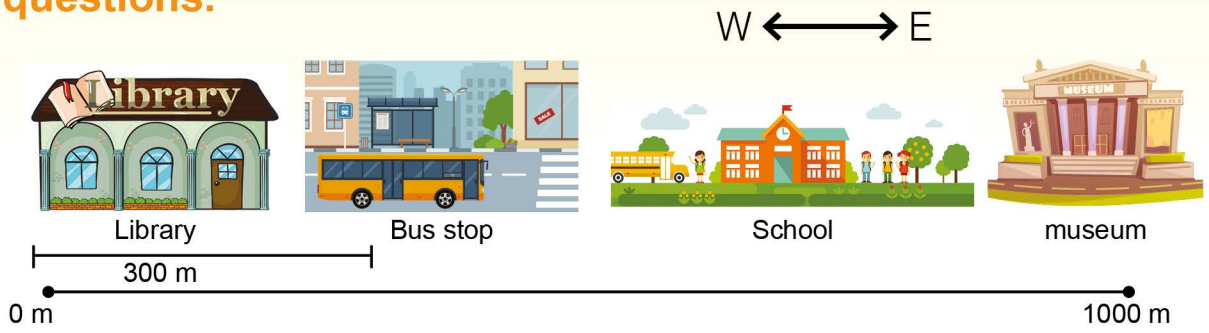
How would you describe where you are right now?

You might say that you are sitting half a metre to the left of your friend, or that you are at home two buildings south of your school.

We determine our location relative to a certain point. This point is called the reference point.

The reference point is the starting point we choose to describe the location (position) of an object. Relative directions such as west and south are also used to determine the position of an object.

Use the information in the following figure to answer the questions.



- Describe the position of the bus stop. Would the description of the bus stop differ according to the reference point? Explain your answer.

The bus stop is 300 m east of the library and 700 m west of the museum. Yes, the description of the bus stop may differ based on the reference point. If the reference point changes, the relative position and direction would be described differently.

- Describe the position of the library relative to the museum.

The library is 1000 m west of the museum.

- Describe the motion of a bus from the bus station to the museum.

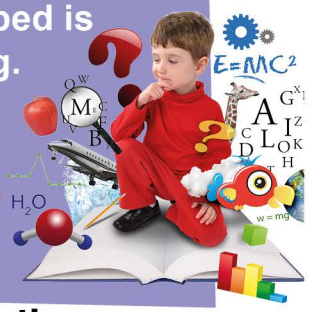
The bus would be moving east from the bus station to the museum.

- The reference point is the starting point we choose to describe the location (position) of an object.
- The position of an object is its distance in a certain direction from a reference point.
- Relative directions such as north, west, south, east, up, down, left, and right are also used to describe the position of an object.
- Motion is the change in an object's position.
- To describe an object's motion you have to know where the object is.

Not all reference points have to stand still. When you look out the window of a car and notice that you are moving faster than the car next to you, the car next to you is also moving; it is just moving slower than your car. You use that other car as a reference point to determine that your car is moving.

If you were sleeping in your bed, and your bed is the reference point then you are not moving. What would be the case if we choose the sun as a reference point?

If the sun is the reference point, you would be moving because the Earth is constantly rotating and orbiting around the sun.



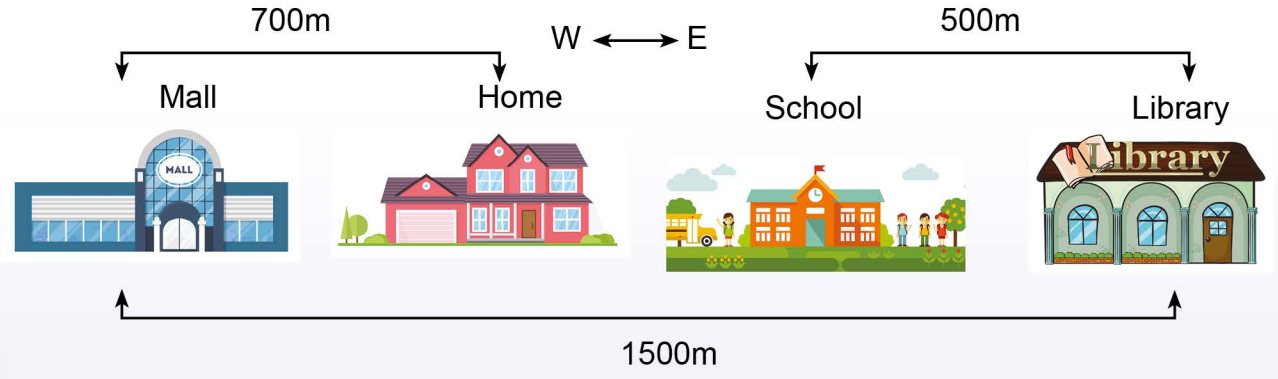
Look at the figure below, then answer the following questions:

- Describe the position of the school relative to the library.

The school is 500 m west of the library.....

- Describe the position of your home relative to the school.

The home is 300 m west of the school.....



Speed

Lesson 2

One way to describe the motion of an object is to describe its speed.

Speed is a measure of the distance an object moves in a given amount of time. Let's find out how we measure speed.

Look at the following table, in which race data were recorded, and then calculate the speed of each racer.

Racer	Distance (D) m	Time (T) Sec	Speed (D/T) m/sec
Racer no (1)	300	90	3.3 m/sec
Racer no (2)	300	60	5 m/sec
Racer no (3)	300	50	6 m/sec
Racer no (4)	300	100	3 m/sec

Who was the winner? .....Racer no (3).....

Students' own answers

A **Using a stopwatch, find out how long it takes you to walk (3) metres at a normal pace. Record your time in the following table.**

Trial	Distance (D) m	Time (T) Sec	Speed (D/T) m/sec
A	3		
B		3	
C	3		
D	3		
E		3	
F		3	

B **Find out how far you can walk in (3) seconds if you walk at a normal pace. Record your distance in the table.**

C **Repeat step (A) walking slower than normal pace. Record your time in the table.**

D **Repeat step (A) walking faster than normal pace. Record your time in the table.**

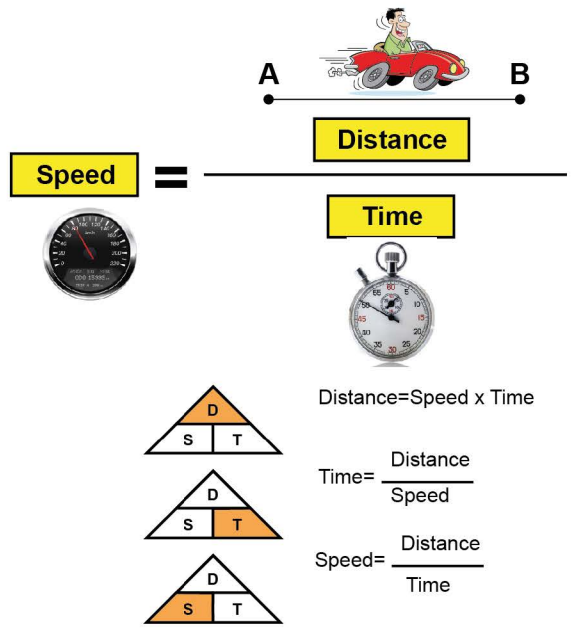
E **Repeat step (B) walking slower than normal pace. Record your time in the table.**

F **Repeat step (B) walking faster than normal pace. Record your time in the table.**

Calculate your speed in each step.

