

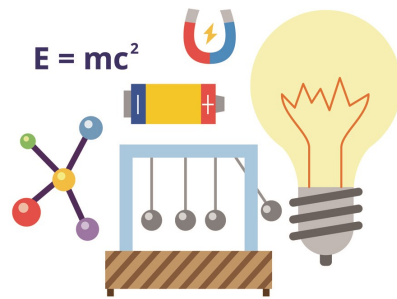
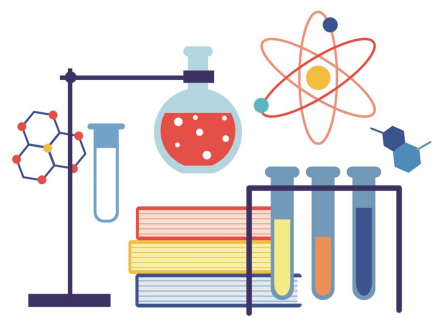


Manchester Academy

The best in everyone™

Part of United Learning

Transition Booklet



Science

Questions & Answers

Getting Ready for Science

Year 6 – Year 7

Name: _____

This booklet contains 4 sets of Science questions that will help you to practice and remember Scientific Concepts.

Track your progress below:

Session	Date	Time taken	How did you find it? Easy? Hard?
1			
2			
3			
4			

Signature of completion (parent or guardian):

Session 1: EARTH AND SPACE

- 1) Put these things in order from smallest to largest: Sun, Moon, Earth.

- 2) What shape is the moon?

- 3) How many planets can you name from our solar system? You get a bonus point if you can name them in order!

- 4) When are shadows shortest: morning, midday or evening?

- 5) Fill in the blanks with 'earth', 'moon' and 'sun'. Make sure each sentence is correct!
 - i) The is a source of light.
 - ii) The Orbits the sun.
 - iii) The has an orbit of 28 days.

- 6) At night it is dark, and during the day it is light. Give one reason why this happens.

- 7) To go into space, rocket engines push the spacecraft away from Earth. What force tries to pull the spacecraft back down?

- 8) How many times does the earth spin on its axis in one day: 1, 7 or 12?

Session 2: THE HUMAN BODY

1) Put these stages of the human life cycle in order, from youngest to oldest:

i) teenager ii) baby iii) adult iv) toddler

2) Name one thing which would cause damage to your lungs:

3) What is the name of the organ which pumps blood around your body?

4) Name three types of food which are part of a balanced and healthy diet:

5) What happens to our heart rate when we exercise? (for a bonus point, why does this happen?)

6) Name four organs found in every human body

7) What side of your body does the left side of your brain control?

8) Why does brushing your teeth help them to stay healthy?

Session 3: MATERIALS

- 1) Name two metals which are magnetic

- 2) What is the name for water when it is in a solid form?

- 3) If I stirred hot soup with a wooden spoon and a metal spoon, which spoon would heat up first?

- 4) Windows are generally made of glass. Why is glass a good material for windows? Give two reasons.

- 5) “This plastic plate is translucent.” Is that an observation or a prediction?

- 6) Name three different elements you need to create a circuit where a bulb lights up.

- 7) When some tablets are put in water, they fizz. What is being produced – a solid, liquid or gas?

- 8) Can you name: three solids, two liquids and one gas?

Session 4: VOCABULARY ROUND!

How many of these scientific words can you explain?

- 1) Opaque
- 2) Evaporation
- 3) Experiment
- 4) Magnetic
- 5) Gravity
- 6) Reversible change
- 7) Irreversible change
- 8) Food chain
- 9) Habitat
- 10) Absorbent
- 11) Conductor
- 12) Pulse
- 13) Consumer
- 14) Circulation
- 15) Photosynthesis
- 16) Reproduction
- 17) Friction
- 18) Reflection
- 19) Transparent
- 20) Insulator

Getting Ready for Science

Year 6 – Year 7

Name: _____

When you start Science lessons in Secondary school you find that we look at the things you thought you already knew in a slightly different way – more Scientifically.

