

Glossary



$2n^2$ rule: a rule that states that the n th shell of an atom can hold $2n^2$ electrons

A

absolute dating: determining the age of a fossil and the rock in which it is found using the remaining amount of unchanged radioactive carbon

absolute magnitude: actual brightness of a star

absolute zero: temperature at which the particles that make up an object or substance have no kinetic energy, approximately -273.15°C

acceleration: rate of change in speed

acids: chemicals that react with a base to produce a salt and water. Edible acids taste sour.

action: a force

Alfred Wallace: (1823–1913) developed the theory of evolution by natural selection at the same time as Charles Darwin

alkali metals: very reactive metals in Group I of the periodic table

alkaline earth metals: reactive metals in Group II of the periodic table

alkalis: bases that dissolve in water

alleles: different forms of a gene for a particular characteristic. Each allele is characterised by a slightly different nucleotide sequence.

alpha particles: positively charged nuclei of helium atoms, consisting of two protons and two neutrons

amniocentesis: removal and testing of fluid from the amniotic sac surrounding the foetus

amplitude: maximum distance that a particle moves away from its undisturbed position

amylase: enzyme in saliva that breaks down starch into sugar

analogous structures: body structures that perform a similar function but may not have a similar basic structure

analogue: describes quantities that can have any value and change continuously over time

anions: atoms or groups of atoms that have gained electrons and are negatively charged

apparent magnitude: brightness of a star as seen from Earth

aqueous solution: liquid mixture in which the solute is dissolved in water

Archaea: one of three domains used to classify organisms based on their genetic make-up

armature: the turning part of an electric motor on which coils of wire are wound

artificial selection: when humans mimic the process of natural selection by artificially selecting certain desired characteristics in a population in their breeding of domesticated plants and animals

association: involves linking new knowledge to previous knowledge. It helps you to anchor the information in time and space.

atomic number: number of protons in the nucleus of an atom. The atomic number determines which element an atom is.

attitude: mental state that involves beliefs, feelings and values to act in certain ways

audio: waves with a frequency range of sounds audible to people

aurora australis: spectacular light show mainly visible from areas close to the South Pole. It is caused by solar particles interacting with the Earth's magnetic field. It is sometimes called the southern lights.

aurora borealis: spectacular light show mainly visible from areas close to the North Pole. It is caused by solar particles interacting with the Earth's magnetic field.

autosomal: located on a non-sex determining chromosome

autosomal recessive: recessive trait with alleles located on a non-sex determining chromosome

autosomes: non-sex chromosomes

autotrophs: organisms that can produce their own nutrients

average speed: distance travelled divided by time taken

B

bacteria: single-celled organisms in the Prokaryotae or Monera kingdom that do not contain membrane-bound organelles

base station: consists of antennas on top of a large tower which transmit signals from mobile phones to a switching centre

base-pairing rule: a nucleotide with an adenine base is always paired with one containing thymine for DNA and uracil for RNA; a nucleotide containing cytosine is always paired with one containing guanine

bases: chemicals that react with an acid to produce a salt and water. Edible bases taste bitter.

beamline: part of a synchrotron that directs radiation through a monochromator and into an experimental station

belief: feeling or mental acceptance that things are true or real. These form the basis of what we think about the world.

beta particles: charged particles (positive or negative) with the same size and mass as electrons

big bang theory: a theory which states that the universe began about 15 billion years ago with the explosive expansion of a singularity

big chill theory: a theory which proposes that the expansion of the universe will continue indefinitely until stars use up their fuel and burn out

big crunch theory: a theory which proposes that the universe will snap back on itself resulting in another singularity

big rip theory: a theory which proposes that the universe will rip itself apart due to accelerating expansion

Binomial System of Nomenclature: system devised by Carl von Linne giving organisms two names, the genus and another specific name

biogeography: geographical distribution of species

bioluminescence: the release of light energy from a living thing

biomass: material produced by living organisms

black hole: the remains of a star, which forms when the force of gravity of a large neutron star is so great that not even light can escape

blue shift: shift of lines of a spectral pattern towards the blue end when a light source is moving rapidly towards the observer

bonding electrons: shared electrons holding two atoms together

brachytherapy: cancer treatment also known as internal radiotherapy. Radioisotopes are placed inside the body at, or near, the site of a cancer.

