Glossary

The words in this list occur in **dark type** throughout the book. The number after each entry gives the page where you will find more information. For some words the pronunciation is given. The syllable in capitals should be stressed; for example, evaporation (e-VAP-or-AY-shun).

acceleration: the rate at which an object speeds up or slows down; average acceleration (in m/s^2) is calculated by dividing the change in speed by the time. 104

activity series: a list of the metals arranged from the most reactive to the least reactive. 300

addition: making colour by adding different coloured lights together. 61

alkali metals: very reactive elements in Group I of the periodic table, eg sodium and potassium. 268

alkaline earth metals: reactive metals in Group II of the periodic table, eg magnesium and calcium. 268

alleles (a-LEELs): different forms of the same gene; each allele produces variations in inherited characteristics, eg eye colour. 195

allotropes: different forms of the same element; for example, diamond, graphite and buckyballs are allotropes of carbon. 271

AM (amplitude modulated): radio stations that broadcast using a type of wave whose frequency is constant but whose amplitude varies. 94

amplitude: the size of a signal or the loudness of a sound, measured by the height of the wave above or below the zero point. 75

analog (AN-a-log) signal: a wave signal used in communication devices, that varies in value at different points in time. 76

anodising: an electrolytic process which thickens the protective film of oxide on the surface of aluminium. 301

artificial selection: the selection and breeding of particular organisms to produce offspring with desired characteristics. 225

atomic number: the number of protons in the nucleus of an atom; equal to the number of electrons. 262

auxins (ORK-sins): a group of hormones responsible for the growth of cells in the stems and roots of plants. 168

biomass: plant and animal material used as a source of renewable energy. 140

bit: a binary digit, with the value 1 (on) or 0 (off). 76

blind experiment: a controlled experiment involving people, where the subjects do not know who is in the control group and who is in the test group. 7

brain: the main organ of the nervous system, which controls all the systems in the body. 156

brain stem: the base of the brain which controls involuntary actions such as breathing and heartbeat. 157

byte: a unit of information, usually eight bits, used in communications technology. 76

capacitors: electronic components that store charge in a circuit. 83

cathode ray tube: a glass tube in which an electron beam is produced and controlled to form a pattern of light on a fluorescent screen. 90

cerebellum (ser-a-BELL-um): a small, crinkly part at the lower back of the brain which controls involuntary actions such as balance and coordination. 157

cerebrum (ser-EE-brum): the largest part of the brain; it controls memory, speech and voluntary actions, and receives information from sense receptors. 157

chemical bonds: attractive forces between atoms holding them together. 236

chromosomes: objects found in the nucleus of a cell that carry the genetic information. 180

clones: organisms that have identical genes to their parents. 230

co-dominance: where the genes for a particular characteristic combine to give features of both the individual genes. 200

communication: the sending of a message, verbally or non-verbally, to another person who understands the message. 74

correlation: how closely two variables depend on each other. 14

corrosion: the process in which water and air react with metals; rusting is the corrosion of iron. 298

covalent bond: a chemical bond formed by the sharing of electrons between two or more atoms. 240

digital signal: a wave signal used in communication devices; it has one of two values—zero or one. 76

diode: an electronic component that allows current to flow in one direction only. 82

dispersion: the splitting up of white light into the colours of the spectrum. 58

DNA (deoxyribonucleic acid): the complex chemical compound found in chromosomes that contains the genetic code. 186

dominant gene: a gene for a particular characteristic that completely hides or masks the alternative (recessive) gene. 195

double-blind experiment: an experiment in which neither the subjects nor the experimenters know who is in the control group and who is in the test group. 7

dry cells: electric cells that contain a moist paste rather than a liquid electrolyte. 287

electric cell: an electrochemical cell that converts chemical energy into electrical energy using chemical reactions. 284

electrodes: conductors that allow electric current to flow into or out of an electrolyte. 284

electrolysis (ee-lek-TROL-e-sis): the process of passing an electric current through an electrolyte to produce chemical reactions at the electrodes. 276