This booklet contains some of the common misconceptions/alternative conceptions that you may have already come across.

Read through and see how many you already knew!

Signature of completion (parent or guardian):

Common Misconceptions/Alternative conceptions in Primary Science:

Adaptations

1. *Misconception:* Camels' humps store water.
Fact: Camels' humps store fats, which can break down to produce energy and water when there is a shortage of food. Water is stored in the bloodstream and sacs in the stomachs of the camels.
2. *Misconception:* Cactus has no leaves.
Fact: The needles or spines of a cactus are modified leaves which reduce water loss.
3. *Misconception:* Individuals can adapt to change in the environment if they need to, and that these adaptations are inherited (Lamarckian interpretation).
Fact: Populations with features and behaviour which suit the environment are best able to survive. These populations continue to survive over the generations through the process of natural selection (Charles Darwin's interpretation).

Animals

1. *Misconception:* All ocean creatures are 'fish', e.g. whales, dolphins.
Fact: Whales, dolphins, jellyfish and shellfish are not fish, but seahorses and sea dragons are fish!
2. *Misconception:* All fishes lay eggs.
Fact: Some fishes give birth to live young, e.g. guppy, molly, swordtail, most types of sharks
3. *Misconception:* Differences between vertebrates and invertebrates
Fact: Vertebrates are animals with backbones (vertebrae) or spinal column, e.g. birds, fishes, mammals, reptiles and amphibians; Invertebrates do not have backbones, e.g. insects, worms, molluscs
4. *Misconception:* All mammals give birth to live young.
Fact: Most mammals give birth to live young; The duck-billed platypus and spiny anteater are two mammals which lay eggs.
5. *Misconception:* Spiders are insects; any tiny creepy crawlie is an insect.
Fact: Spiders are not insects. They are arachnids, belonging to the same group as scorpions. They have four pairs of legs and two body segments. Insects have three pairs of legs and three body segments.
6. *Misconception:* Turtles and penguins are amphibians.
Fact: Turtles are reptiles and penguins are birds.
7. *Misconception:* Only large land mammals are animals.
Fact: There are many different types of animals such as worms, spiders, sea anemone and corals.
8. *Misconception:* Only large animals are consumers.
Fact: Small animals may be consumers, e.g. the black widow spider is a consumer.

9. *Misconception:* Male animals are always bigger and stronger than females.
Fact: That may generally be true for human beings, but it is not so for many animals, e.g. the queen ants and bees are much bigger than the males.

Body systems

1. *Misconception:* Digestion starts in the stomach.
Fact: Digestion starts in the mouth, where the salivary amylase (a digestive enzyme) acts on the starch in food.
2. *Misconception:* Digestion ends in the stomach or large intestine.
Fact: Digestion ends in the small intestine, where carbohydrates, proteins and fats are digested. Proteins are digested in the stomach. Water and minerals are absorbed into the bloodstream in the large intestine.
3. *Misconception:* The digestive system has two outlets – one for faeces and one for urine.
Fact: The digestive system has one outlet – the anus through which undigested food is discharged from the body.
4. *Misconception:* Digestion is the process which releases usable energy from food.
Fact: Digestion is the breakdown of large food molecules into smaller ones. Respiration is the process by which energy is released from food.
5. *Misconception:* Confusion over the sequence of the processes and anatomical route of digestion.
Fact: Digestion starts in the mouth before the food goes through the gullet (oesophagus) where no digestion takes place. Food then goes to the stomach where proteins are digested before entering the small intestine. In the small intestine, fats, carbohydrates and proteins are digested. Digested food is absorbed through the wall of the small intestine into the bloodstream. Undigested food passes into the large intestine where water and minerals are absorbed by the body. The rest of the undigested food is stored in the rectum temporarily and discharged out of the body through the anus.
6. *Misconception:* The discharge of undigested food through the anus is called excretion.
Fact: The discharge of undigested food through the anus is called egestion or defecation. Excretion is the discharge of metabolic wastes from the body, e.g. urine excreted by the kidneys, carbon dioxide excreted by the lungs.
7. *Misconception:* Gullet is not an organ.
Fact: The gullet is an organ, which is formed by different types of tissues to perform a specific function. Skin is also an organ.
8. *Misconception:* The gullet and windpipe are one and the same tube which splits at the end of the stomach and lungs.
Fact: The gullet (oesophagus) and windpipe (trachea) are two different tubes. The gullet connects the mouth to the stomach while the windpipe leads to the lungs. A flap called the epiglottis closes the windpipe while food is being swallowed into the gullet. Clear illustrations or models of the digestive and respiratory systems may be used to help pupils correct the misconception.

