

## Definitions and Concepts for AQA Physics GCSE

### Topic 4: Atomic Structure

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*Definitions in **bold** are for higher tier only*

*Definitions marked by '\*' are for separate sciences only*

**Activity:** The rate at which an unstable nucleus decays.

**Alpha Particle:** A positively charged particle consisting of two protons and two neutrons.

**Atomic Number:** The number of protons found in an atom of a specific element. Each element has a different atomic number.

**\*Background Radiation:** Radiation that is found in small quantities all around us and originates from natural sources such as rocks and cosmic rays, as well as from man-made sources such as nuclear weapons testing and accidents.

**Becquerel:** The unit of radioactive activity.

**Beta Particle:** A high speed electron that a nucleus emits when a neutron converts into a proton.

**Bohr Model:** A model of the atom that suggested that electrons orbit the nucleus at set distances.

**\*Chain Reaction:** The process of neutrons released by a fission reaction, being absorbed by another unstable, large nuclei, and inducing further fission.

**Count-Rate:** The number of decays that a detector measures per second.

**Electrons:** A negatively charged constituent of the atom, that are found in different energy levels, around the nucleus.

**Energy Levels:** The stable states in which electrons are found in around a nucleus. Electrons can transition to a higher energy level through the absorption of electromagnetic radiation and can transition to a lower energy level through the emission of electromagnetic radiation.



**\*Fission Products:** Fission produces two smaller nuclei, two or three neutrons and gamma rays. All these products are released with kinetic energy.

**Gamma Ray:** Electromagnetic radiation emitted from a nucleus.

**Geiger-Muller Tube:** A detector that measures the count-rate of a radioactive sample.

**Half-Life:** The time it takes for the number of unstable nuclei of an isotope in a sample to halve, or the time it takes for the initial count rate of a sample of the isotope to halve.

**Ions:** Atoms with a resultant charge due to the loss or gain of electrons.

**Irradiation:** The process of an object being exposed to nuclear radiation. The object doesn't become radioactive.

**Isotopes:** Atoms with the same number of protons but different numbers of neutrons. The atomic number is the same, but the mass number is different.

**Mass Number:** The number of protons and neutrons in an atom.

**Negative Ions:** Atoms that gained electrons and so have a resultant negative charge.

**Neutrons:** A neutrally charged constituent of the nucleus.

**\*Nuclear Explosions:** Nuclear explosions in nuclear weapons are caused by an uncontrolled chain reaction which results in vast quantities of energy being produced in a very small period of time.

**\*Nuclear Fission:** The splitting of a large and unstable nucleus into two smaller and more stable nuclei to produce energy.

**\*Nuclear Fusion:** The joining of two small, light nuclei to form a larger, heavier one and release energy.

**Nucleus:** The positively charged centre of an atom, containing protons and neutrons.

**Plum Pudding Model:** An old model of the atom that represented the atom as a ball of positive charge, with negative charges distributed throughout it.

**Positive Ions:** Atoms that have lost electrons and so have a resultant positive charge.

**Protons:** A positively charged constituent of the nucleus.



**Radioactive Contamination:** The unwanted presence of radioactive atoms on other materials. It is hazardous due to the decay of the contaminating atoms.

**Radioactive Decay:** The random process involving unstable nuclei emitting radiation to become more stable.

**\*Sieverts:** The unit used for radiation dosage.

**\*Spontaneous Fission:** Fission that occurs without the absorption of a neutron. Spontaneous fission is rare and in most cases, fission is induced with a neutron.

