Glossary

A

Acceleration Change of velocity per second (in metres per second per second, m/s^2).
Acid A substance that produces hydrogen ions when it dissolves in water.
Activation energy The minimum amount of energy needed for a given chemical reaction to take place.
Active site The site on an enzyme where the reactants bind.
Active transport The movement of substances against a concentration gradient across a cell membrane, using energy.
Aerobic respiration The process by which food molecules are broken down using oxygen to release energy for the cells.
Aerobic Using oxygen.
Alkali A soluble base.
Alleles Different forms of the same gene.
Alpha emission A process in which a large unstable nucleus becomes stable by emitting an alpha particle.
Alpha particle scattering Scattering of alpha particles (usually in a narrow beam) by nuclei of the atoms of a thin metal foil.
Amino acids The building blocks of protein.
Anhydrous An anhydrous substance does not contain water.
Anode Positive electrode.
Antistatic material Material that is a poor insulator and which is used to conduct charge to earth.
Aqueous solution A solution with water as the solvent.
Association When two variables change together, but they are both linked by a third variable. E.g. lack of carbon dioxide in soil and poor growth of plants: both could be linked to too much water in the soil.
Atom economy The efficiency of a chemical reaction in terms of all of the atoms involved.
Atomic number The number of protons in a nucleus, symbol *Z* (also called the proton number).

B

Bases Compounds which react with acids to neutralise them.
Beta emission A process in which a neutron-rich nucleus becomes stable as a result of a neutron changing into a proton, creating and emitting a beta particle (i.e. an electron) at the instant of change.
Biological detergents Washing detergents that contain enzymes.
Biomass The amount of biological material in an organism.
Biomass fuel Fuel from animal waste or cut-down plants.
Bladder The organ where urine is stored until it is released from the body.
Braking distance The distance travelled by a vehicle during the time its brakes act.

C

Cable Two or three insulated wires surrounded by an outer layer of rubber or flexible plastic.
Carbohydrases Enzymes which speed up the breakdown of carbohydrates.
Carbon cycle The cycling of carbon through the living and non-living world.
Carriers People who have a single recessive allele for a genetic disease.
Catalyst A substance that speeds up the rate of another reaction but is not used up or changed itself.
Categoric variable These tell us the name of the variable, e.g. copper, iron, magnesium.
Cathode Negative electrode.
Causal link One change in a variable has caused a change in another variable. You can only be reasonably certain of this when you have valid and reliable evidence. E.g. increasing the length of the wire causes an increase in resistance.
Cell membrane The membrane around the contents of a cell which controls what moves in and out of the cell.
Chain reaction Reactions in which one reaction causes further reactions, which in turn cause further reactions, etc. A nuclear chain reaction occurs when fission neutrons cause further fission, so more fission neutrons are released. These go on to produce further fission.
Chance When there is no scientific link between the two variables. E.g. increased sea temperatures and increased diabetes.
Charging by friction The process of charging certain insulating materials by rubbing with a dry cloth, causing electrons to transfer between the material and the cloth.
Charging without direct contact The process in which an insulated conductor is charged without being in direct contact with a charged object.
Chip An electronic component which contains an integrated circuit.
Chloride ion A chlorine atom that has gained one electron, which gives it a negative charge.
Chlorophyll The green pigment contained in the chloroplasts.
Chloroplasts The organelles in which photosynthesis takes place.
Circuit breaker An electromagnetic switch that opens and cuts the current off if too much current passes through it.
Circuit Components connected together so that current passes through them.
Collision theory An explanation of chemical reactions in terms of reacting particles colliding with sufficient energy for a reaction to take place.
Combustion The process of burning.
Component A part or device in an electric circuit.
Compost heap A site where garden rubbish and kitchen waste are decomposed by microorganisms.
Concentration gradient The gradient between an area where a substance is at a high concentration and an area where it is at a low concentration.
Conduction electrons Electrons that move about freely inside a metal because they are not attached to individual atoms.
Conservation of momentum Momentum is conserved in any collision or explosion provided no external forces act on the objects that collide or explode.
Constrict To narrow.
Continuous variable A continuous variable can be any numerical value, e.g. your own weight.
Control rods Metal rods (made of boron or cadmium) used to absorb excess fission neutrons in a nuclear reactor so that only one fission neutron per fission on average goes on to produce further fission.
Controlled An experiment is controlled when all variables that might affect your result (apart from the independent variable) have been kept constant.

Coolant Fluid in a sealed circuit pumped through the core of a nuclear reactor to remove thermal energy to a heat exchanger.
Coulomb (C) The unit of electrical charge, equal to the charge passing a point in a (direct current) circuit in 1 second when the current is 1 A.
Covalent bonds The bonds formed when atoms join together by sharing electrons.
Cystic fibrosis A genetic disease that affects the lungs, digestive and reproductive systems. It is inherited through a recessive allele.
Cytoplasm The water-based gel in which the organelles of all living cells are suspended.

