Definitions and Concepts for Edexcel Physics IGCSE

Topic 1: Forces and Motion

---

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

Definitions marked by '' are for separate sciences only*

Acceleration: The rate of change of velocity. It can be calculated from the gradient of a velocity-time graph.

Balanced Forces: A resultant force of zero.

Braking Distance: The distance a vehicle travels under the braking force. This can be affected by adverse road and weather conditions as well as the condition of the vehicle.

Changes of Momentum:** **When a force acts on a moving object, or on an object that has the ability to move, a change of momentum will occur. The force is equal to the rate of change of momentum.

Conservation of Momentum:** **The total momentum of a system before an event is always equal to the total momentum of the system after the event.

Contact Force: A force that acts on an object through physical contact.

Crumple Zone:** **A vehicle safety feature that compresses during a collision. It increases the time over which the momentum change occurs, and so reduces the force experienced by the occupants.

Distance-Time Graph: A plot of how an object's distance changes over time. The gradient of the graph at any point, equals the object's speed at that point.

Distance: A measure of how far an object moves. It doesn't depend on direction and is therefore a scalar quantity.

Distortion: The changing of an object's size or shape as a result of a deforming force.

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

Elastic Limit: The force beyond which an object will no longer deform elastically, and will instead deform plastically.

Equilibrium: An object is in equilibrium if the resultant force **and resultant moment** are both equal to zero.

Friction: A resistive contact force that acts to oppose the relative motion between two surfaces.

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.

Human Reaction Time: The time it takes for the brain to react to a stimulus. Typical human reaction times are in the range of 0.2-0.9 seconds.

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.

***Moment:** **The turning effect of a force, equal to the product of the magnitude of the force and the perpendicular distance from the pivot to the line of action of the force.**

***Momentum:** **The product of an object's mass and velocity.**

Newton Meter: A device used to measure the magnitude of a force. It is commonly used to measure an object's weight.

***Newton Metre:** **The unit of a moment.**

Newton: The unit of force.

Newton's First Law: If a stationary object's resultant force is zero, the object will remain stationary. If a moving object's resultant force is zero, the object will continue to move at a constant velocity (same speed and direction).

Newton's Second Law: An object's acceleration is directly proportional to the resultant force acting on it, and inversely proportional to the object's mass.

Newton's Third Law: The forces that two objects exert on each other when they interact are equal and opposite.

Non-Contact Force: A force that acts on an object at a distance. There is no physical contact, and instead the force acts through a field.

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

***Principle of Moments:** **For an object in equilibrium, the sum of the clockwise moments about any point on the object must equal the anticlockwise moments about that same point.**

Resultant Force: The single force that can replace all the individual forces acting on an object, and have the same effect.

***Resultant Moment:** **The single moment that has the same effect as the sum of all the other clockwise and anticlockwise moments acting on an object.**

Scalar Quantities: Quantities that only have a magnitude, not a direction.

***Seat Belt:** **A vehicle safety device that increases the time over which the momentum change occurs during a collision, and so reduces the force experienced by the wearer.**

Spring Constant: A measure of a spring's stiffness. The higher the spring constant, the smaller the extension is for a given force.

Stopping Distance: The sum of the thinking and braking distances.

Terminal Velocity: The maximum velocity an object can reach when falling through a fluid. It occurs when the resistive forces equal the object's weight.

Thinking Distance: The distance a vehicle travels during the driver's reaction time. This reaction time may be affected by tiredness, drugs or alcohol.

Vector Quantities: Quantities that have both a magnitude and direction. They are represented by an arrow, with the length representing the magnitude and the arrowhead representing the direction.

Velocity-Time Graph: A plot of how an object's velocity changes over time. The gradient at any point, equals the object's acceleration at that point. The area under the graph equals the object's displacement.

Velocity: A vector quantity that is a measure of the rate of change of displacement. It is the speed in a given direction.

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.

