

Year 10 Combined PHYSICS Curriculum Map

Note: KS4 (Yr10-11) Topics often span half terms and can be up to 20+ lessons long, for simplicity the main topic each term has been identified but this may start the term before and or spill over into the following term.

Term	Topic/Unit title	Essential Skills / Knowledge (what students should know and be able to apply by the end of the unit/topic)
Autumn 1	AQA Paper 1 Particle Models	<p>Describe the different states of matter and their properties using the particle model.</p> <p>Recall the formula for density</p> <p>Calculate the density of materials and give the correct units.</p> <p>Convert kg/m^3 into g/cm^3 and back again.</p> <p>Explain why different states of matter have different densities using the particle model.</p> <p>Find the density of regular shaped solids.(e.g. cube, sphere etc) (PRAC)</p> <p>Find the density of irregular solids. (PRAC)</p> <p>Find the density of a liquid and a gas</p> <p>Describe changes of state using correct terminology.</p> <p>Describe what internal (thermal) energy of a solid is.</p> <p>Calculate the specific heat capacity of a material (formula Given).</p> <p>Find the specific heat capacity of a material. (PRAC)</p> <p>Give the unit of specific heat capacity.</p> <p>Explain what latent heat is. (vaporization and fusion)</p> <p>Calculate latent heat using $E = mL$ (formula given).</p> <p>Describe heating and cooling graphs and identify a change of state.</p>

		<p>Explain the motion of gas particles and the effect of temperature.</p> <p>Explain why gases exert a pressure on the walls of a container.</p> <p>Explain why changing the temperature of a gas affects the pressure.</p>
Autumn 2	AQA Paper 1 Energy	<p>Define a system as an object or group of objects and state examples of energy changes.</p> <p>Identify energy stores (eg Chemical) and transfer mechanisms (eg Heating).</p> <p>Describe and calculate energy changes in a system.</p> <p>Recall the formula for kinetic energy $E_k = \frac{1}{2}mv^2$</p> <p>Calculate the kinetic energy of an object and rearrange the formula.</p> <p>Calculate the elastic potential energy using $E_e = \frac{1}{2}ke^2$ (formula given)</p> <p>Rearrange $E_e = \frac{1}{2}ke^2$ and give the unit of the spring constant N/m</p> <p>Recall the formula for potential energy $E_p = mgh$</p>
Spring 1	AQA Paper 1 Energy	<p>Calculate the potential energy of an object and rearrange the formula.</p> <p>Define the term 'specific heat capacity'</p> <p>Calculate the specific heat capacity of a material (formula given).</p> <p>Find the specific heat capacity of different materials (PRAC)</p> <p>Define power (the rate at which energy is transferred) 1 watt = 1 J/s</p> <p>Recall, rearrange and applying the equations $P = E/t$ & $P = W/t$</p> <p>Understand energy can be transferred usefully, stored or dissipated.</p> <p>Explain how energy can be (wasted) dissipated to the surroundings</p> <p>Explain ways of reducing unwanted energy transfers.</p> <p>Describe how the rate of cooling of a building can be reduced</p>

		<p>Investigate effectiveness of (thermal) insulators (PRAC)</p> <p>Recall , rearrange and apply the efficiency equation $\text{Efficiency} = \frac{\text{Useful Energy}}{\text{Total Energy}}$</p> <p>List renewable and non-renewable energy resources and define “renewable energy”</p> <p>Compare ways that different energy resources are used.</p> <p>Explain why some energy resources are reliable and explain patterns and trends in use.</p> <p>Evaluate the use of different energy resources.</p>
Spring 2	AQA Paper 1 Electricity	<p>Draw and interpret circuit diagrams, including all common circuit symbols</p> <p>Define electric current as the rate of flow of electrical charge.</p> <p>Calculate charge and current by recalling and applying the formula: $Q = It$</p> <p>Recall, rearrange, calculate energy using $E = Pt$ and $E = QV$</p> <p>Explain what causes current and that it is the same at all points in a series circuit.</p> <p>Describe the relationship between current, voltage and resistance in a component.</p> <p>Recall, rearrange, calculate and use Ohm’s Law $V = IR$</p> <p>Investigate resistance of wires and resistors (in series and parallel) (PRAC)</p> <p>Sketch and Interpret I-V graphs for Ohmic Resistors, Filament Lamps and Diodes</p> <p>Explain and draw a circuit to measure the resistance of a component</p> <p>Construct circuits to investigate the I–V characteristics of components (PRAC)</p> <p>Recall the properties of LDRs and thermistors.</p> <p>State components in a parallel circuit have the same voltage across them.</p> <p>Calculate the total resistance of two components in series. (Resistances add together)</p> <p>Explain why adding resistors in parallel decreases the total resistance.</p>

