Glossary

a.c. generator a device, such as a dynamo, used to generate alternating current (a.c.)

acceleration the rate of change of an object's velocity

acceleration due to gravity the acceleration of an object falling freely under gravity

acceleration of free fall *see* acceleration due to gravity

activity the rate at which nuclei decay in a sample of a radioactive substance

air resistance the frictional force on an object moving through air

alpha decay the decay of a radioactive nucleus by emission of an α-particle

alpha particle (α-particle) a particle of two protons and two neutrons emitted by an atomic nucleus during radioactive decay

alternating current (a.c.) electric current that flows first one way, then the other, in a circuit

ammeter a meter for measuring electric current

amp, ampere (A) the SI unit of electric current

amplitude the greatest height of a wave above its undisturbed level

angle of incidence the angle between an incident ray and the normal to the surface at the point where it meets a surface

angle of reflection the angle between a reflected ray and the normal to the surface at the point where it reflects from a surface

angle of refraction the angle between a refracted ray and the normal to the surface at the point where it passes from one material to another

average speed speed calculated from total distance travelled divided by total time taken

axis the line passing through the centre of a lens, perpendicular to its surface

background radiation the radiation from the environment to which we are exposed all the time

barometer an instrument used to measure atmospheric pressure

battery two or more electrical cells connected together in series; the word may also be used to mean a single cell

becquerel (Bq) the SI unit of activity; 1 Bq = one decay per second

beta decay the decay of a radioactive nucleus by emission of a beta particle

beta particle (β-particle) a particle (an electron) emitted by an atomic nucleus during radioactive decay

biomass fuel a material, recently living, used as a fuel

boiling point the temperature at which a liquid changes to a gas (at constant pressure)

Boyle's law the law that relates the pressure and volume of a fixed mass of gas (pV = constant at constant temperature)

Brownian motion the motion of small particles suspended in a liquid or gas, caused by molecular bombardment

cell a device that provides a voltage in a circuit by means of a chemical reaction

centre of mass the point at which the mass of an object can be considered to be concentrated

charge *see* electrostatic charge

chemical energy energy stored in chemical substances and which can be released in a chemical reaction

circuit breaker a safety device that automatically switches off a circuit when the current becomes too high

commutator a device used to allow current to flow to and from the coil of a d.c. motor or generator

compression a region of a sound wave where the particles are pushed close together

conduction the transfer of heat energy or electrical energy through a material without the material itself moving

conductor a substance that transmits heat or allows an electric current to pass through it

contaminated when an object has acquired some unwanted radioactive substance

convection the transfer of heat energy through a material by movement of the material itself

converging lens a lens that causes rays of light parallel to the axis to converge at the principal focus

corkscrew rule the rule used to determine the direction of the magnetic field around an electric current

coulomb (C) the SI unit of electric charge; 1 C = 1 A s

count rate the number of decaying radioactive atoms detected each second (or minute, or hour)

crest the highest point of a wave

critical angle the minimum angle of incidence at which total internal reflection occurs

current the rate at which electric charge passes a point in a circuit

current–voltage characteristic a graph showing how the current in a component depends on the p.d. across it

demagnetisation destroying the magnetisation of a piece of material

density the ratio of mass to volume for a substance

diffraction when a wave spreads out as it travels through a gap or past the edge of an object

diode an electrical component that allows electric current to flow in one direction only

direct current (d.c.) electric current that flows in the same direction all the time

dispersion the separation of different wavelengths of light because they are refracted through different angles

diverging lens a lens that causes rays of light parallel to the axis to diverge from the principal focus

doing work transferring energy by means of a force

drag the frictional force when an object moves through a fluid (a liquid or a gas)

dynamo effect electricity is generated when a coil moves near a magnet

earthed when the case of an electrical appliance is connected to the earth wire (for safety)

efficiency the fraction of energy that is converted into a useful form

elastic energy *see* strain energy

electric field a region of space in which an electric charge will feel a force

electrical energy energy transferred by an electric current

electrical resistance *see* resistance

electromagnet a coil of wire that, when a current flows in it, becomes a magnet

electromagnetic radiation energy travelling in the form of waves

electromagnetic spectrum the family of radiations similar to light

electron a negatively charged particle, smaller than an atom

electron charge the electric charge of a single electron; -1.6×10^{-19} C

electrostatic charge a property of an object that causes it to attract or repel other objects with charge

e.m.f. (electro-motive force) the voltage across the terminals of a source of electrical energy (for example, a cell or power supply)

energy the capacity to do work

equilibrium when no net force and no net moment act on a body

evaporation when a liquid changes to a gas at a temperature below its boiling point

extension the increase in length of a spring when a load is attached

Fleming's left-hand rule a rule that gives the relationship between the directions of force, field and current when a current flows across a magnetic field