What is the relationship between the distance you walk, the time it takes, and your walking speed? The relationship is that speed equals distance divided by time. If you walk a longer distance in the same amount of time, your speed increases. If you take more time to walk the same distance, your speed decreases.

Speed is a measure of the distance an object moves in a given amount of time.



Learn More

We use different units for speed. The speed of athletes is measured in metres per second. For cars, we might use kilometres per hour (km/h) or miles per hour (m/h).

Think

Why would a ball speed up when it moves down a hill? A ball speeds up when moving down a hill because gravity pulls it downward, increasing its speed as it descends.

Complete the following table.

Distance (m)	6	10	6	8
Time (sec)	12	5	8.9	32
Speed (m/sec)	0.5	2	0.67	0.25

Lesson 3 Forces

A force is any push or pull that causes an object to move, stop, or change direction. Let's revise what force is.

Activity

Classify the following actions by writing push or pull in each blank.

.....push.....

.....push.....

.....pull.....

.....pull.....

.....push.....

What is the relation between force and motion? Let's find out.

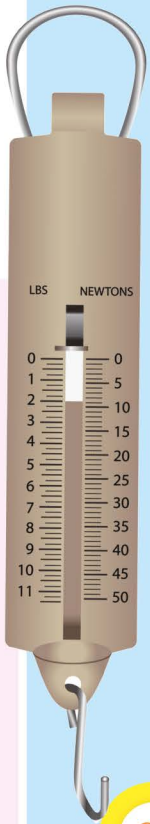
Materials:

A ball that can be used indoors, such as bouncy ball, or a small beach ball, 6 plastic bottles half-filled with water, and a smooth floor surface

Procedure:

1. Place the bottles on the smooth surface.
2. Roll the ball lightly, aiming towards the bottles. Record the number of bottles that were knocked over.
3. Roll the ball towards the bottles with more force. Record the number of bottles that were knocked over.
   Which roll worked best – the one with less force or more force?

A force is a push or a pull. When one object pushes or pulls another object, you say that the first object exerts a force on the second object. The motion of an object can change by speeding up, slowing down or changing direction.
The strength of a force is measured in a unit called "Newton" (N). This unit is named after the English scientist Isaac Newton. We use the spring scale to measure force.
The spring stretches when a force is applied to the hook.
The bigger the force applied, the longer the spring stretches and the bigger the reading.



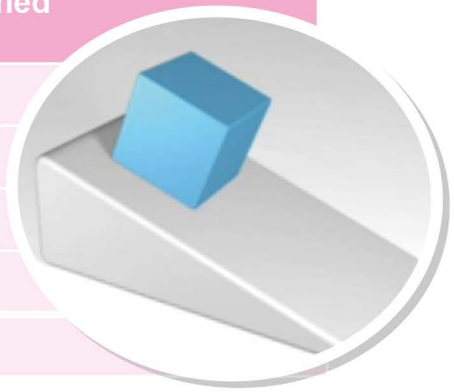
Attend with your classmates under the supervision of your teacher a sporting event such as a football game or gymnastics competitions. Take notes, and record sketches of forces and motion. Share notes with your classmates.

The force that two surfaces exert on each other when they rub against each other is called **friction**. How does the friction force affect moving objects? Let's find out.

Activity

A student covered a ramp with different materials and measured how far a wooden block slides on each surface before it stops. Here are the results.

Type of surface	How far the block slides after being pushed (cm)
Sand paper	50
Glass	500
Wood	100
Plastic	300
Cardboard	90



- Which is the smoother surface?.....Glass.....
- Which is the roughest surface?.....Sand paper.....
- Explain how did you know the answer of the above questions?

.....Rough surfaces cause more friction.....

.....More friction cause the object to slow down.....

- Friction is a force that two surfaces exert on each other when they rub against each other.
- Friction is a force that opposes the motion of objects; friction can cause objects to slow down.
- In general, smooth surfaces produce less friction than rough surfaces.

It is difficult to walk on a slippery road due to low friction. When we move on ice, it becomes difficult to walk due to the low friction of ice.

Friction between the road and the tires of a car helps the driver to control the speed of the vehicle. By applying the brakes, it allows you to slow down the car to a stop.

The friction created by rubbing a matchstick on the side of the matchbox causes the matchstick to ignite.

The main disadvantage of friction is that it produces heat in various parts of the machines. For example, car engines become warmer due to friction. This could cause overheating and damage.

Think

Sometimes, noise may result from doors because of the friction between their metal parts. How would you reduce the friction?

By applying oil or lubricant to the metal parts of the door.

Activity

1. Look at the following picture and answer the questions:

A. What is this student measuring?

...The strength of an object.....

B. Name the tool that he used in measuring.

...Spring scale.....

2. Which plastic piece would travel more distance? The one on the sandpaper or the other on the cardboard? Explain.

...The one on cardboard Because there is less friction.....

REVISION

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

- A lighter object needs less force to move than a heavier object. ✓
- You can use a spring scale to measure force. ✓
- The speed of an object is calculated by determining the distance travelled and the mass of an object. ✗
- The position of an object is its distance in a certain direction from a reference point. ✓
- The strength of a force is measured in metres. ✗

2. Which has a greater speed, a bird (a) that travels 600m in 60 seconds or a bird (b) that travels 60m in 5 seconds? Explain.

Bird (a) speed is 600/60=10...Bird (b) speed is 60/5=12..Bird (b) is faster.....

3. Circle the correct answer.

The terms up, down, forward, and backward are used to describe the:

- Speed of an object's motion.
- Direction of an object's motion.
- Amount of time an object takes to move.

A boy can run 50 metres in 10 seconds and a girl can run 100 metres in 20 seconds. Who has a faster speed?

- The boy has a faster speed.
- The girl has a faster speed.
- They both have the same speed.