electrolyte (ee-LEK-tro-lite): a substance in solution or molten that conducts an electric current and is decomposed in the process. 284

electromagnetic spectrum: the full range of electromagnetic radiation, such as heat, light, ultraviolet and X-rays. 67

electroplating: depositing a thin layer of metal on another using electrolysis. 293

emulsifiers (ee-MULL-si-fiers): substances which can turn mixtures into emulsions (colloids with tiny droplets of one liquid, eg oil, spread through a second liquid, eg water). 43

endocrine glands: glands found in various places in the body, which produce hormones and release them directly into the blood. 162

endocrine system: system consisting of a number of endocrine glands throughout the body. 156

evolution: a process in which species change over time and develop into new species. 219

extrapolating (ex-STRAP-oh-late-ing): using a graph to predict a value beyond the range of a set of measurements. 13

FM (frequency modulated): radio stations that broadcast using a type of wave whose amplitude is constant but whose frequency varies. 95

focus: the point at which rays of light meet after reflection from a curved mirror, or refraction by a lens. 49

frequency: the number of waves that pass a certain point in one second; it is measured in hertz (Hz). 94

friction: a force that opposes motion of one surface across another; before sliding occurs you have **static friction**, and once sliding occurs you have **sliding friction**. 113

fuel cell: an electric cell in which the reactants are supplied continuously; in a common fuel cell, hydrogen and oxygen react to produce water. 150

gene pool: the sum of all the genes in a population of a particular organism. 219

genes: segments of DNA that carry genetic information from one generation to the next. 186

genetic engineering: the common term for a technique in biotechnology of inserting desired genes from one species into the chromosomes of another species. 226

genome: the total genetic material in an organism. 191

genotype (JEE-no-type): the type of genes in an organism. 197

geostationary orbits: orbits at a particular altitude such that a satellite remains over the same point on the Earth's surface. 318

geothermal power stations: power stations which use hot water or steam from deep within the Earth to generate electricity. 141

half-life: the time it takes a radioactive substance to lose half of its radioactivity. 130

halogens: very reactive non-metals in Group VII of the periodic table, eg chlorine and iodine. 270

heterozygous (HET-er-o-ZYE-gus): where the genes for a particular characteristic are different; a hybrid. 197

homozygous (HO-mo-ZYE-gus): where the genes for a particular characteristic are the same; a pure breeder. 197

hormones: chemical messages that control important processes of an organism, such as growth. 156

incomplete dominance: where the genes for a particular characteristic are neither dominant nor recessive but combine to give a mixture or blend of characteristics. 200

inertia (in-ER-sha): the tendency of a body to stay at rest or continue its motion, unless acted on by a force; this is called Newton's first law of motion. 117

interpolating (in-TERP-oh-late-ing): using a graph to predict a value between two or more measurements. 13

ions (EYE-ons): atoms or groups of atoms that have a positive or negative charge, caused by the loss or gain of electrons. 236

ionic bond: a chemical bond resulting from the attraction between oppositely charged ions. 237

law of reflection: the angle of incidence of a light ray is equal to the angle of reflection. 49

line of best fit: a line which is closest to most of the plotted points on a graph; it shows the relationship between two variables. 11

liquid crystal displays (LCDs): displays which use liquid crystals sealed between two glass plates; used in digital watches, calculators and flat screen TVs. 93

meiosis (my-OH-sis): the process of cell division that produces sex cells with half the number of chromosomes that body cells have. 182

microgravity: a term that describes the apparent weightlessness of an object that is in orbit. 322

minerals: metal compounds found in the Earth. 273

momentum: the mass of a moving body multiplied by its speed. 117

mutations: permanent changes in genes; they may be caused by exposure to radiation or chemicals. 188

natural selection: the process in which the best adapted individuals survive in a particular habitat (often called survival of the fittest). 213

negative feedback system: a system of control in the body in which the response acts as a stimulus to oppose the change caused by the original stimulus. 171

nervous system: system consisting of the brain, spinal cord and nerves that run to all parts of the body. 156

