

Knowledge organiser: Atomic Structure

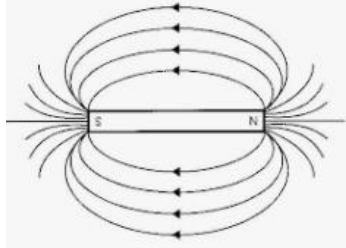
1	What is the radius of an atom?	Atoms have a radius of about 1×10^{-10} meters.
2	Describe the structure of an atom.	The atom has a positively charged nucleus composed of protons and neutrons surrounded by negatively charged electrons.
3	Where are the electrons in an atom?	The electrons are arranged at different distances from the nucleus (different energy levels).
4	What is the atomic number?	The atomic number is the number of protons.
5	What is the mass number?	The mass number is the number of protons and neutrons.
6	What is an isotope?	An isotope is an atom of the same element with different numbers of neutrons.
12	What is radioactive decay?	Radioactive decay is the process by which the nucleus gives out radiation. This process is random.
13	What is the activity of a radioactive element?	Activity is the rate at which a source of unstable nuclei decays. It is measured in Becquerel (Bq)
14	Name three types of radioactive decay.	Alpha, beta and gamma.
15	What is an alpha particle?	An alpha particle (α) – this consists of two neutrons and two protons, it is the same as a helium nucleus.
16	What is a beta particle?	A beta particle (β) – a high speed electron ejected from the nucleus as a neutron turns into a proton.
17	What is a gamma ray?	A gamma ray (γ) – electromagnetic radiation from the nucleus.
18	How does alpha decay affect the atomic number and mass number of an atom?	In an alpha decay the mass number reduces by 4 and the atomic number decreases by 2.
19	How does beta decay affect the atomic number and mass number of an atom?	In a beta decay the mass number is unchanged and the atomic number increases by 1.
20	What is half life?	The half-life of a radioactive isotope is the time it takes for the number of nuclei of the isotope in a sample to halve, or the time it takes for the count rate (or activity) from a sample containing the isotope to fall to half its initial level.
21	What is radioactive contamination?	Radioactive contamination is the unwanted presence of materials containing radioactive atoms or other materials.
22	What is radioactive irradiation?	Irradiation is the process of exposing an object to nuclear radiation.

Knowledge organiser: Waves

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1	Name the two types of waves.	Transverse and longitudinal.
2	Which type of wave has areas of compression and rarefaction?	Longitudinal waves have areas of compression and rarefaction.
3	What is a wavelength?	The wavelength is the distance from the point on one wave to the equivalent point on another wave.
4	What is amplitude?	The amplitude is the maximum displacement of a point on a wave away from its undisturbed position.
5	What is frequency?	The frequency of a wave is the number of waves passing a point each second.
6	Describe the oscillations in a transverse wave.	In a transverse wave the oscillation is at right angles (perpendicular) to the direction of travel.
7	Describe the oscillations in a longitudinal wave.	In a longitudinal wave the oscillation is parallel to the direction of travel.
8	What is the equation that links frequency, wavelength and wave speed?	$v = f \lambda$ Wave speed = frequency x wavelength Speed in metres per second (m/s), frequency in Hertz (Hz) and wavelength in metres (m)
9	What type of waves are electromagnetic (EM) waves?	Electromagnetic waves are transverse waves.
10	What is the order of the EM spectrum from longest wavelength to shortest wavelength?	The electromagnetic spectrum in order of decreasing wavelength (increasing frequency) is Radio waves, Microwaves, Infrared, Visible light, Ultraviolet, X-rays, Gamma rays.
11	What is refraction?	When a wave changes direction as it crosses the boundary between two media.
12	Why does refraction occur?	Refraction is due to the different velocities of waves in different substances.
13	How are radio waves produced?	Radio waves can be produced by oscillations in electric circuits.
14	How are radio waves detected?	When radio waves are absorbed they create an alternating current of the same frequency in a conductor.

15	What is the unit for radiation dose?	Radiation dose in Sieverts is a measure of the risk of harm from exposure to radiation.
16	What risks are associated with ultraviolet radiation?	Ultraviolet can cause skin to age prematurely and increase the risk of skin cancer.
17	What are the risks associated with X-rays and gamma rays?	X-rays and gamma rays can cause gene mutation and cancer.
18	Name a use for each part of the EM spectrum.	<p>Uses of the electromagnetic waves include:</p> <ul style="list-style-type: none"> • Radio waves – T.V and radio. • microwaves – satellite communications, cooking food. • infrared – electrical heaters, cooking food, infrared cameras. • visible light – fibre optic communications. • ultraviolet – energy efficient lamps, sun tanning. • X-rays and gamma rays – medical imaging and treatments.

Knowledge Organiser: Magnetism and Electromagnetism

1	Draw the field lines around a bar magnet.	
2	What are the rules for attraction and repulsion for a bar magnet?	Like poles repel, unlike poles attract. A north pole will attract a south pole. A north pole will repel a north pole. A south pole will repel a south pole.
3	What direction will a magnet orientate itself if left free to move?	The north pole will point to the north.
4	Name the three magnetic elements.	Iron, cobalt and Nickel.
5	Why is steel attracted to magnets?	It contains iron.
6	What is a solenoid?	A coil of wire.
7	What is an electromagnet?	A coil of wire, usually wound on an iron core that produces a magnetic field when an electric current flows through it.
8	What three things can affect the strength of an electromagnet?	The size of the current, the number of coils and a soft iron core.
9	What is produced around a current carrying wire?	A magnetic field.
10	What is the motor effect?	A current carrying conductor in a magnetic field will experience a force.
11	Name two uses of the motor effect.	Loudspeakers and headphones.