GCSE Physics

Outline of Exams and RAG Checklists

This GCSE consists of 2 written exam papers, 100 marks each and lasting 1 hour 45 mins. The question styles include multiple choice, structured, closed short answer and open extended response. In addition to the checklists below, there will be questions relating to the required practical activities studied through the course and there will be calculations, so a calculator is required.

The paper 1 exam on 22nd May 2025 (AM) includes Modules P1 to P4 Energy; Electricity; Particle model of matter; and Atomic structure. And is 50% of the grade.

The paper 2 exam on 16th June 2025 (AM) includes Modules P5 to P8 Forces, Waves; Magnetism and electromagnetism; and Space physics.

Questions in paper 2 may draw on an understanding of energy changes and transfers due to heating, mechanical and electrical work and the concept of energy conservation from Energy and Electricity in paper 1,and is 50% of the grade.

Below are the 8 Learning Journey Checklists for this GCSE. Bold statements are assessed on the higher tier paper only.

KS4 TRIPLE PHYSICS

P1 LEARNING JOURNEY

P1	REF	SKILL	RAG
1.1 ENERGY CHANGES IN A SYSTEM	P.1.1.1a	I can define a system as an object or group of objects, and I can state examples of changes in the way energy is stored in a system	
	P.1.1.1b	I can describe all the energy changes involved in an energy transfer, and calculate relative changes in energy when the heat, work done or flow of charge in a system changes	
	P.1.1.1c	I can use calculations to show on a common scale how energy in a system is redistributed	
	P.1.1.2a	I can calculate the kinetic energy of an object by recalling and applying the equation: [$E_k = 0.5mv^2$]	
	P.1.1.2b	I can calculate the amount of elastic potential energy stored in a stretched spring by applying, but not recalling, the equation: [$E_e = 0.5ke^2$]	
	P.1.1.2c	I can calculate the amount of gravitational potential energy gained by an object raised above ground level by applying, but not recalling, the equation: [$E_p = mgh$]	
	P.1.1.3a	I can calculate the amount of energy stored in or released from a system as its temperature changes by applying, but not recalling, the equation: [$\Delta E = mc\Delta\theta$]	
	P.1.1.3b	I can define the term 'specific heat capacity'	
	P.1.1.4a	I can state that a force does work on an object only when it causes a displacement, but that work is also done when charge flows in a circuit	
	P.1.1.4b	I can calculate work done by recalling and applying the equation: [$W = Fs$]	
	P.1.1.5a	I can define power as the rate at which energy is transferred or the rate at which work is done, and the watt as an energy transfer of 1 joule per second	
	P.1.1.5b	I can calculate power by recalling and applying the equations: [$P = E/t$ & $P = W/t$]	
	P.1.1.5c	I can explain, using examples, how two systems transferring the same amount of energy can differ in power output due to the time taken	

P1	REF	SKILL	RAG
1.2 CONSERVATION AND DISSIPATION	P.1.2.1a	I can state that energy can be transferred usefully, stored or dissipated, but cannot be created or destroyed, and so the total energy in a system does not change	
	P.1.2.1b	I can explain that only some of the energy in a system is usefully transferred, with the rest 'wasted', giving examples of how this wasted energy can be reduced	
	P.1.2.1c	I can explain the correlation between the thermal conductivity of a material and the higher rate of energy transfer by conduction across it, relating this to examples such as heat escaping a building's walls	
	P.1.2.2a	I can calculate efficiency by recalling and applying the equation: [efficiency = useful power output / total power input]	
	P.1.2.2b	**I can suggest and explain ways to increase the efficiency of an intended energy transfer**	
1.3 NATIONAL AND GLOBAL ENERGY RESOURCES	P.1.3.1a	I can list the main renewable and non-renewable energy resources, and define a renewable energy resource as one that is replenished as it is used	
	P.1.3.1b	I can compare ways that different energy resources are used, including uses in transport, electricity generation and heating	
	P.1.3.1c	I can explain why some energy resources are more reliable than others, explaining patterns and trends in their use	
	P.1.3.1d	I can evaluate the use of different energy resources, taking into account any ethical and environmental issues which may arise	
	P.1.3.1e	I can justify the use of energy resources, with reference to both environmental issues and the limitations imposed by political, social, ethical or economic considerations	