D

Daughter cells The cells produced by cell division.
Deceleration Change of velocity per second when an object slows down.
Decompose To split up.
Decomposers Microorganisms that break down waste products and dead bodies.
Delocalised electrons Electrons in a molecule which do not belong to a single atom or a single bond.
Denatured Enzymes that are denatured have their protein structure broken down and can no longer catalyse a reaction.
Dependent variable The variable that you are measuring as a result of changing the independent variable, e.g. the volume of CO_2 produced.
Detritus feeders See **decomposers**.
Differentiated Specialised for a particular function.
Diffusion The net movement of particles of a gas or a solute from an area of high concentration to an area of low concentration (along a concentration gradient).
Dilate To widen.
Discrete variable These are numerical, but can only be whole numbers, e.g. numbers of layers of insulation.
Dominant The characteristic that will show up in the offspring even if only one of the alleles is inherited.
Drag force A force opposing the motion of an object due to fluid (e.g. air) flowing past the object as it moves.

E

Earth wire A wire used to connect the metal case of an appliance to earth so that the case cannot become live.
Earthed Connected to the ground by means of a conducting lead or wire.
Elastic A material is elastic if it is able to regain its shape after it has been squashed or stretched.
Elastic potential energy Energy stored in an elastic object when work is done to change its shape.
Electric current The rate of flow of electric charge (in amperes, A).
Electric potential energy Energy of a charged object due to its charge (in joules, J).
Electrical energy Energy transferred by the movement of charge.
Electrical power The rate of transfer of electrical energy (in watts, W).
Electrolyte A substance that conducts electricity when molten or when dissolved in water.
Electron microscope An instrument used to magnify specimens using a beam of electrons.
Electronic structure The arrangement of electrons around the nucleus of an atom.
Electrons Negative particles found outside the nucleus of an atom.
Empirical formula A chemical formula that shows the ratio of the number of atoms in a compound.
Emulsify To physically break down large droplets into smaller droplets.
Endothermic Involving a net absorption of energy.
Energy level See **shells**.
Enzymes Biological catalysts.
Enzyme substrate complex The combination of the enzyme and the substrate at the active site.
Equilibrium The point at which a reversible reaction takes place at exactly the same rate in both directions.
Exothermic Involving a net release of energy.

F

Fatty acids Building blocks of lipids.
Force A force can change the motion of an object (in newtons, N).
Friction force A force opposing the relative motion of two surfaces where they are in contact with each other.
Fructose syrup A sugar syrup.
Fullerene A type of giant structure made up of carbon atoms.
Fuse A fuse contains a thin wire that melts and cuts the current off if too much current passes through it.

G

Galvanising Covering iron with a protective layer of zinc.
Genetic diseases Diseases which are inherited.
Genetic disorders See **genetic diseases**.
Giant covalent structures Giant structures held together by many covalent bonds which give them high melting points and hardness, e.g. diamond.
Giant structure Large numbers of atoms or ions arranged in a regular way.
Glucagon Hormone involved in the control of blood sugar levels.
Glucose A simple sugar.
Glycerol Building block of lipids.
Glycogen Carbohydrate store in animals.
Grain A metal crystal.
Grain boundaries Where two metal crystals meet.
Gravitational field strength The force of gravity on an object of mass 1 kg (in newtons per kilogram, N/kg).
Gravitational potential energy Energy of an object due to its position in a gravitational field.
Near the Earth's surface, change of g.p.e. (in joules, J) = weight (in newtons, N) × vertical distance moved (in metres, m).
Groups Vertical columns of elements in the periodic table.

H

Haber process The industrial process used to make ammonia.
Homeostasis The maintenance of constant internal body conditions.
Hydrated A hydrated substance contains water.
Hydroponics Growing plants in water enriched by mineral ions rather than soil.
Hypothesis Using theory to suggest explanations for observations, e.g. 'I think that the plants are smaller because they do not have enough water.'

I

Impact force The force acting on an object when it collides with another object; the two objects experience equal and opposite forces.
Independent variable The variable that you have decided to change in an investigation, e.g. temperature of the acid.
Indicator A chemical compound that changes colour according to the pH of the solution it is in.
Inert Unreactive.
Insoluble Unable to dissolve in a given solvent.
Insulin Hormone involved in the control of blood sugar levels.
Ionic bond A chemical bond formed when one atom gives up one or more electrons to another atom.
Isomerase An enzyme which converts one form of a molecule into another.

Isotopes Atoms of the same element which have different numbers of neutrons.