9. *Misconception:* We breathe in *only* oxygen and breathe out *only* carbon dioxide.
Fact: We breathe in air and the air we breathe in has more oxygen than the air we breathe out; we breathe out air with more carbon dioxide than the air that we breathe in. Pie-charts showing the compositions of inhaled and exhaled air may be shown to pupils to correct the misconception.
10. *Misconception:* Inhaled air remains in the head.
Fact: The oxygen in inhaled air is transported to the cells all over the body by the red blood cells.
11. *Misconception:* Air is inhaled into the lungs, then exhaled, without links with the heart and circulatory system.
Fact: Air inhaled into the lungs is circulated to the heart, then to the rest of the body through the circulatory system.
12. *Misconception:* The amount of nitrogen in inhaled and exhaled air is different.
Fact: The body does not use the nitrogen in the inhaled air, thus the amount of nitrogen in inhaled and exhaled air is the same.
13. *Misconception:* Air is blown into the straw (which represents the airway) to inflate the balloon (which represents the lung) in the model of a lung.
Fact: The plastic or rubber sheet representing the diaphragm should be pulled to inflate the lung.
14. *Misconception:* Inability to link the need for oxygen with the use of food.
Fact: Oxygen is needed for aerobic respiration, to release energy from food in the cells.
15. *Misconception:* Respiration is the same as breathing; the respiratory system is for carrying out respiration.
Fact: Respiration is the release of energy from food and takes place in the cells, with or without oxygen. Breathing is the exchange of respiratory gases between the body and the surroundings through the respiratory system.
16. *Misconception:* There are air tubes linking the lungs and the heart.
Fact: The lungs and the heart are linked by blood vessels.
17. *Misconception:* Blood from the lungs to the other parts of the body has only one gas – oxygen.
Fact: Blood from the lungs is *rich* in oxygen.
18. *Misconception:* The brain is responsible for thinking (cognition) but not responsible for physical actions, voluntary movements (e.g. swimming) and involuntary movements (e.g. coughing and sneezing), emotions or sensations.
Fact: Different parts of the brain are responsible for cognition, emotions, personality, sensations and voluntary and involuntary movements.
19. *Misconception:* No relationship between muscles and meat.
Fact: Meat is the muscles of animals.

20. *Misconception:* Muscles and brain are not involved in the workings of the digestive, circulatory or respiratory systems.
Fact: The brain controls the workings of these systems and many of the organs in these systems are made up of muscular tissues.

Cells

1. *Misconception:* Bigger organisms have bigger cells.
Fact: Bigger organisms have more cells.
2. *Misconception:* Cells are two dimensional and flat.
Fact: Cells are 3 dimensional.
3. *Misconception:* All cells have nuclei.
Fact: Not all cells have nuclei, e.g. red blood cells do not have nuclei.
4. *Misconception:* Organisms grow bigger when their cells grow bigger.
Fact: Organisms grow bigger when their cells go through cell division and multiply.
5. *Misconception:* Unclear about nature or function of genes.
Fact: Genes are parts of chromosomes which are made up of DNA and proteins. Genes are responsible for inherited characteristics and are responsible for the similarities between parents and offspring.