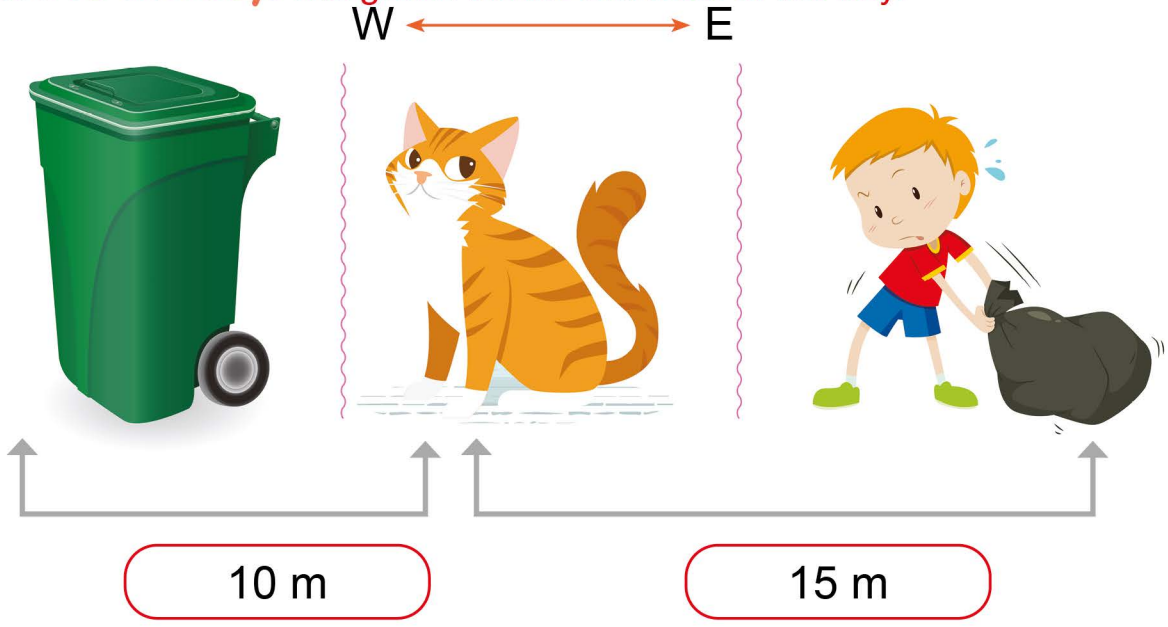
A force that occurs when an object rubs against another object.

- Thermometre
- Conduction
- Friction

How does friction affect speed?

- More friction decreases speed.
- More friction increases speed.
- Less friction decreases speed.

4. A boy participated with his neighbors in cleaning the neighborhood. Describe the position of the green bin relative to the boy. The green bin is 25m west of the boy.



5. Sportsmen use sticky sneakers. Explain why.

Because they have more friction, which causes a better grip, they result in fewer slipping accidents.

6. Classify the forces in the images.

Push	Pull
..... 1	..... 2 .....
..... 4	..... 3 .....
..... 6	..... 5 .....

1

2

3

4

5

6

Unit 3 Matter and its properties

Why is it important to know the properties of a matter?

Vocabulary

- Weight
- Density
- Sinking
- Floating
- Mixture
- Solution
- Chemical reaction

Objectives

- Investigate physical properties.
- Measure the weight of different objects.
- Define weight.
- Describe the relationship between weight and mass.
- Separate different mixtures based on physical properties.
- Mention the indicators that a chemical reaction occurred.

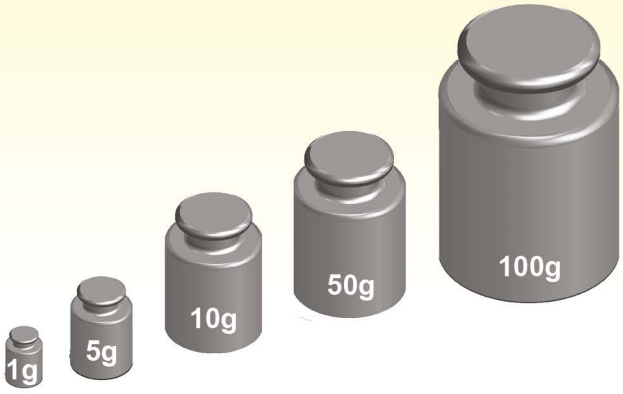
Matter is anything that has mass and takes up space. Objects made of matter can be very different from each other. Each object has its own physical properties such as colour and hardness. We are going to investigate other main physical properties of matter.

Weight

Many people confuse mass with weight. Mass is the amount of matter in an object, but weight is the measure of the pull of gravity on an object. On Earth, all objects are attracted toward the centre of the planet by the force of Earth's gravity. Let's find out how to measure the weight of an object.

Materials:

Spring scale, objects of various mass (1g, 5g, 10g, 50g, 100g).



Procedure:

- Using the spring scale, measure the weights of the object and record the results in the following table.

Mass	1g	5g	10g	50g	100g
Weight					

What is the relation between mass and weight?

...Mass is a measurement of the amount of matter something has.....

...Weight is the measurement of the pull of gravity on an object. Weight...

...depends on mass and the gravitational force acting on that mass.....

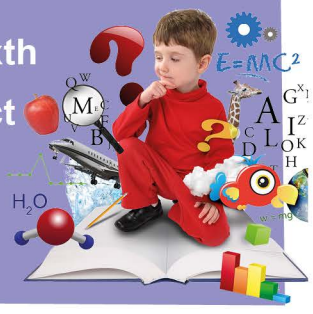
Mass is the amount of matter in an object.

Weight is the measure of the pull of gravity on an object. Weight is measured by a spring scale. How much the spring in the scale is stretched depends on the pull of gravity and the mass of the object being weighed. The weight is measured in a unit called Newton (N).

Don't use the spring scale to measure the weight of very heavy objects.

Kids who are overweight or obese by fifth grade have a higher risk of keeping on that weight into their teenage years. Many factors may increase the risk of obesity, such as watching too much television, having obese parents, low activity levels and fast food consumption.

On the moon, an object weighs one-sixth ($\frac{1}{6}$) of its weight on Earth. If an object weighs (300) N on Earth, calculate its weight on the moon. 300 / 6 = 50



Density:

Density is another property of matter. If you have measured the mass and the volume of an object, you can calculate its density.

Let's calculate the density of different matters.

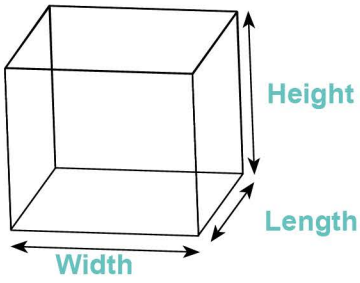
Activity

Materials:

Two cubes of the same volume of different materials (wood and steel), a balance, and a metric ruler

Procedure:

- Use the metric ruler to measure the length, width, and height of each cube to be sure that Volume = length x width x height



- Compare the masses of the two cubes by using the balance.

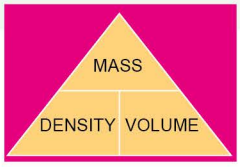
Why are the masses of the two cubes different?

Density is calculated by using the following formula:

$$\text{Density} = \frac{\text{mass}}{\text{volume}} = (\quad)\ \text{g/cm}^3$$

Density is how much mass is in a certain volume of matter.