Brownian motion: random motion of small particles in a fluid. In his study on Brownian motion, Einstein confirmed the existence of atoms.

brushes: part of an electric motor that allows current to travel through the rotor coils by being connected to the power supply and lightly touching the commutator

C

Carolus Linnaeus: (1708–1778) a Swedish naturalist who, in 1735, developed a naming system for all living things called the binomial system of nomenclature. Also known as Carl Von Linné.

carrier: person who is heterozygous for a characteristic and therefore does not display the recessive trait

carrier waves: radio waves that are altered in a precise way so that they contain an audio signal

catalase: enzyme in the liver involved in the breakdown of hydrogen peroxide, a toxic waste product from cells in the body

catalyst: chemical that speeds up reactions but is not consumed in the reaction

cations: atoms or groups of atoms that have lost electrons and are positively charged

cell theory: scientifically accepted belief that all living things are composed of cells that are produced from pre-existing cells

cell wall: wall around the cell membrane in plant, fungal and bacterial cells. It provides a tough extra covering that gives strength and support.

cellular phones: mobile phones. So called because base stations that receive mobile phone transmissions are arranged in a network of hexagonal cells.

cellular system: mobile phone system

cellulose: natural polymer chain made up of monomers that are a type of glucose molecule. Cellulose keeps the cell wall of plant cells rigid.

centromere: part of the chromosome holding the chromatids together; important when chromosomes duplicate

Charles Darwin: (1809–1882) developed the theory of evolution by natural selection

chemical formula: shorthand statement of the elements in a substance showing the relative number of atoms of each kind of element

chemiluminescence: light produced from a chemical reaction

chitin: strong substance with long fibrous molecules, which is found in the cell wall of fungi

chlorophyll: green-coloured chemical in plants that absorbs the sun's light energy, to be used during photosynthesis to make simple sugars from carbon dioxide and water

chloroplasts: oval-shaped organelles found only in plant cells. Chloroplasts contain the pigment chlorophyll. They are the 'factories' in which carbon dioxide and water are changed by sunlight into food through the process of photosynthesis.

chorionic villus sampling (CVS): removal and testing of cells taken from the foetus

chromatids: the two strands of a chromosome, held together by the centromere

chromosomal mutation: a change in the amount of DNA in a cell

chromosomes: tiny thread-like structures inside the nucleus of a cell. Chromosomes contain the DNA that carries genetic information.

chunking: involves dividing information into small 'chunks' you can remember more easily

class: group of orders with similar characteristics

classification: grouping of living things

clones: identical copies

coaxial cables: wires that can transmit a number of different signals as electrical pulses

codominance: type of inheritance in which the heterozygote shows the expression of both alleles in its phenotype

combination reactions: chemical reactions in which two substances, usually elements, combine to form a compound

combustion reactions: chemical reactions in which a substance reacts with oxygen and heat is released

commutator: device attached to the rotor shaft that receives the current. In most motors it is a metal ring split into sections.

complete dominance: type of inheritance in which the dominant trait requires only one allele to be present for its expression. It masks the allele for the recessive trait.

compound: substance made up of two or more different types of atoms that have been joined (bonded) together

compression: region in which the particles are closer than when not disturbed by a wave

compression wave: waves involving the vibration of particles in the same direction as energy transfer

cone: hollow shape with a circular opening at one end and a closed point at the other

constellations: groups of stars that were given a particular name because of the shape the stars seem to form in the sky when viewed from Earth

convergent evolution: tendency of unrelated organisms to acquire similar structures due to similar environmental pressures

corona: sun's bright, hazy atmosphere, obvious only when there is a total solar eclipse

corrosion reactions: chemical reactions that wear away a metal. Air, water or chemicals contained in air and water can be corrosive.

corrosive: describes a chemical that wears away the surface of substances, especially metals

cosmology: the study of the beginning and end of the universe

covalent bond: shared pair of electrons holding two atoms together

covalent compounds: compounds in which the atoms are held together by covalent bonds

crossing over: exchange of genes between maternal and paternal chromosomes

crystal: geometrically shaped substance made up of atoms and molecules arranged in one of seven different shapes

D

dangerous goods: chemicals that could be dangerous to people, property or the environment. They are divided into classes including explosive, toxic, corrosive and flammable.

deceleration: decrease in speed, resulting in negative acceleration

decomposition reactions: chemical reactions in which one single compound breaks down into two or more simpler chemicals

deforestation: removal of trees from the land

dendrimer: basic structure of a nanoparticle

diaphragm: cone of a loudspeaker that vibrates to produce a sound wave

differentiated: changed in structure and function

diffusion: spreading of one substance through another due to the movement of their particles

digital: describes quantities that can have only particular values and are represented by numbers

diploid: number of chromosomes in each body cell

displacement reactions: chemical reactions involving the transfer of electrons from the atoms of a more reactive metal to the ions of a less reactive metal

DNA: deoxyribonucleic acid, the chemical substance found in all living things that encodes the genetic information of an organism. DNA is composed of building blocks called nucleotides, which are linked together in a chain.