K

Kidneys Organs which filter the blood and remove urea, excess salts and water.
Kinetic energy Energy of a moving object due to its motion; kinetic energy (in joules, J) $= \frac{1}{2} \times$ mass (in kilograms, kg) $\times$ (speed)^2 (in m^2/s^2).

L

Law of force between charged objects Like charges repel; unlike charges attract.
Light microscope An instrument used to magnify specimens using lenses and light.
Limiting factors Factors which limit the rate of a reaction, e.g. photosynthesis.
Lipids Fats and oils.
Live wire The wire of a mains circuit that has a potential that alternates from positive to negative and back each cycle.
Liver A large organ in the abdomen which carries out a wide range of functions in the body.

M

Magnesium A metallic element. Magnesium ions are needed by plants to make chlorophyll.
Mass A measure of the difficulty of changing the motion of an object (in kilograms, kg).
Mass number The total number of protons and neutrons in the nucleus of an atom (symbol *A*).
Meiosis The two-stage process of cell division which reduces the chromosome number of the daughter cells. It is involved in making the gametes for sexual reproduction
Mitochondria The site of aerobic cellular respiration in a cell.
Mitosis Asexual cell division where two identical daughter cells are formed.
Mixing occurs when two or more substances are physically mixed but not chemically combined.
Moderator A solid or liquid used in a nuclear reactor to slow fission neutrons down so they can cause further fission.
Mole The relative formula mass of a substance in grams.
Molecular formula A formula that shows the total number of the different kinds of atoms in a molecule.
Momentum Mass (in kilograms, kg) $\times$ velocity (in m/s).
Motive force A force on a powered object (e.g. a vehicle) that makes it move.

N

Net Overall.
Neutral Neither acid nor alkaline.
Neutral wire The wire of a mains circuit that is earthed at the local sub-station so its potential is close to zero.
Neutrons Neutral particles found in the nucleus of an atom.
Nitrates Mineral ions needed by plants to form proteins.
Nitrogen Inert gas making up around 80% of the Earth's atmosphere.
Noble gases The unreactive gases which have a complete outer shell of electrons, e.g. neon, argon, helium.
Nuclear fission reactor A reactor that releases energy as a result of nuclear fission inside it.
Nuclear fission The process in which certain nuclei (uranium 235 and plutonium 239) split into two fragments when struck by a neutron, releasing energy and two or three neutrons as a result.
Nuclear fusion The process in which small nuclei are forced together so they fuse with each other to form a larger nucleus, releasing energy in the process.
Nuclear model of the atom Every atom contains a positively charged nucleus consisting of neutrons and protons. This is where most of its mass is concentrated, and it is much smaller than the atom. Electrons move about in the space surrounding the nucleus.
Nucleus (of a cell) An organelle found in many living cells containing the genetic information.

O

Ohm's law The current through a resistor at constant temperature is directly proportional to the potential difference across the resistor.
Ohmic conductor A conductor that has a constant resistance and therefore obeys Ohm's law.
OILRIG Oxidation Is Loss, Reduction Is Gain (of electrons).
Ordered variable Variables that can be put into an order, e.g. small, large, huge lumps of rock. These tell us more than categoric variables.
Organ A group of different tissues working together to carry out a particular function.
Organ systems A group of organs working together to carry out a particular function.
Organelles Membrane-bound structures in the cytoplasm of a cell which carry out particular functions.
Oscilloscope A device used to display the shape of an electrical wave.
Osmosis The net movement of water from an area of high concentration (of water) to an area of low concentration (of water) along a concentration gradient.
Ova The female sex cells, eggs.
Ovaries Female sex organs which produce eggs and sex hormones.
Oxidation Losing electrons.
Oxidised See **oxidation**.

P

Pancreas An organ which produces the hormone insulin and many digestive enzymes.
Parallel circuit rules 1. The potential difference across components in parallel is the same. 2. The total current passing through components in parallel is shared between the components.
Parallel Components connected in a circuit so that the potential difference is the same across each one.
Partially permeable Allowing only certain substances to pass through.
Percentage yield The percentage of product formed in a chemical reaction compared with the maximum possible amount of product that could be formed.
Periods Rows of elements in the periodic table.
pH scale A scale running from 0 to 14 that describes the degree of acidity of a solution.
Phloem The living transport tissue in plants which carries sugars around the plant.
Photosynthesis The process by which plants make food using carbon dioxide, water and light energy.
Plasma A gas consisting of bare nuclei (i.e. atoms stripped of their electrons).
Plug A plug has an insulating case and is used to connect the cable from an appliance to a socket.
Plum pudding model of the atom A model of the atom which supposed that the positive charge was evenly spread throughout its matter and the negative charge was held in tiny particles (electrons) inside the atom.
Potential difference A measure of the difference in electric potential energy per unit charge between two charged objects (in volts, V).
Power The energy transformed per second. The unit of power is the watt (W).
Precipitate A solid material produced from a solution.
Precipitation See **precipitate**.
Protease An enzyme which breaks down proteins.
Protein synthesis The process of building up protein molecules from

amino acids on the surface of a ribosome.

