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
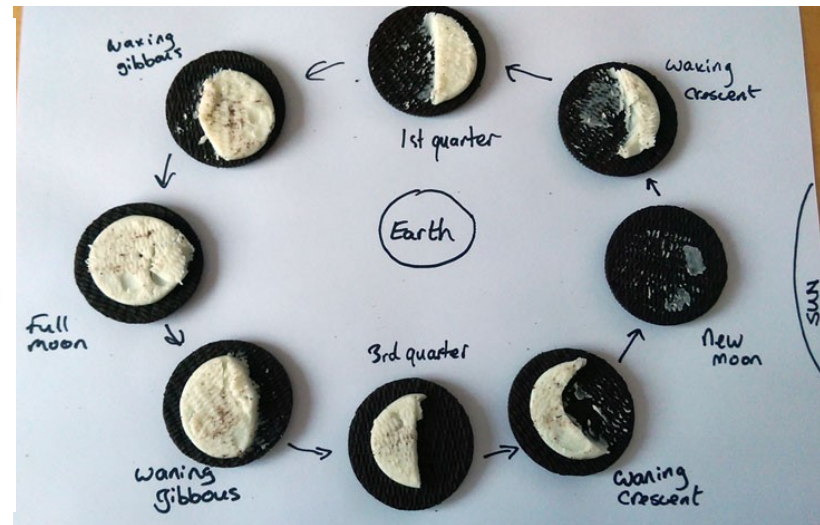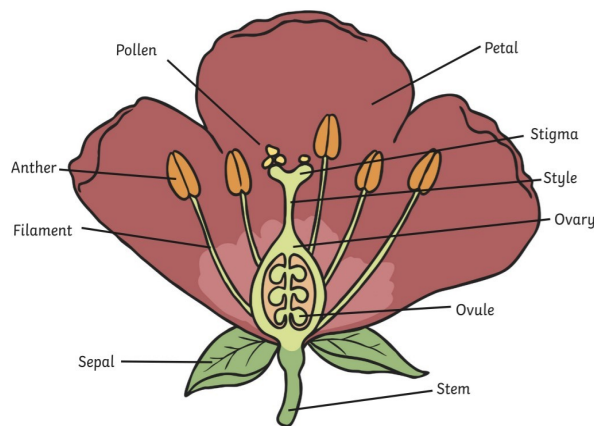N.B.
Children do not need to understand what voltage is, but will use volts and voltage to describe different batteries. The words "cells" and "batteries" are now used interchangeably.
*Key vocabulary
Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material
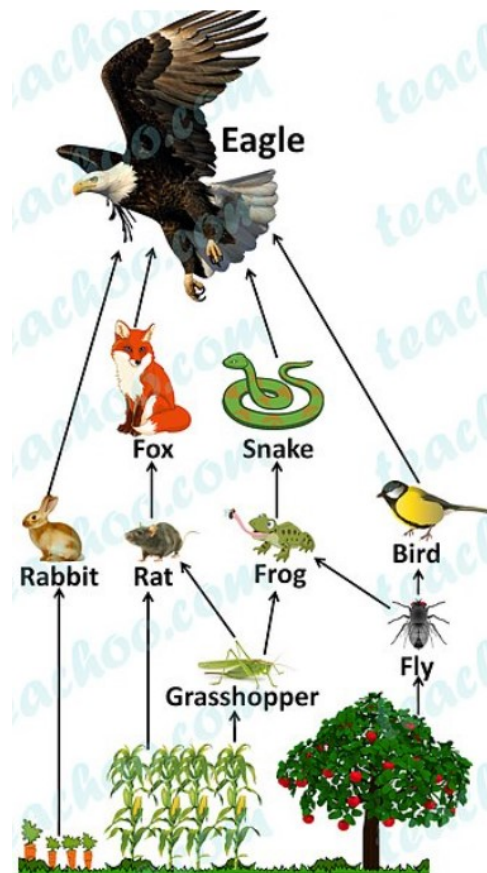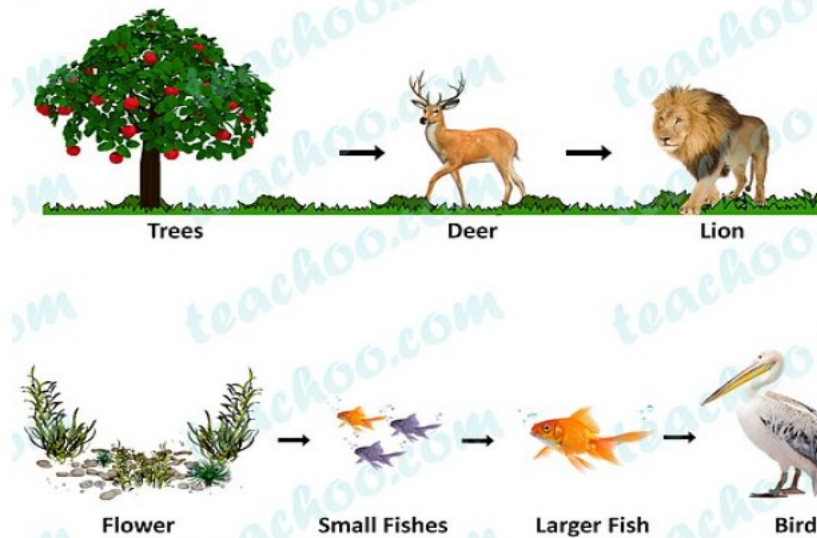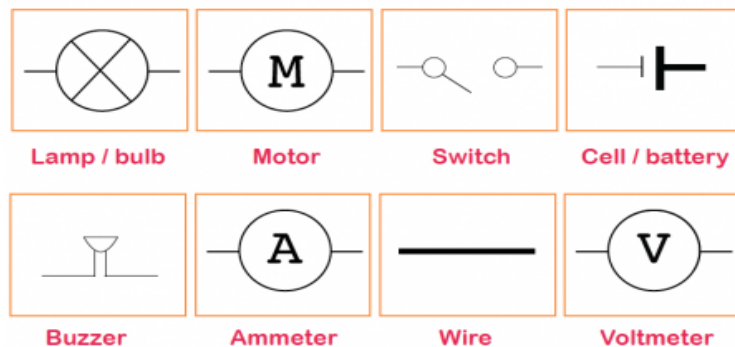
Name	
Class	

