



SMILETutor

EFFICIENT . EFFECTIVE . EASY

PSLE Science Revision Notes

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The HANDSOME Strategy

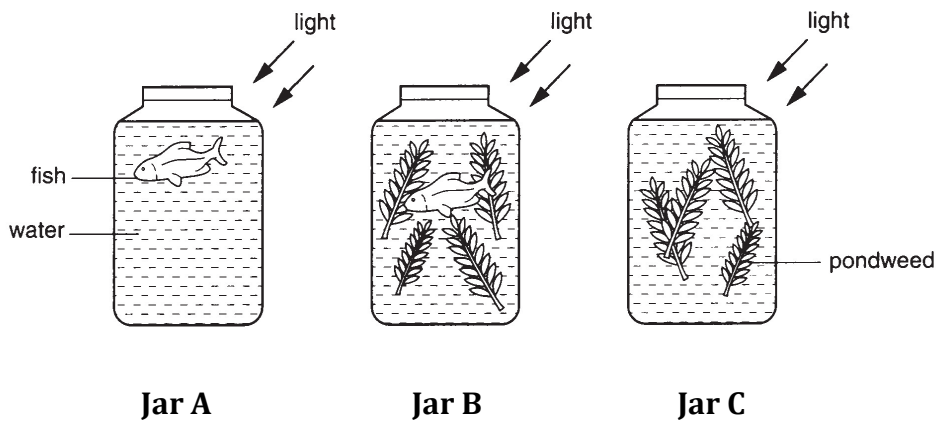
Use the **H.A.N.D.S.O.M.E** strategy to help you understand the questions better and **increase your chances of scoring A★**.

- H** Highlight important information like...
- A** Aim of experiment/ investigation
- N** Numbers (e.g. temperature, quantity, length, distance)
- D** Different – any differences among the set-ups?
- S** Same – any similarities among the set-ups?
- O** On what topic?
- M** Match – with the well-phrased answers.
THESE ARE FOUND FROM PAGES 9 - 34.
- E** Examine and adjust – the well-phrased answers to relate back the question.

EXAMPLES

EXAMPLE 1

Kenneth wanted to find out if the amount of dissolved carbon dioxide varies when different organisms were placed in the jars. He set up the three identical airtight jars (with same amount of water) and put them at the same place.



Four hours later, Kenneth measured the amount of dissolved carbon dioxide in each of the jars.

What will happen to the level of carbon dioxide in each jar?

Using the **HANDSOME** strategy...

Highlight ... AIM	Kenneth wanted to find out if the amount of dissolved carbon dioxide varies when different organisms were placed in the jars.)
... NUMBERS	three identical airtight jars, Four hours later
... DIFFERENCES	presence of fish and pondweed
... SIMILARITIES	jars, place, amount of water, presence of light
ON what topic?	Photosynthesis & respiration
MATCH with well-phrased answers	<p>That's on pg 21</p> <p>#4 - Photosynthesis is a process in which green plants combine carbon dioxide and water in the presence of light to give glucose and oxygen. Carbon dioxide + Water (vapour) + Energy → Glucose + Oxygen</p> <p>#8 - During inhalation and exhalation, animals take in oxygen and give out carbon dioxide.</p>
EXAMINE & ADJUST	<p>Answer:</p> <p>The carbon dioxide in Jar A will increase as the fish exhales carbon dioxide.</p> <p>In Jar B, the fish is also exhaling carbon dioxide but it is taken in by the photosynthesizing pondweeds. So carbon dioxide level will decrease.</p> <p>As for Jar C, there is no fish to contribute carbon dioxide, the photosynthesizing pondweeds take in the carbon dioxide so its level also decreases.</p>

Some questions are straightforward and you may not need to use the **HANDSOME** strategy. You can use the well-phrased answers with minimal adjustments like in the next example.

EXAMPLE 2

The polar bear and the penguin are very different animals but they live in environments of extremely low temperatures.



Polar Bear



Penguin

- (a) How do the outer coverings help the animals keep warm?
- (b) Name another **structural** adaptation they both have which enables them to withstand the cold.