DNA fingerprinting: involves isolating and separating DNA fragments into their specific lengths to form a pattern that may be used to identify an individual or to determine the presence of a particular gene

DNA hybridisation: technique that can be used to compare the DNA in different species to determine how closely related they are

domains: a classification system proposed by Carl Woese in 1990 which divided organisms into three main groups called domains on the basis of their genetic make-up

dominant: refers to a trait that requires only one allele to be present for its expression in a heterozygote

Doppler effect: observed change in frequency of a wave when the wave source and observer are moving in relation to each other

duty: moral obligation or responsibility

dynamo: electric generator

E

echolocation: use of sound to locate objects by detecting echoes

ecological biodiversity: variation in the many different communities and their environments on Earth

electric generator: device that transforms kinetic energy of rotation into electrical energy

electric motor: device that converts electrical energy into kinetic energy of a rotating shaft

electromagnet: magnet formed by wrapping a coil of wire around an iron core. When electricity passes through the coil, the iron core becomes an electromagnet.

electromagnetic pollution: unwanted electromagnetic radiation that can interfere with electronic equipment

electromagnetic spectrum: complete range of wavelengths of energy radiated as electric and magnetic fields

electromagnetic waves: electromagnetic energy that is transmitted as moving electric and magnetic fields. There are many different types of electromagnetic energy e.g. light, microwaves, radio waves.

electron dot diagrams: diagrams using dots to represent the electrons in the outer shell of atoms. Used to show the bonds between atoms in molecules.

electron shell diagram: diagram showing electrons in their shells around the nucleus of an atom

electron transfer: movement of electrons from one atom, ion or molecule to another

electrons: negatively charged, very light particles in an atom. Electrons move around the nucleus of the atom.

electrovalency: the number of positive or negative charges on an ion

embryonic stem cells: stem cells derived from the inner cell mass of a blastocyst. These cells are pluripotent and can give rise to most cell types

endothermic: chemical reactions that absorb heat energy from the surroundings

entomological: relating to insects

enzyme: biological catalyst

epidemic: a disease that spreads quickly through a large number of people in a particular area

episodic memory: your memory of important events. When you are emotionally engaged, your brain's neurons fire faster and increase your memory power.

equation: one-line statement describing a chemical reaction, with the reactants on the left and the products on the right separated by an arrow

ethics: involve moral reasoning to distinguish right from wrong

eugenics: science of improving human populations by the selection of parents or altering chromosomes

Eukarya: one of three domains used to classify organisms based on their genetic make-up

eukaryotic cells: cells that have a nucleus with a membrane around it

evolved: developed through the process of evolution

exoplanets: planets orbiting stars other than our sun

exothermic: chemical reactions that give out heat energy to the surroundings

external radiotherapy: cancer treatment where radiation is directed from an external machine to the site of the cancer

extinction: complete loss of a species when the last organism of the species dies. The Tasmanian tiger is believed to be extinct but there are still occasional reports of sightings.

F

falsification: suggests that no theory is ever proven beyond all doubt

family: group of genera with similar characteristics

fault: a break in a rock structure causing a sliding movement of the rocks along the break

fertile: able to successfully breed with members of the same species

field magnets: magnets producing a magnetic field that acts on the rotor coils

fireflies: insects that release light

fission: splitting of the nuclei of large atoms into two smaller atoms and several neutrons, releasing radiation and heat energy

fluorescent: describes substances that release light when given energy

fold: a layer of rock bent into a curved shape, which occurs when rocks are under pressure from both sides

force: a push, pull or twist. Forces are measured in newtons (N).

fossil: evidence of life in the past

fossil fuels: substances such as coal, oil and natural gas that have formed from the remains of ancient organisms. They are used as fuel when burnt in order to produce heat.

fossil record: consists of all fossils found within the various layers of rock on Earth

frequency: number of vibrations in one second, or the number of wavelengths passing in one second

fuel rods: rods containing nuclear fuel, such as uranium or plutonium, for use in nuclear reactors

