

Definitions and Concepts for OCR (B) Physics GCSE

Topic 6: Matter Models and Explanations

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

Definitions marked by '' are for separate sciences only*

***Artificial Satellites:** Man-made satellites that have been sent into space for purposes such as satellite imaging and communications.

***Atmosphere:** The thin layer of air surrounding the Earth, which gets less dense with increasing altitude. The pressure also decreases with increasing altitude.

***Big Bang Theory:** The currently accepted model for the origin of the universe. It suggests that the universe has expanded from an initially very small, hot and dense point.

Bohr Model: A model of the atom that suggested that negative electrons orbit a positive nucleus at set distances. It is the currently accepted model.

Change in Thermal Energy: The product of the mass, specific heat capacity and temperature change of a substance.

Chemical Changes: Changes to the chemical structure of a substance. The substance does not usually restore its original properties when the changes are reversed.

Condensation: The changing from vapour state to a liquid state, when a substance is cooled.

Density: The mass per unit volume of an object.

***Doppler Effect:** The change in a wave's observed wavelength and frequency when there is relative motion between its source and an observer.

Elastic Deformation: A non-permanent deformation for which the object will return to its original shape when the deforming forces are removed.

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

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Evaporation: The changing from liquid state to a vapour state, when a substance is heated.

***Floating:** An object will float if the volume of liquid it displaces has a greater weight than that of the object itself. The upthrust acting on the object is greater than its weight.

Fluid: A liquid or gas.

Freezing: The changing from a liquid state to a solid state, when a substance is cooled.

***Galaxy:** A system containing billions of stars.

Gas: A state of matter in which the particles are spread apart and have high kinetic energies. Any intermolecular forces acting between the particles are very weak.

Hooke's Law: The extension of a spring is directly proportional to the force applied to it, up to the limit of proportionality. The constant in this relationship is known as the spring constant.

Latent Heat: The energy required for a substance to change state.

Limit of Proportionality: The point beyond which the extension of an elastic object is no longer directly proportional to the force applied to it.

Linear Relationship: A relationship between two variables where if one variable increases, so does the other by the same factor. They produce straight lines when plotted.

Liquid: A state of matter in which the particles are in contact, but can flow over each other. Intermolecular forces act between the particles.

Melting: The changing from solid state to liquid state, when a substance is heated.

***Milky Way Galaxy:** The galaxy in which our solar system is located.

***Natural Satellites:** The moons that orbit planets.

Neutrons: A neutrally charged constituent of the nucleus.

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



***Orbital Speed:** A measure of how fast an object orbits. It is directly proportional to the orbital radius and inversely proportional to the orbital period.

Pascals: The unit of pressure, equal to a force of one Newton acting perpendicular to an area of one metre squared.

Physical Changes: Changes to the physical properties of a substance which can be reversed. Changes of state are physical changes since substances can restore their original properties when the changes are reversed.

***Planet:** A body that has a sufficiently large mass and that orbits a star. Our solar system contains eight planets, all of which orbit the sun.

Plastic Deformation: A permanent deformation for which the object will no longer return to its original shape when the deforming forces are removed.

***Pressure in a Liquid Column:** Equal to the product of the height of the column, the density of the liquid and the gravitational field strength.

***Pressure of a Gas:** The perpendicular force per unit area acting on the surfaces of a container as a result of the gas particles colliding with it.

***Pressure-Volume Relationship:** When at a constant temperature, the volume of a fixed quantity of gas is inversely proportional to its pressure.

Pressure: The force acting perpendicular to a surface, per unit area.

Protons: A positively charged constituent of the nucleus.

***Red-Shift:** The observed increase in the wavelength of the light emitted by distant galaxies. The more distant the galaxy, the faster it is moving and so the bigger the observed increase in wavelength.

Rutherford Model: A model of the atom that represented the atom as being mostly empty space, with a dense positive centre and negative charges scattered around it.

***Sinking:** An object will sink if the volume of liquid it displaces has a lower weight than that of the object itself. The upthrust acting on the object is lower than its weight and so there is a resultant downwards force.

Solid: A state of matter in which the particles are tightly packed together and can only vibrate about their fixed positions. Strong intermolecular forces act between the particles



Specific Heat Capacity: The amount of energy needed to increase the temperature of one kilogram of a given substance by one degree Celsius.

Specific Latent Heat of Fusion: The amount of energy needed to change the state of one kilogram of a substance from solid state to liquid state, whilst held at constant temperature.

Specific Latent Heat of Vaporisation: The amount of energy needed to change the state of one kilogram of a substance from liquid state to vapour state, whilst held at constant temperature.

Specific Latent Heat: The amount of energy needed to change the state of one kilogram of a substance, whilst held at constant temperature.

Sublimation: The direct changing of a substance from a solid state to a vapour state, without passing through the liquid phase.

Temperature: A measure of the average kinetic energy of the particles in a substance. An increase in temperature will result in an increase in the particles' kinetic energies and velocities.

Thomson Model: A rejected model of the atom that represented the atom as a ball of positive charge, with negative charges distributed throughout it. It is sometimes referred to as the plum-pudding model.

***Universe:** A large system of billions of galaxies.

***Upthrust:** The upward force acting on an object in a fluid, due to it experiencing a greater pressure below it than above it. It is equal to the weight of the fluid displaced by the object.

Weight: The force acting on an object due to gravity. It is equal to the product of the object's mass and the gravitational field strength at its location.