KS4 TRIPLE PHYSICS

P2 LEARNING JOURNEY

P2	REF	SKILL	RAG
2.1 CURRENT, POTENTIAL DIFFERENCE AND RESISTANCE	P.2.1.1a	I can draw and interpret circuit diagrams, including all common circuit symbols	
	P.2.1.2a	I can define electric current as the rate of flow of electrical charge around a closed circuit	
	P.2.1.2b	I can calculate charge and current by recalling and applying the formula: [Q = It]	
	P.2.1.2c	I can explain that current is caused by a source of potential difference and it has the same value at any point in a single closed loop of a circuit	
	P.2.1.3a	I can describe and apply the idea that the greater the resistance of a component, the smaller the current for a given potential difference (p.d.) across the component	
	P.2.1.3b	I can calculate current, potential difference or resistance by recalling and applying the equation: [V = IR]	
	P.2.1.4a	I can define an ohmic conductor as one for which current through it is directly proportional to the potential difference across it (at a constant temperature)	
	P.2.1.4b	I can explain that the resistance of components such as lamps, diodes, thermistors and LDRs is not constant, and sketch/interpret IV graphs of their characteristic electrical behaviour	
	P.2.1.4c	I can explain how to measure the resistance of a component by measuring the current through, and potential difference across, the component, drawing an appropriate circuit diagram using correct circuit symbols	
2.2 SERIES AND PARALLEL CIRCUITS	P.2.2.1a	I can show by calculation and explanation that components in series have the same current passing through them, and the total potential difference shared between them	
	P.2.2.1b	I can show by calculation and explanation that components connected in parallel have the same the potential difference across each of them, and the total current through the circuit shared between them	
	P.2.2.1c	I can calculate the total resistance of two components in series as the sum of the resistance of each component using the equation: [Rtotal = R1 + R2]	
	P.2.2.1d	I can explain qualitatively why adding resistors in series increases the total resistance whilst adding resistors in parallel decreases the total resistance	
	P.2.2.1e	I can solve problems for circuits which include resistors in series using the concept of equivalent resistance	

P2	REF	SKILL	RAG
2.3 DOMESTIC USES AND SAFETY	P.2.3.1a	I can explain the difference between direct and alternating voltage and current, stating that UK mains is an a.c. supply of 50 Hz and 230 V	
	P.2.3.2a	I can identify and describe the function of each wire in a three-core cable	
	P.2.3.2b	I can state that the potential difference between the live wire and earth (0 V) is about 230 V, and that both neutral wires and our bodies are at, or close to, earth potential (0 V)	
	P.2.3.2c	I can explain that a live wire may be dangerous even when a switch in the mains circuit is open by explaining the danger of providing any connection between the live wire and earth	
	P.2.3.3a	I can explain the function of a fuse and a circuit breaker, the advantages of using a circuit breaker, and why appliances which are double insulated do not need an earth connection	
2.4 ENERGY TRANSFERS	P.2.4.1a	I can calculate power by recalling and applying the equations: [P = VI] and [P = I2 R]	
	P.2.4.2a	I can describe how appliances transfer energy to the kinetic energy of motors or the thermal energy of heating devices because work is done when charge flows in a circuit	
	P.2.4.2b	I can calculate and explain the amount of energy transferred by electrical work by recalling and applying the equations: [E = Pt] and [E = QV]	
	P.2.4.3a	I can identify the National Grid as a system of cables and transformers linking power stations to consumers	
	P.2.4.3b	I can explain why the National Grid system is an efficient way to transfer energy, with reference to change in potential difference reducing current and therefore heat loss, for a given electrical power	
2.5 STATIC ELECTRICITY	P.2.5.1a	I can describe the production of static electricity, and sparking, by the rubbing of insulating surfaces	
	P.2.5.1b	I can describe evidence that charged objects exert forces of attraction or repulsion on one another when not in contact	
	P.2.5.1c	I can explain how the transfer of electrons between objects can explain the phenomenon of static electricity, including how insulators are charged and sparks are created	
	P.2.5.2a	I can draw the electric field pattern for an isolated charged sphere	
	P.2.5.2b	I can explain the concept of an electric field, and the decrease in its strength as the distance from it increases	
	P.2.5.2c	I can explain how the concept of an electric field helps to explain the non-contact force between charged objects as well as other electrostatic phenomena such as sparking	

