

SP6a Atomic models

Word	Pronunciation	Meaning
alpha particle		A particle made of two protons and two neutrons, emitted as ionising radiation from some radioactive isotopes.
atom		The smallest neutral part of an element that can take part in chemical reactions.
electron		A tiny particle with a negative charge and very little mass.
element		A simple substance made up of only one type of atom.
kinetic theory		The model that explains the properties of different states of matter in terms of the movement of particles.
nucleus		The central part of an atom or ion.
particle theory		Another term for kinetic theory.
subatomic particle		A particle that is smaller than an atom, such as a proton, neutron or electron.

SP6b Inside atoms

Word	Pronunciation	Meaning
atomic number		The number of protons in the nucleus of an atom. It is also known as the proton number.
isotope		Atoms of an element with the same number of protons (atomic number) but different mass numbers due to different numbers of neutrons.
mass number		The total number of protons and neutrons in the nucleus of an atom. It is also known as the nucleon number.
neutron		A particle found in the nucleus of an atom having zero charge and mass of 1 (relative to a proton).
nucleon		A particle found in the nucleus (neutron or proton).
nucleon number		Another term for mass number.
proton		A particle found in the nucleus of an atom, having a positive charge and the same mass as a neutron.
proton number		The number of protons in an atomic nucleus. Another term for atomic number.
relative mass		The mass of something compared to the mass of something else which is often given the mass of 1.

SP6c Electrons and orbits

Word	Pronunciation	Meaning
absorption spectrum		A spectrum of light (or other electromagnetic radiation) that includes black lines. These are caused by some wavelengths being absorbed by the materials that the light (or radiation) passes through.
electromagnetic radiation		A form of energy transfer, including radio waves, microwaves, infrared, visible light, ultraviolet, X-rays and gamma rays.
electron shell		Area around a nucleus that can be occupied by electrons. Shells are usually drawn as circles. Also called an electron energy level or an orbit.
electronic configuration	<i>el-eck-tron-ik con-fig-your-ay-shun</i>	The arrangement of electrons in shells around the nucleus of an atom.
emission spectrum	<i>em-ish-un spek-trum</i>	A set of wavelengths of light or other electromagnetic radiation showing which wavelengths have been given out (emitted) by a substance.
ion	<i>I-on-eyes-ing ray-dee-ay-shun</i>	An atom or group of atoms with an electrical charge due to the gain or loss of electrons.
ionising radiation		Radiation that can cause charged particles (ions) to be formed. It can cause tissue damage and DNA mutations.
orbit		A word used to describe the way electrons move around the nucleus of an atom.
positive ion		An atom that has lost electrons and so has an overall positive charge.
visible light		Electromagnetic waves that can be detected by the human eye.
visible spectrum		The part of the electromagnetic spectrum that can be detected by our eyes.
wavelength		The distance between a point on one wave and the same point on the next wave.

SP6d Background radiation

Word	Pronunciation	Meaning
background radiation		Ionising radiation that is around us all the time from a number of sources. Some background radiation is naturally occurring, but some comes from human activities.
cosmic rays		Charged particles with a high energy that come from stars, neutron stars, black holes and supernovae.
count rate		The number of alpha or beta particles or gamma rays detected by a Geiger–Müller tube in a certain time.
dose		The amount received at one time – for example, the amount of radiation a person receives.
Geiger–Müller (GM) tube	<i>guy-ger mou-er tyoob</i>	A device that can detect ionising radiation and is used to measure the activity of a radioactive source.

SP6e Types of radiation

Word	Pronunciation	Meaning
alpha particle		A particle made of two protons and two neutrons, emitted as ionising radiation from some radioactive isotopes.
beta particle		A particle of radiation emitted from the nucleus of a radioactive atom when it decays. It is an electron.
decay (radioactive)		When an unstable nucleus changes by giving out ionising radiation to become more stable.
gamma ray		A high-frequency electromagnetic wave emitted from the nucleus of a radioactive atom.
penetrate		To go through.
positron		The anti-particle of an electron, having the same mass but opposite charge. Positron emission is a type of beta decay.
random		Any process that cannot be predicted and can happen at any time is said to be random.
unstable		An unstable nucleus in an atom is one that will decay and give out ionising radiation.