G

- galaxies:** very large groups of stars and dust held together by gravity
- galvanised:** describes a metal coated with a more reactive metal that will corrode first; often zinc covering iron
- gametes:** reproductive cells (sperm or ova) containing half the genetic information of normal cells
- gamma rays:** high energy electromagnetic radiation produced during nuclear reactions
- gene:** segment of a DNA molecule with a coded set of instructions; may determine the characteristics of an organism
- gene mutation:** mutation in a single gene
- gene pool:** all the genetic information for a particular species
- gene technology:** manipulation of DNA
- gene therapy:** replacement of problem genes with normal genes
- genetic biodiversity:** variation in the genes of the many different species on Earth
- genetics:** study of heredity and the similarities and differences between organisms
- genome:** set of genes of an organism contained in every body cell
- genome maps:** maps which describe the order and spacing of genes on each chromosome
- genotype:** information inherited from the parents and contained in the DNA
- genus:** group of species with similar characteristics (plural 'genera')
- geostationary:** describes a satellite that remains above the same location of the Earth's surface
- geothermal:** describes heat generated inside the Earth's crust
- global village:** the Earth as one community
- goal:** something that you want to achieve
- Gondwana:** one of the continents formed when Pangaea broke up. Part of Gondwana became Australia.
- gravitational potential energy:** energy stored due to the height of an object above a base level
- groups:** columns of the periodic table containing elements with similar properties

H

- half-life:** time taken for half the radioactive atoms in a sample to decay; that is, change into atoms of a different element
- halogens:** non-metal elements in Group VII of the periodic table
- haploid:** number of chromosomes contained in gametes; equal to half the number of chromosomes in each body cell
- hazardous substance:** chemicals that have an effect on human health. This effect may be immediate such as poisoning, or long-term like cancer.
- hertz:** unit of frequency; its abbreviation is Hz. One hertz is equal to one vibration every second.
- heterozygous:** having two different alleles for a characteristic
- homologous structures:** body structures that perform a different function but have a similar basic structure
- homology:** similar characteristics that result from common ancestry
- homozygous:** having the same two alleles for a characteristic
- homozygous dominant:** having two alleles for the dominant trait in the genotype
- homozygous recessive:** having two alleles for the recessive trait in the genotype
- Human Genome Project (HGP):** international investigation to identify, sequence and study the genetic instructions within humans; completed in 2003
- hybrid:** organism with both the dominant and recessive gene
- hydrocarbons:** compounds containing only carbon and hydrogen

I

- inclination:** angle between the plane of a satellite's orbit and the plane of the equator
- incomplete dominance:** type of inheritance in which the heterozygote shows the expression of the two alleles in its phenotype in a blending of the characteristics
- inductionism:** suggests with enough evidence, scientific theories can become universal laws
- inertia:** property of objects that makes them resist changes in their motion

- infra-red radiation:** invisible radiation emitted by all warm objects. You feel infra-red radiation as heat.
- inheritance:** genetic transmission of characteristics from parents to offspring
- instantaneous speed:** speed at any particular instant of time
- internal radiotherapy:** cancer treatment also known as brachytherapy. Radioisotopes are placed inside the body at, or near, the site of a cancer.
- introduced species:** a species that is not native to an ecosystem. It has been brought in from another ecosystem.
- ionic bond:** attractive force between ions with opposite electrical charge
- ionic compounds:** compounds containing positive and negative ions held together by the electrostatic force
- ionosphere:** highest layer of the atmosphere where the air is extremely thin. This layer reflects radio waves, enabling communication between many parts of the Earth.
- ions:** atoms or groups of atoms that have lost or gained electrons
- isotopes:** atoms of the same element that differ in the number of neutrons in the nucleus

J

- judgement:** formation of an opinion after considering available information

K

- karyotyping:** process of sorting chromosomes into matched pairs
- kinetic energy:** energy due to motion of an object
- kingdom:** group of phyla with similar characteristics. There are five kingdoms of living things prokaryotae, protoctista, fungi, plantae and animalia.

L

- last universal common ancestor (LUCA):** cell from which all living things could have descended
- Laurasia:** one of the continents formed when Pangaea broke up

Law of Conservation of Energy:

law that states that energy cannot be created or destroyed. However, energy can be transformed from one type to another or transferred between objects.