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$ often density is expressed in g/cm^3



Pure substances always have the same density when measured under the same conditions.

Objects of different materials but of the same volume differ in mass and density.

Which cube has a greater density? Explain your answer with your teacher.

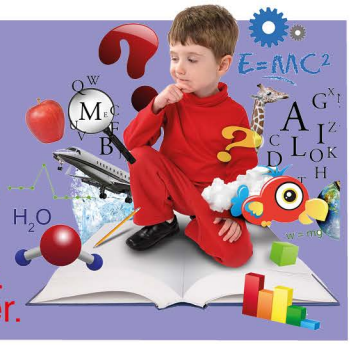
Learn More

Liquids have density too. You can perform several experiments with different types of liquids to determine which is denser. For example, if you mix 100 ml of vinegar with 100 ml of oil, the vinegar sinks to the bottom of the bottle. The oil floats on the top of the vinegar. The density of the vinegar is greater than the density of the oil.

Think

When we drop an iron nail in a tub of water, the nail sinks, and when we drop a block of wood in the water, the wood floats. Explain why.

Iron has a higher density than water.
Wood has a lower density than water.



Activity

1. Define the density.

   Density is how much mass is in a certain volume of matter.

2. If the mass of Sara is 45 kg and the mass of Adam 50 kg, which of them has the greater weight?

   Adam

3. Look at the following photo and determine which liquid has the least density. Explain your answer.

   Vegetable oil has the least density. it is the lightest causing it to float at the top.

Most of the materials around us are not pure substances. Instead, they are mixtures. **A mixture** is a combination of two or more different substances. Each substance in a mixture keeps its own properties. Here are some examples of mixtures.

Salad

Cereals with milk

Nuts

Iron fillings with sand

Milk

Gravel with sand

A solution is a special mixture that forms when a solid dissolves in a liquid. When we mix sugar with water a solution is formed.

Mixtures can be separated into the substances that make them up. The method used to separate a mixture depends on the physical properties of the substances in the mixture. Let's find out these methods.

Separation of mixtures using handpicking

Materials:

A mixture of cereals and small plastic containers

Procedure:

Separate the cereal mixture as shown in the picture.

Separation of mixtures using a magnet

Materials:

A mixture of iron fillings with sand and a magnet.

Procedure:

- Bring the magnet closer to the mixture. Record your observation.
- Explain the reason for using the magnet.
- Conclude the type of mixtures that are separated by magnets.

Separation of mixtures by sieving

Materials:

A mixture of gravel and sand and a sieve

Procedure:

- Put the mixture in the sieve.
- Which substance would remain in the sieve?
- Conclude when we can use the sieve for separation.

Separation of mixtures by filtration

Materials:

A mixture of sand and water, a filter paper, a funnel, and a flask

Procedure:

- Fold the filter paper in half, and then fold it in quarters.
- Fit the paper cone to the funnel.
- Place the funnel into a flask as shown in the following picture and wet the filter paper completely.
- Pour the mixture through the filter paper.

- Record your observations.
- Conclude what type of mixtures that are separated by filtration.

Separation by evaporation

Materials:

A mixture of sugar and water in a beaker and a bunsen burner

Procedure:

- Put the mixture on the burner as shown in the following picture.

Be careful while using the burner.

- Let the water evaporate.
  Once the water is gone, what would remain in the beaker?

- **A mixture** is a combination of two or more different substances.
  Each substance in a mixture keeps its own properties.
  A solution is a special mixture that forms when a solid dissolves in a liquid.
  Mixtures can be separated into the substances that make them up by:
- **Magnetism:** to separate magnetic substance from other substances in the mixture.
- **Handpicking:** to separate large solid substances from each other.
- **Sieving:** to separate substances varying in size from each other.
- **Filtration:** to separate water from a substance that is not soluble in water.
- **Evaporation:** to separate dissolved substance from water.

Learn More

We can use water to separate substances. When we have a mixture of sawdust and sand, for example, we can add water so that the sand will precipitate at the bottom of the container while the sawdust will float on top. This separation occurs according to the substances densities.

Think

If a student dissolves 50 grammes of sugar in water and then evaporates the water, how much sugar will be left?

50 grams

Activity

1. How can you separate the following mixtures?
   Gravel, sand, and salt: ....Sieving.....
   Iron fillings, water, and sugar: .....Filtration.....

2. What would you do if the pepper was spilled over the salt by mistake?

   ....Sieving.....

3. You want to cook some chickpeas, but there is a problem shown in the photo. How would you solve this problem?

   ..Handpicking.....

Lesson 3 Chemical changes of matter

As you know, matter occurs in three states: solid, liquid, and gas.

A change in which no new substances are formed is called a physical change. If you melt ice it turns into water. This change is reversible; the water can be turned back into ice by freezing.

Unlike a physical change, a chemical change produces new substances with properties different from those of the original substances.
This is called the chemical reaction.

Let's classify the chemical changes.

Activity

Classify the following chemical changes by writing useful or harmful in the blanks.

Baking bread

.....useful.....

Rusting

.....harmful.....

Cooking

.....useful.....

Curdling of milk

.....useful.....

Decaying of teeth

.....harmful.....

Ripening of fruits

.....useful.....

There are many observations which can tell you whether a chemical reaction has occurred. What are these observations?

Activity

Look at the following pictures and fill in the blanks with the suitable observation(s): a change in colour, giving off gas, or giving off light.

a change in colour

giving off gas

giving off gas / giving off light

a change in colour

giving off gas / giving off light

Learn More

Rocks can be attacked by chemical or physical changes. This is called weathering.

A chemical change produces new substances with properties different from those of the original substances. This chemical change is called a chemical reaction.

There are many observations which indicate that a chemical reaction occurred; a change in colour, giving off light, giving off gas, a change in odour, etc.

Chemical changes are irreversible; when fireworks go off we can't collect all the gases and smoke and turn them back into fireworks.

Write about the importance of our teeth and how we can prevent tooth decay. in your notebook.

Give extra examples of chemical reactions.

...The metabolism of food in the body.....

...Cooking an egg.....

REVISION

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

- Cooking food causes chemical changes. ✓
- Giving off gas is an indicator that a physical change occurred. ✗
- Weight is the measure of the pull of gravity on an object. ✓
- Weight is measured in a unit called (kg). ✗
- Density is how much mass is in a certain volume of matter. ✓
- Larger objects always weigh more. ✗

2. How would you separate a mixture of gravel, sand, and water?

Filtration

3. Circle the correct answer.

Which of the following statements about mixtures and solutions is correct?

