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).

abiotic factors: physical or non-living factors which affect the survival of organisms in ecosystems; for example, soil type, availability of clean water and temperature. 302

acid rain: rain which is acidic due to dissolved air pollutants; it can damage plants and buildings. 236

acids: substances which can form hydrogen ions (H^+) in solution; an acid can neutralise a base. 218

adaptations (ADD-ap-TAY-shuns): the characteristics of an organism which enable it to survive in its habitat. 243

alkalis: bases that are soluble in water. 218

alloys: mixtures composed wholly or mainly of metals; they have properties different from the metals they are made from. 192

alveoli (AL-vee-OH-lee): minute air sacs in the lungs which allow the gases to pass into and out of the blood capillaries. 106

ammeter: an instrument used to measure electric current, in amperes or amps (A). 173

anticlines: upwards-bending folds in rock layers. 147

arteries: thick-walled blood vessels that carry blood *away from* the heart. 104

bases: substances that can form hydroxide ions (OH^-) in solution; a base can neutralise an acid. 218

behavioural adaptation: the way an organism behaves in order to survive in its habitat. 244

Big Bang model: a model that suggests that the universe began as a massive explosion; it is based on evidence that the universe is expanding. 286

biodegradable: able to be broken down or decayed by biological means (bacteria and fungi). 201

biotic factors: biological or living factors which affect the survival of organisms in ecosystems; for example, predators and availability of food. 302

black holes: invisible objects in space that emit X-rays and that are thought to form when the most massive stars explode. 283

capillaries: microscopic blood vessels with very thin walls that allow substances in the blood to pass to and from the body cells. 104

carbohydrates: a food type that supplies energy for the body; carbohydrates include sugars and starches. 90

cast (fossil): an exact copy of the original organism formed when minerals from the surrounding rocks seep into a mould and solidify. 140

catalysts (CAT-a-lists): substances that speed up chemical reactions, without being used up themselves. 32

catalytic converters: devices fitted to cars to convert the exhaust gases to less harmful ones; they usually contain catalysts such as platinum. 37

cellular respiration: the process that occurs in cells in which food is broken down in chemical reactions to release energy. 88

chemical bonds: attractive forces between atoms holding them together. 196

chemical formula: a group of symbols and numbers indicating the elements in a compound and the ratio of these elements; for example H_2O. 76

chromosomes (KROME-oh-somes): objects found in the nucleus of a cell that carry the genetic information. 120

chromosphere: the lower atmosphere of the Sun in which bursts of glowing gas shoot out from the surface. 275

circuit-breakers: safety devices that break electric circuits when they carry too much current. 169

combustion (burning): a rapid chemical reaction that occurs when a substance reacts with oxygen in the air, producing heat and light energy. 38

compound: a pure substance that contains atoms of two or more elements combined in a fixed ratio; it can be broken down into its elements by chemical reactions. 76

concentration: the amount of solute dissolved in a certain volume of solution. 28

conduction: the transfer of heat through a solid, or the passing of an electric current through a solid or liquid. 53

conductor: a substance that allows heat or electricity to move through it easily. 53

continental drift: an early theory which suggested that the positions of the continents on the Earth's surface have changed over time. 159

control the variables: to keep all the variables the same, except the one you are purposely changing in an experiment. 6

convection: the transfer of heat in a liquid (or gas) by the movement of particles, when less dense liquid rises and more dense liquid flows in to take its place. 55

core: the innermost part of the Earth, made of a liquid outer core and a solid inner core. 146

corona: the upper atmosphere of the Sun which can be seen only during a solar eclipse. 275

corrosion: the process in which a metal reacts with the air, water and other substances in its surroundings; the rusting of iron is one form of corrosion. 194

corrosive: type of chemical which can burn or 'eat away' skin and other materials; examples include acids and alkalis. 218

cosmology: the study of the origin and structure of the universe. 286

crust: the relatively thin, solid outer skin of the Earth. 146

dependent variable: a variable that changes in response to changes in the independent variable; values for this variable are graphed on the vertical axis. 9

detergents: synthetic compounds with cleaning properties similar to soap. 201

digestion: the physical and chemical breakdown of food into soluble materials. 96

