

KS1&2 Science

Key vocabulary

Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings

*Key vocabulary

Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils

*Key vocabulary

Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle

*Key vocabulary

Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering, non-flowering

*Keywords:

Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage

N.B.

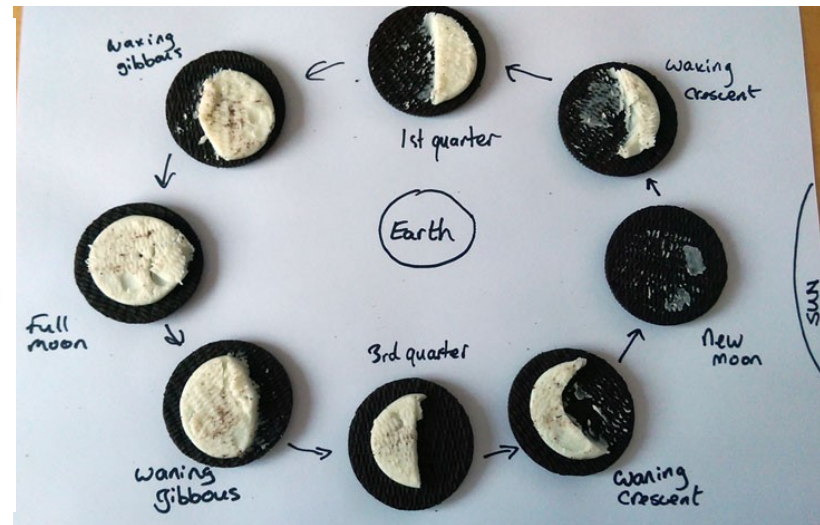
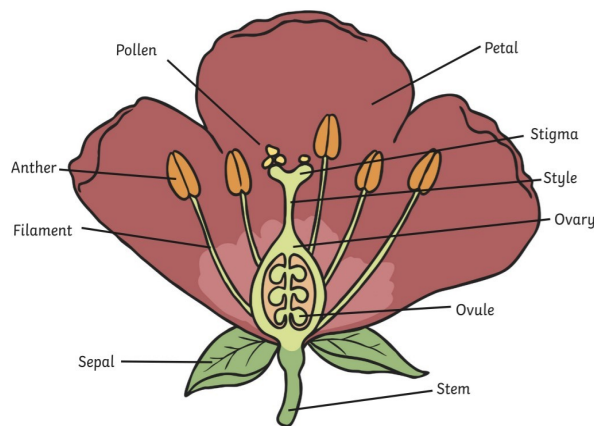
Children do not need to understand what voltage is, but will use volts and voltage to describe different batteries. The words "cells" and "batteries" are now used interchangeably.

*Key vocabulary

Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material

Organisms:

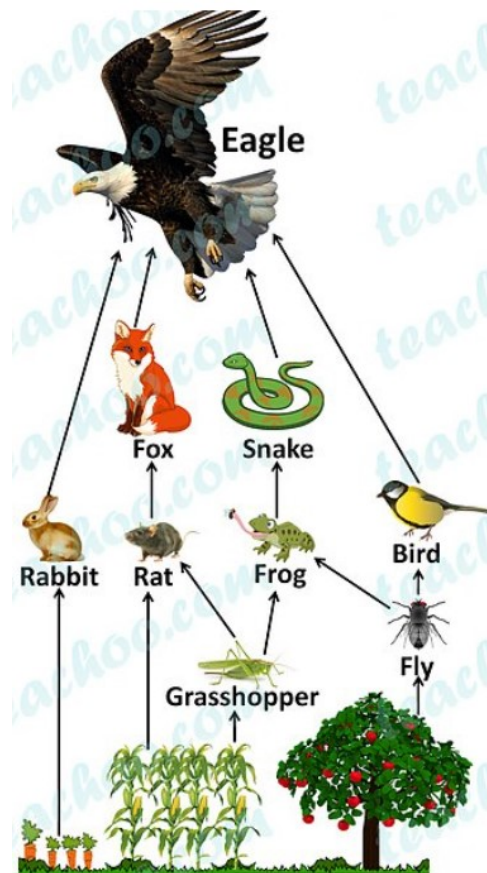
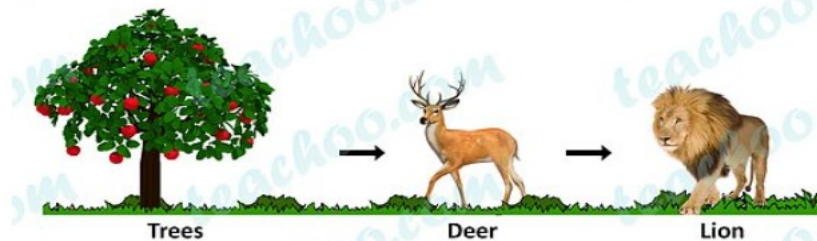
Parts of a Flower