KS2 Science

Organisms:

Parts of a Flower

Pollen, Petal, Anther, Stigma, Style, Filament, Ovary, Sepal, Ovule, Stem

Waxing gibbous, 1st quarter, Waxing crescent, Earth, SUN, Full moon, New moon, 3rd quarter, Waning gibbous, Waning crescent

Foo chain

VS

Food web

Trees → Deer → Lion

Flower → Small Fishes → Larger Fish → Birds

Eagle, Fox, Snake, Rabbit, Rat, Frog, Bird, Grasshopper, Fly

Electricity

Lamp / bulb, Motor, Switch, Cell / battery, Buzzer, Ammeter, Wire, Voltmeter

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
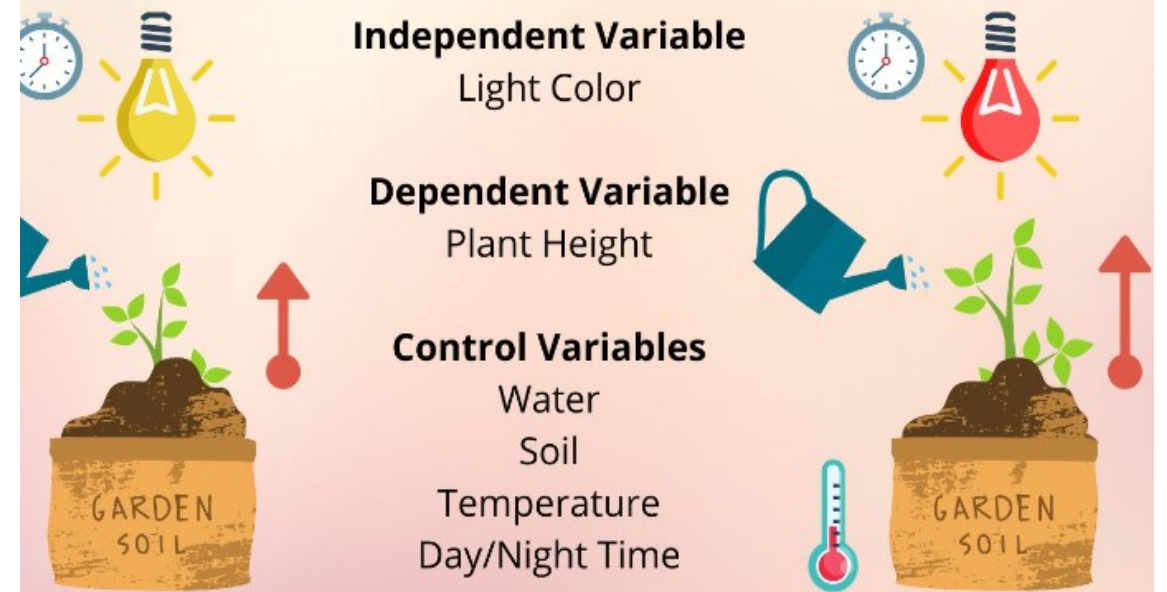**Sketch-** Draw approximately
State- Express in clear terms
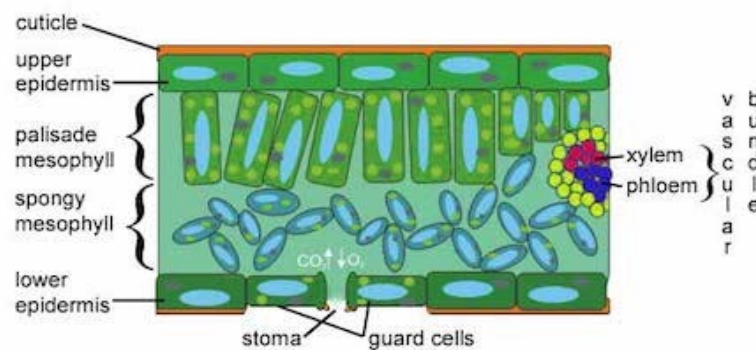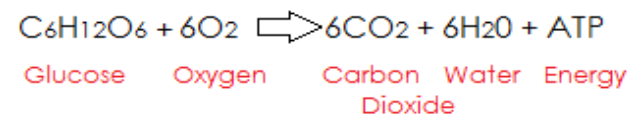**Suggest-** Present a possible case

Maths in Science:

Control Variables
Does red light affect plant growth?

Independent Variable
Light Color

Dependent Variable
Plant Height

Control Variables
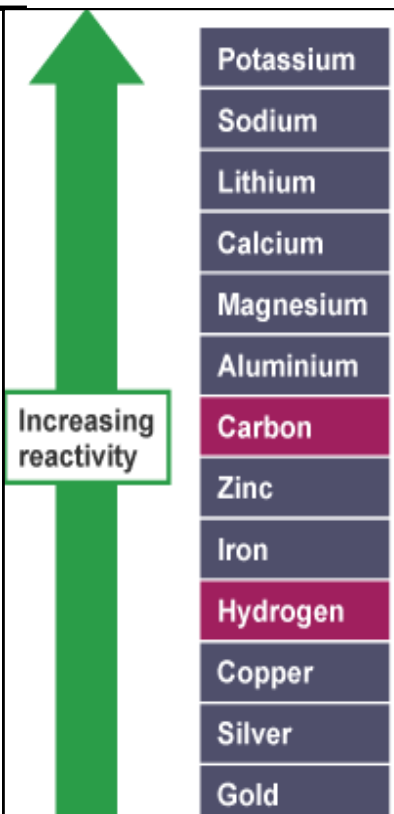Water
Soil
Temperature
Day/Night Time

Breathing
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

Respiration
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.