DNA (deoxyribonucleic acid): the chemical compound found in chromosomes that contains the genetic code. 122

dominant gene: a gene for a particular characteristic that hides or masks a recessive gene. 131

earth wire: a wire connecting the metal case of an appliance to the ground. 170

ecliptic (ek-CLIP-tick): the path followed by the Sun, Moon, planets and a number of constellations in their apparent movement across the sky. 271

ecosystem: the system of relationships among organisms and their interactions with the non-living parts of the environment. 242

electrical resistance: resistance to the flow of electric current through a conductor; good conductors have low resistance. 169

element: a pure substance made up of only one type of atom; it cannot be broken down into simpler substances by chemical reactions. 71

endothermic reaction: a reaction during which energy is absorbed; energy must be supplied to keep the reaction going. 38

energy pyramid: a diagram that shows the amount of chemical potential energy in each level of a food web. 297

enzymes (EN-zimes): biological catalysts that speed up (or control) chemical reactions in organisms. 34

epicentre: the point on the Earth's surface directly above where the movement of rocks occurs in an earthquake. 153

evolution: through a process of natural selection, species change over time and new species may form. 260

excretion (ex-KREE-shun): the process of removing wastes from the body by the liver and kidneys. 107

exothermic reaction: a reaction that releases energy. 38

faeces (FEE-seas): solid waste produced by the body and removed through the anus. 107

fair test: an experiment where you change something, measure something and keep everything else the same. 6

fats: a food type that supplies a large amount of energy and which can be stored in the body. 90

fault: a crack in the Earth's crust along which rocks move. 148

fertilisation: the process in which the nuclei of a sperm and ovum join, making a new living thing. 129

folds: the buckling of rocks caused by huge Earth forces. 147

fossils: preserved remains, impressions or traces of past life on Earth. 138

fractional distillation: distillation process used to separate a mixture of liquids into 'fractions', based on their different boiling points. 197

functional adaptation: the way an organism's body works in order to survive in its habitat. 244

fuse: a safety device containing a piece of wire that melts and breaks the circuit if too great an electric current passes through it. 169

gene: a section of DNA containing a sequence of bases. 123

generalisation: a statement or conclusion, based on many observations, that holds true in most cases: for example, most plants are green. 3

generators (electric): devices that use electromagnetic induction to convert kinetic energy into electrical energy. 183

geological time scale: a timeline of events in the history of the Earth, presented as a chart with the oldest events at the bottom and the present at the top. 143

global warming: an increase in the global temperature of the Earth thought to be due to the build-up of greenhouse gases in the atmosphere. 309

greenhouse effect: the trapping of heat energy by gases in the atmosphere, causing its temperature to rise; carbon dioxide is the main greenhouse gas. 307

heat: a type of energy that can raise the temperature of things; it is measured in joules. 47

hydrocarbons: covalent compounds containing only the elements hydrogen and carbon. 197

hypothesis (high-POTH-e-sis): a generalisation that explains a set of observations or gives a possible answer to a question; it can be tested by experimenting. 7

independent variable: a variable that is purposely changed in an experiment; values for this variable are graphed on the horizontal axis. 9

indicator (acid–base): a substance, eg litmus, that turns different colours in acidic and basic solutions. 220

inheritance: the passing on of characteristics (genes) from one generation to the next. 128

insulator: a substance that does not allow heat or electricity to move through it easily. 53

ion (EYE-on): an atom or group of atoms that has a positive or negative charge, caused by the loss or gain of electrons. 227

ionosphere (eye-ON-os-fear): the top layer of the atmosphere; it contains ions formed from collisions of cosmic rays with gas molecules. 306

kidneys: organs that filter and remove waste materials from the blood. 106

kilowatt-hour (kWh): the unit used to measure electrical energy; it is 1000 watts used for one hour. 177

law of conservation of mass: the total mass of the reactants in a chemical reaction is always equal to the total mass of the products. 42

line of best fit: a line which is closest to most of the plotted points drawn on a graph; it shows the relationship between two variables. 174

liver: a large dark red organ that stores and distributes digested food materials. 103

lungs: large organs which absorb oxygen from the air and remove carbon dioxide from the body. 106

mantle: thick layer of rock below the Earth's crust; it is partly solid and partly molten. 146

mitosis (my-TOE-sis): a process of cell division in which a cell makes two daughter cells exactly the same as the original cell. 121

molecule: a tiny particle containing two or more atoms in a fixed ratio and joined by chemical bonds. 69

mould (fossil): a hollow imprint in a rock left behind by an organism. 140

mutations: alterations to genes; they may be caused by radiation or certain chemicals. 251

natural selection: the process in which organisms with favourable characteristics survive in a particular habitat, and pass these characteristics on to their offspring. 245

nebula (NEB-you-la): a huge expanding cloud made up of dust and gases formed after a massive star explodes (supernova). 281

neutralisation: the reaction of an acid and a base to form salt and water. 234

neutron star: a small star made of extremely dense matter and formed from the remaining matter after a massive star explodes. 283