KS4 TRIPLE PHYSICS

P3 LEARNING JOURNEY

P3	REF	SKILL	RAG
3.1 CHANGES IN STATE	P.3.1.1A	I can calculate the density of a material by recalling and applying the equation: [ρ = m/V]	
	P.3.1.1b	I can recognise/draw simple diagrams to model the difference between solids, liquids and gases	
	P.3.1.1c	I can use the particle model to explain the properties of different states of matter, and differences in the density of materials	
	P.3.1.2a	I can recall and describe the names of the processes by which substances change state	
	P.3.1.2b	I can use the particle model to explain why a change of state is reversible and affects the properties of a substance, but not its mass	
3.2 INTERNAL ENERGY AND ENERGY TRANSFERS	P.3.2.1a	I can state that the internal energy of a system is stored in the atoms and molecules that make up the system	
	P.3.2.1b	I can explain that internal energy is the total kinetic energy and potential energy of all the particles in a system, and that heating increases the energy of these particles, either raising the temperature of the substance, or changing its state	
	P.3.2.3a	I can calculate the specific latent heat of fusion/vaporisation, or the energy required for a certain mass to change state by applying, but not recalling, the equation: [E = mL]	
	P.3.2.3b	I can interpret and draw heating and cooling graphs that include changes of state, recognising and representing that internal energy can continue to increase when the temperature doesn't	
3.3 PARTICLE MODEL AND PRESSURE	P.3.3.1a	I can explain that the molecules of a gas are in constant random motion, and that the higher the temperature of a gas, the greater the particles' average kinetic energy	
	P.3.3.1b	I can explain, with reference to the particle model, the effect of changing the temperature of a gas held at constant volume on its pressure	
	P.3.3.2a	I can explain, with reference to the particle model, how increasing the volume in which a gas is contained can lead to a decrease in pressure when the temperature is constant	
	P.3.3.2b	I can calculate the pressure for a fixed mass of gas held at a constant temperature by applying, but not recalling, the equation: [pV = constant]	
	P.3.3.3a	I can explain how work done on an enclosed gas can lead to an increase in the temperature of the gas, as in a bicycle pump	