Electricity

1. *Misconception:* Electric current flows from the negative to the positive terminal.
Fact: The conventional current flows from the positive to the negative terminal, although in actual fact, current in a wire in a circuit is due to the flow of electrons from the negative to the positive terminal.
2. *Misconception:* Electric current is 'used up' by an electric bulb in a circuit, so there is less current 'going back' to the battery in the wire after the electric bulb in a series circuit.
Fact: Electric current in the wires on both sides of the electric bulb is the same.
3. *Misconception:* The second bulb is less bright than the first bulb in a series circuit because electric current has been 'used up' by the first bulb in the circuit.
Fact: Both bulbs are equally bright if they are identical. The current flowing through both bulbs is the same in a series circuit and depends on the voltage and total effective resistance of the two bulbs.
4. *Misconception:* In an open circuit, current flows to the part where there is a gap and 'turns back' to the battery when it finds that it cannot flow through the gap.
Fact: In an open circuit, current does not flow at all.

5. *Misconception:* An electric cell is called a battery.
Fact: A battery is made up of two or more electric cells connected in series.
6. *Misconception:* An electric cell delivers a constant current in a closed circuit.
Fact: An electric cell maintains a constant voltage or potential difference. The current delivered depends on the voltage and the effective resistance of the circuit.
7. *Misconception:* Electric current is the same as electrical energy.
Fact: Electric current is the rate of flow of electric charges.
8. *Misconception:* A change in one place of a circuit only affects the parts 'downstream' from the change (sequential model).
Fact: An electric circuit is a complete system and different parts of the circuit interact so that a change in one place affects the whole circuit.
9. *Misconception:* When electric current increases, voltage increases; there is no voltage when there is no current flowing.
Fact: Voltage is a precondition for current to flow, not a property of current. Voltage is present even when no current is flowing.

Energy

1. *Misconception:* Energy can be created or destroyed.
Fact: Energy cannot be created or destroyed. It is converted from one form to another. (Conservation of energy)
2. *Misconception:* Only living things or animate objects have energy.
Fact: Non-living things which do not move have energy too.
3. *Misconception:* Force and energy are synonymous.
Fact: Force and energy are different concepts. Force is a push or a pull while energy is the ability to do work.
4. *Misconception:* Fuel is energy.
Fact: Fuel contains energy or fuel is a source of energy.

Food chains

1. *Misconception:* A population higher on a food chain is a predator on all the organisms below it.
Fact: A population higher on a food chain is a predator on only the organisms directly below it.

Forces and simple machines

1. *Misconception:* The bigger the gears (more teeth), the faster it moves.
Fact: The smaller gear with fewer teeth makes one rotation faster.

2. *Misconception:* Confusion between the axle and the wheel
Fact: The axle is the part (rod or shaft) which the wheel turns about.
3. *Misconception:* The fulcrum is always between the effort and load in a lever.
Fact: In second and third class levers, the fulcrum is not between the effort and the load. Demonstrate this to pupils using levers such as forceps, tongs and stapler.
4. *Misconception:* If there is motion, there is a force acting; when an object is moving, there is a force in the direction of its motion.
Fact: No force is acting on the object if the object is in uniform motion (constant speed in a straight line).
5. *Misconception:* If there is no motion, then there is no force acting.
Fact: There are forces acting on a stationary object in equilibrium.
6. *Misconception:* Kicks and throws are not associated with 'push'.
Fact: Kicks and throws are pushes.
7. *Misconception:* When oil is applied, there is no more friction.
Fact: When oil is applied, friction is reduced.
8. *Misconception:* Moving objects come to a stop even when there is no friction.
Fact: Moving objects continue to move when there is no friction.
9. *Misconception:* Friction only exists between two rough surfaces.
Fact: Friction can exist between two very smooth surfaces, e.g. two smooth and clean glass rods, due to electrostatic attraction between the atoms or molecules on the two surfaces in contact.
10. *Misconception:* Friction only exists between two solid surfaces.
Fact: There is friction when solid objects move through fluids (e.g. air resistance when objects move through air).
11. *Misconception:* Air has no weight or negative weight.
Fact: Air has weight and the weight of air per unit area is air pressure.
12. *Misconception:* There must be air for gravity to act.
Fact: The presence of air is not a precondition for gravitational force to act. The Moon has no air, yet has gravity.
13. *Misconception:* Only large objects, such as planets, exert a gravitational force.
Fact: All objects exert gravitational force as gravitational force is the force of attraction between two masses and objects have mass.
14. *Misconception:* Gravity increases with height above the Earth (confusion between gravity and potential energy).
Fact: Gravity decreases with height above the Earth's surface.