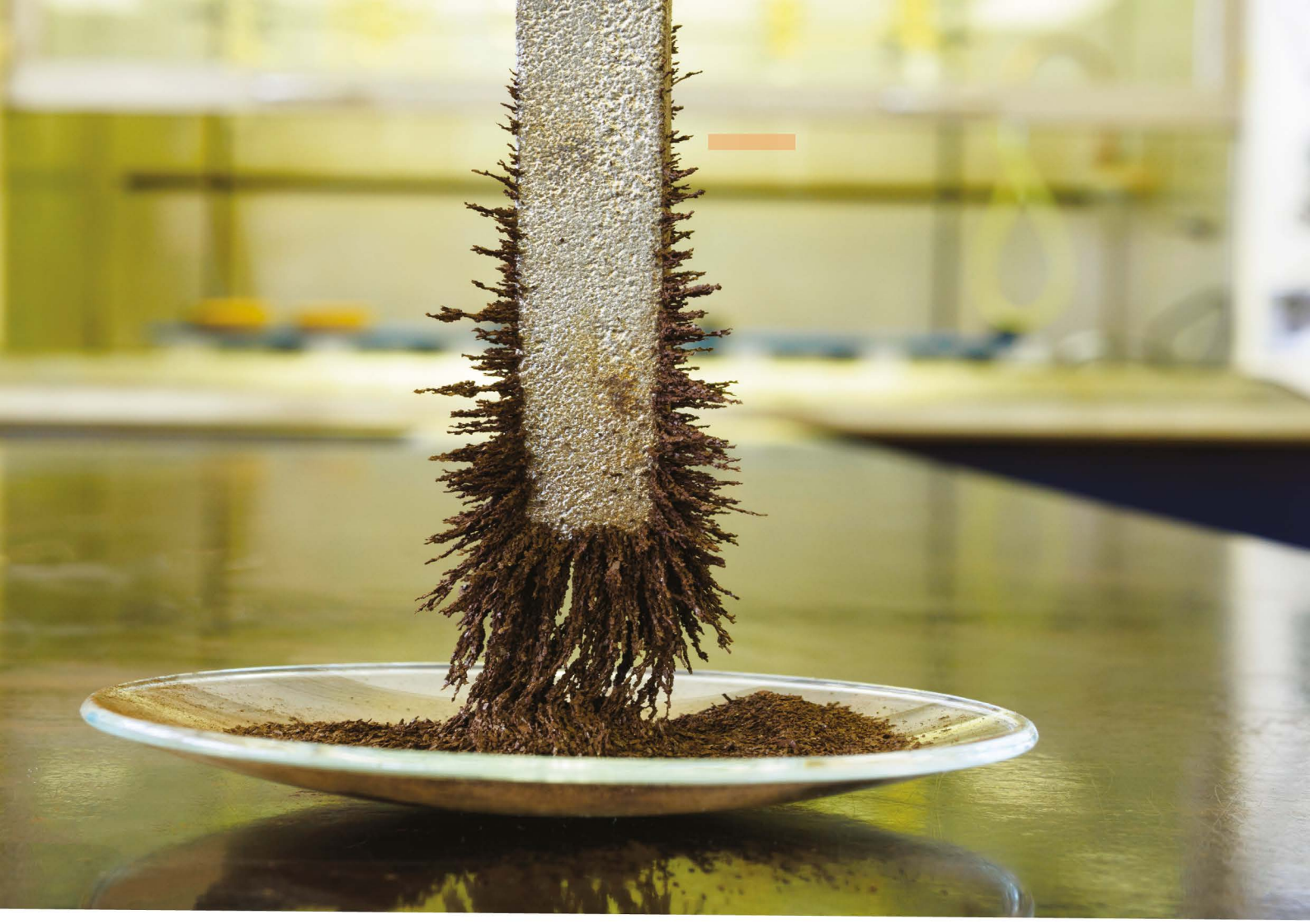
- All solutions are mixtures, but not all mixtures are solutions.
- Some mixtures are solutions, and some solutions are mixtures.
- All mixtures are solutions, but not all solutions are mixtures.

Salt dissolved in water can be separated from the water by:

- Precipitation.
- Evaporation.
- Filtration.

Which of the following would be helpful in seperating iron nails from soil?

- A magnet.
- A filter paper and funnel.
- Mixing with water.



4. Which method of separation is represented by this picture?

.....Magnetism.....

5. Underline the chemical changes from the following:

- Slicing a loaf of bread.
- Iron rusting.
- Wood burning.
- Paper tearing.
- Water evaporation.
- Lighting a candle.

Weather and climate

Unit 4

Why is weather forecasting important?

Vocabulary

- Water cycle
- Weather elements
- Temperature
- Wind
- Precipitation
- Weather forecast

Objectives

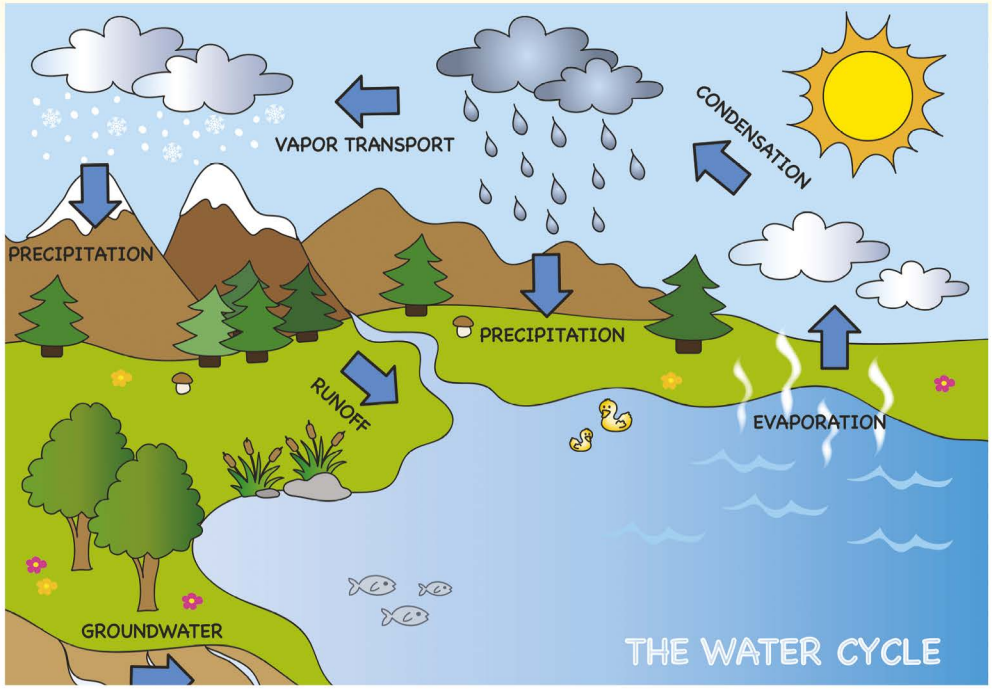
- Trace the movement of water through the water cycle.
- Name the weather's elements.
- Measure different weather elements.
- Make an anemometre and a rain gauge.
- Recognise different world climates.