Highlight	-
... AIM	-
... NUMBERS	-
... DIFFERENCES	-
... SIMILARITIES	environments of extremely low temperatures.
ON what topic?	Adapting to the Environment
MATCH with well-phrased answers	<p>That's on pg 29</p> <p>#4 - An animal is able to keep warm in cold surroundings because it has:</p> <ul style="list-style-type: none"> • ... a thick layer of fats (/blubber) under the skin to act as insulation and slow down heat loss to the surroundings. [Polar bears, penguins, whales] • ... dense fur to trap a layer of air next to the body. Air, being a poor conductor of heat, will slow down heat loss to the surrounding.
EXAMINE & ADJUST	<p>Answer:</p> <p>(a) Their outer covering of dense fur trap a layer of air next to the body. Air, being a poor conductor of heat, will slow down heat loss to the surrounding.</p> <p>(b) They also have a thick layer of fats under the skin to act as insulation and slow down heat loss to the surroundings.</p>

PRIMARY 3 TOPICS

Theme: Diversity

Big Idea: It is important to have a variety of living and non-living things in the world. Man organizes the things around him to better understand the world he lives in.

Topic: Living and non-living things	
1.	Living things need air, food and water to survive.
2.	Non-living things do not need air food and water to survive.
3.	_____ [name of organism] is a living thing because it can grow/ respond to changes around them/ reproduce.
4.	_____ [name of item] is a non-living thing because it does not grow/ does not respond to changes around/ does not reproduce/ cannot die.
5.	Living things reproduce to ensure that their kind will continue to exist.
6.	The _____ [name of animal] died because it did not have enough oxygen/ food and/ water to survive.

Topic: Animal Diversity

1.	_____ [name of organism] is a mammal because it has hair or fur covering its body/ mainly gives birth to live young/ suckles its young.
2.	_____ [name of organism] is a bird because it has feathers covering its body / a beak/ 2 wings.
3.	_____ [name of organism] is an insect because it has an exoskeleton/ a 3-part body consisting of head, thorax and abdomen/ 6 legs.
4.	_____ [name of organism] is a fish because it has scales covering its body/ breathes in water using gills/ swims using its fins and tail.

Topic: Plant Diversity

1.	_____ [name of plant] is a flowering plant because it reproduces from seeds and bears fruits.
2.	_____ [name of plant] is a non-flowering plant because it reproduces from spores and does not bear fruits.
3.	Each seed contains a baby plant (embryo) which will grow into a seedling only when warmth (not sunlight), water and air are present.
4.	The seed leaves (cotyledons) store food for the germinating seedling. They shrink and drop off as the nutrients are used up.

Topic: Fungi & Bacteria

1.	Fungi are not plants because they do not have leaves, stem, roots, flowers or fruits. ... reproduce by tiny spores.
2.	Fungi cannot make food by themselves. They feed on dead plants and animals (/dead matter) around them.
3.	The food turned bad because bacteria, which are found everywhere, have gotten into it.

Topic: Materials	
1.	Glass is fragile, shiny and transparent.
2.	Metals are hard, strong, shiny and can be bent.
3.	Wood is strong but can be easily scratched.
4.	Fabrics are flexible, soft and water absorbent.
5.	Rubber is soft, flexible and elastic.
6.	Plastic is waterproof and versatile - it can be strong or soft, flexible or rigid, and tough or easily broken.
7.	The more a material is able to bend without breaking, the more flexible it is.
8.	The more weight or pressure a material can support before breaking, the stronger it is.
9.	The less easily a material can be scratched or dented, the harder it is.

****Note:**

MCQ questions often list the correct properties of the material as the other options. You have to pick the property most suited to the function of the object that the material is made into.

*These properties include: **Hardness, Transparency to light, Electrical conductivity, Heat conductivity, Waterproofness, Lightness, Flexibility, Elasticity etc...***

Theme: System

Big Idea: A system is a whole consisting of parts that work together to perform a function. Understanding systems allows Man to understand how they operate and how the parts influence and interact with one another.

Topic: Body System	
1.	Lungs are the locations for exchange of gases, where air rich in oxygen is taken in and air full of carbon dioxide is removed.
2.	The walls of arteries are thick and extremely elastic so as to withstand the high pressure of the blood that is surging through them.
3.	The circulatory system moves nutrients, water and oxygen to every part of the body and carries wastes away from all parts of the body for removal.
4.	The skeletal system is made up of bones that help to hold up the body, give it shape and protect vital organs like the brain, lungs and heart.
5.	The muscular system works with the skeletal system to allow movement of different parts of the body.
6.	The digestive system breaks down food into simpler substances for the body to use with the help of digestive juices (/enzymes).
7.	Digestion starts in the mouth, continues in the stomach and ends in the small intestine.
8.	Most of the digestion process takes place in the small intestine as it is where the most types of digestive juices are secreted.
9.	Water is absorbed into the circulatory system at the large intestine.