Lungs

Cell Respiration Formula

$$C_6H_{12}O_6 + 6O_2 \Rightarrow 6CO_2 + 6H_2O + ATP$$

Glucose Oxygen Carbon Dioxide Water Energy

Combustion Reaction: Organic Compound + Oxygen → Energy (Heat and Light) + Carbon Dioxide + Water

Cell Respiration: Organic Compound (Food) + Oxygen → Usable Energy (ATP) + Carbon Dioxide + Water

Photosynthesis Equation

$$6CO_2 + 6H_2O \xrightarrow[\text{Chlorophyll}]{\text{Sunlight / Photosynthesis}} C_6H_{12}O_6 + 6O_2$$

Carbon dioxide + Water → Glucose + Oxygen

Maths in Science:

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.


To Find the Resistance of a Wire
— Set 1
— Set 2
— Set 3
anomaly

Increasing reactivity:
Potassium, Sodium, Lithium, Calcium, Magnesium, Aluminium, Carbon, Zinc, Iron, Hydrogen, Copper, Silver, Gold

Name		KS3 Science
Class		

Neutralisation reactions

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

ACID + ALKALI → SALT + WATER
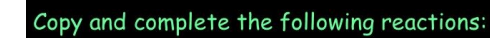
Copy and complete the following reactions:
1) Sodium hydroxide + hydrochloric acid →
2) Calcium hydroxide + hydrochloric acid →
3) Sodium hydroxide + sulphuric acid →
4) Magnesium hydroxide + sulphuric acid →

Reactions of metals with acids

METAL + ACID → SALT + HYDROGEN

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

Copy and complete the following reactions:
1) Calcium + hydrochloric acid →
2) Zinc + hydrochloric acid →
3) Iron + hydrochloric acid →
4) Lithium + sulphuric acid →

Group 1 Alkali metals
Group 2 Alkali earth metals
Group 3 Icosagens
Group 4 Crystallogens
Group 5 Pnictogens
Group 6 Chalcogens
Group 7 Halogens
Group 0 Noble gasses
Transition metals

The Digestive System

Mouth
Salivary glands
Esophagus
Liver
Gallbladder
Stomach
Pancreas
Large intestine
Small intestine
Appendix
Rectum
Anus

Lungs

Pharynx
Larynx
Trachea
Right lung
Thorax
Left lung
Bronchiole
Bronchi
Alveoli
Cardiac notch
Lingula
Bronchial tubes

Maths in Science:

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

Frequency (vertical axis, 0 to 40)
Eye colour (horizontal axis): Green, Blue, Brown

Year 7
Year 8

Green: 22
Blue: 34
Brown: 20

Title – all bar charts need a title to explain what data is being shown.

Vertical axis title – all bar charts need a title along this axis to describe what the information along this axis relates to.

Key – bar charts with more than one bar for each section will need a key so it is clear what each bar refers to.

Our favourite sports

Number of students (vertical axis, 0 to 10)
Girls
Boys
Soccer, Softball, Netball, Other
Sports

Numbered scale – the axis must be numbered with a sensible scale, the numbers could go up in 1s, 2s, 5s, 10s etc. depending on what is appropriate for the data.

Bars – whilst this seems like stating the obvious, your bar chart needs accurately drawn bars that are all the same width.

Horizontal axis title – all bar charts need a title along this axis to describe what the information along this axis relates to.

Bar labels – each bar must be clearly labelled.