Lesson 1 Water cycle

Do you ever wonder where the water goes after rain?

Water is always moving from the earth into the air and back to the earth again through the water cycle. Let's review the water cycle.

Activity



- What is the cause of water evaporation?

  The heat from the sun

- How do clouds form?

  When water vapour condenses

- How does rain form?

  Rain forms through the water cycle

Water is always moving from the earth into the air and back to the earth again through the water cycle.

Water evaporates from oceans, lakes, and rivers. The warmer the air, the faster the water enters the air as water vapour. Water vapour condenses high in the air. As the water vapour condenses, clouds are formed.

Water drops fall from the cloud as rain. In freezing temperatures, the water falls as snow. As water reaches the ground some of it soaks in, most of the water runs into lakes, rivers, oceans, and the whole cycle starts again.

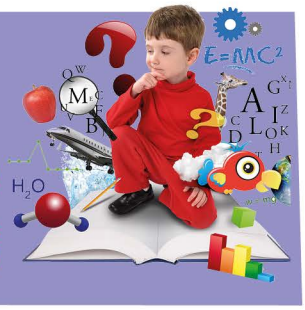
Learn More

Some water soaks in as it reaches the ground. Water that soaks into the ground is called groundwater. People drill wells deep below the surface and drink ground water.

Think

If the sun disappeared, what would happen to the water cycle? Explain the effect of that on living things.

Without the sun, the water cycle would stop, leading to no evaporation or rain, causing water scarcity and threatening the survival of living things.



Search to find out how springs are formed. Springs form when the water table rises to meet the land surface, allowing groundwater to flow out.

Write three sentences showing the importance of preserving water in your notebook.

Students' own answers

Lesson 2 Weather and its elements

If you and your family decide to go on a weekend trip, you will certainly be watching the weather. There are several weather elements. What are these elements?

1. Temperature

Air temperature is one of the weather elements. How is it measured? Let's measure the temperature.

Activity

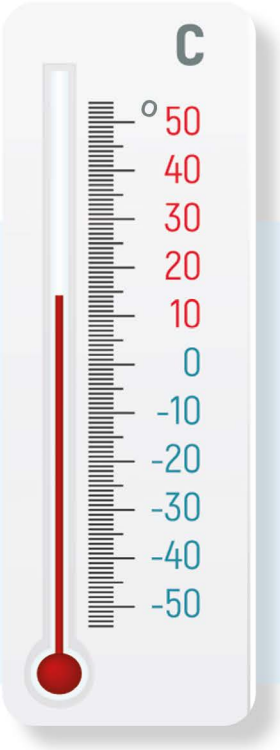
Materials:

A thermometre

Procedure:

- Place the thermometre outside for 20 minutes.
- Read the thermometre and record your measurement.

Note: The letter C on the thermometre stands for Celsius – a metric scale for measuring temperature.



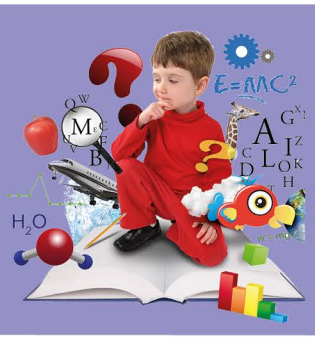
Thermometres differ in shape.

The main type that is used for measuring weather is a tube with liquid inside.

When the air around the liquid gets warmer, the liquid gets warmer and expands, so it moves up the thermometre. The letter C stands for Celsius.

Think

Would the air temperature change if we put the thermometre in the shade? Design an experiment to check your answer.



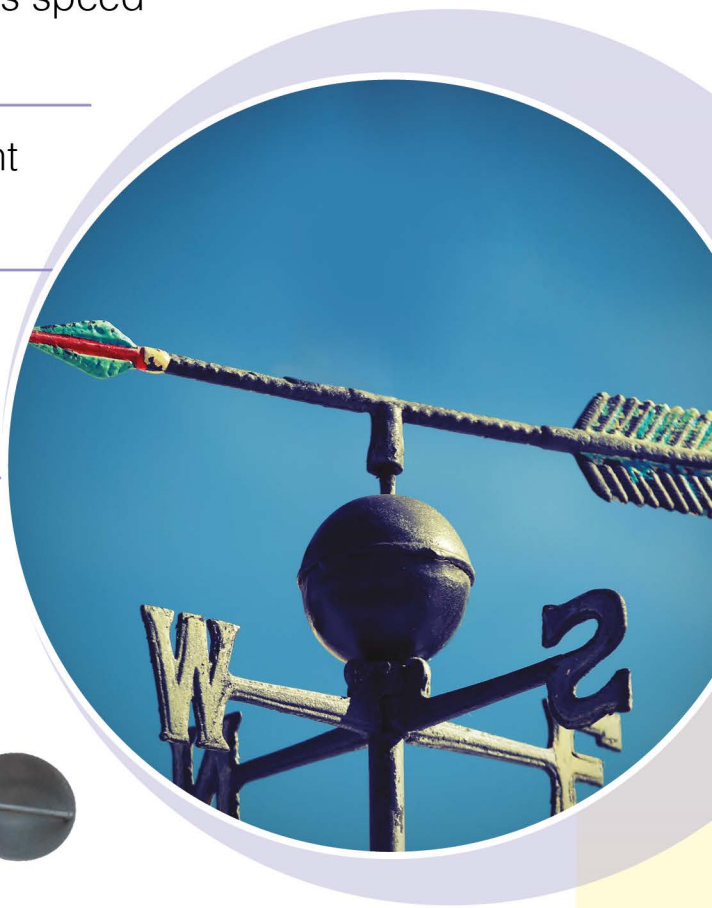
2. Wind

Wind is the second weather element; its speed and direction are measured.

Wind vane is used for the measurement of wind direction.

A wind vane has markers showing the four main directions; north, south, east, west.

The exact wind speed is measured using a tool called an anemometre.



Anemometres are usually placed in high places, such as a roof. Sometimes anemometres are connected to wind vanes.