neuron (NEW-ron): the basic unit of the nervous system; a nerve cell. 158

noble gases (or inert gases): unreactive gases in Group VIII of the periodic table, eg helium and neon. 270

non-renewable energy: energy resources that are not replaced as they are used; for example, coal and oil. 130

nuclear fission: the splitting of the nucleus of a large atom such as uranium into smaller atoms, with the release of a large amount of energy. 130

nuclear fusion: the combining of nuclei of small atoms, such as hydrogen, into larger nuclei, with the release of large amounts of energy; the process occurs in stars. 132

objective tests: tests where the results are based on measurements rather than people's opinions. 28

optical fibres: cables made of thin pure glass fibres which allow the transmission of digital light pulses over long distances. 77

orbit: the path followed by an object in space as it moves around another object. 315

ores: mineral-containing rocks that are suitable for mining and mineral extraction. 273

pedigree: a family tree, showing the inheritance of particular characteristics from one generation to later generations. 198

periodic table: a listing of the elements in order of their atomic numbers; elements are grouped according to their chemical properties. 262

phenotype (FEE-no-type): the physical appearance or characteristics of an organism. 197

phosphors (FOS-fours): substances, coated on the inside of a cathode ray tube or plasma screen, that glow when struck by electrons. 91

pituitary (pit-YOU-it-tree) gland: an endocrine gland, located on the underside of the brain, that controls other endocrine glands. 163

placebos (pla-SEE-bows): substances that have no chemical effect on the body; given to a subject in a blind or double-blind experiment. 7

quadrat: a small measuring area which can be used to sample the organisms in a particular area. 17

reaction time: the time it takes you to respond to a stimulus; for example, the time between seeing a red light and applying the brakes. 111

recessive gene: a gene for a particular characteristic that is completely hidden or masked by the alternative (dominant) gene. 195

recombination: the process by which offspring have a combination of genes from each parent. 210

reflex action: an automatic response to a stimulus without involving the brain. 160

refraction: the bending of light which occurs when light passes from one transparent substance to another. 51

renewable energy: energy resources that can be replaced as they are used; for example, wood and solar energy. 130

replication: the process by which DNA makes identical copies of itself. 187

resistors: poor conductors used to reduce the amount of current flowing in an electric circuit. 82

sample: a small part of anything, intended as representative of the whole, eg a sample of city voters. 29

satellite: a natural or artificial object that orbits a planet. 315

scatter graph: a graph where you plot many points to see if there is any correlation between two variables. 14

scattering (of light): the bouncing of light from particles such as dust or smoke. 63

semiconductors: substances, for example silicon and germanium, that have properties between conductors and insulators and that are used to make diodes and transistors. 87

smelting: the process of extracting metals from their ores through melting. 274

solar cell (or photovoltaic cell): a device containing a semiconductor which absorbs solar energy and converts it directly to electrical energy. 135

species: a population of organisms that have similar features and can interbreed. 218

spectrum: the rainbow colours produced when white light is split up after passing through a prism or raindrops. 58

speed (average): the total distance travelled, divided by the time it takes to go that distance; usually measured in m/s or km/h. 102

subjective tests: tests where the results are based on people's opinions rather than on measurements. 28

subtraction (of colour): making colours by mixing different paints or pigments together. 61

survey: a method of obtaining information which involves looking at a sample of a larger group. 28

thrust: the force developed by a rocket's engines to move it forward. 312

total internal reflection: occurs when light hits a boundary between two transparent substances at a large angle of incidence and is reflected, with none transmitted. 54

transistor: an electronic component that acts as a switch or an amplifier in a circuit. 83

transition metals: the elements found in the middle of the periodic table; they include common metals such as iron and copper. 269

valency: the number of electrons an atom gains, shares or loses when combining with other atoms. 243

valence electrons: the electrons in the outer shell of an atom; these electrons participate in chemical reactions. 264

viscosity: a measure of how easily a liquid flows. 35

X-linked: genes that are found on the X chromosome but have no equivalent on the Y chromosome. 202