Topic: Plant System	
1.	Roots help to hold the plant in the ground, take in water and mineral salts from the soil and sometimes store food. They also prevent soil erosion as they grasp the surrounding soil firmly in place.
2.	Most stems provide support for the plant above the ground by allowing it to stand upright, holding the branches and leaves.
3.	Some plants with weak stems cling around trees or fences for support to get sunlight to make food.
4.	Leaves have large surface areas to trap as much sunlight as possible for the plant to make food.
6.	The stomata (<i>singular: stoma</i>) allow the exchange of gases between the leaf and the surrounding air.
7.	There are stomata on both surfaces of the leaf, with more on the underside than the upper surface.
8.	When stomata are blocked (e.g. by a layer of Vaseline), water vapour cannot escape into the air. This prevents the plant from taking in water. This is because as water evaporated off, the water column in the xylem moves upwards, drawing in more water.

****Note:**

*Stomata are the **holes** formed by 2 guard cells.*

When the guard cells are filled with water, they swell and block the "holes". This closes the stomata.

When the guard cells lose water, they shrink and do not block the "holes". This opens the stomata.

Theme: Interaction

Big Idea: Interactions occur within an organism, between organisms as well as between organisms and the environment. Understanding the interactions helps Man understand the environment and his role in it.

Topic: Magnets	
1.	As the object is attracted* by a magnet, it must be made of magnetic material like steel, nickel, iron or cobalt.
2.	More pins/ paper clips are attracted* to the poles of the magnet because the magnetic force is strongest at the poles.
3.	When a magnet is allowed to turn freely, it will come to a rest in the North-South direction. This property enables it to be used to in compasses tell directions.
4.	When two metallic objects move away from each other, they are likely to be magnets whose like poles are facing each other. This is because like poles of magnets repel.
5.	When two metallic objects move towards from each other, they are likely to be magnets whose unlike poles are facing each other. This is because unlike poles of magnets attract.
6.	As the number of strokes using the same pole of a magnet increases, the temporary magnet's magnetic force also increases.
7.	As the number of coils around the magnetic object increases, the electromagnet's magnetic force also increases.
8.	As the number of batteries increases, the electromagnet's magnetic force also increases.
9.	Repeated hitting/ dropping or heating of a magnet will cause it to lose its magnetic force.

****Note:**

- Use **“attract”**, not **“stick”**, **“pick up”** or **“suck up”**; and **“magnetic force”**, not **“magnetism”**.

PRIMARY 4 TOPICS

Theme: Cycles

Big Idea: Cycles are repeated patterns of change. Understanding cycles helps Man to predict events and processes.

Topic: Life Cycles of Animals	
1.	Living things reproduce to ensure that their kind will continue to exist.
2.	Most insects moult because when they grow, the external skeleton restricts the growth so it has to be removed first.

Examples:

- *Animals whose young resembles them are: cat, dog and horse (most mammals).*
- *Animals whose young do not resemble them are: butterfly (most insects) and frog.*
- *Animals with **3-staged** life cycle are: chicken, frog, cockroach*
- *Animals with **4-staged** life cycle are: butterfly, mealworm beetle*

****Note:**

We say: The animal has 3 stages in its life cycle

Or

The animal has a 3-staged life cycle.

Topic: Life Cycles of Plants	
1.	If seeds are produced, the plant is a flowering plant. If spores are produced instead, the plant is a non-flowering plant.
2.	Each seed contains a baby plant (embryo) which will grow into a seedling only when warmth (not sunlight), water and air are present.

Topic: States of Matter	
1.	Bits of tissue paper in overturned cups can stay dry when the cup is submerged in water. This is because air takes up space in the cup and prevents water from entering and wetting the tissue.
2.	Objects with trapped air inside them are able to float because air is less dense than water.
3.	If air is trapped in a container, it is difficult to pour in liquids because the space is taken up by the air. There must be an outlet for the air to escape and free up the space for the liquid.
4.	As liquids have a definite volume but no definite shape, they take the shape of the container.
5.	As gases have no definite shape and no definitive volume, they can be compressed but up to a certain extent.
6.	As gases have no definite shape and no definitive volume, they can take up whatever volume the container is.

****Note:**

There are 3 **states** of matter: solid, liquid & **gaseous**.

There are 3 **types** of matter: solids, liquids & **gases**.