Definitions and Concepts for Edexcel Physics IGCSE

Topic 2: Electricity

---

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

Definitions marked by '' are for separate sciences only*

Alternating Current: Current flow consisting of charges that continually change direction. These oscillations usually occur at a set frequency.

Ammeter: A device connected in series with a component to measure the current that flows through it.

Ampere (Amp): The unit of current.

Circuit Breaker: A safety device that cuts off the power supply if a surge of current passes through it. Circuit breakers can be reset and are quicker acting than fuses.

Conductor: A material that allows electrical charge to flow easily. Metals are particularly good conductors due to the free electrons in their structures.

Coulomb: The unit of charge.

Currents at a Junction: The sum of the currents entering a junction must always equal the sum of the currents leaving it. This is a consequence of the conservation of charge.

Diode: A component that only allows current to flow through in the forward direction. They have very large resistances in the reverse direction.

Direct Current: Current flow consisting of charges flowing in a single direction only. Batteries and cells provide direct current.

Earthing: The removal of excess charge by providing a low resistance path for electrons to flow through.

Earth Wire: The green and yellow striped safety wire connected to metal casings, that prevents an appliance from becoming live.

Electric Current: The rate of flow of electrical charge. Its value is the same at any position in a single closed loop. In metals, the charges that flow are electrons.

Energy Transfers in Circuits: Electrical energy is transferred to thermal energy when current does work against a resistance. In metals this is a result of collisions between electrons and ions.

Filament Lamp: A light emitting component consisting of an enclosed metal filament. Its resistance increases as the filament's temperature increases.

Fuse: A safety device consisting of a thin metal filament that melts and cuts off the power supply if there is a surge in current. Fuses are connected to the live wire.

Insulator: A material that doesn't allow electrical charge to flow.

***Lightning:** **A consequence of static charge building up in the clouds. Lightning strikes are caused by the discharge of this charge.**

***Like Charges:** **When two charges of the same polarity meet, they will repel.**

Light Dependent Resistor (LDR): A light sensitive component whose resistance decreases as its temperature increases.

Light Emitting Diode: A device that gives out light when a current flows through it. Current can only flow through it in one direction, and a minimum voltage must be applied across it before it illuminates.

Live Wire: The brown coloured wire that carries the alternating current from the supply in a mains power supply.

Mains Electricity: An a.c supply, which in the UK has a frequency of 50Hz a value of 230V.

Neutral Wire: The blue coloured wire that completes the circuit in a mains power supply.

Ohmic Conductor: A conductor whose current flow is directly proportional to the potential difference (voltage) across it, when held at a constant temperature.

Ohm: The unit of resistance.

Ohm's Law: The current flowing through an Ohmic conductor at constant temperature is directly proportional to the potential difference (voltage) across it.

Parallel: Components connected in parallel have the same potential difference (voltage) across each component. The total current is equal to the sum of the currents flowing through each component.

Potential Difference: The energy that is transferred per unit charge between two points in a

circuit. It is often also called a voltage.

Power: The rate at which an appliance transfers energy. For a circuit component, it is equal to the product of the current passing through it and the potential difference across it.

Resistance: A measure of the opposition to current flow.

Resistors in Parallel: The total resistance is less than the lowest individual resistance.

Resistors in Series: The total resistance is equal to the sum of the resistances of the individual resistors.

Series: Components connected in series have the same current passing through each component but share the total potential difference (voltage) of the power supply.

***Sparking:** **The transfer of electrons between two surfaces that have an imbalance of charges. Sparking can be particularly dangerous in locations such as petrol pumps, and so the pumps must be earthed.**

***Static Charge:** **The charge caused by an imbalance of positive and negative charges in, or on, an object's surface. It is often caused by electrons being rubbed from one surface onto another.**

Thermistor: A temperature dependent component, whose resistance increases as its temperature decreases.

***Unlike Charges:** **When two charges of opposite polarities meet, they will attract.**

Volt: The unit of potential difference (voltage). One volt is equal to one joule per coulomb.