KS4 TRIPLE PHYSICS

P4 LEARNING JOURNEY

P4	REF	SKILL	RAG
4.1 ATOMS AND ISOTOPES	P.4.1.1a	I can describe the basic structure of an atom as consisting of a positively charged nucleus surrounded by negatively charged electrons at different distances from the nucleus, which vary with the absorption or emission of electromagnetic radiation	
	P.4.1.2a	I can define electrons, neutrons, protons, isotopes and ions	
	P.4.1.2b	I can relate differences between isotopes to differences in conventional representations of their identities, charges and masses	
	P.4.1.3a	I can describe why the evidence from Rutherford's scattering experiment led to a change in the atomic model, describing differences between the plum pudding model of the atom and the nuclear model of the atom	
4.2 ATOMS AND NUCLEAR RADIATION	P.4.2.1a	I can describe and apply the idea that the activity of a radioactive source is the rate at which its unstable nuclei decay, measured in becquerel (Bq), or counts per second, by a Geiger-Muller tube	
	P.4.2.1b	I can describe the penetration through materials, the range in air and the ionising power for alpha particles, beta particles and gamma rays	
	P.4.2.1c	I can apply knowledge of the uses of radiation to evaluate the best sources of radiation to use in a given situation	
	P.4.2.2a	I can use the names and symbols of common nuclei and particles to complete balanced nuclear equations, by balancing the atomic numbers and mass numbers	
	P.4.2.3a	I can define half-life of a radioactive isotope as the average time it takes for the number of decaying nuclei in the isotope, or the activity of the isotope, to halve	
	P.4.2.3b	**I can determine the half-life of a radioactive isotope from given information and calculate the net decline, expressed as a ratio, in a radioactive emission after a given number of half-lives**	
	P.4.2.4a	I can compare the hazards associated with contamination and irradiation, and outline suitable precautions taken to protect against any hazard the radioactive sources may present	
	P.4.2.4b	I can discuss the importance of publishing the findings of studies into the effects of radiation on humans, and sharing findings with other scientists so that they can be checked by peer review	

P4	REF	SKILL	RAG
4.3 HAZARDS AND BACKGROUND RADIATION	P.4.3.1a	I can state, giving examples, that background radiation is caused by natural and man-made sources, and that the level of radiation may be affected by occupation and/or location	
	P.4.3.2a	I can explain the relationship between the instability and half-life of radioactive isotopes, and why the hazards associated with radioactive material differ according to the half-life involved	
	P.4.3.3a	I can describe and evaluate the uses of nuclear radiation in exploration of internal organs, and controlling or destroying unwanted tissue	
	P.4.3.3b	I can evaluate the perceived risks of using nuclear radiation in relation to given data and consequences	
4.4 NUCLEAR FISSION AND FUSION	P.4.4.1a	I can describe fission as rare and requiring fissionable isotopes, but as a process of huge energy release which, when controlled, can be used to generate electricity	
	P.4.4.1b	I can draw/interpret diagrams representing nuclear fission and how a chain reaction may occur	
	P.4.4.2a	I can describe nuclear fusion as a process which requires very high temperature and pressure, and in which some of the mass of two light nuclei is converted into energy as they join to form a heavier nucleus	

KS4 TRIPLE PHYSICS

P5 LEARNING JOURNEY

P5	REF	SKILL	RAG
5.1 FORCES AND THEIR INTERACTIONS	P.5.1.1a	I can identify scalar quantities, and describe vector quantities as those with both magnitude and an associated direction, representing them with arrows	
	P.5.1.2a	I can identify and give examples of forces as contact or non-contact forces	
	P.5.1.2b	I can describe the interaction between two objects and the force produced on each as a vector	
	P.5.1.3a	I can describe weight as the force acting on an object due to gravity, and explain that its magnitude at a point depends on the gravitational field strength, for which I can state the units	
	P.5.1.3b	I can calculate weight by recalling and using the equation: [W = mg]	
	P.5.1.3c	I can represent the weight of an object as acting at a single point which is referred to as the object's 'centre of mass'	
	P.5.1.4a	I can calculate the resultant of two forces that act in a straight line	
	P.5.1.4b	**I can use free body diagrams to qualitatively describe examples where several forces act on an object, and explain how that leads to a single resultant force or no force**	
	P.5.1.4c	**I can use free body diagrams, and accurate vector diagrams to scale, to resolve multiple forces and show magnitude and direction of the resultant, or represent one force as two component forces at right angles**	
5.2 WORK DONE	P.5.2.1a	I can describe energy transfers involved when work is done, and calculate the work done by recalling and using the equation: [W = Fs]	
	P.5.2.1b	I can state that one joule of work is done when a force of one newton causes a displacement of one metre, stating that the Nm is an equivalent unit to the joule	
	P.5.2.1c	I can explain why work done against the frictional forces acting on an object causes a rise in the temperature of the object	
5.3 FORCES AND ELASTICITY	P.5.3.1a	I can describe examples of the forces involved in stretching, bending or compressing an object	
	P.5.3.1b	I can describe the extension of an elastic object below the limit of proportionality, such as a spring, to be directly proportional to the force applied, and calculate it by recalling and applying the equation: [F = ke]	
	P.5.3.1c	I can explain why a change in the shape of an object only happens when more than one force is applied and that the work done by the force on a spring is equal to the elastic potential energy the spring stores	
	P.5.3.1d	I can describe the difference between and interpret data from an investigation to explain possible causes of a linear and non-linear relationship between force and extension	
	P.5.3.1e	I can calculate the work done in stretching a spring by recalling or applying the equation: [E = 0.5ke2]	