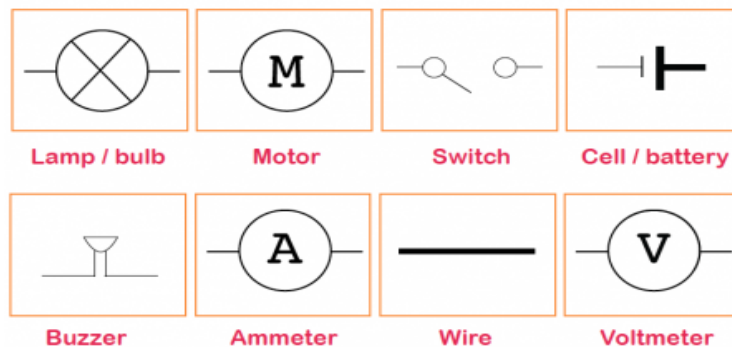
Food chain

VS

Food web



Electricity



Hope View School

Additional Educational Needs Provision

Name

Class

KS2 Science

Command words in science:

Analyse- Separate information into components and identify their characteristics

Annotate- Add notation or labelling to a graph, diagram or other drawing

Apply- Put into effect in a recognised way

Draw—Produce a diagram

Estimate—Assign an approximate value

Evaluate- Judge from available evidence

Explain- Give reasons

Explore- Investigate without preconceptions about the outcome

Give- Produce an answer from recall or from given information

Identify- Name or otherwise characterise

Justify- Support a case with evidence

Label- Provide appropriate names on a diagram

List- List a number of features or points without further elaboration

Name—Identify using a recognised technical term

Outline- Set out main characteristics

Predict- Give a plausible outcome

Relate- Give a technical term or its equivalent

Show- Provide structured evidence to reach a conclusion

Sketch- Draw approximately

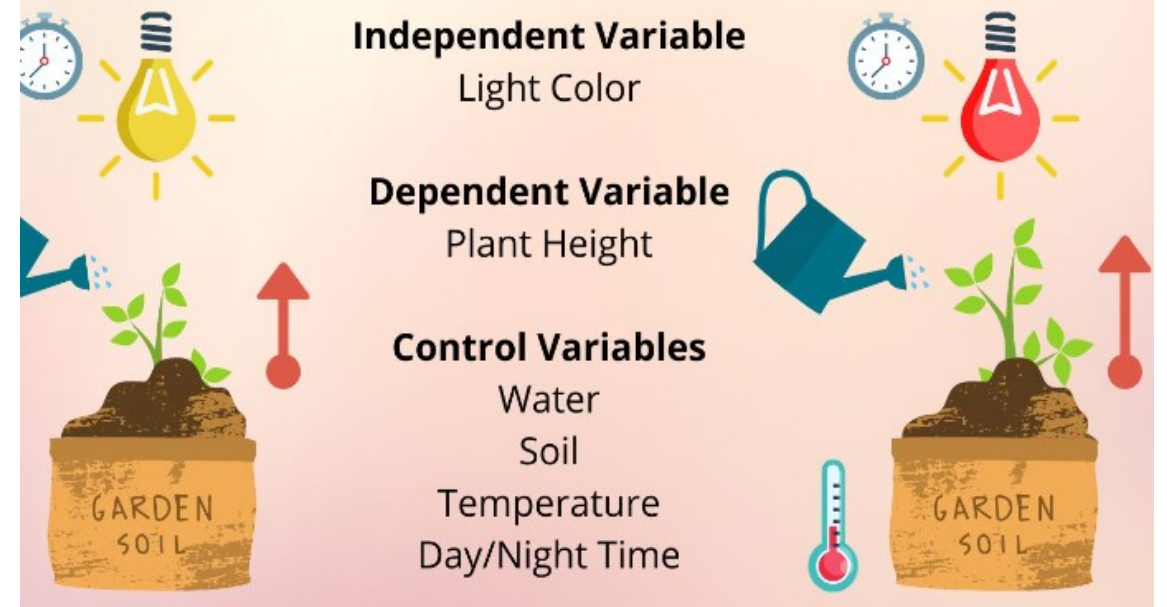
State- Express in clear terms

Suggest- Present a possible case