Proton number See **atomic number**.

Protons Positive particles found in the nucleus of an atom.

Pyramid of numbers A model of feeding relationships based on the numbers of organism at each level of a food chain.

R

Random error Measurements when repeated are rarely exactly the same. If they differ randomly then it is probably due to human error when carrying out the investigation.

Recessive The characteristic that will show up in the offspring only if both of the alleles are inherited.

Redox A **RED**uction **OX**idation reaction in which electrons are lost by one substance and gained by another.

Reduced See **reduction**.

Reduction Gaining electrons.

Relative atomic mass The mass of an atom compared with an atom of $^{12}_{6}C$. This is usually the same as or very similar to the mass number of the element.

Relative formula mass The mass of a chemical compound based on the relative atomic masses of the elements involved.

Reliable Describes data we can trust. E.g. others can get the same results, even using different methods.

Resistance Resistance (in ohms, Ω) = potential difference (in volts, V) ÷ current (in amperes, A).

Resistors in parallel Resistors in a circuit with the same potential difference across each one. The bigger the resistance of a resistor, the smaller the current that passes through it

Resistors in series Resistors in a circuit with the same current passing through them. Their combined resistance = sum of the individual resistances.

Respiration The process by which food molecules are broken down to release energy for the cells.

Resultant force The combined effect of the forces acting on an object.

Reversible reaction A reaction in which the products immediately react together to produce the original reactants.

Ribosomes The site of protein synthesis in a cell.

S

Series circuit rules 1. The current through components in series is the same. 2. The total potential difference across components in series is shared between the components.

Series Components connected in a circuit so that the same current passes through them are in series with each other.

Sewage treatment plant A site where human waste is broken down using microorganisms.

Sex chromosomes The chromosomes which carry the information about the sex of an individual.

Shells The region in which electrons are concentrated as they travel around the nucleus of an atom.

Short-circuit A circuit fault in which two wires at different potentials touch and a large current passes between them at the point of contact.

Socket A mains socket is used to connect the mains plug of a mains appliance to the mains circuit.

Sodium ion A sodium atom that has lost an electron to give it a positive charge.

Soluble Able to dissolve in a given solvent.

Solute The solid which dissolves in a solvent to form a solution.

Solvent A liquid in which some solids will dissolve.

Specialised Adapted for a particular function.

Speed Distance travelled per second (in metres/second, m/s).

Sperm The male sex cells.

Static electricity Charge 'held' by an insulator or an insulated conductor.

Stem cells Undifferentiated cells with the potential to form a wide variety of different cell types.

Stopping distance Braking distance + thinking distance.

Sugars Simple carbohydrates.

Systematic error If the data is inaccurate in a constant way, e.g. all results are 10 mm more than they should be. This is often due to the method being routinely wrong.

T

Terminal velocity The velocity reached by an object when the drag force on it is equal and opposite to the force making it move.

Testes Male sex organs which produce sperm and sex hormones.

Thermal decomposition Splitting up a substance by means of heat.

Thermoregulatory centre The area of the brain which is sensitive to the temperature of the blood.

Thinking distance The distance travelled by the vehicle in the time it takes the driver to react.

Three-pin plug A three-pin plug has a live pin, a neutral pin and an earth pin. The earth pin is used to earth the metal case of an appliance so the case cannot become live.

Time base control An oscilloscope control used to space the waveform out horizontally.

Tissue A group of specialised cells all carrying out the same function.

U

Universal indicator A substance containing a range of indicators to provide a measurement of pH.

Urea A substance produced by the liver as a waste product from breaking down excess amino acids.

Urine The liquid formed by the kidneys.

V

Valid Describes an investigation that successfully gathers the data needed to answer the original question.

Van de Graaff generator A large insulated metal dome charged by the motion of a rubber belt brushing against a friction pad.

Velocity Speed in a given direction (in metres/second, m/s).

Volt (V) The unit of potential difference, equal to energy transfer per unit charge in joules per coulomb.

W

Weight The force of gravity on an object (in newtons).

Work Energy transferred by a force, given by:
Work done (in joules, J) = force (in newtons, N) × distance moved in the direction of the force (in metres, m).

X

Xylem The non-living transport tissue in plants, which transports water around the plant.

Y

Y-gain control An oscilloscope control used to adjust the height of the waveform.

Yield The amount of product formed in a chemical reaction.