P5	REF	SKILL	RAG
5.4 MOMENTS, LEVERS AND GEARS	P.5.4.1a	I can state that a body in equilibrium must experience equal sums of clockwise and anticlockwise moments, and recall and apply [M = Fd]	
	P.5.4.1b	I can apply the idea that a body in equilibrium experiences an equal total of clockwise and anti-clockwise moments about any pivot	
	P.5.4.1c	I can explain why the distance, d, must be taken as the perpendicular distance from the line of action of the force to the pivot	
5.5 PRESSURE AND PRESSURE DIFFERENCES IN FLUIDS	P.5.5.1a	I can describe a fluid as either a liquid or a gas and explain that the pressure in a fluid causes a force to act at right angles (normal) to the surface of its container	
	P.5.5.1b	I can recall and apply the equation: [p = F/A]	
	P.5.5.1c	I can explain why the pressure at a point in a fluid increases with the height of the column of fluid above that point and with the density of the fluid, and calculate differences in pressure at different depths in a liquid by applying, but not recalling, the equation: [p = h **ρ** g]	
	P.5.5.1d	I can describe upthrust in terms of a greater pressure on the bottom surface of an object than on its top surface, and so explain why the density of the fluid has an effect on the upthrust experienced by an object submerged in it	
	P.5.5.1e	I can explain why an object floats or sinks, with reference to its weight, volume and the upthrust it experiences	
	P.5.5.2a	I can describe a simple model of the Earth's atmosphere and of atmospheric pressure, explaining why atmospheric pressure varies with height above a surface	
5.6 FORCES AND MOTION	P.5.6.1a	I can identify displacement as a vector quantity, and express displacement in terms of both its magnitude and direction	
	P.5.6.1b	I can explain that the speed at which a person can walk, run or cycle depends on a number of factors and can recall some typical speeds for walking, running, cycling and other common transportation systems	
	P.5.6.1c	I can explain that the speed of wind and of sound through air varies and why (recalling a typical value of around 330 ms-1), and I can measure distance travelled and time taken in an experiment to calculate speed by recalling and applying the equation: [s = v t]	
	P.5.6.1d	I can explain, giving examples, that when an object moves in a circle at a constant speed, the direction of the object is continually changing, as is the velocity	
	P.5.6.1e	I can represent an object moving along a straight line using a distance-time graph, describing its motion and calculating its speed from the gradient	
	P.5.6.1f	I can calculate the speed of an accelerating object at any point by drawing a tangent to the distance-speed graph and measuring its gradient	