Theme: Energy

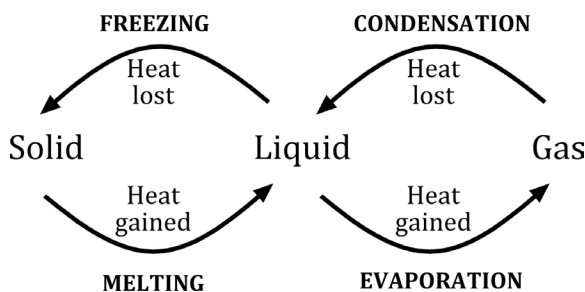
Big Idea: Energy makes changes and movement possible in everyday life. There are many forms of energy and one form can be converted to another. Man uses energy in many ways, for many purposes.

Topic: Light Energy	
1.	We can see an object because light falls on it and the rays are reflected into our eyes.
2.	We can see light coming from its source when we are at the other end because light travels in a straight line.
3.	We cannot see light coming from its source when we are at the other end when the path of light is blocked. This is because light travels in a straight line and cannot go around the obstacle.
4.	A shadow, or an area of darkness, is formed when an object blocks all or some light. Since light travels in a straight line, it cannot go around the object and light up that area.
5.	The nearer an object is to a light source, the larger but less sharp shadow will be.
6.	The further an object is from a light source, the smaller but sharper its shadow will be.
7.	The position of a shadow is opposite to the location of the light source.

Topic: Heat Energy	
1.	Heat is transferred/ conducted away from a hotter object to a cooler object until both objects reach equilibrium (/the same temperature).
2.	Heat is transferred more quickly when the contact area between the 2 objects are larger.
3.	Matter expands when heated and contracts when cooled. Its volume changes but mass remains the same.
4.	When an object is heated, it gains heat so its temperature increases. When an object is cooled, it loses heat so its temperature decreases.
5.	The larger the exposed surface area of an object, the faster heat is lost to/ gained from the surroundings.
6.	The larger the contact area between 2 objects moving in opposite directions, the more friction is produced. As more friction resulted, more heat is produced.
7.	When air is heated, it expands and becomes less dense. The surrounding cold air, being denser, sinks, causing the heated air to move up. If there are objects above this air, like overturned cups or paper spirals, the movement of this air column will cause these objects to move as well.

****Note:**

Summary of the changes in state of matter:



PRIMARY 5 TOPICS

Theme: Systems

Big Idea: *A system is a whole consisting of parts that work together to perform a function. Understanding systems allows Man to understand how they operate and how the parts influence and interact with one another.*

Topic: Electrical System	
1.	An electrical conductor allows electricity to pass through it while an electrical insulator does not allow electricity to pass through it.
2.	Bulbs are brighter but don't last long in circuits where the batteries are arranged in series.
3.	Bulbs are dimmer but last longer in circuits where the batteries are arranged in parallel.
4.	Bulbs arranged in parallel are of the same brightness and when one bulb fuses, all the other bulbs will remain lit.
5.	Bulbs arranged in series are dimmer but when one bulb fuses, all the other bulbs will not light up as the circuit becomes open.
6.	When a bulb fuses/blows, the filament in the bulb breaks, causing a gap in the circuit that disrupts the flow of electricity. It thus becomes an open circuit.
7.	Bulbs do not light up when... ... there is gap in the circuit/ the circuit is open. ... the batteries are placed in the wrong direction. ... the batteries are dead. ... the bulb has fused.

Topic: Air & Living Things	
1.	Air and nutrients are carried by the blood to all parts of the body.
2.	Plants and animals respire throughout the day.
3.	Respiration is a process in which oxygen in the air is combined with glucose from digested food to produce energy. Carbon dioxide and water are also produced. Glucose + Oxygen → Carbon dioxide + Water (vapour) + Energy
4.	Photosynthesis is a process in which green plants combine carbon dioxide and water in the presence of light to give glucose and oxygen. Carbon dioxide + Water (vapour) + (Light) Energy → Glucose + Oxygen
5.	Respiration is the reverse of photosynthesis and vice versa. Photosynthesis takes place only in the presence of light whereas respiration occurs all the time.
6.	Breathing rate increases during exercise as our lungs work harder to take in oxygen as well as remove carbon dioxide produced during respiration.
7.	Heart beat/ Pulse rate increases during exercise as our heart pumps harder to supply more food and oxygen to the cells.
8.	During inhalation and exhalation, animals take in oxygen and give out carbon dioxide.