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. 185

ohm (Ω): the unit of electrical resistance. 173

Ohm's law: the current (I) flowing through a resistor is proportional to the voltage difference (V) between its ends; the equation for Ohm's law is V = I R, where R is the resistance. 174

ova (singular: ovum): female sex cells. 129

ozone layer: a layer containing ozone gas found at the top of the stratosphere; it absorbs some of the dangerous UV radiation from the Sun. 311

pedigrees: family trees, showing the inheritance of particular characteristics from one generation to later generations. 133

petrification: a process in which the chemicals in the body of a dead organism are replaced by minerals from the surrounding rock. 139

pH: a scale from 0 to 14 which indicates how acidic or basic something is; pH stands for 'power of hydrogen'. 224

photosphere: the visible part of the Sun. 274

plasma: an extremely hot gas-like state of matter composed of positive ions and free electrons; found in the Sun, fission reactors and plasma screens. 274

plasma (blood): the pale yellow liquid part of blood, which contains mainly water, dissolved food, minerals and waste products from cells. 103

plate tectonics: a theory modified from the continental drift theory which suggests that the Earth's crust is made up of slowly moving plates. 160

polymerisation (pol-IM-er-eyes-AY-shun): a chemical reaction in which many small molecules link up to form a giant molecule (polymer). 203

polymers: substances composed of giant molecules formed by linking many smaller molecules (monomers) together. 20

power (electrical): the rate at which an appliance uses electrical energy; it is measured in watts (W). 177

proteins: a food type that provides the materials for the growth and repair of cells. 90

radiation: the transfer of heat from a hot object through space (or air) to a cold object. 56

reaction rate: the speed of a chemical reaction. 24

recessive gene: a gene for a particular characteristic that is hidden or masked by a dominant gene. 131

red blood cells: small red-coloured, doughnut-shaped cells in the blood that carry oxygen to other cells in the body. 103

reliable: results are reliable if they are the same when the experiment is repeated many times. 29

Richter (RICK-ter) scale: a scale from 1 to 10, used to measure the magnitude or strength of an earthquake. 157

salts: compounds formed when an acid reacts with a base, a metal or a carbonate. 233

seismographs (SIZE-mo-graphs): instruments which record earthquakes and measure their magnitude. 153

short circuit: a fault that allows current to flow along an unintended low resistance path in an electric circuit. 169

solar cell: a device that converts light energy into electrical energy. 182

species: a population of organisms that have very similar features and can interbreed. 255

specific heat capacity: the amount of heat needed to raise the temperature of one gram of a substance by one degree Celsius. 50

sperm: male sex cells. 129

stratosphere: the middle layer of the atmosphere; its upper region contains the ozone layer. 306

structural adaptation: the shape and size of an organism's body parts that help it survive in its habitat. 244

structural formula: a chemical formula which shows the structure of a molecule—how the atoms are linked together. 196

supernova: occurs when a massive star explodes, scattering most of its matter into space. 281

symbols: signs, markings or letters that represent something else; for example, the symbol for copper is Cu. 71

synclines: downwards-bending folds in rock layers. 147

temperature: how hot or cold something is; it is measured in degrees Celsius. 47

thermoplastics: plastics that can be melted or remoulded repeatedly. 205

thermosets: plastics that cannot be remoulded after the initial heating and moulding process. 205

trachea (track-EE-a): a cartilage-banded pipe that takes air from the throat to the lungs. 106

transformer: a device designed to increase (step up) or decrease (step down) the voltage of alternating current. 187

troposphere (TROP-os-fear): the layer of the atmosphere closest to the Earth. 306

tsunami (tsoo-NAH-me): a giant wave or series of waves caused by an underwater earthquake. 154

variable: any changeable factor that may influence the results of an experiment. 6

veins: tubes in plants that carry water, minerals and food materials. 102 : blood vessels that carry blood *towards* the heart. 104

viscosity: a measure of how easily a liquid flows. 198

vitamins and minerals: substances needed in very small amounts by your body to keep it healthy. 90

voltmeter: an instrument used to measure voltage, in volts (V). 173

watt (W): the unit of power, equal to one joule per second. 177

zodiac: the twelve constellations that follow the same path as the Sun, Moon and planets across the sky. 271