P5	REF	SKILL	RAG
5.6 FORCES AND MOTION	P.5.6.1h	I can calculate the average acceleration of an object by recalling and applying the equation: [$a = \Delta v/t$]	
	P.5.6.1i	I can represent motion using velocity–time graphs, finding the acceleration from its gradient and distance travelled from the area underneath	
	P.5.6.1j	I can apply, but not recall, the equation: [$v^2 - u^2 = 2as$]	
	P.5.6.1k	I can draw and interpret velocity-time graphs for objects that reach terminal velocity	
	P.5.6.1l	I can interpret and explain the changing motion of an object in terms of the forces acting on it	
	P.5.6.1m	I can explain that an object falling from rest through a fluid due to gravity reaches its terminal velocity when its increased speed creates a drag force, which is equal to its weight	
	P.5.6.2a	I can explain the motion of an object moving with a uniform velocity, and identify that forces must be in effect if its velocity is changing, by stating and applying Newton's First Law	
	P.5.6.2b	I can explain that the acceleration of an object is proportional to the resultant force acting on the object, and calculate the force or acceleration for an object by recalling and applying the equation: [$F = ma$]	
	P.5.6.2c	I can describe inertia as the tendency of objects to continue in their state of rest or of uniform motion, and inertial mass as a measure of how difficult it is to change the velocity of an object, defining it as the ratio of force over acceleration	
	P.5.6.2d	I can estimate the speed, accelerations and forces of large vehicles involved in everyday road transport	
	P.5.6.2e	I can apply Newton's Third Law to examples of equilibrium situations	
	P.5.6.3a	I can describe stopping distance of a vehicle as the sum of the driver's reaction time and vehicle's braking distance	
	P.5.6.3b	I can explain that, for a given braking force, the braking distance increases dramatically with an increase in speed	
	P.5.6.3c	I can estimate the distance required for an emergency stop in a vehicle over a range of typical speeds	
	P.5.6.3d	I can interpret graphs relating speed to stopping distance for a range of vehicles	
	P.5.6.3e	I can state typical reaction times and describe how reaction time (and therefore stopping distance) can be affected by different factors	
	P.5.6.3f	I can explain methods used to measure human reaction times, and I can take, interpret and evaluate measurements of the reaction times of students	
	P.5.6.3g	I can explain how the braking distance of a vehicle can be affected by different factors, including implications for road safety	

P5	REF	SKILL	RAG
5.6 FORCES AND MOTION	P.5.6.3h	I can explain that a braking force applied to the wheel does work to reduce the vehicle's kinetic energy and increases the temperature of the brakes	
	P.5.6.3i	I can explain and apply the idea that a greater braking force causes a larger deceleration, and that larger decelerations might cause overheating/loss of control and be dangerous for drivers	
	P.5.6.3j	I can estimate the forces involved in the deceleration of road vehicles	
5.7 MOMENTUM	P.5.7.1a	I can calculate momentum by recalling and applying the equation: [$p = mv$]	
	P.5.7.2a	I can explain and apply the idea that, in a closed system, the total momentum before an event is equal to the total momentum after the event	
	P.5.7.2b	I can describe examples of momentum in a collision	
	P.5.7.2c	I can complete conservation of momentum calculations involving two objects	
	P.5.7.3a	I can explain that when a force acts on an object that is moving, or able to move, a change in momentum occurs	
	P.5.7.3b	I can calculate a force applied to an object, or the change in momentum it causes, by applying but not recalling the equation: [$F = m \Delta v / \Delta t$]	
	P.5.7.3c	I can explain that an increased force delivers an increased rate of change of momentum	
	P.5.7.3d	I can apply the idea of rate of change of momentum to explain safety features such as air bags, seat belts, helmets and cushioned surfaces	