15. *Misconception:* The gravitational force acting on an object by the Earth is larger than the gravitational force acting on the Earth by the object.
Fact: Both forces are equal in magnitude (Newton's third law of motion: For every action, there is an equal but opposite reaction). An object accelerates towards the centre of the Earth in a free fall while the Earth does not appear to move because the Earth is much more massive.
16. *Misconception:* Confusion between mass and weight.
Fact: Mass is the amount of matter while weight is the gravitational force acting on an object.
17. *Misconception:* Things fall naturally; the person letting go of the thing causes it to fall.
Fact: A force (gravity) is needed for things to fall.
18. *Misconception:* Heavier objects fall faster than lighter objects from the same height on Earth.
Fact: Heavy and light objects fall at the same rate (acceleration due to gravity, g , is the same).
19. *Misconception:* Gravity begins to act when an object begins to fall and it ceases to act when the object lands on the ground.
Fact: Gravity exists between the object and the Earth all the time.
20. *Misconception:* There is no gravitational force acting on a ball that is thrown up at the highest point of its motion.
Fact: There is a gravitational force acting on the ball at all times.
21. *Misconception:* The Moon has no gravity; not all planets have gravity.
Fact: Since they have mass, they have gravity.

Heat and Temperature

1. *Misconception:* A substance becomes cold because it gains 'coldness'.
Fact: A substance becomes cold because it loses heat.
2. *Misconception:* Change of state is not related to a specific temperature.
Fact: Change of state takes place at a specific temperature.
3. *Misconception:* When a wet solid object dries, water just disappears or penetrates the solid object.
Fact: When a solid object dries, water from the object evaporates into the air.
4. *Misconception:* Boiling point is not fixed, e.g. the time of boiling and the energy supply influence the boiling point of a pure liquid (the temperature of water can be greater than 100°C if heated longer or if the energy supply is increased).
Fact: At constant pressure, boiling point of a substance is fixed.

5. *Misconception:* Confusion between heat and temperature; increasing the amount of heat will increase the temperature; heat is hot, but temperature can be cold or hot; temperature is heat; temperature is a means of measuring heat.
Fact: Heat is a form of energy which flows when there is a temperature difference. Temperature is the degree of hotness or coldness of a substance. In kinetic theory, temperature is the average kinetic energy of the particles (atoms, molecules or ions) in matter. Increasing the amount of heat will not necessarily increase the temperature of a substance.
6. *Misconception:* Hot and cold are two different phenomena.
Fact: Hot and cold are parts of the same continuum.
7. *Misconception:* Metals feel colder than plastics because metals attract or absorb coldness.
Fact: Metals feel colder because they are better heat conductors. They conduct heat away from the hand faster than plastics.
8. *Misconception:* Heat conductors and insulators are seen as opposites, having no degrees of conducting ability.
Fact: Conductors and insulators have different degrees of conducting ability.

Life cycles

1. *Misconception:* The first stage of each life cycle is the egg; every life cycle begins with the egg; Labelling the 'egg' as the first stage.
Fact: The stages in a life cycle are repeated and there is no first or last stage.
2. *Misconception:* Eggs and seeds are non-living things.
Fact: Eggs and seeds are living things.