Voltmeter: A device that is connected in parallel with a component to measure the potential difference (voltage) across it.

Watt: The unit of power.

Definitions and Concepts for Edexcel Physics IGCSE

Topic 3: Waves

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

Definitions marked by '' are for separate sciences only*

Amplitude: The maximum displacement of a wave from its undisturbed (equilibrium) position.

Critical Angle: The angle of incidence beyond which all the wave is totally internally reflected when it meets a boundary.

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

Diffuse Reflection: The reflection of a wave from a rough surface that results in the wave being scattered.

Electromagnetic Spectrum: A group of transverse waves that cover a large range of frequencies and wavelengths. The highest frequency waves in the spectrum are gamma-rays and the lowest are radio waves.

Electromagnetic Waves: Transverse waves that transfer energy from the source of the waves, to an absorber. They form a continuous spectrum of different frequencies and all travel at the same speed in a vacuum.

Frequency: The number of waves passing a given point in a second. It is the inverse of the wave's time period.

Gamma Rays: High energy radiation rays used for detecting and treating cancers, and sterilising food and medical implements. They can cause cell damage and mutations.

Hertz (Hz): The unit of frequency.

***Human Hearing:** **Humans can hear sounds in the frequency range of 20Hz to 20kHz.**

Infrared Radiation: A type of radiation that all objects emit and absorb. The hotter an object is, the greater the infrared radiation it emits in a given time.

Infrared: Used for cooking food, thermal imaging and short range communications. It can

cause skin burns.

Law of Reflection: The angle of incidence must always equal the angle of reflection when a wave reflects.

Longitudinal Waves: Waves with oscillations that are parallel to the direction of travel/energy transfer.

***Loudness:** **A measure of the amplitude of the oscillations of a sound wave. The larger the amplitude, the louder the sound will be.**

Microphone: A device that converts the particle oscillations of a sound wave into an electrical signal that can be analysed using an oscilloscope.

Microwaves: Used for satellite communications and for cooking food. They can cause internal heating of body cells.

Oscilloscope: **A device used to display the waveform of a signal. It shows how the voltage of the electrical signal varies with time.**

***Pitch**: **A measure of the frequency of the oscillations of a sound wave. The higher the frequency, the higher the pitch of the sound.**

Radio Waves: Used for television and radio signals. **They can be produced by oscillations in electrical circuits, or can induce these oscillations themselves.**

***Ray Diagram:** A visual representation of the path of a wave, usually around the point where it meets a boundary. Rays are usually drawn as straight lines with an arrow pointing in their direction of travel.

Real Image: An image produced by light-rays physically converging. Real images are ones that can be projected onto a screen.

***Reflection:** The bouncing back of a wave at a boundary.

***Refraction:** The changing of speed, and consequently the direction, of a wave as it changes medium. The wavelength of the wave will also change but the frequency remains constant.

Refractive Index: The ratio of the speed of the wave in a vacuum to the speed of the wave in a given medium.

Seismic Waves: Waves that are produced by earthquakes.

Sound Waves: The longitudinal waves responsible for sound. They require a medium to travel through and are transmitted by the vibrations of the medium's particles.

Specular Reflection: The reflection of a wave from a smooth surface.

Speed of EM Waves: All electromagnetic waves travel at the same speed in a vacuum (3×10^8 m/s).

Time Period: The time it takes for one complete wave to pass a given point. It is the inverse of frequency.

Total Internal Reflection: The process of all a wave being reflected when it meets a boundary. It occurs when the angle of incidence is greater than the critical angle, and only when going from a higher refractive index to a lower one.

Transverse Waves: Waves with oscillations that are perpendicular to the direction of travel/energy transfer.

***Ultrasound Waves:** Waves that have a frequency higher than the upper limit of human hearing (20kHz).

Ultraviolet: Used in energy efficient lamps, disinfecting water, and for sun tanning. It can cause cell and eye damage that can result in skin cancer and eye conditions.