Law of Conservation of Mass:

law that states that in a chemical reaction, the total mass of the reactants is the same as the total mass of the products

Law of Constant Proportions:

law that states that in chemical compounds, the ratio of the elements is always the same

Law of Inertia: see Newton's First Law of Motion**life span:** period of time for which organisms live**linear accelerator:** part of a synchrotron that uses extremely high voltages (100 million volts) to accelerate electrons to 99.9987 per cent of the speed of light**locus:** position occupied by a gene on a chromosome**longitudinal waves:** compression waves**luciferases:** enzymes involved in the light-producing chemical reaction in fireflies

M

magnetic field: area where a magnetic force is experienced by another magnet. The direction of the magnetic force is shown by drawing field lines; the size of the force is shown by how close together the lines are.**magnitude:** size. Also a measure of the brightness of a star.**main sequence:** area on the Hertzsprung–Russell where the majority of stars are plotted. Stars on the main sequence produce energy by fusing hydrogen to form helium. Such stars are at times referred to as being in their 'adult' stage, one of stability.**major histocompatibility complex (MHC):** a particular set of genes that can play a part in who you are attracted to and your ability to fight off pathogens**mass number:** number of protons and neutrons in the nucleus of an atom**maternal:** derived from the mother**medium:** material through which a wave moves**meiosis:** cell division process that results in new cells with half the number of chromosomes of the original cell**memory systems:** systems to assist your ability to remember things**messenger RNA:** copied DNA sequence**metabolic:** refers to the chemical reactions occurring within an organism that enable it to use energy and grow and repair cells**metalloids:** elements that have the appearance of metals but not all the other properties of metals**metals:** elements that conduct heat and electricity; shiny solids which can be made into thin wires and sheets that bend easily. Mercury is the only liquid metal.**microfossils:** extremely small fossils such as those of single cells**microgravity:** describes the apparent weightlessness felt when in a stable orbit around the Earth**micro-lensing:** technique that enables the discovery of smaller, rocky exoplanets by using gravity as a lens**microprocessors:** electronic central processing units of computers on a microchip**microsatellites:** short, repetitive DNA sequences on a chromosome that are also called short tandem repeats. Patterns of these sequences form the basis of DNA fingerprinting.**mitosis:** cell division process that results in new cells with the same number of chromosomes as the original cell**molecular compounds:** compounds in which the atoms are held together by covalent bonds**molecular formula:** shorthand statement of the elements in a molecule showing the relative number of atoms of each kind of element**molecular ions:** groups of atoms that have an overall charge and are treated as an entity, e.g. OH^- , SO_4^{2-} , NH_4^+ **molecules:** particles with two or more atoms joined (bonded) together**monochromators:** materials that allow only specific wavelengths of radiation to pass through**monohybrid ratio:** the 3:1 ratio of a particular characteristic for offspring produced by heterozygous parents**MSDS:** material safety data sheet. An MSDS contains safety information about a chemical including possible health hazards, first aid instructions and necessary precautions.**multipotent stem cells:** stem cells that can give rise to only certain cell types, e.g. various types of blood or skin cells**mutagen:** agent or factor that can induce or increase the rate of mutations**mutations:** changes to DNA sequence, at the gene or chromosomal level

N

names: labels given to different elements, often honouring a scientist or the place where they were discovered**nanoparticles:** very small human-made particles, about 0.1–100 nanometres in size**natural selection:** process by which a species gives rise to new species that has characteristics that make them better adapted for survival in a particular environment. This is also called 'survival of the fittest'.**nebulae:** clouds of dust and gas that may be pulled together by gravity and heat up to form a star**need:** something that you require**neutral:** neither acidic nor basic**neutralisation:** reaction between an acid and a base. A salt and water are the products of this type of reaction.**neutron star:** extremely dense remnants of a supernova in which protons and electrons in atoms are fused to form neutrons**neutrons:** particles with no electrical charge that are found in the nucleus of an atom**Newton's First Law of Motion:**

law that states that an object remains at rest or continues to move with the same speed in the same direction unless acted on by an outside, unbalanced force

Newton's Second Law of Motion:

law that states that the acceleration of an object equals the total force on the object divided by its mass