Fleming's right-hand rule a rule that gives the relationship between the directions of force, field and current when a current is induced by moving a conductor relative to a magnetic field

focal length the distance from the centre of a lens to its principal focus

focal point *see* principal focus

force the action of one body on a second body that causes its velocity to change

fossil fuel a material, formed from long-dead material, used as a fuel

frequency the number of vibrations per second, or number of waves per second passing a point

friction the force that acts when two surfaces rub over one another

fuse a device used to prevent excessive currents flowing in a circuit

gamma ray (γ-ray) electromagnetic radiation emitted by an atomic nucleus during radioactive decay

geothermal energy the energy stored in hot rocks underground

gravitational potential energy (g.p.e.) the energy of an object raised up against the force of gravity

gravity the force that exists between any two objects with mass

half-life the average time taken for half the atoms in a sample of a radioactive material to decay

hard a material that, once magnetised, is difficult to demagnetise

Hooke's law the extension of an object is proportional to the load producing it, provided that the limit of proportionality is not exceeded

image what we see when we view an object by means of reflected or refracted rays

impulse the product of a force and the time for which it acts (impulse = Ft)

incident ray a ray of light striking a surface

induction a method of giving an object an electric charge without making contact with another charged object

infrared radiation electromagnetic radiation whose wavelength is greater than that of visible light; sometimes known as heat radiation

infrasound sound waves whose frequency is so low that they cannot be heard

insulator a substance that transmits heat very poorly or does not conduct electricity

internal energy the energy of an object; the total kinetic and potential energies of its particles

interrupt card a piece of card that breaks the light beam of a light gate

ionisation when a particle (atom or molecule) becomes electrically charged by losing or gaining electrons

ionising radiation radiation, for example from radioactive substances, that causes ionisation

irradiated when an object has been exposed to radiation

isotope isotopes of an element have the same proton number but different nucleon numbers

joule (J) the SI unit of work or energy

kinetic energy (k.e.) the energy of a moving object

kinetic model of matter a model in which matter consists of molecules in motion

lamina a flat object of uniform thickness

laser a device for producing a narrow beam of light of a single colour or wavelength

latent heat the energy needed to melt or boil a material

law of reflection the law relating the angle of incidence of a light ray to the angle of reflection ($i = r$)

light-dependent resistor (LDR) a device whose resistance decreases when light shines on it

light-emitting diode (LED) a type of diode that emits light when a current flows through it

light energy energy emitted in the form of visible radiation

light gate a device for recording the passage of a moving object when it breaks a light beam

limit of proportionality the point beyond which the extension of an object is no longer proportional to the load producing it

load a force that causes a spring to extend

logic gate an electronic component whose output voltage depends on the input voltage(s)

longitudinal wave a wave in which the vibration is forward and back, along the direction in which the wave is travelling

magnetic field the region of space around a magnet or electric current in which a magnet will feel a force

magnetisation causing a piece of material to be magnetised; a material is magnetised when it produces a magnetic field around itself

manometer a device used to measure the pressure difference between two points

mass the property of an object that causes it to have a gravitational attraction for other objects, and that causes it to resist changes in its motion

melting point the temperature at which a solid melts to become a liquid

model a way of representing a system in order to understand its functioning; usually mathematical

moment the turning effect of a force about a point, given by force × perpendicular distance from pivot to force

momentum the product of an object's mass and its velocity (momentum = mv)

monochromatic describes a ray of light (or other electromagnetic radiation) of a single wavelength

national grid the system of power lines, pylons and transformers used to carry electricity around a country

negative charge one type of electric charge

neutral having no overall positive or negative electric charge

neutron an electrically neutral particle found in the atomic nucleus

neutron number (*N*) the number of neutrons in the nucleus of an atom

newton (N) the SI unit of force; the force required to give a mass of 1 kg an acceleration of 1 m/s^2

non-renewable energy resource which, once used, is gone forever

normal the line drawn at right angles to a surface at the point where a ray strikes the surface

nuclear energy energy stored in the nucleus of an atom

nuclear fission the process by which energy is released by the splitting of a large heavy nucleus into two or more lighter nuclei

nuclear fusion the process by which energy is released by the joining together of two small light nuclei to form a new heavier nucleus

nucleon a particle found in the atomic nucleus: a proton or a neutron

nucleon number (*A*) the number of protons and neutrons in an atomic nucleus

nuclide a 'species' of nucleus having particular values of proton number and nucleon number

ohm (Ω) the SI unit of electrical resistance; 1 Ω = 1 V/A

ohmic resistor any conductor for which the current in it is directly proportional to the p.d. across it

pascal (Pa) the SI unit of pressure; 1 Pa = 1 N/m^2

p.d. (potential difference) another name for the voltage between two points

penetrating power how far radiation can penetrate into different materials

period the time for one complete oscillation of a pendulum, one complete vibration or the passage of one complete wave

photocell *see* solar cell

pitch how high or low a note sounds

pivot the fixed point about which a lever turns

positive charge one type of electric charge

potential divider a part of a circuit consisting of two resistors connected in series

power the rate at which work is done or energy is transferred

power lines cables used to carry electricity from power stations to consumers

pressure the force acting per unit area at right angles to a surface

principal focus the point at which rays of light parallel to the axis converge after passing through a converging lens

principle of conservation of energy the total energy of interacting objects is constant provided no net external force acts

principle of conservation of momentum the total momentum of interacting objects is constant provided no net external force acts