Topic: Plant Transport System

1.	Food-carrying tubes and water-carrying tube help plants transport food and water, as well as provide support to keep the plant upright.
2.	In water-carrying tubes (xylem), the contents move in one direction, from roots upward. So when these tubes are cut off, water cannot reach the leaves above the cut. Without water, the leaves cannot photosynthesize and make food. Gradually the leaves wither and die.
3.	In food-carrying tubes (phloem), the contents move in both upwards and downwards, from leaves located everywhere to the rest of the plant. So when these tubes are cut off, food cannot reach the parts above and below the cut. However, the leaves in those parts can still get water to photosynthesize and make their own food.

Theme: Cycles

Big Idea: Cycles are repeated patterns of change. Understanding cycles helps Man to predict events and processes.

Topic: Reproduction in Plants	
1.	Each seed contains a baby plant (embryo) which will grow into a seedling only when warmth (not sunlight), water and air are present.
2.	When fruits are present on plants, that means fertilization has occurred, resulting in the flower transforming into a fruit.
3.	Fruits are formed to protect the seeds inside, which had developed from the ovules. The fruits sometimes help in the dispersal of the seeds.
4.	Seeds need to be dispersed far from the parent plant in order to reduce competition for water, air, nutrients, sunlight and space, thus ensuring survival of their kind.
5.	Seeds/fruits can be dispersed by wind, water, animals or explosive action (/splitting).

****Note:**

Some plants disperse the entire fruit, e.g., coconut, angsana.

Some plants disperse only the seeds, e.g., kapok, rubber

Topic: Reproduction in Animals

1.	Fertilisation occurs when the male sex cell (sperm) fuses with the female sex cell (egg).
2.	Only one sperm can fuse with an egg. Once the egg is fertilised, it divides to form many cells and eventually a baby develops in the womb.
3.	The developing baby is connected to the womb by an umbilical cord, which supplies oxygen and food as well as removes waste from the baby.

Topic: Hereditary

1.	Living things reproduce to ensure that their kind will continue to exist.
2.	People who share inheritable characteristics, e.g., tongue-rolling ability, are likely to be related as these characteristics are passed down from one generation to another.

Topic: Water Matters

1.	Water changes from solid state (ice) to liquid state (water) and then to gaseous state (water vapour) when heat is gained from the surroundings.
2.	Water changes from gaseous state (water vapour) to liquid state (water) and then to solid state (ice) when heat is lost to the surroundings.
3.	Water (Liquids) cool down when evaporation is allowed to take place. The water vapour uses the heat present as the energy it needs to evaporate off.
4.	If water boils at 100°C , that means it is pure water. Presence of dissolved impurities (e.g., salt) increases the boiling point and reduces the freezing point (also melting point) of water.
5.	Condensation and evaporation happen to ensure that water cycle continues.
6.	Evaporation takes place when a liquid gains heat. Condensation happens when a liquid loses heat.
7.	Water cycle occurs continuously due to condensation and evaporation of water.

****Note:**

Water vapour at 100°C is called **steam**.

PRIMARY 6 TOPICS

Theme: Energy

Big Idea: Energy makes changes and movement possible in everyday life. There are many forms of energy and one form can be converted to another. Man uses energy in many ways, for many purposes.

Topic: Forms of Energy	
1.	When an object is falling, its gravitational potential energy is converted to kinetic energy. This is because energy cannot be created or destroyed but can be changed from one form into another.
2.	A stationary object does not have kinetic energy but has potential energy.
3.	The faster an object moves and the heavier it is, the more kinetic energy it possesses.
4.	The higher an object is from the ground and the heavier it is, the more gravitational potential energy it possesses.
5.	The more stretched, or compressed an elastic object is, the more elastic potential energy it possesses.
6.	Gravitational potential energy is maximum when the object is at its greatest height from the ground.
7.	Kinetic energy is maximum when a moving object is just about to hit the ground.
8.	Kinetic energy is often lost as heat energy (due to friction) and sound energy.

Topic: Energy & the Sun

1.	All living things need energy to carry out life processes.
2.	Plants are important in food webs because all animals get their energy source (food) directly or indirectly from plants, which gets their energy from the Sun.
3.	Animals and plants respire both during the day and at night.
4.	Plants photosynthesize as long as light is present, which maybe during the day or at night, under artificial light source.

Topic: The Environment

1.	A population of animals will adapt/ leave/ die when conditions of the environment change.
----	---

****Note:**

The characteristics of an environment interact with one another and affect the survival of the living things in the environment.