Newton's Third Law of Motion:

law that states that for every action there is an equal and opposite reaction

noble gases: elements in the last column of the periodic table. They are extremely inert.**non-metals:** elements that do not conduct electricity or heat; they melt and turn into gases easily, and are brittle and often coloured

non-motile: not moving
north pole: end of the magnet that when free to rotate, points to the north pole of the Earth. The magnetic forces are strongest at the poles of a magnet.
nth shell: generic shell number
nuclear force: very large force that holds protons and neutrons together in the nucleus of an atom
nuclear fusion: joining together of the nuclei of lighter elements to form another element, with the release of energy
nuclear radiation: radiation from the nucleus of an atom, consisting of alpha or beta particles, or gamma rays
nuclear reactions: reactions involving the breaking of bonds between the particles (protons and neutrons) inside the nuclei of atoms
nuclear reactors: power plants where the radioactive properties of uranium are used to generate electricity
nucleic acids: molecules composed of building blocks called nucleotides, which are linked together in a chain
nucleotides: compounds (DNA building blocks) containing a sugar part, a phosphate part and a nitrogen-containing base that varies
nucleus: central part of an atom, made up of protons and neutrons

O

oestrogen: a steroid sex hormone involved in maintenance of the female reproductive system and secondary sex characteristics
OIL RIG: mnemonic used for remembering electron transfer for redox reactions: Oxidation Is Loss, Reduction Is Gain
opinion: involves making judgements about the desirability of something
optical fibres: narrow strands made of two concentric glass layers so that the light is internally reflected along the fibres
order: group of families with similar characteristics
organelles: small structures in a cell with a special function
oxidation: chemical reaction involving the loss of electrons by a substance
oxytocin: a peptide hormone produced by the hypothalamus that can reduce fear and increase feelings of trust

P

palaeontology: study of organisms of the geological past as represented by their fossil remains
pandemic: a disease which spreads rapidly through a large number of people worldwide.
Pangaea: a giant continent that existed 200 million years ago and broke into two parts called Laurasia and Gondwana
paradigm: a generally accepted perspective, idea or theory at a particular time
paralanguage: non-verbal parts of communication used to modify meaning and show attitudes
parallax: apparent movement of close stars against the background of distant stars when viewed from different positions around the Earth's orbit
partially closed: describes a life system from which some waste materials are removed and some supplies are obtained from outside the system
paternal: derived from the father
pedigree chart: diagram showing the family tree and a particular characteristic for family members
Periodic Law: statement made by Mendeleev that elements with similar properties occur at regular intervals when all elements are listed in order of atomic mass
periodic table: table listing all known elements. The elements are grouped according to their properties and in order of the number of protons in their nucleus.
periods: rows of elements on the periodic table
permanent magnet: magnet that retains its magnetic effect for many years
pH scale: scale from 1 (acidic) to 14 (basic) that measures how acidic or basic a substance is
phenotype: sum of the physical and mental characteristics of an organism at a particular time. Phenotype depends on both the genotype and the environment.
photochromic: describes lenses made from glass that darkens in bright light
photoelectric effect: Einstein's theory that described the interaction of light and matter and suggested that light was both a particle and a wave
photosynthesis: food-making process in plants that takes place in chloroplasts. The process uses carbon dioxide, water and energy from the sun.
photovoltaic cells: solar cells that convert sunlight into electrical energy using the movement of electrons between layers of 'doped' silicon
phyla: groups of classes with similar characteristics
pitch: highness or lowness of a sound. The pitch that you hear depends on the frequency of the vibrating air.
planetary nebula: ring of expanding gas caused by the outer layers of a star less than eight times the mass of our sun being thrown off into space
planet: large object that orbits a star. Planets do not produce their own light.
plasmids: rings of DNA in bacteria
pluripotent stem cells: stem cells that can give rise to most cell types, e.g. blood cells, skin cells and liver cells
positrons: positively charged electrons
potential energy: energy that is stored due to the position or state of an object
precipitate: solid product of a chemical reaction that is insoluble in water
precipitation reactions: chemical reactions in which there is a water-insoluble product
primacy: remembering the first time that you experience something
primary coil: coil connected to the input voltage
prions: abnormal and infectious proteins that cause a variety of degenerative neurological diseases
procedural memory: your 'how to' memory
product: new chemical substance that results from a chemical reaction
prokaryotic cells: cells that do not have a nucleus or other membrane-bound organelles e.g. bacteria
protons: positively charged particles found in the nucleus of an atom
proximate rules: govern the physical distance that is comfortable between people
pulsating star: star that periodically expands due to an increase in core temperature and then cools and contracts under gravity. As the star cools, its colour becomes redder.
pure breeding: describes organisms that for many generations have offspring identical to the parent in a particular characteristic