Maths in Science:

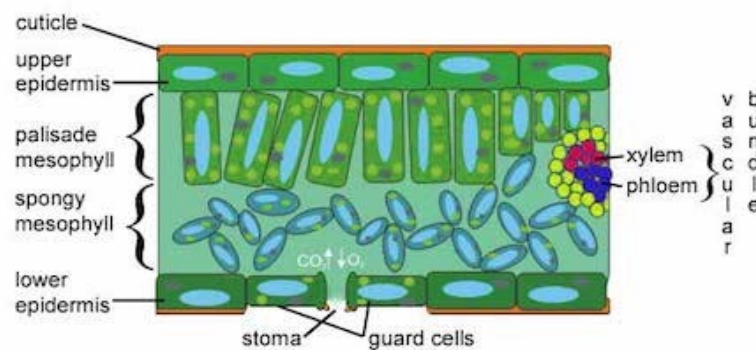
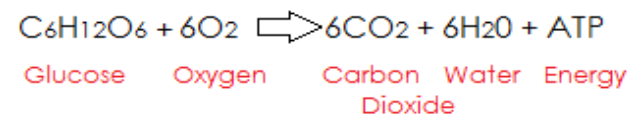
Control Variables

Does red light affect plant growth?

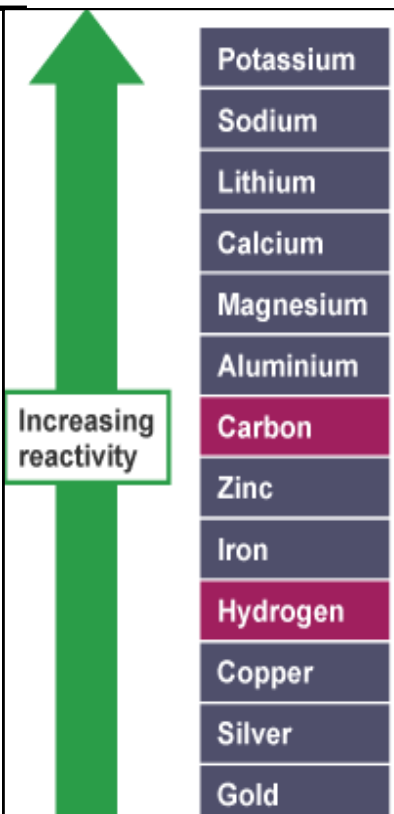


1. The process of obtaining oxygen and realising carbon dioxide in the alveoli, in the lungs.
2. It is a physical process.
3. It takes place in the lungs.
4. It utilises energy from the food

1. The process of realising energy from food is called respiration.
2. It is a biochemical process.
3. It takes place in mitochondria, in the cells, including the lung cells.
4. It releases energy from the oxidation of simple food.



The independent variable is plotted on the x-axis
The dependent variable is plotted on the y-axis.
The mnemonic DRY MIX, for “dependent, responding, y-axis” and “manipulated, independent, x-axis,” can help students remember this point.
Independent variable – the variable that is altered during a scientific experiment. It is the one changing.
Dependent variable – the variable being tested or measured during a scientific experiment.
Controlled variable – a variable that is kept the same during a scientific experiment. Any change in a controlled variable would invalidate the results.