Light

1. *Misconception:* Light is not necessary for vision; it is possible to see in the dark.
Fact: Light is necessary for vision. It is impossible to see in total darkness.
2. *Misconception:* Only smooth, shiny objects like mirrors reflect light; dull and rough objects do not reflect light.
Fact: Dull objects do reflect light, otherwise we would not be able to see them. Smooth surfaces produce regular reflection while rough surfaces produce scattered, diffused or irregular reflection.
3. *Misconception:* Light travels from the source to both the observer and the object, but there is no link between the two.
Fact: Light travels from the source to the object; the object reflects the light from the source into the eyes of the observer; the receptor cells in the observer's retinas detect the light and send the signals to the brain.
4. *Misconception:* Shadow is the presence of something that light allows us to see.
Fact: Shadow is the absence of light.

Magnets

- Misconception:* All metallic-looking objects are magnetic.
Fact: Not all metals are magnetic. Iron, steel, nickel and cobalt are metals which are magnetic.
- Misconception:* All objects made of iron and steel are magnets.
Fact: Iron and steel are magnetic and can be made into magnets.
- Misconception:* Magnetism is a kind of gravity.
Fact: Magnetic force and gravity are two different types of forces. Magnetic force is the force of attraction between magnets and magnetic materials or the unlike poles of two magnets, or the force of repulsion between two like poles of magnets. Gravity is the force of attraction between two masses.
- Misconception:* Magnetic force is called 'magnetic energy'.
Fact: Force is a pull or a push; energy is the ability to do work.
- Misconception:* Poles of magnets are defined as the ends of magnets.
Fact: Poles of magnets are the parts of the magnets where the attraction or repulsion is the strongest.
- Misconception:* Big magnets are stronger than small ones.
Fact: Big magnets are not necessarily stronger than small magnets.
- Misconception:* A coil of wire had to be uninsulated in order to create an electromagnet.
Fact: A coil of wire can be insulated to create an electromagnet.

Materials

- Misconception:* Plastic is not breakable
Fact: Plastics can be broken. Different types of plastics have different properties. Some types of plastics can be broken more easily than others, e.g. the plastic used to make cling-wrap breaks more easily than the plastic used to make a plug cover.
- Misconception:* Confusion about hardness and strength
Fact: The differences between the common usage and the scientific definitions of the terms 'hardness' and 'strength' should be emphasised to pupils. In science, hardness refers to the ability of a material to withstand scratching and strength refers to the ability of a material to support a heavy load without breaking or tearing. Thus, a piece of chalk which is conventionally considered to be hard is not considered hard in the scientific sense. It can easily be scratched.
- Misconception:* Heat insulators are non-conductors.
Fact: Matter which are heat insulators do conduct heat, albeit poorly. Thus, it is more appropriate to call them poor conductors of heat rather than non-conductors. Vacuum, which does not have particles (atoms, molecules or ions) to pass on heat can be considered to be a non-conductor. However, in reality, it is difficult to obtain a true vacuum.

Matter

- Misconception:* Sand and rice take the shape of containers, therefore they are not solids.
Fact: Each individual grain of sand and rice have definite shape, therefore they are solids.
- Misconception:* Plasticine is not a solid as it has no definite shape.
Fact: A solid can change its shape if a force acts on it. Plasticine changes its shape when it is moulded (a force acted on it). It remains in its new shape because it is inelastic.
- Misconception:* Solids are hard, strong and non-malleable.
Fact: Different solids have different degree of hardness, strength and malleability.
- Misconception:* Mass is associated with the term 'massive' and thus related to the size or volume of an object.
Fact: Mass is the amount of matter in an object.
- Misconception:* The liquid form of a matter is lighter than the same mass of its solid state, and heavier than its gaseous state.
Fact: All states have the same mass as they have the same amount of matter although their volumes, and hence their densities, differ.
- Misconception:* Air is good, but gas is bad because it is poisonous, dangerous or flammable.
Fact: Air is made up of different types of gases. Not all gases are poisonous, dangerous or flammable.
- Misconception:* Air is one substance.
Fact: Air is made up of a mixture of gases.
- Misconception:* Gases do not have mass or weight.
Fact: Gases are matter, and thus they have mass and weight.
- Misconception:* Confusion between melting and dissolving, e.g. sugar 'melts' into water.
Fact: Melting involves only one substance while dissolving involves at least two substances. Melting takes place at a fixed temperature, but not dissolving.
- Misconception:* Matter disappears when it decays.
Fact: Matter breaks down into simpler substances which are released into the environment when it decays.
- Misconception:* There is a loss in mass when matter burns.
Fact: Mass is conserved. Gases produced by burning have masses.