KS4 TRIPLE PHYSICS

P6 LEARNING JOURNEY

P6	REF	SKILL	RAG
6.1 WAVES IN AIR, FLUIDS AND SOLIDS	P.6.1.1a	I can describe waves as either transverse or longitudinal, defining these waves in terms of the direction of their oscillation and energy transfer, and giving examples of each	
	P.6.1.1b	I can define waves as transfers of energy from one place to another, carrying information, and therefore explain that for water and sound waves it is the wave itself and not the water or air that travels	
	P.6.1.2a	I can define amplitude, wavelength, frequency, period and wave speed, and identify them where appropriate on diagrams	
	P.6.1.2b	I can state examples of methods of measuring wave speeds in different media and identify the suitability of apparatus of measuring frequency and wavelength	
	P.6.1.2c	I can calculate wave speed, frequency or wavelength by applying, but not recalling, the equation: [$v = f \lambda$], and I can calculate wave period by recalling and applying the equation: [$T = 1/f$]	
	P.6.1.2d	I can demonstrate how changes in velocity, frequency and wavelength are inter-related in the transmission of sound waves from one medium to another	
	P.6.1.2e	I can discuss the importance of understanding both mechanical and electromagnetic waves by giving examples, such as designing comfortable and safe structures and technologies	
	P.6.1.3a	I can describe a wave's ability to be reflected, absorbed or transmitted at the boundary between two different materials	
	P.6.1.3b	I can draw the reflection of a wave at a surface by constructing ray diagrams	
	P.6.1.4a	**I can describe, with examples, processes which convert wave disturbances between sound waves and vibrations in solids, examples may include the effect of sound waves on the ear drum**	
	P.6.1.4b	**I can explain why such processes only work over a limited frequency range and the relevance of this to the range of human hearing, which is from 20 Hz to 20 kHz**	
	P.6.1.5a	I can define ultrasound waves as having a frequency higher than the upper limit of human hearing, and explain how these are used to form images of internal structures in both medical and industrial imaging	
	P.6.1.5b	I can compare the two types of seismic wave produced by earthquakes with reference to the media they can travel in and the evidence they provide of the structure of the Earth	
	P.6.1.5c	I can describe how echo sounding using high frequency sound waves is used to detect objects in deep water and measure water depth	

P6	REF	SKILL	RAG
6.2 ELECTROMAGNETIC WAVES	P.6.2.1a	I can state that electromagnetic waves are transverse waves that travel at the same velocity through a vacuum and transfer energy from a source to an absorber, and that they are grouped in terms of their wavelength and their frequency	
	P.6.2.1b	I can list the groups of electromagnetic waves in order of wavelength: radio, microwave, infrared, visible light (red to violet), ultraviolet, X-rays and gamma rays, illustrating the transfer of energy, with examples	
	P.6.2.1c	I can explain that because our eyes only detect a limited range of electromagnetic waves, they can only detect visible light	
	P.6.2.2a	I can explain how different wavelengths of electromagnetic radiation are reflected, refracted, absorbed or transmitted differently by different substances and types of surface	
	P.6.2.2b	I can illustrate the refraction of a wave at the boundary between two different media by constructing ray diagrams	
	P.6.2.2c	I can describe that refraction is due to the difference in velocity of waves in different substances, and illustrate this using wave front diagrams	
	P.6.2.3a	I can explain that radio waves can be produced by oscillations in electrical circuits, or absorbed by electrical circuits, inducing an alternating current with the same frequency	
	P.6.2.3b	I can explain that changes in atoms and the nuclei of atoms can result in electromagnetic waves being generated or absorbed over a wide frequency range	
	P.6.2.3c	I can state examples of the dangers of each group of electromagnetic radiation, and discuss the effects of radiation as depending on the type of radiation and the size of the dose, measured in sieverts	
	P.6.2.4a	I can state examples of the uses of each group of electromagnetic radiation, explaining why each type of electromagnetic wave is suitable for its applications	
	P.6.2.5a	I can state that a lens forms an image by refracting light, and that the distance from the lens to the principal focus is called the focal length	
	P.6.2.5b	I can explain that images produced by a convex lens can be either real or virtual, but those produced by a concave lens are always virtual	
	P.6.2.5c	I can construct ray diagrams for both convex and concave lenses	
	P.6.2.5d	I can calculate magnification as a ratio with no units by applying, but not recalling, the formula: [magnification = image height / object height]	
	P.6.2.6a	I can explain how the colour of an object is related to the differential absorption, transmission and reflection of different wavelengths of light by the object	
	P.6.2.6b	I can describe the effect of viewing objects through filters or the effect on light of passing through filters, and the difference between transparency and translucency	
	P.6.2.6c	I can explain why an opaque object has a particular colour, with reference to the wavelengths emitted	