They include:

- temperature
- amount of light
- amount and quality of air
- amount of water
- availability of food
- types of soil
- types of living things present

Topic: Environmental Interactions

1.	A population of an organism includes its various stages of growth, e.g., egg, pupa, larva.
2.	The introduction of a predator into a community helps to maintain a balance in the population of the prey.
3.	Maggots and centipedes help speed up decomposition by breaking dead matter into smaller pieces for decomposers to act on.
4.	Fungi and bacteria (Decomposers) break down dead matter into simpler substances that can be absorbed back by the surroundings.
5.	Aquatic animals provide aquatic plants with exhaled carbon dioxide for photosynthesis and nutrients from their excreted wastes.
6.	Fully submerged water plants provide the animals in the pond or sea with oxygen, food, shelter and hiding place to lay their eggs.
7.	Floating water plants provide the animals in the pond or sea with shelter from the sun and from predators like birds.
8.	When floating plants like water hyacinth multiply quickly, they prevent sunlight from reaching the submerged plants . As a result, the submerged plants could not photosynthesize and die. They are also unable to release oxygen for the aquatic animals, which will subsequently die as well.

Topic: Adapting to the Environment	
1.	A streamlined body reduces resistance when moving in the air/ through water, thus using less energy.
2.	<p>An animal is adapted to move more efficiently in water because it has:</p> <ul style="list-style-type: none"> • ... forelimbs that are modified into flippers increasing the surface area in contact with the water to paddle. [Turtles, penguins] • ... webbed feet, increasing the surface area in contact with the water to paddle. [Ducks] • ... fins for balancing, changing directions and propelling it. [Fish] • ... waterproof feathers enabling it to remain dry, warm and light.
3.	<p>An animal is able to stay cool in hot surroundings because it has:</p> <ul style="list-style-type: none"> • ... large, thin ears where there are fine capillaries just below the skin. The heat from the blood travelling through these capillaries is lost quickly to the surrounding. • ... a nocturnal lifestyle, hunting and feeding at night to escape the heat of the day. Hence it does not need to waste energy to cool down its body temperature. • ... thickened pads on feet so that it will not feel the heat from the ground as it walks. [Camel]

4.	<p>An animal is able to keep warm in cold surroundings because it has:</p> <ul style="list-style-type: none">• ... a thick layer of fats (/blubber) under the skin to act as insulation and slow down heat loss to the surroundings. [Polar bears, penguins, whales]• ... dense fur to trap a layer of air next to the body. Air, being a poor conductor of heat, will slow down heat loss to the surrounding.
5.	<p>An animal is able to reduce water loss because it:</p> <ul style="list-style-type: none">• ... sweats less. [Camel]• ... urinates less frequently. When it does urinate, the urine is very concentrated, thus losing less water. [Camel]
6.	<p>An animal is an excellent hunter because it has:</p> <ul style="list-style-type: none">• ... long, sharp claws (/talons) which grip onto the prey tightly. [Birds of prey]• ... a sharp pointed beak that tear off the prey's flesh. [Birds of prey]• ... a very keen sense of smell to detect its prey.• ... very good eyesight to locate preys from far away.• ... efficient muscles, enabling it to chase its prey over long distances without tiring.

7.	<p>An animal is able to escape detection from their predators/ preys because it:</p> <ul style="list-style-type: none"> • ... has ___-coloured fur/ skin/ body, similar to its surroundings, allowing it to blend right in. • ... has ___-patterns, similar to its surroundings, allowing it to blend right in. • .. has a body shaped like a leaf/ branch, similar to its surroundings, so as to blend with its surroundings. [Stick insect] • ... has stripes in its body so that when it travels in a group, its predator cannot distinguish its outline and not know where to attack. [Zebras] • ... has a dark-coloured back to blend with the darker river bed so that predators from above cannot spot it easily. [Fish] • ... has a light-coloured belly to blend with the bright sky so that predators from below cannot spot it easily. [Fish]
8.	<p>An animal is able to scare off would-be predators because it:</p> <ul style="list-style-type: none"> • ... has large eyespots on its wings so when a predator approaches, it flaps its wings, mimicking the blinking of the eyes of a larger animal. [Butterflies] • ... drops its tail off when attacked so as to stun and distract its predator, giving it an opportunity to escape. [Lizard] • ... has body markings similar to venomous species of its own kind. [Coral snake]

9.	<p>An animal is able to defend itself from would-be predators because it:</p> <ul style="list-style-type: none"> • ... is able to shoot a high pressure jet of boiling liquid. [Bombardier beetle] • ... has spines on its body to protect it. [Porcupines]
10.	<p>An animal is able to survive from attacks because it has large eyespots at its rear/ on its wings so that if a predator attacks, it injures a less vital part of its body, not the important parts like the head. [Butterflies, fish]</p>
11.	<p>An animal is able to prevent itself from slipping on slippery surfaces because it has:</p> <ul style="list-style-type: none"> • ... stiff hairs between the paws to increase friction between the animal and the slippery surface. [Polar bears] • ... short, sharp claws that dig into the slippery surface. [Polar bears] • ... suction pads on its palms, enabling it to climb on walls. [Lizards]