Class

KS3 Science

Keywords 7: abiotic adaptation alloy ammeter atomic number bacteria battery biodiversity biotic brittle cell chlorophyll chloroplast compound conduction conductor current cytoplasm ductile efficiency electron element embryo fertilisation foetus food chain gamete gestation gland hormone insulator internal energy kinetic energy microscope malleable mass menstrual cycle metal mitochondria mixture multicellular neutron nucleus parallel circuit parasite periodic table photosynthesis predator prey producer proton puberty quadrat reactivity resistance ribosomes species starch temperature thermal equilibrium tissue unicellular vacuole voltage voltmeter;

Year 8: acceleration acid adaptation aerobic respiration air resistance alkali amplitude anaerobic respiration anomaly antibiotic artery base biodegradable braking distance bronchiolitis carbohydrate cholesterol chromosome cilia combustion compression conservation coronary artery crest crumple zone deficiency distance-time graph DNA domain drag echo electromagnet endangered evolution exhale exothermic extinction frequency gene generator genetic fingerprinting gradient gravity hazard hypothesis incident wave indicator ligament longitudinal magnetic field magnetic material motor natural selection neutralisation nicotine nurture oscilloscope pathogen pitch platelet product rarefaction reactant reactivity series reflex arc relative formula mass renewable energy selective breeding species speed of light stopping distance superpose tendon thinking distance titration trachea transverse trough velocity weight

A neutralisation reaction occurs when an acid reacts with an alkali. An alkali is a metal oxide or metal hydroxide dissolved in water.

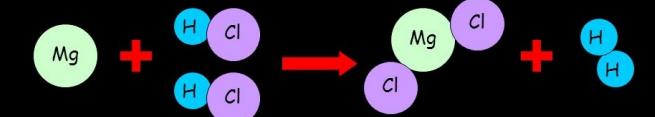


Copy and complete the following reactions:

- 1) Sodium hydroxide + hydrochloric acid _____
- 2) Calcium hydroxide + hydrochloric acid _____
- 3) Sodium hydroxide + sulphuric acid _____
- 4) Magnesium hydroxide + sulphuric acid _____

METAL + ACID → SALT + HYDROGEN

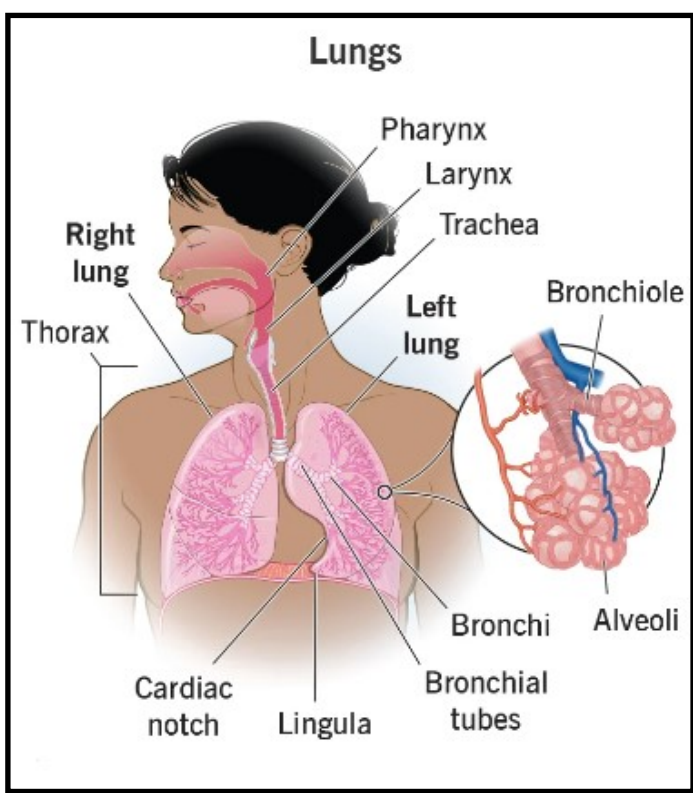
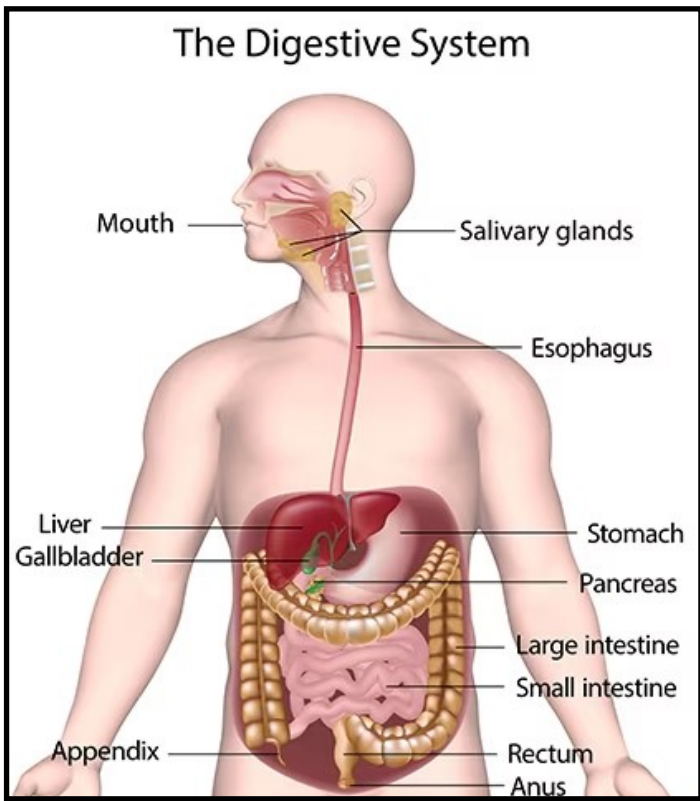
e.g. magnesium + hydrochloric acid → magnesium chloride + hydrogen