R

radio waves: low energy electromagnetic waves with a much lower frequency and longer wavelength than visible light

radiocarbon dating: determining the age of a fossil using the remaining amount of unchanged radioactive carbon. All living organisms have the same proportion of radioactive and non-radioactive carbon atoms but this changes after they die.

radioisotope: unstable (radioactive) isotope of an element

radiometric techniques: based on the rate of decay or half-life of particular isotopes and enables the dating of fossils

rapproach: a relationship of mutual trust and understanding

rarefaction: region in which the particles are farther apart than when not disturbed by a wave

rate: how fast an event happens (e.g. the speed of a reaction)

reactant: chemical substance used up in a chemical reaction. The chemical bonds of a reactant are broken during the reaction.

reaction: force acting in response to another force

receiving antenna: metal structure in which electrons are made to vibrate by radio waves or microwaves in the atmosphere

recency: recalling the last time that you experience something or the 'ending' of something

recessive: describes a gene that is present in an organism but may not be evident in its phenotype. Two recessive genes are needed for the characteristic to be present in the phenotype.

red giant: star in the late stage of its life. Red giants are cooler than main sequence stars and in their core helium is fused to form carbon and other heavier elements.

red shift: shift of lines of a spectral pattern towards the red end when the source is moving away from the observer

redox reactions: chemical reactions involving oxidation and reduction; that is, electron transfer

reduction: chemical reaction involving the gain of electrons by a substance

reflectiveness: being self-aware, open-minded and sometimes standing back and looking at the big picture

relative atomic mass: a number that compares the mass of atoms to an agreed mass; such as 1/12 of the mass of a carbon-12 isotope

relative dating: method of dating that determines the age of a rock layer by relating it to another layer using superposition and the fossils contained

repeater stations: equipment that retransmits communication signals with increased energy so the signal does not fade away

repetition: regularly reviewing something

resilience: believing in yourself and having the ability to tolerate feeling a little uncomfortable sometimes

resourcefulness: taking responsible risks and using a range of appropriate learning tools and strategies

responsibility: being able to manage yourself and your leaning

right: something you feel that you are entitled to

risk assessment: a procedure that identifies the potential hazards of an experiment and gives protective measures to minimise the risk

RNA: ribonucleic acid, a substance that allows the DNA to read the coded instructions

rotor coils: coils of a motor that turn when a current flows through them

S

salt: one of the products of the reaction between an acid and a base. The salt contains the positive metal ion from the base and the negative non-metal ion from the acid.

satellite: object that orbits another object. The Moon is the Earth's satellite. Scientists have made and launched many artificial satellites.

secondary coil: coil providing the output voltage

semantic memory: your 'fact' memory

sex chromosomes: pair of chromosomes containing information for sexual characteristics

sex-linked: alleles (or genes) for a particular trait that are located on a sex-determining chromosome

sex-linked recessive: recessive trait with alleles located on a sex-determining chromosome

shaft: central rotating rod of the motor that transmits the kinetic energy

shells: energy levels surrounding the nucleus of an atom into which electrons are arranged

singularity: a single point of immense energy present at the time of the big bang

Sir Charles Lyell: (1797–1875) incorporated Hutton's gradualism into uniformitarianism theory, which said that the Earth's geological processes have not changed

solenoid: coil of wire able to pass a current

solute: substance that is dissolved in the solvent to form a solution

solution: mixture of a solute dissolved in a solvent. Solutions are clear but may be coloured.

solvent: substance in which a solute dissolves to form a solution

somatic stem cells: stem cells derived from the bone marrow, skin and umbilical cord blood. These cells are multipotent and can give rise only to certain types of cells.

sonar: use of reflected sound waves to locate objects under water (sound navigation and ranging)

south pole: end of a magnet opposite the north pole and attracted to the north pole of another magnet

spatial memory: your 'mental map' memory

special relativity: Einstein's special relativity theory examined the nature of space and time. It was called 'special' because it didn't include the effects of gravity.

speciation: formation of new species

species: a group of animals with many features in common. Members of the same species can mate with each other to produce fertile young under natural conditions.

species biodiversity: variation in characteristics of the many different species on Earth

spectrum: light from a source separated out into the sequence of colours, showing the different frequencies

speed: distance covered during a stated time interval

stable: a nucleus that does not change spontaneously. The protons and neutrons in the nucleus are held together strongly.

