

Definitions and Concepts for OCR (A) Chemistry GCSE

Topic 1 - Particles

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

Definitions marked by '*' are for separate sciences only

Definitions have been taken, or modified from the [OCR \(A\) Specification for GCSE Chemistry. J248. Version 3.3 May 2020](#)

Atom: The smallest part of an element that can exist. All substances are made up of atoms. Typical atomic radii are in the order of 10^{-10} m. Atoms contain a positively charged nucleus surrounded by negatively charged electrons. The nuclear radius is much smaller than the atomic radius and most of the mass is in the nucleus.

Atomic nucleus: Positively charged object composed of protons and neutrons at the centre of every atom with one or more electrons orbiting it.

Atomic number: The number of protons in the nucleus.

Bohr: Developed the Bohr model as a modification of Rutherford's model, proposing that electrons exist in shells of fixed energy around the nucleus.

Chemical change: Require a chemical reaction and the products must have a different chemical composition to the reactants.

Compound: A substance made up of two or more types of atoms chemically combined together.

Dalton: Developed an early atomic model, which described atoms as solid spheres, stating that different spheres made up the different elements. He also stated that atoms of an element were identical and that atoms could not be divided.

Electron: Negatively charged subatomic particle which orbit the nucleus at various energy levels. Very small relative mass (negligible).

Element: A substance made up of only one type of atom.

Gas: The state of matter where the particles have the most energy. The particles in a gas are relatively spread out and move randomly in all directions.

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Geiger and Marsden: Carried out the gold foil experiment designed by Rutherford. The experiment involved firing alpha particles at a thin sheet of gold foil. They found that most of the particles passed straight through the foil and the deflected particles were deflected much more than expected. This led Rutherford to develop the nuclear atomic model.

Ion: An atom or molecule with an electric charge due to the loss or gain of electrons.

Isotope: Atoms of the same element with the same number of protons but a different number of neutrons.

Liquid: The state of matter where the particles are arranged randomly and close together. The particles are able to move past each other.

Mass number: The total number of protons and neutrons in the nucleus of an atom.

Neutron: Neutral subatomic particle present in the nucleus of the atom. Relative mass of 1.

Particle model: Models the three states of matter by representing the particles as small solid spheres. The particle model can help to explain melting, boiling, freezing and condensing.

Physical change: Requires energy and involves a change in state. The form of the chemical is changed but the chemical composition remains the same.

Proton: Positively charged subatomic particle present in the nucleus of the atom. Relative mass of 1.

Rutherford: Designed the gold foil experiment which was carried out by Geiger and Marsden. This led Rutherford to propose the nuclear atomic model which stated that atoms were made up of a small positively charged nucleus which was surrounded by mostly empty space and a layer of orbiting electrons.

Solid: The state of matter where the particles hold a regular arrangement and have the least amount of energy.

Subatomic particles: Particles smaller than an atom. Protons, neutrons and electrons are the three most common subatomic particles.

Thomson: Developed the plum pudding atomic model which said the atom was a positively charged sphere with small negatively charged electrons dotted through it. He used a cathode ray tube to prove that there are small particles inside atoms, disproving Dalton's idea that atoms could not be split.