proton a positively charged particle found in the atomic nucleus

proton charge the electric charge of a single proton; $+1.6\times10^{-19}$ C

proton number (*Z*) the number of protons in an atomic nucleus

radiation energy spreading out from a source carried by particles or waves

radioactive decay the decay of a radioactive substance when its atomic nuclei emit radiation

radioactive substance a substance that decays by emitting radiation from its atomic nuclei

radioactive tracing a technique that uses a radioactive substance to trace the flow of liquid or gas, or to find the position of cancerous tissue in the body

radiocarbon dating a technique that uses the known rate of decay of radioactive carbon-14 to find the approximate age of an object made from dead organic material

radioisotope a radioactive isotope of an element

random process a process that happens at a random rate rather than at a steady rate; in radioactive decay, it is impossible to predict which atom will be the next to decay, or when a given atom will decay

rarefaction a region of a sound wave where the particles are further apart

ray diagram a diagram showing the paths of typical rays of light

real image an image that can be formed on screen

rectifier an electric circuit in which one or more diodes are used to convert alternating current to direct current

reflected ray a ray of light that has been reflected after striking a surface

reflection the change in direction of a ray of light when it strikes a surface without passing through it

refracted ray a ray of light that has changed direction on passing from one material to another

refraction the bending of a ray of light on passing from one material to another

refractive index the property of a material that determines the extent to which it causes rays of light to be refracted

relay an electromagnetically operated switch

renewable energy resource which, when used, will be replenished naturally

residual-current device (RCD) a device used to protect the user in case of an electrical fault

resistance a measure of the difficulty of making an electric current flow through a device or a component in a circuit

resistor a component in an electric circuit whose resistance reduces the current flowing

resultant force the single force that has the same effect on a body as two or more forces

ripple a small, uniform wave on the surface of water

scalar quantity a quantity that has only magnitude

slip rings a device used to allow current to flow to and from the coil of an a.c. motor or generator

Snell's law the law that relates the angles of incidence and refraction: $\text{refractive index} = \frac{\sin i}{\sin r}$

soft describes a material that, once magnetised, can easily be demagnetised

solar cell an electrical device that transfers the energy of sunlight directly to electricity, by producing a voltage when light falls on it

solar panel a device that absorbs sunlight to heat water

solenoid a coil of wire that becomes magnetised when a current flows through it

sound energy energy being transferred in the form of sound waves

sound wave a wave that carries sound from place to place

specific heat capacity (s.h.c.) a measure of how much thermal (heat) energy a material can hold

specific latent heat the energy required to melt or boil 1 kg of a substance

spectrum waves, or colours of light, separated out in order according to their wavelengths

speed the distance travelled by an object in unit time

speed of light the speed at which light travels (usually in a vacuum: 3.0×10^8 m/s)

static electricity electric charge held by a charged insulator

strain energy energy of an object due to its having been stretched or compressed

temperature a measure of how hot or cold something is

terminal velocity the greatest speed reached by an object when moving through a fluid

thermal (heat) energy energy being transferred from a hotter place to a colder place because of the temperature difference between them

thermal equilibrium describes the state of two objects (or an object and its surroundings) that are at the same temperature so that there is no heat flow between them

thermal expansion the expansion of a material when its temperature rises

thermionic emission the process by which cathode rays (electrons) are released from the heated cathode of a cathode-ray tube

thermistor a resistor whose resistance changes a lot over a small temperature range

thermocouple an electrical device made of two different metals, used as an electrical thermometer

total internal reflection (TIR) when a ray of light strikes the inner surface of a solid material and 100% of the light reflects back inside it

transducer any device that converts energy from one form to another

transformer a device used to change the voltage of an a.c. electricity supply

transverse wave a wave in which the vibration is at right angles to the direction in which the wave is travelling

trip switch a device used to protect an electric circuit in case of an electrical fault

trough the lowest point on a wave

truth table a way of summarising the operation of a combination of logic gates

turbine a device that is caused to turn by moving air, steam or water, often used to generate electricity

ultrasound sound waves whose frequency is so high that they cannot be heard

ultraviolet radiation electromagnetic radiation whose frequency is higher than that of visible light

upper limit of hearing the highest frequency of sound that a person can just hear

variable resistor a resistor whose resistance can be changed, for example by turning a knob

vector quantity a quantity that has both magnitude and direction

vector triangle a method for finding the vector sum of two vector quantities

velocity the speed of an object in a stated direction

virtual image an image that cannot be formed on a screen; formed when rays of light appear to be spreading out from a point

volt (V) the SI unit of voltage (p.d. or e.m.f.); one volt is equal to one joule per coulomb (1 V = 1 J/C)

voltage the 'push' of a battery or power supply in a circuit

voltmeter a meter for measuring the p.d. (voltage) between two points

watt (W) the SI unit of power; the power when 1 J of work is done in 1 s

wave speed the speed at which a wave travels

wavefront a line joining adjacent points on a wave that are all in step with each other

wavelength the distance between adjacent crests (or troughs) of a wave

weight the downward force of gravity that acts on an object because of its mass

work done the amount of energy transferred when one body exerts a force on another; the energy transferred by a force when it moves