SP6f Radioactive decay

Word	Pronunciation	Meaning
nuclear equation		An equation representing a change in an atomic nucleus due to radioactive decay. The atomic numbers and mass numbers must balance.

SP6g Half-life

Word	Pronunciation	Meaning
activity		The number of emissions of ionising radiation from a sample in a given time. Activity is usually given in becquerels (Bq).
becquerel (Bq)	<i>beck-er-ell</i>	The units for the activity of a radioactive object. One becquerel is one radioactive decay per second.
half-life		The average time taken for half of the radioactive nuclei in a sample of radioactive material to have decayed. It is also the time taken for the activity of a source to fall to half its value.
probability		The likelihood of an event happening. It can be shown as a fraction from 0 to 1, a decimal from 0 to 1, or a percentage from 0 to 100 per cent.

SP6h Using radioactivity

Word	Pronunciation	Meaning
irradiate		To expose something to ionising radiation (e.g. in order to sterilise food or medical equipment with gamma rays).
sterilise	<i>ste-rill-eyes</i>	To destroy microorganisms (e.g. bacteria, viruses and fungi) in or on an object. It can be carried out using radioactive sources.
tracer	<i>tray-ser</i>	A radioactive substance that is deliberately injected into the body or into moving water. It allows the movement of the substance to be followed by detecting the ionising radiation emitted.

SP6i Dangers of radioactivity

Word	Pronunciation	Meaning
contaminate		An unwanted addition that makes something unsuitable or impure, e.g. a person may be contaminated with a radioactive substance.
mutation		A change to a gene caused by a mistake in copying the DNA base pairs during cell division, or by the effects of radiation or certain chemicals.

SP6j Radioactivity in medicine

Word	Pronunciation	Meaning
external radiotherapy		Treatment of cancer by sending radiation into the body from outside.
gamma camera		A camera that detects gamma rays.
internal radiotherapy		Treatment of cancer by putting a radioactive source inside the body.
PET scanner		A medical scanning technique that detects gamma rays caused by the interaction of a positron from a radioactive source with an electron.
tumour		A lump formed of cancer cells.

SP6k Nuclear energy

Word	Pronunciation	Meaning
climate change		Changes that will happen to the weather as a result of global warming, which is caused by the increase in the amount of carbon dioxide in the atmosphere.
decommission		To dismantle safely.
fossil fuel		A fuel formed from the dead remains of organisms over millions of years (e.g. coal, oil or natural gas).
non-renewable		Any energy resource that will run out because it cannot be renewed, such as oil.
nuclear fission	<i>fish-un</i>	The reaction in which the nucleus of a large atom, such as uranium, splits into two smaller nuclei.

Word	Pronunciation	Meaning
nuclear fusion	<i>few-zshun</i>	The reaction in which nuclei of light atoms, such as hydrogen, combine to make the nucleus of a heavier atom.

SP6I Nuclear fission

Word	Pronunciation	Meaning
chain reaction		The sequence of reactions produced when a nuclear fission reaction triggers one or more further fissions.
control rod		A rod that can be lowered into the core of a nuclear reactor to absorb neutrons and slow down the nuclear chain reaction.
core		The innermost part of something.
daughter nucleus		A nucleus produced when the nucleus of an unstable atom splits into two during fission or when a radioactive nucleus decays by emitting an alpha or beta particle.
fuel rod		A rod containing the nuclear fuel for a nuclear reactor.
moderator		A substance in a nuclear reactor that slows down neutrons, so that the nuclear fuel can absorb them more easily.

SP6m Nuclear fusion

Word	Pronunciation	Meaning
electrostatic repulsion		A force between two electrical charges that have the same sign, which pushes them apart.