		<p>Solve problems for circuits finding voltage, current and resistance.</p> <p>Explain the difference between DC and AC, stating UK mains voltage and current.</p> <p>Describe the function of each wire in a three-core cable connected to the mains.</p> <p>State that the voltage between the live wire and earth is about 230 V and that neutral wire and our bodies are close to 0 V.</p> <p>Explain why a live UK mains wire is dangerous. Due to providing a connection to earth.</p> <p>Explain how the power transfer is related to the voltage and current.</p> <p>Recall, rearrange and calculate power by applying the equations: $P = VI$ and $P = I^2 R$</p> <p>Explain how power is transferred from power stations to people's homes and why voltage is changed.</p>
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Autumn 1	AQA Paper 2 Forces	<p>Identify and describe scalar quantities and vector quantities.</p> <p>Identify and give examples of forces as contact or non-contact forces.</p> <p>Describe the interaction between two objects and the force produced.</p> <p>Describe weight and explain that how it varies depends on the gravitational field strength</p> <p>Recall and calculate weight using the equation: [$W = mg$].</p> <p>Identify an objects centre of mass.</p> <p>Calculate the result of two forces.</p>
Autumn 2	Atomic Structure Revision and PPEs	<p>Describe energy transfers when work is done and recall + calculate using [$W = Fs$].</p> <p>Describe what a Joule is & convert between Nm and J.</p> <p>Explain that work done against friction causes the temperature of an object to rise.</p> <p>Describe examples of the forces involved in stretching, bending or compressing an object.</p> <p>Describe the difference between elastic and inelastic deformation.</p> <p>Describe the extension of an elastic object and calculate it by recalling & using: [$F = ke$].</p>
Spring 1	AQA Paper 2 Forces	<p>Calculate energy stored in a spring using [$E = \frac{1}{2}ke^2$] (GIVEN).</p> <p>PRAC: Investigate stretching springs.</p> <p>Define & explain distance and displacement, speed and velocity as scalar or vector quantities.</p>

		<p>Recall typical speeds of walking, running, cycling and factors that affect it.</p> <p>Calculate average speed for non constant speed.</p> <p>Explain, with examples, motion in a circle including changes in velocity but not speed.</p> <p>Use Distance time graphs, calculate speed and distance travelled.</p> <p>Give everyday accelerations and understand negative accelerations mean slowing down.</p> <p>Calculate the average acceleration of an object recalling and use: $[a = \Delta v / t]$.</p> <p>Use velocity time graphs to find acceleration (from Grad) and distance travelled (from Area).</p> <p>Apply $[v^2 = u^2 + 2as]$ (GIVEN).</p> <p>Use Newton's first law (for stationary and moving objects).</p> <p>Use Newton's second Law to define acceleration recall and apply: $[F = ma]$.</p> <p>Use Newton's 3rd law on equilibrium situations.</p> <p>PRAC Investigate effect of varying mass and force on acceleration</p> <p>Estimate speed acceleration and force on typical road transport</p> <p>Explain methods of measuring reaction time and estimate an average person's reaction time</p> <p>Discuss stopping, braking and thinking time and distance including factors affecting.</p> <p>Explain that a greater braking force causes a larger deceleration and explain dangerous to drivers</p>
Spring 2	AQA Paper 2 Waves	<p>Describe transverse and longitudinal waves. Give examples of each.</p> <p>Define waves as transfers of energy from one place to another, carrying information.</p> <p>Define and Identify on a diagram: amplitude, wavelength, frequency, period and wave speed.</p> <p>Recall and Calculate: wave speed, frequency and wavelength using $v = f \lambda$</p>

		<p>Calculate wave period using $T = 1/f$ (formula given)</p> <p>Describe a method to measure the speed of sound waves in air.</p> <p>Describe a method and apparatus used to measure the speed, Frequency and wavelength of ripples on a water surface. (PRAC)</p> <p>Describe what electromagnetic (EM) waves are and explain how they are grouped / ordered.</p> <p>Give examples of: energy transfers by EM waves, their uses.</p> <p>Give examples of: dangers of EM radiation and how the type of radiation and the dose affect this.</p> <p>Explain the origin of EM radiation in terms of changes to the structure of the atom and nucleus.</p> <p>Explain what visible light is (in relation to our eyes)</p> <p>Draw ray diagrams of refraction.</p>
Summer 1	AQA Paper 2 Magnets	<p>Describe the attraction and repulsion between unlike and like poles of magnets.</p> <p>Draw the magnetic field pattern of a bar magnet, showing how field strength and direction.</p> <p>Explain how a magnetic compass is related to evidence that the core of the Earth must be magnetic.</p> <p>Describe how to plot the magnetic field pattern of a magnet using a compass.</p> <p>Give examples of how the magnetic effect of a current.</p> <p>Explain how a solenoid arrangement can increase the magnetic effect of the current.</p>
Summer 2	Exams	