Copy and complete the following reactions:

- 1) Calcium + hydrochloric acid \longrightarrow
- 2) Zinc + hydrochloric acid \longrightarrow
- 3) Iron + hydrochloric acid \longrightarrow
- 4) Lithium + sulphuric acid \longrightarrow

[illegible]



Hope View School
Additional Educational Needs Provision

"My teacher thought I was smarter than I was, so I was."

Name		ELC Science
Class		

ELC Science

Command words:

Control variable is one which may, in addition to the independent variable, affect the outcome of the investigation and therefore has to be kept constant or at least monitored.

Dependent variable is the variable of which the value is measured for each and every change in the independent variable.

Independent variable is the variable for which values are changed or selected by the investigator.

Prediction A prediction is a statement suggesting what will happen in the future, based on observation, experience or a hypothesis.

Evidence Data which has been shown to be valid.

Fair test A fair test is one in which only the independent variable has been allowed to affect the dependent variable.

Hypothesis A proposal intended to explain certain facts or observations.

*Key vocabulary about the human body:

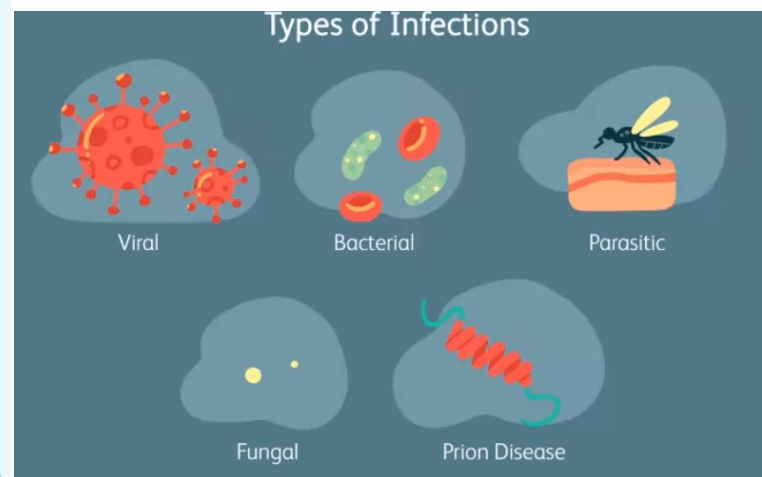
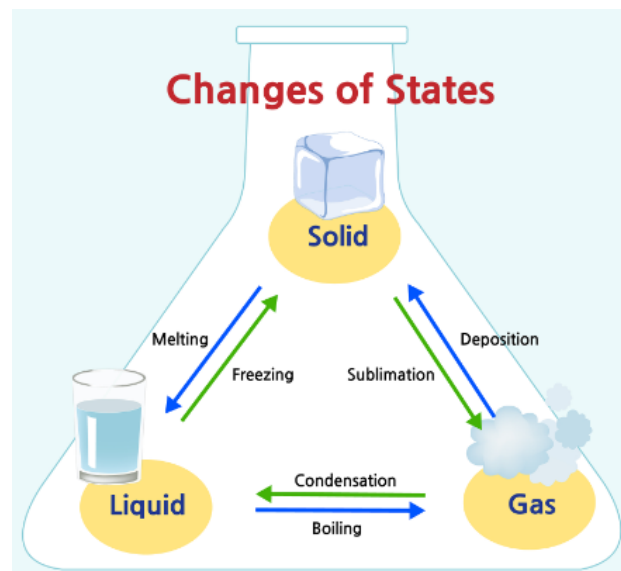
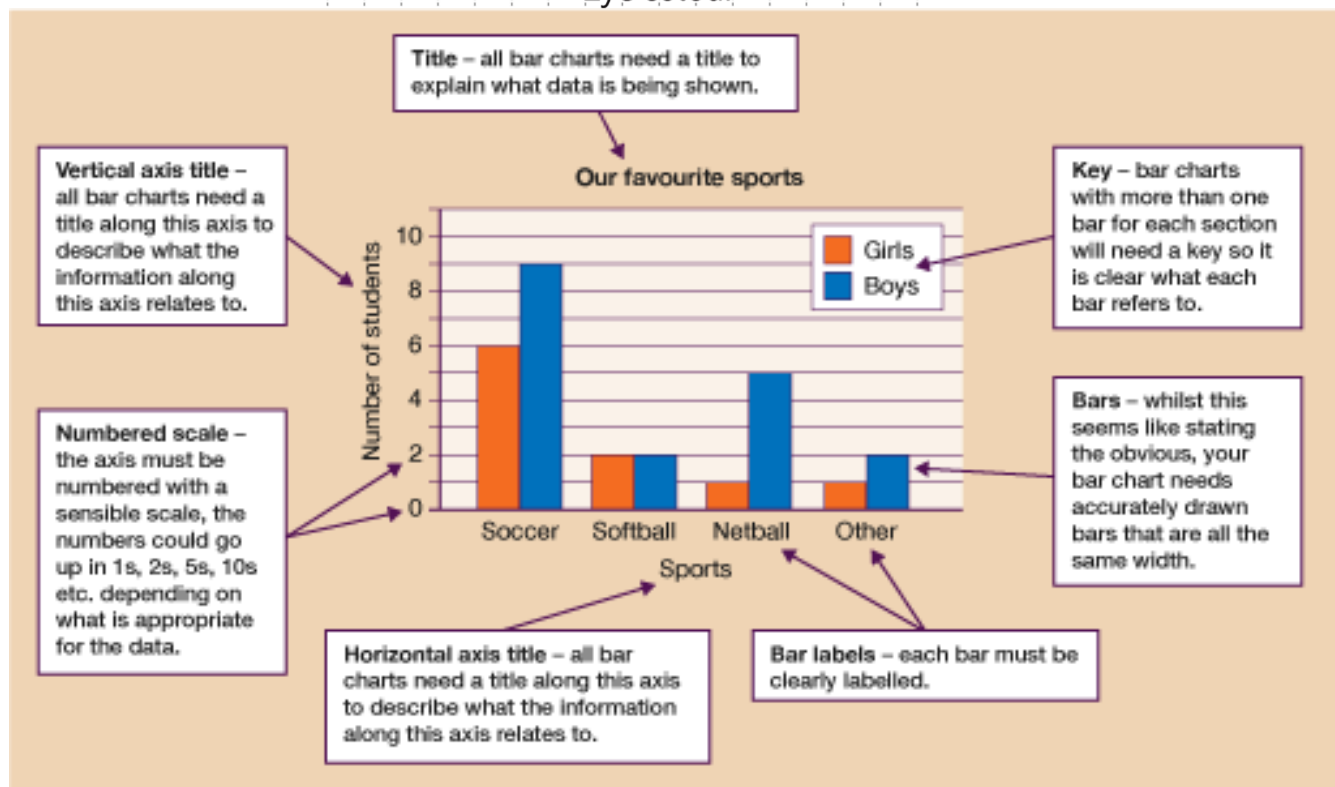
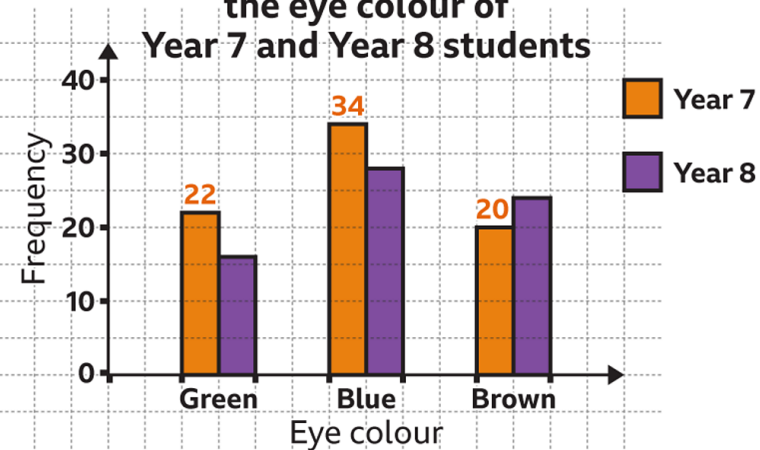
Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle

Common misconceptions

- your heart is on the left side of your chest
- the heart makes blood
- the blood travels in one loop from the heart to the lungs and around the body
- when we exercise, our heart beats faster to work the muscles more
- some blood in our bodies is blue and some blood is red
- we just eat food for energy
- all fat is bad for you
- all dairy is good for you
- protein is good for you, so you can eat as much as you want
- foods only contain fat if you can see it
- all drugs are bad for you.

Maths in Science:

A dual bar chart to show the eye colour of Year 7 and Year 8 students



Dates	GCSE Science	FOUNDATION TIER (%)	HIGHER TIER (%)
	Paper 1	55% for Grade 4	25% for Grade 5
	Paper 2		
	Paper 3		
	Paper 4		

*A **nucleus** that holds all the genetic material (including DNA) needed to control the cell's activities.

***Cytoplasm** which is a jelly-like substance that contains nutrients, salts and enzymes required for chemical reactions to take place.

*A **semi-permeable cell membrane** that controls what comes in and out of the cell.

*Many **mitochondria** that contain enzymes needed for respiration, which releases energy for the cell to use.

*Ribosomes for the production of proteins.

*A **cell wall** made of cellulose that provides structure and protection to the cell. Algal cells also have this feature.

*A **vacuole** that holds a weak solution of sugar and salts called cell sap that keeps the cell swollen.

*Many **chloroplasts** that are the site of photosynthesis in the cell. They contain chlorophyll, a green pigment that absorbs the light and specific enzymes required for photosynthesis to occur

Maths in Science:

Independent Variable: X-Values	Dependent Variable: Y-Values
0	0
0.5	0.6
0.7	2.7
1.8	1.5
2	2
2.6	1.8
3.5	2.7
4	3.7

A graph showing how Independent Variable "X" affects Dependent Variable "Y"

Dependent Variable Y (units!!)

Independent Variable X (units!!)

Linear Scale – Start at Zero unless there is a very good reason not to. ALWAYS go up in even sized steps / chunks! Logarithmic scales aren't generally necessary at GCSE level.

Don't forget to include an axis TITLE and units! Put units in brackets after the axis title. E.g. (cm), (secs), (mins).

A line of best fit is usually straight or simply curved. After discounting anomalous results (or outliers), the line should be as close to all points as possible.

Potassium

Sodium

Lithium

Calcium

Magnesium

Aluminium

Carbon

Zinc

Iron

Hydrogen

Copper

Silver

Gold

Increasing reactivity

DISTANCE - TIME GRAPH

FASTER OBJECT TRAVELLING AT A CONSTANT SPEED

STATIONARY

SLOWER OBJECT TRAVELLING AT A CONSTANT SPEED

Dependent Variable Y (unit)

Independent Variable X (unit)

Dependent Variable Y (unit)

Independent Variable X (unit)

Interpreting Graphs:

The graph above shows a positive linear correlation between X and Y. As X increases, Y also increases proportionately. An example of this might be the distance travelled over time by an object moving at a steady speed.

Interpreting Graphs:

The graph above shows a positively skewed normal distribution (because it leans to the left). It shows that X=5 is the most common X variable value. This could be something like the number of leaves (Y) found of a particular length (X) on a tree.