Virtual Image: An image produced by the apparent, but not actual, divergence of light-rays. Virtual images cannot be projected onto a screen.

Visible Light: The only type of electromagnetic radiation that our eyes can detect. It is used for fibre optic communications and photography.

Wave Velocity: The velocity at which energy is transferred through the medium. It is equal to the product of the wave's wavelength and frequency.

Wave: A process of energy transfer through oscillations, without matter being transferred with it.

Wavefront: An imaginary surface representing points of a wave that are at the same point in their cycle.

Wavelength: The distance from a point on one wave to the same point on the adjacent wave (ie. peak to peak or trough to trough).

X-Rays: Used for medical imaging and security scanners. They can cause cell damage and mutations.

Definitions and Concepts for Edexcel Physics IGCSE

Topic 4: Energy Resources and Energy Transfers

---

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

Definitions marked by '' are for separate sciences only*

Chemical Energy: A store of energy found in things such as batteries, fuels and food.

Closed System: A system that experiences no net change in its total energy when energy transfers occur within it.

Conduction: The transfer of heat energy through the vibrations of particles in a medium.

Conservation of Energy: The law that energy can be transferred, stored or dissipated but never created or destroyed.

Constant Temperature: Bodies at a fixed temperature radiate the same average power that they absorb.

Convection: The transfer of heat energy through convection currents in a fluid.

Elastic Potential Energy: The store of energy that stretched or compressed objects contain.

Electrostatic Potential Energy: The store of energy due to the relative position of a charge in an electric field.

Fossil Fuels: Coal, oil and gas.

Gravitational Potential Energy: The store of energy that all raised matter has. It is directly proportional to the mass of the object, the distance that it is raised, and the gravitational field strength at that point.

Heat Transfer: The transfer of thermal energy from a hotter region to a cooler region, through conduction, convection or radiation.

Joule: The unit used for energy. Equal to the work done when a force of one Newton acts over a distance of one metre.

Kinetic Energy: The store of energy that all moving matter has. It is directly proportional to

the object's mass and to the square of its velocity.

Lubrication: The application of a lubricant (such as oil) to reduce the friction that acts between surfaces. This may improve the efficiency of a system.

Magnetic Energy: The potential energy of a magnet.

***Non-Renewable Energy Resource**: **An energy resource that cannot be replenished whilst it is being used. It is a finite resource.**

Nuclear Energy: The store of energy found in the nuclei of atoms.

Power: The rate at which energy is transferred, or the rate at which work is done. It is calculated by dividing the work done by the time taken.

Radiation: The transfer of energy, without the transfer of matter. No medium is needed for radiation to occur.

***Renewable Energy Resource:** **An energy resource that can be replenished whilst it is being used.**

Sankey Diagram: A diagram used to show the energy transfers of a system.

Surface Temperature: The temperature of a body is determined by the rate at which they absorb and emit radiation.

Thermal Energy: The store of energy that all objects with a temperature contain. The higher the temperature, the greater its thermal energy store.

Thermal Insulation: The addition of a material that reduces the amount of heat that is transferred from a system to its surroundings.

Useful Energy Transfer: The transfer of energy by a system, to directly serve the purpose of the system.

Waste Energy Transfer: The transfer of energy by a system to a form that doesn't directly serve the purpose of the system.

Work Done: Work is done on an object when a force causes it to move through a distance. It is equal to the product of the distance travelled and the magnitude of the force in the direction of motion.

Definitions and Concepts for Edexcel Physics IGCSE

Topic 5: Solids, Liquids and Gases

---

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

Definitions marked by '' are for separate sciences only*

Absolute Zero: The lowest possible temperature. At this temperature the particles have no kinetic energy and so are completely stationary.

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.

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

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

Gas Temperature: The absolute temperature of a gas is directly proportional to the average kinetic energy of its molecules.

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.