Activity

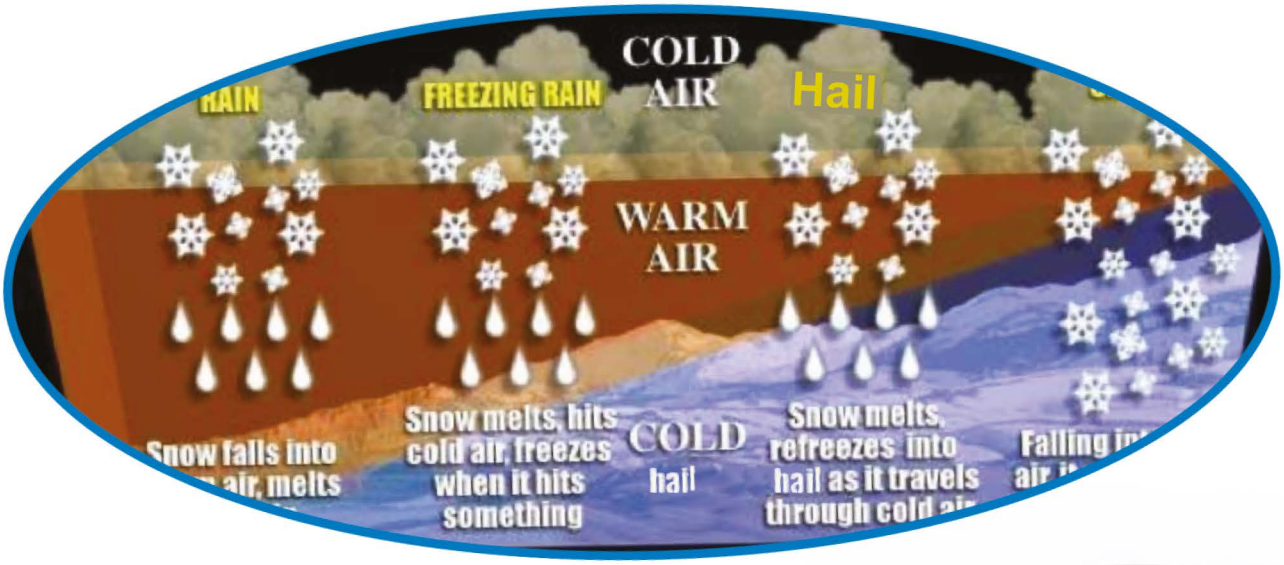
How to make an anemometre

Make an anemometre as shown in the following figure.

- Count the number of the anemometre spins per minute.
- Compare your records with your classmates.

3. Precipitation

Water drops fall from the cloud as rain. Rain is one kind of precipitation. As you learned, air carries water vapour. When water vapour rises, it cools and forms tiny water drops. The tiny water drops freeze into ice crystals and become larger and heavier. Then they begin to fall towards the earth. What are the other kinds of precipitation? Look at the following figure to answer the question.

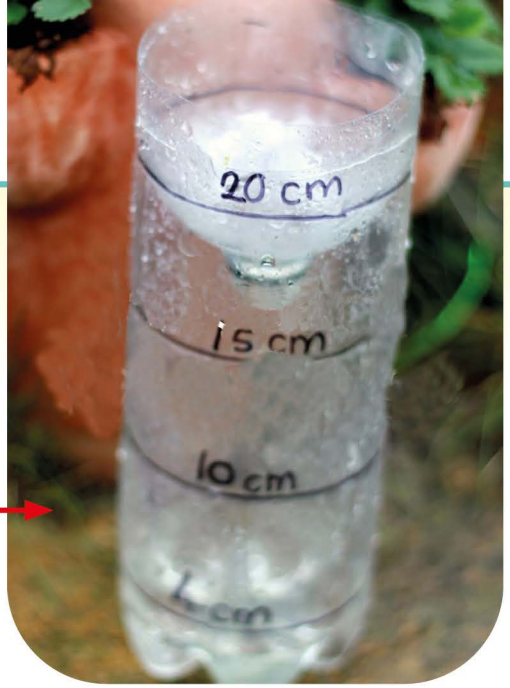


The amount of rain is measured with a rain gauge. **A rain gauge** is simply an open-topped container in which rain is collected. The container is marked on the side to show how much rain has fallen.

Activity

How to make a rain gauge

Make a rain gauge as shown in the this picture.



Air carries water vapour. When water vapour rises, it cools and forms tiny water drops. The tiny water drops freeze into ice crystals and become larger and heavier. Then they begin to fall towards the earth.

When the temperature on Earth is below freezing, the ice crystals do not melt. They fall to Earth as snow.

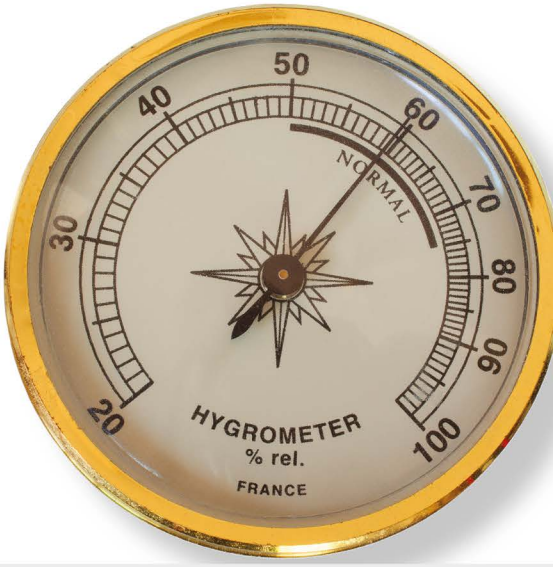
Hail forms when strong wind carries frozen water drops higher into clouds. Another layer of ice is added and hail forms.

Think

If the amount of rain collected in area (A) was 4 mm/h, what would be the amount of rain collected in area (b) if it is 7 times as mush as (a)? 4 mm/h × 7 = 28 mm/h

Learn More

Humidity is a measure of the amount of water vapour in the air.
The amount of water vapour that air can hold is related to the temperature of the air. Cold air can hold less water vapour than warm air can.
Humidity can be measured using a hygrometre.



Search to find out types of clouds.

- Cirrus
- Altocumulus
- Cumulus

Complete the following chart.

Tools for measuring

Thermometre	Anemometre	Rain gauge
Measures temperature.	Measures wind.	Measures rain water.

Lesson 3 Weather forecasting

The weather is not always the same. It changes during the week. Everyone is interested in the weather forecast. Let's study the following weather forecasts.

Study the following data which shows the weather during a week, and then answer the questions according to the predictions.

The day	Sun / Clouds	Temperature
Saturday		20 °C
Sunday		16 °C
Monday		10 °C
Tuesday		4 °C
Wednesday		12 °C
Thursday		17 °C
Friday		20 °C


Partly cloudy


Snowy


Rainy


Sunny


Cloudy

- Will the weather be sunny all days of the week?

  No.....

- Which day will it rain?

  Monday.....

- Which day will be the least temperature recorded?

  Tuesday.....

A weather forecast is a prediction of what the weather will be like for the next few days.

Scientists who study the weather are called **"meteorologists"**.

To make a prediction, the high and low temperatures each day are recorded from many places. All other weather elements are recorded. The speed and direction of the wind are also important in making weather predictions.

The following is a list of various reasons why weather forecasts are important:

- it helps people prepare for how to dress, and prepare if they need to take an umbrella or rain coat.
- it helps people plan outdoor activities.
- it helps farmers and gardeners plan for plant protection, and watering.
- it helps people know outside weather dangers.

Watch or listen to weather forecasts, record the weather conditions for a week in a table, and draw the weather symbols in the table.