Micro-organisms

- Misconception:* Micro-organisms are the same as germs.
Fact: Germs are micro-organisms such as bacteria, fungi and protists which cause diseases. Not all micro-organisms are germs.

2. *Misconception:* Viruses are micro-organisms.
Fact: Viruses are not considered to be living things (organisms) as they cannot reproduce on their own; they need living hosts to reproduce.
3. *Misconception:* All bacteria are bad.
Fact: Bacteria that cause diseases are bad, but there are many good bacteria which help to decompose matter, make vitamins in our bodies and recycle important nutrients in the environment.
4. *Misconception:* Micro-organisms can live in all sorts of places except in or on the human body.
Fact: The human body is a habitat for many types of micro-organisms.
5. *Misconception:* There is no connection between disease and decay and micro-organisms.
Fact: Micro-organisms are responsible for infectious diseases and decay.

Plants

1. *Misconception:* Trees are not plants.
Fact: Trees are plants.
2. *Misconception:* Many flowering plants have been mistaken to be non-flowering plants due to inconspicuous flowers or infrequent flowering.
Fact: Mosses and liverworts, ferns and conifers are non-flowering plants. Most other plants are flowering plants.
3. *Misconception:* Non-green plant parts have no chloroplasts.
Fact: Non-green plant parts do not have chlorophyll, but they may have chloroplasts which contain accessory pigments like carotene, which gives autumn leaves a yellow colour.
4. *Misconception:* Minerals in the soil, water and carbon dioxide are food for plants.
Fact: Plants make their own food. Minerals help in plant growth and health. Water and carbon dioxide are ingredients for photosynthesis.
5. *Misconception:* Roots are organs for feeding.
Fact: Roots absorb minerals and water for the plants. Minerals and water are not food for plants.
6. *Misconception:* Leaves take in water; the main function of leaves is to capture rain, water or dew; water vapour moves into the leaf during photosynthesis.
Fact: Roots take in water. The main function of leaves is to carry out photosynthesis.
7. *Misconception:* Fertilisers are plant food.
Fact: Fertilisers are not plant food. They supply minerals to the plants.
8. *Misconception:* Plants carry out photosynthesis in the day and respiration at night.
Fact: Plants carry out respiration all the time and photosynthesis when there is light.

9. *Misconception:* Plants breathe in carbon dioxide and breathe out oxygen.
Fact: Plants take in carbon dioxide in the day when photosynthesis takes place and gives out oxygen at night or in the dark when photosynthesis stops, as respiration continues to take place.
10. *Misconception:* Respiration in plants occurs only in the cells of leaves, since only leaves have gas exchange pores.
Fact: Respiration takes place in all plant cells.
11. *Misconception:* Plants do not respire, or they only respire in the dark.
Fact: Plants respire all the time.

Pollution

1. *Misconception:* Anything natural is not pollution.
Fact: There are many natural sources of pollution, e.g. volcanoes, bush fires, rotting vegetation which gives out methane gas.
2. *Misconception:* Biodegradable materials are not pollutants.
Fact: Some biodegradable materials can release poisons into the soil or water.
3. *Misconception:* Solid waste in dumps is safe.
Fact: Some solid waste can release poisons into the soil or water.
4. *Misconception:* The use of lead-free petrol can reduce global warming.
Fact: The use of lead-free petrol reduces pollution caused by lead particulates in the air, but does not reduce global warming.
5. *Misconception:* Confusion between global warming, greenhouse effect and ozone layer depletion.
Fact: The release of greenhouse gases into the atmosphere gives rise to the greenhouse effect, which in turn causes global warming. The release of gases like CFCs depletes the ozone layer in the stratosphere.