Internal Energy: The energy stored by the atoms and molecules that make up a system. It is equal to the sum of the total kinetic and potential energies of the particles in the system.

Kelvin: The SI unit of temperature, based on an absolute temperature scale. To convert from degrees Celsius to degrees Kelvin, subtract 273 degrees. For a gas it is proportional to the average kinetic energy of the molecules.

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.

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.

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. It acts equally in all directions.

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

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

Pressure-Temperature Relationship: When at a constant volume, the pressure of a fixed quantity of gas is directly proportional to its absolute temperature.

***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.**

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.

Definitions and Concepts for Edexcel Physics IGCSE

Topic 6: Magnetism and Electromagnetism

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

Definitions marked by '' are for separate sciences only*

Current-Carrying Wires: When current flows through a wire, a magnetic field is generated around it. The strength of the field depends on the magnitude of the current and the distance from the wire.

Electric Motor: A current-carrying coil of wire in a magnetic field. The two sides of the coil that are perpendicular to the magnetic field experience forces in opposite directions, causing rotation.

Electromagnet:** **A solenoid with an iron core. The magnetism of an electromagnet can be switched on and off, and the strength changed, through varying the current in the solenoid.

Fleming's Left-Hand Rule: A rule used to determine the orientation of the force (thumb), current (second finger) and magnetic field (first finger) when a current-carrying wire is placed in a magnetic field (motor effect).

Generator Effect: When there is relative motion between an electrical conductor and a magnetic field, a voltage will be induced across the ends of the conductor. A current will flow if this conductor is part of a complete circuit.

Induced Magnet: A material that becomes a magnet when it is placed in an existing magnetic field, but loses its magnetism quickly once it is removed. Induced magnetism always produces attractive forces.

Like Magnetic Poles: When matching poles of a magnet are brought near each other they repel each other.

Loudspeaker: A device that converts variations in current into vibrations of a diaphragm to produce corresponding sound waves.

Magnetic Field Lines: Lines that show the strength and direction of a magnetic field. The lines point from North to South and their concentration represents the magnitude of the field.

Magnetic Field: The region around a magnet in which another magnet or magnetic material

will experience a non-contact force.

Magnetic Materials: Iron, steel, cobalt and nickel.

Magnetic Poles: The regions of a magnet where the magnetic forces are at their strongest.

Magnetically Hard: A material property that means the material can be permanently magnetised. Examples include iron and alloys containing large amounts of iron.

Magnetically Soft: A material property that means the material can be temporarily magnetised. Examples include alloys with lower amounts of iron.

Permanent Magnet: A magnet that produces its own magnetic field.

***Power Cables:** **Metal wires that are part of the National Grid. Electricity is transported along them at very high voltages to reduce the energy loss and make the transportation more efficient.**

***Solenoid:** **A wire wrapped into the shape of a coil, that has a strong and uniform magnetic field inside of it. The solenoid's magnetic field strength can be increased by adding an iron core.**

***Step-Down Transformer:** **A transformer that has a smaller potential difference in the secondary coil than in the primary coil. This is a result of the secondary coil having fewer turns.**

***Step-Up Transformer:** **A transformer that has a larger potential difference in the secondary coil than in the primary coil. This is a result of the secondary coil having more turns.**

***Transformer:** **An iron core with a primary and secondary coil of wire wound around opposite ends. Transformers can change the magnitude of an alternating voltage.**

***Turns Ratio:** **The number of turns in the primary coil of a transformer over the number of turns in the secondary coil. This is equal to the voltage ratio for a 100% efficient transformer.**

Unlike Magnetic Poles: When opposite poles of a magnet are brought near each other they attract each other.

***Voltage Ratio:** **The voltage across the primary coil of a transformer over the voltage across the secondary coil.**

Definitions and Concepts for Edexcel Physics IGCSE

Topic 7: Radioactivity and Particles

*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. The activity of a radioactive source reduces over time.

Alpha Particle: A positively charged particle consisting of two protons and two neutrons. They are highly ionising, but can be stopped by a few centimetres of air.