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 .
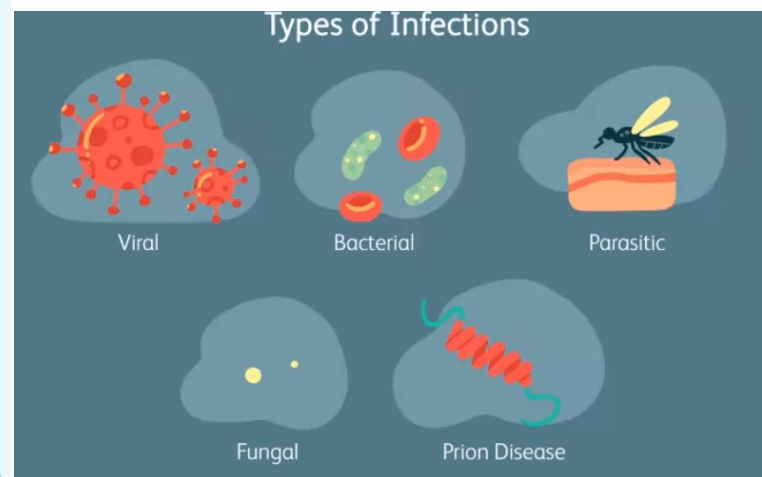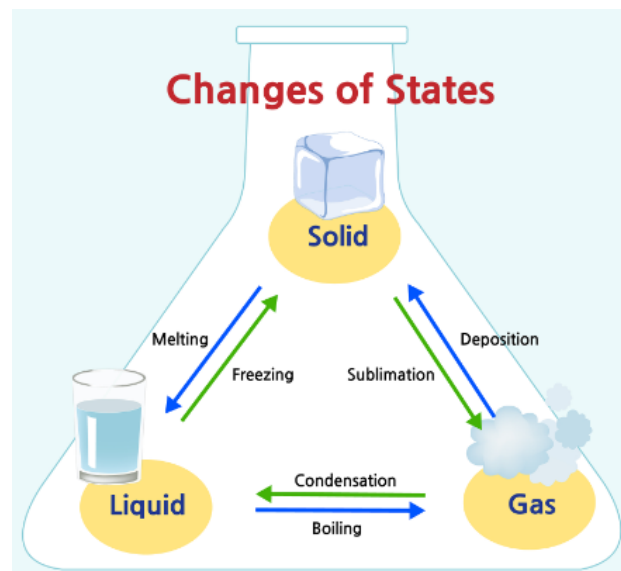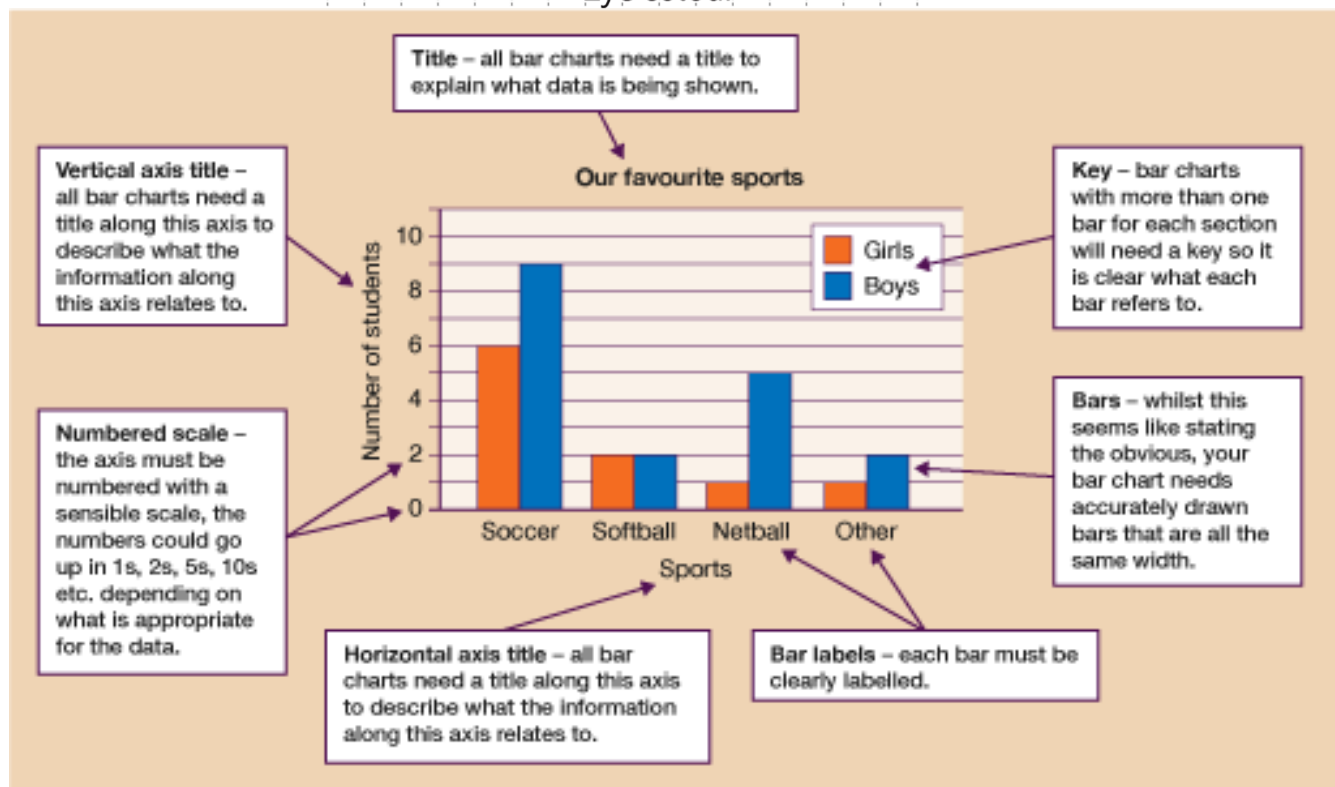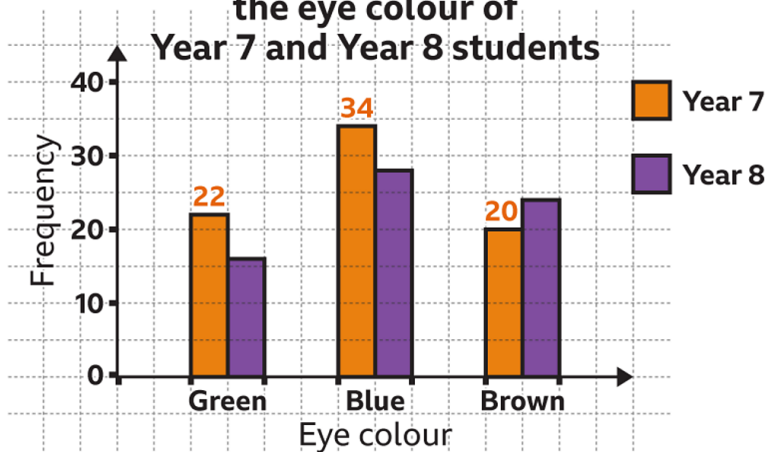
*Key vocabulary about the human body:
Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle

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.

Changes of States

Solid
Liquid
Gas
Melting
Freezing
Sublimation
Deposition
Condensation
Boiling

Types of Infections

Viral
Bacterial
Parasitic
Fungal
Prion Disease

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

Increasing reactivity

Potassium
Sodium
Lithium
Calcium
Magnesium
Aluminium
Carbon
Zinc
Iron
Hydrogen
Copper
Silver
Gold

Interpreting Graphs:
The graph above shows a positive linear correlation between X and Y. As X increases, Y also increases proportionally. 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.

Hope View School
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.

The Digestive System