standing out: a strategy to help you remember

steady state theory: a theory which states that there was no beginning to the universe and that the universe does not change in appearance

step-down transformer: transformer in which the input voltage is greater than the output voltage

step-up transformer: transformer in which the output voltage is greater than the input voltage

structural formula: diagram showing the arrangement of atoms in a substance with covalent bonds drawn as dashes

sunspots: dark spots on the surface of the sun that are cooler than the rest of the surface; they are regions of intense magnetic activity

supercontinents: very large landmasses

supergiants: very large stars that are expanding while running out of fuel, and will eventually explode

supernova: huge explosion that happens at the end of the life cycle of supergiant stars. A neutron star or black hole remains.

switching centre: switches mobile phone calls to other base stations or to a fixed telephone system

symbols: one or two letter codes used for the elements, often an abbreviation of their name

synchrotron: a building-sized device that uses electrons accelerated to near the speed of light to produce intense electromagnetic radiation. This is used to produce data that can describe objects as small as a single molecule.

T

temporary magnet: magnet that stays magnetic while it touches a permanent magnet, or one that is magnetic for a very short time

Theory of Plate Tectonics: describes the movement of the parts of the Earth's crust called plates, and explains the events at the plate boundaries

thermal pollution: heat released into the atmosphere causing an increase in the temperature of the environment

thrust: forward push

total internal reflection: complete reflection of a light beam that may occur when the angle between a boundary and a beam of light is small

totipotent stem cells: the most powerful stem cells that can give rise to all cell types

transcription: process of making a copy of a DNA sequence

transferred: moved from one place (or object) to another

transformed: changed from one type to another. For example, energy is transformed from gravitational potential to kinetic energy as an object falls from a height.

transformers: devices that increase or decrease the voltage of alternating current

transgenic: organism with a foreign, introduced gene

translated: the process in which the triplet code of messenger RNA is used to create

transition metals: metallic elements that form a block in the middle of the periodic table

transmitting antenna: metal structure in which vibrating electrons cause radio waves to travel through the air

transverse waves: waves involving the vibration of particles perpendicular to the direction of energy transfer

triplet: sequence of three nucleotides that can code for an amino acid

tumours: abnormal growths

turbines: wheels that, when turned, drive electrical generators. Steam or water are often used to turn turbines.

U

ultrasound: sound with frequencies too high for humans to hear

ultraviolet radiation: invisible radiation similar to light but with a slightly higher frequency and more energy

unstable: a nucleus that changes spontaneously into the nucleus of another element

V

vacuole: sac within a cell used to store food and wastes. Plant cells usually have one large vacuole. Animal cells may have several small vacuoles or none at all.

valency: equal to the number of electrons that each atom needs to gain, lose or share to fill its outer shell

values: represent a deep commitment to a particular issue and serve as standards for decision making

vector: organism used to transmit genes or disease

velocity: a measure of rate of change in position. Unlike speed, it has a direction as well as a magnitude.

viroids: smallest known infectious agents made up of very short pieces of naked RNA

virus: small particle that is able to grow and reproduce only inside living cells. The cells are destroyed as the virus leaves the cell. It is debatable whether a virus is a living organism.

visible light: very small part of the electromagnetic spectrum to which our eyes are sensitive

voice coil: coil of wire in a loudspeaker that vibrates at the frequency of the electrical signal. This frequency matches the frequency of the sound produced by the cone.

W

wave: transmitter of energy without the movement of particles from place to place. The vibration of particles or energy fields is involved.

wavelength: distance between two neighbouring crests or troughs of a wave. This is the distance between two particles vibrating in step.

weighted mean: average mass of an element that is calculated from the percentage of each isotope in nature

white dwarf: the core remaining after a red giant has shed layers of gases. A white dwarf has no nuclear reactions and its only energy source is gravity that pulls it into a core of very dense matter, a jumble of tightly packed electrons, protons and neutrons.

work: transfer in energy that occurs when a force moves an object in the direction of the force. The object doing work loses energy and the object on which work is done gains energy.

working memory: your 'thinking' memory. It refers to what you remember at a given moment.

X

X-rays: high energy electromagnetic waves that can be transmitted through solids and provide information about their structure

Z

zeolites: crystalline substances consisting of aluminium, silicon and oxygen that are used as catalysts to break up large molecules in crude oil

zygote: fertilised ovum before it starts to divide into more cells