****Note:**

- *Behavioural adaptations – related to the activities of the organism*
- *Structural adaptations – related to the physical body of the organism*

12.	Plants reduce water loss by having leaves with small surface area.
13.	Leaves have more stomata on the underside than the upper surface. This puts the stomata at a cooler, more shaded area, such that when they open for gaseous exchange, less water vapour is lost to the surroundings.
14.	Floating and partially-submerged plants have waxy leaves that enable collected water to quickly run off such that it does not weigh the plant down.
15.	Seeds need to be dispersed far from the parent plant to prevent competition for air, nutrients, space, sunlight and water.
16.	Seeds/fruits can be dispersed by wind, water, animals or explosive action (/splitting).
17.	Seeds/fruits dispersed by wind have large surface area so that there is more air resistance acting against them as they fall, keeping them in the air longer, letting them drift further from the parents plant.
18.	Seeds/fruits dispersed by water have an outer layer of husk, enabling them to trap air and stay buoyant in the water, floating far from the parent plant.
19.	Fruits whose seeds are dispersed by explosive action (/splitting) have weakened lines along the fruit wall which crack open when the fruit dries up, propelling the seeds far from the parent plant.
20.	<p>Fruits whose seeds are dispersed by animals have:</p> <ul style="list-style-type: none"> • juicy flesh and sweet aroma to attract animal to eat them and toss the unwanted seeds far from the parent plant. <p>Or</p> <ul style="list-style-type: none"> • hooks that catch onto a passing animal's fur or human's clothing and later drop off some distance away from the parent plant.

Topic: People & the Environment

1.	If water sample taken upstream and downstream of a factory shows a big increase in toxic compounds, the factory has discharged harmful wastes.
2.	If water sample taken upstream and downstream of a factory shows no big difference in toxic compounds, the factory did not discharge harmful wastes.

Examples:

- *Negative impact on the environment: Soil erosion, deforestation, water pollution, land pollution, air pollution, global warming, endangerment of animal species etc...*

Topic: Forces

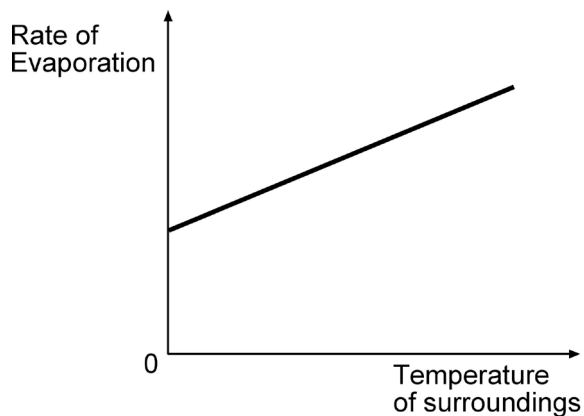
1.	The object moved/ changed the direction/ sped up/ slowed down/ stopped/ changed shape because a force was applied.
2.	The rougher the surface, the greater the friction between the moving object and the surface.
3.	A moving object slows down because the friction between the object and the surface is acting against the forward force.
4.	The more friction generated, the shorter the distance moved/ the faster the moving object comes to a stop.
5.	The magnet was able to exert its effects although it was not in contact with the object because magnetic forces can act at a distance.
6.	The object moved towards the right because the forces acting towards the right is more than the forces acting towards the left.

Relationships from Graphs

- 1) Identify **INFLUENCING** variable & **INFLUENCED** variable
- 2) Explain every part of the graph using this format:

As the [INFLUENCING VARIABLE] increases/ decreases, the [INFLUENCED VARIABLE] increases/ decreases...

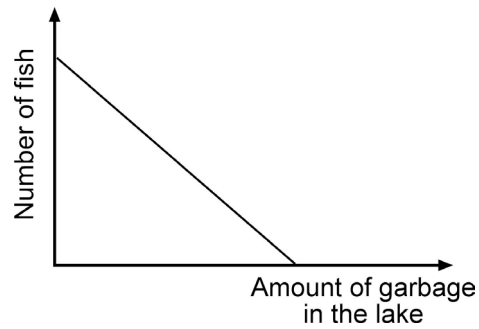
Example 1 (Line graph)



Temperature is **INFLUENCING** the rate of evaporation.
Rate of evaporation is being **INFLUENCED**.