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Additional Educational Needs Provision

Name

Class

GCSE Science

Command words in Science:

Data Information, either qualitative or quantitative, that has been collected.

Error See also uncertainty. Measurement error The difference between a measured value and the true value.

Anomalies These are values in a set of results which are judged not to be part of the variation caused by random uncertainty.

Random error These cause readings to be spread about the true value, due to results varying in an unpredictable way from one measurement to the next. Random errors are present when any measurement is made, and cannot be corrected. The effect of random errors can be reduced by making more measurements and calculating a new mean.

Systematic error These cause readings to differ from the true value by a consistent amount each time a measurement is made. Sources of systematic error can include the environment, methods of observation or instruments used.

Zero error Any indication that a measuring system gives a false reading when the true value of a measured quantity is zero, eg the needle on an ammeter failing to return to zero when no current flows. A zero error may result in a systematic uncertainty.

Evidence Data which has been shown to be valid. Fair test A fair test is one in which only the independent variable has been allowed to affect the dependent variable.

Hypothesis A proposal intended to explain certain facts or observations. Interval The quantity between readings, eg a set of 11 readings equally spaced over a distance of 1 metre would give an interval of 10 centimetres.

Precision Precise measurements are ones in which there is very little spread about the mean value. Precision depends only on the extent of random errors – it gives no indication of how close results are to the true value.

Prediction A prediction is a statement suggesting what will happen in the future, based on observation, experience or a hypothesis.

Range The maximum and minimum values of the independent or dependent variables; important in ensuring that any pattern is detected. For example a range of distances may be quoted as either: 'From 10 cm to 50 cm' or 'From 50 cm to 10 cm'.

Repeatable A measurement is repeatable if the original experimenter repeats the investigation using same method and equipment and obtains the same results. Previously known as reliable.

Reproducible A measurement is reproducible if the investigation is repeated by another person, or by using different equipment or techniques, and the same results are obtained. Previously known as reliable.

Resolution This is the smallest change in the quantity being measured (input) of a measuring instrument that gives a perceptible change in the reading.

Uncertainty The interval within which the true value can be expected to lie. Whenever a measurement is made, there will always be some uncertainty or doubt about the result obtained. Uncertainty can be expressed in terms of spread of values obtained. For example, a length of 56 cm ±2 cm would mean the true value could be anywhere between 54 cm and 58 cm.

Validity Suitability of the investigative procedure to answer the question being asked. For example, an investigation to find out if the rate of a chemical reaction depended upon the concentration of one of the reactants would not be a valid procedure if the temperature of the reactants was not controlled.

Valid conclusion A conclusion supported by valid data, obtained from an appropriate experimental design and based on sound reasoning. Variables These are physical, chemical or biological quantities or characteristics.

Categoric variables have values that are labels, eg names of plants or types of material.

Continuous variables can have values (called a quantity) that can be given a magnitude either by counting (as in the case of the number of shrimp) or by measurement (eg light intensity, flow rate etc). Previously known as discrete variable.

Control variable is one which may, in addition to the independent variable, affect the outcome of the investigation and therefore has to be kept constant or at least monitored.

Dependent variable is the variable of which the value is measured for each and every change in the independent variable.

Independent variable is the variable for which values are changed or selected by the investigator.

Ions

- Atoms that **lose electrons** have a **positive** charge and are called **cations**.
- Atoms that **gain electrons** have a **negative** charge and are called **anions**
- The noble gases have **full** outer orbits and therefore **do not** gain/lose electrons.

Sodium Atom Sodium Ion

chlorine atom, Cl 2,8,7 chloride ion, Cl- [2,8,8]-

He Ne Ar

The Digestive System

Substrate

Active Site

Enzyme

Salivary glands

Esophagus

Liver

Gallbladder

Stomach

Pancreas

Large intestine

Small intestine

Appendix

Rectum

Anus

Superior vena cava (from body)

Aorta (to body)

Pulmonary artery (to lungs)

Pulmonary vein (from lungs)

Left atrium

Left ventricle

Right atrium

Right ventricle

Inferior vena cava (from body)

Blood high in oxygen

Blood low in oxygen