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. They are ionising but can be stopped by a thin sheet of aluminium.

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

Control Rods: Found in nuclear reactors to control the rate of fission. They absorb neutrons, preventing them from inducing further fission reactions.

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. These products are released with kinetic energy.

Gamma Ray: Electromagnetic radiation emitted from a nucleus. They have a very high penetrating power and require several centimetre of lead to absorb them.

Geiger-Muller Tube: A device used to detect ionising radiation.

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. It is different for different isotopes.

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

Ionising Radiation: Radiation that can cause cell mutations, damage cells and tissues, and lead to cancers.

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.

Mass-Energy Equivalence: All matter has an associated energy. This means that mass can be converted into energy in the form of radiation.

Moderator: A substance found in nuclear reactors to slow down neutrons so they are at suitable speeds to induce fission in fissile nuclei.

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

Neutrons: A neutrally charged constituent of the nucleus.

Nuclear Fission: The splitting of a large and unstable nucleus into two smaller and more stable nuclei to produce energy. This is the method currently used in nuclear power stations.

Nuclear Fusion: The joining of two small, light nuclei to form a larger, heavier one and release energy. It cannot happen at low pressures and temperatures since in these conditions the electrostatic repulsion of protons in the nucleus cannot be overcome.

PET Scanner: A medical imaging device that uses radioactive tracers and detectors to form internal body images.

Photographic Film: A material that reacts to ionising radiation, allowing an image to be formed.

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.

Random Nature of Radioactive Decay: You cannot predict which nuclei in a radioactive sample will decay next, or when the next decay will occur - it is a random process.

Shielding: A barrier used to prevent radioactive daughter products leaving a nuclear reactor.

Uranium-235: The radioactive isotope used in nuclear reactors. It is often referred to as U-235.

Definitions and Concepts for Edexcel Physics IGCSE

Topic 8: Astrophysics

---

*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.

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.

Circular Orbits: The circular path that a satellite or planet may travel in. Since their direction is continually changing, their velocity is always changing. Gravity provides the required force for these orbits.

CMBR:** **Cosmic microwave background radiation. This is electromagnetic radiation that is found in small quantities all around us. It is suggested to have come from the high energy radiation emitted by the Big Bang.

Comets: Objects consisting of rock, dust and ice that travel in the universe at high speeds. When they approach the sun they vaporise and produce a trail.

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

Galaxy: A system containing billions of stars.

Hertzsprung-Russell Diagram:** **A plot of the luminosity of stars against their temperatures.

Main Sequence Star: The stable state of all stars. The gravitational forces pulling the star together, and the pressure pushing outwards, are balanced.

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

Natural Satellites: The moons that orbit planets.

Nebula: A cloud of dust and gas.

Orbital Radius: The radius of a body's orbit. For a stable orbit, a change in its orbital radius is required for the body to undergo a speed change.

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.

Orbital Period: The time it takes for an object in orbit to complete one full cycle.

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.

Protostar: The first stage all stars go through after forming from a nebula. In this stage the star becomes hot enough for hydrogen nuclei to fuse.

Red Giant Star: When their hydrogen is used up and larger nuclei are produced by fusion, stars of a similar magnitude to the Sun will expand to form a red giant.

***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.**

Star Life Cycle: The stages that a star passes through in its lifetime, dependent on the size of the star relative to the sun.

Sun: A star formed from a cloud of dust and gas being pulled together by gravitational attraction. Fusion reactions occur in the sun.

Supernova: The explosion of a massive star, that distributes the elements created by the fusion reactions in the star, throughout the universe.

Universe: A large system of billions of galaxies.

Weight: The force of matter due to gravity. It is equal to the product of mass and gravitational field strength, and so varies depending on your location in the universe.

White Dwarf: When the fusion reactions in stars of a similar magnitude to the sun come to an end, the star will contract under gravity and cool down to form a white dwarf.