→ As the temperature of the surroundings increases, the rate of evaporation also increases.

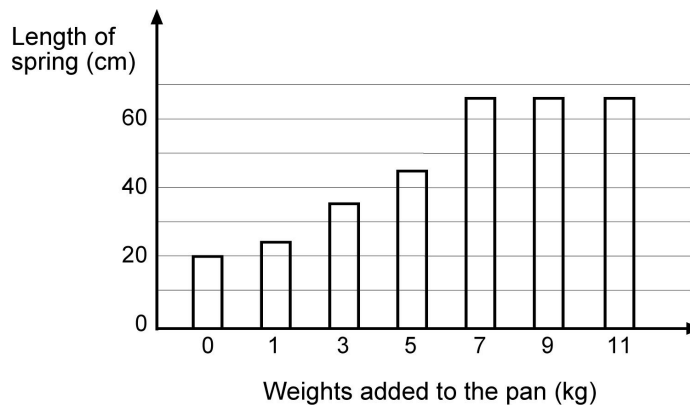
Example 2 (Line graph)



Amount of garbage is INFLUENCING the number of fish.
The number of fish is being INFLUENCED.

→ As the amount of garbage in the lake increases, the number of fish decreases instead.

Example 3 (Bar chart)



Weights added to the pan is INFLUENCING the length of the spring.
Length of the spring is being INFLUENCED.

→ As the weights added to the pan increases, the length of the spring increases, **but up to a certain extent.**

This works for tables as well:

Example 4 (Table)

Number of coils	Number of pins attracted
20	5
40	8
60	12
80	16
100	16
120	X

Number of coils (around a magnetic object) is **INFLUENCING** the number of pins attracted.

The number of pins attracted is being **INFLUENCED**.

→ As the number of coils (around a magnetic object) increases, the number of pins increases, but up till a certain extent.

Experiments

Important things about experiments

1. In order for an experiment to be a fair test, **only 1 variable** should be changed in all the set-ups.
2. Control set-ups are to make sure that **the result is due to the changed variable only**, and not due to any other factors.
3. Experiments have to be repeated at least 3 times to **ensure that the results are consistent and reliable**.

Variables

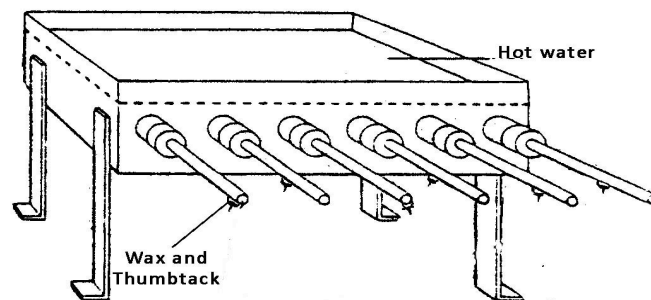
Questions dealing with an experimental set-up usually ask you about variables of the experiment.

Read the question carefully and identify ...

- 1) The aim of the experiment.
- 2) The differences among the set-ups.
- 3) The only variable that is tested.
- 4) The remaining variables (they must be the same in all the set-ups).

Example 1

Matt carried out an experiment with 6 different rods to find out which rod is the best conductor of heat.



State 2 variables that must be kept constant in the above experiment.

Aim of experiment	To find out which rod is the best conductor of heat
Differences among the set-ups	Type of rod
The only changed variable	Type/ Material of rod
All remaining unchanged variables	The overall length/ diameter/ thickness of the rods/ The length of rod exposed to the hot water/ The amount of wax at the end of each rod/ The location of the wax on each rod.

Answer

**The overall length/ diameter/ thickness of the rods/
The length of rod exposed to the hot water/
The amount of wax at the end of each rod/
The location of the wax on each rod.**

Example 2

A group of children wanted to investigate whether balsam seeds or bean seeds grow into seedlings faster.

Jars	Type of seeds	Type of soil used	Location of jar	Number of seeds
A	balsam	garden	In the shade	4
B	balsam	sandy	In the open	4
C	bean	garden	In the shade	4
D	bean	sandy	In the open	5

Which two jars should they use for the investigation?

Aim of experiment	To investigate whether balsam seeds or bean seeds grow into seedlings faster
Differences among the set-ups	Type of seeds, type of soil, location of jar, number of seeds
The only changed variable	Type of seed
All remaining unchanged variables	Type of soil, location of jar, number of seeds

Answer
A and C

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