Reproduction

1. *Misconception:* All plants reproduce from seeds.
Fact: Many plants reproduce by vegetative propagation – from leaves, stems etc.
2. *Misconception:* Propagating of fruit trees – as the tree can be propagated by plant parts, e.g. stem cutting, therefore the fruit has no seed.
Fact: Fruits produced by vegetative propagation do have seeds. Examples of fruits produced by vegetative propagation may be shown to pupils to show them that they produce seeds.
3. *Misconception:* Babies are conceived in the stomach.
Fact: Stomachs are for food, not babies! Fertilisation takes place naturally in the Fallopian tube (oviduct) of the female reproductive system and the fertilised egg, which develops into a ball of cells over time, develops in the uterus (womb) of the female to become a baby.

4. *Misconception:* In human reproduction, a miniature baby is folded up inside the sperm or the egg and the other gamete (reproductive cell) triggers its development.
Fact: The sperm fertilises the egg when the nuclei of the sperm and egg fuse. The fertilised egg (zygote) develops into a ball of cells, which continue to divide and develop into specialised cells to form different organs and systems.
5. *Misconception:* Confusion between mating and reproduction.
Fact: In general, animals have to mate in order to reproduce but these are different processes.
6. *Misconception:* Plants do not produce sexually.
Fact: Flowering plants produce sexually when the nuclei of pollen grains fuse with the eggs.
7. *Misconception:* Sexual reproduction must involve mating.
Fact: Sexual reproduction does not always involve mating, as in the case of flowering plants.

Solar system

1. *Misconception:* Rotation is the same as revolution.
Fact: Rotation is the movement which involves turning about an axis, as in a spinning top. Revolution is the movement in an orbit, as in the Earth revolving round the Sun.
2. *Misconception:* The moon gives off light.
Fact: The moon is a non-luminous body. It can be seen because it reflects the light from the Sun.
3. *Misconception:* The phenomenon of day and night is caused by the movement of the Earth around the Sun or the movement of the Sun around the Earth.
Fact: Day and night is caused by the rotation of the Earth about its axis.
4. *Misconception:* Phases of the moon are caused by the Earth's shadow covering the Moon.
Fact: Phases of the moon are caused by the regular movement of the Moon around the Earth. Only the illuminated parts of the Moon which are facing the Earth can be seen from Earth.

Water

1. *Misconception:* Evaporation takes place only when there is sunlight.
Fact: Evaporation can take place without sunlight. Water molecules at the surface obtain energy from the surrounding water molecules to evaporate, leaving the remaining water cooler.
2. *Misconception:* The mist above the spout of a kettle of boiling water is steam.
Fact: The 'white' mist is made up of tiny droplets of water, which have condensed from the steam. The steam is not visible.
3. *Misconception:* The bubbles seen in boiling water are air bubbles.
Fact: The bubbles are water in gaseous state.

4. *Misconception:* The presence of water droplets on a glass containing ice is caused by the coldness which changed into water; the cold caused hydrogen and oxygen to change into water.
Fact: Water condenses from the water vapour in the air when it touches the cold surface of the glass.
5. *Misconception:* Ice has a smaller volume than the same mass of liquid water.
Fact: Water expands on freezing, thus ice has a larger volume than the same mass of liquid water, which explains why ice floats in water. In general, matter expands when heated and contracts when cooled, but water behaves differently. For a fixed mass of water, its volume is lowest and its density is highest at 4°C.
6. *Misconception:* There is a loss in mass when ice changes to water.
Fact: There is no loss in mass when ice changes to water.
7. *Misconception:* Rain falls when clouds get cold or become hot.
Fact: Rain falls when the water droplets that form cloud become bigger and heavier.
8. *Misconception:* Objects with parts above the surface of water are floating; those which are completely submerged but freely suspended in water, such as fish and submarines, are not floating.
Fact: Fully immersed objects are floating.