Students' own answers

Lesson 4 Climate

Climate is weather measured over a long period of time. Temperature and precipitation are the major factors that determine climate. Wind speed and direction are also factors. Climate differs from one place to another. What are the world climates?

Desert

Tropical regions

Mountains

Polar regions

Cold winters, cool summers, moderate to large amounts of rain.

Hot summers, cool winters, little amounts of rain.

Cold all year; low amounts of precipitation.

Hot all year; large amounts of rain.

Climate is weather measured over a long period of time. Temperature and precipitation are the major factors that determine climate.

Climate differs from one place to another. In deserts, summers are very hot, winters are cool, and the amount of rain is very low.

In mountains, winters are cold, summers are cool, and there are moderate to high amounts of rain.

The tropical regions are hot all year; high amounts of rain.

Polar regions are cold all year; low amounts of precipitation.

Search to find out the climate of the temperate regions.

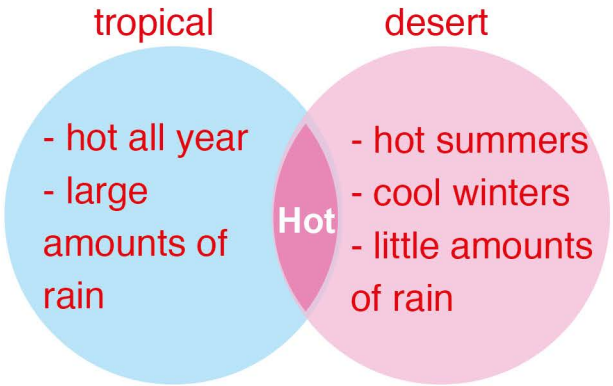
Moderate rain fall all year.
- Mild to warm winters and cool summers.
- Weather is short term and climate is long term.

- Explain the difference between weather and climate.

...Weather refers to short-term atmospheric conditions, while climate is the.....

...long-term average of those conditions over a significant period.....

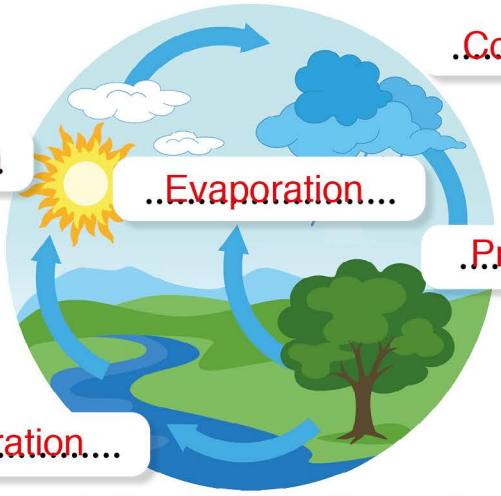
- Compare between the climate of tropical regions and deserts in the following venn shape.



REVISION

1. Write the words in the suitable blanks.

Condensation	Precipitation	Evaporation



2. Find the following words in the word puzzle.

rain, snow, wind, wind vane, hail, hot, cold, air

r	a	i	n	w
s	c	a	h	i
n	o	i	a	n
o	l	r	i	d
w	d		l	v
	h	o	t	a
w	i	n	d	n
u	r	e		e

3. Circle the correct answer:

Scientists who study the atmosphere and predict the weather are called:

- Archaeologists.
- Paleontologists.
- Meteorologists.

What is the name of the scientific instrument used to measure the amount of precipitation?

- Thermometre.
- Barometre.
- Rain gauge.

What does an 'anemometre' measure?

- Amount of rain.
- Amount of humidity.
- Wind speed.

Rain, snow, and hail are kinds of:

- Directions.
- Precipitation.
- Vanes.

What is the process by which water changes to water vapour?

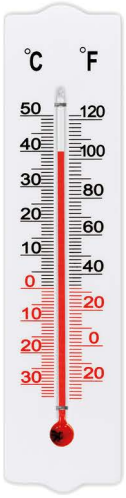
- Evaporation.
- Condensation.
- Precipitation.

What does a weather vane measure?

- Air pressure.
- Wind direction.
- Wind speed.

Climate is:

- Pattern of weather over a long period of time.
- The weather report for the day.
- The changing of weather throughout the day.



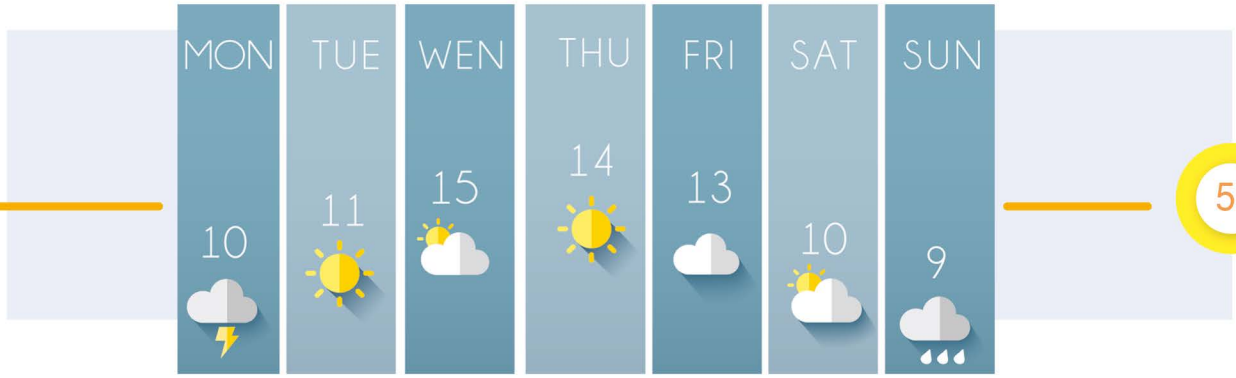
4. Read the temperature that is recorded by the following thermometre. ...40°C.....

5. Which day is the most suitable day to go in a trip?

.....Thursday.....

6. According to the predictions shown in the following picture, which day will it rain?

.....Sunday.....



Glossary

- Chemical change: is the change that produces new substances with properties different from those of the original substances. It is called the chemical reaction.
- Density: is how much mass is in a certain volume of matter.
- Growth: is the process of increasing in size, mass, and height.
- Heredity: is the passing of traits from parents to offspring.
- Mass: is the amount of matter in an object.
- Mixture: is a combination of two or more different substances. Each substance in a mixture keeps its own properties.
- Motion: is the change in an object's position.
- Position: is the distance of an object in a certain direction from a reference point.
- Reference point: is the starting point we choose to describe the location (position) of an object.
- Solution: is a special mixture that forms when a solid dissolves in a liquid.
- Speed: is a measure of the distance an object moves in a given amount of time.
- Weather forecast: is a prediction of what the weather will be like for the next few days.
- Weight: is the measure of the pull of gravity on an object.