P6	REF	SKILL	RAG
6.3 BLACK BODY RADIATION	*P.6.3.1a*	I can state that all bodies, no matter what temperature, emit and absorb infrared radiation, and that the hotter the body, the more infrared radiation it radiates in a given time	
	P.6.3.1b	I can describe a perfect black body as an object that absorbs all the radiation incident on it and explain that, since a good absorber is also a good emitter, this would make it the best possible emitter	
	P.6.3.2a	I can explain that, when the temperature is increased, the intensity of every wavelength of radiation emitted increases, but the intensity of the shorter wavelengths increases more rapidly making the body appear more white	
	P.6.3.2b	I can explain and apply the idea that the temperature of a body is related to the balance between incoming radiation absorbed and radiation emitted, such that when they are equal the temperature is constant, and when uneven the temperature changes	
	P.6.3.2c	I can describe the temperature of the Earth as dependent on the rates of absorption and emission of radiation, and I can draw and interpret diagrams that show how this radiation affects the temperature of the Earth's surface and atmosphere	

KS4 TRIPLE PHYSICS

P7 LEARNING JOURNEY

P7	REF	SKILL	RAG
7.1 PERMANENT AND INDUCED MAGNETISM	P.7.1.1a	I can describe the attraction and repulsion between unlike and like poles of permanent magnets and explain the difference between permanent and induced magnets	
	P.7.1.2a	I can draw the magnetic field pattern of a bar magnet, showing how field strength and direction are indicated, and change from one point to another	
	P.7.1.2b	I can explain how the behaviour of a magnetic compass is related to evidence that the core of the Earth must be magnetic	
	P.7.1.2c	I can describe how to plot the magnetic field pattern of a magnet using a compass	
7.2 THE MOTOR EFFECT	P.7.2.1a	I can state examples of how the magnetic effect of a current can be demonstrated, and explain how a solenoid arrangement can increase the magnetic effect of the current	
	P.7.2.1b	I can draw the magnetic field pattern for a straight wire carrying a current and for a solenoid (showing the direction of the field)	
	P.7.2.1c	I can interpret diagrams of electromagnetic devices in order to explain how they work	
	P.7.2.2a	I can state and use Fleming's left-hand rule and explain that the size of the induced force depends on the magnetic flux density, current in, and length of, the conductor in the magnetic field	
	P.7.2.2b	I can calculate the force on a conductor carrying a current at right angles to a magnetic field by applying, but not recalling, the equation: [$F = BIL$]	
	P.7.2.3a	I can explain how rotation is caused in an electric motor	
	P.7.2.4a	I can explain how a moving-coil loudspeaker and headphones work	

P7	REF	SKILL	RAG
7.3 INDUCED POTENTIAL, TRANSFORMERS AND THE NATIONAL GRID	P.7.3.1a	I can describe the principles of the generator effect, including the direction of induced current, effects of Lenz' Law, and factors that increase induced p.d., and apply them in a given context	
	P.7.3.2a	I can explain how the generator effect is used in an alternator to generate a.c. and in a dynamo to generate d.c.	
	P.7.3.2b	I can draw/interpret graphs of potential difference generated in the coil against time	
	P.7.3.3a	I can explain how a moving-coil microphone works	
	P.7.3.4a	I can explain how the effect of an alternating current in one coil inducing a current in another is used in transformers	
	P.7.3.4b	I can explain how the ratio of the potential differences across the two coils depends on the ratio of the number of turns on each, and so distinguish a step-up from a step-down transformer	
	P.7.3.4c	I can apply the equation linking the p.d.s and number of turns in the two coils of a transformer to the currents and the power transfer involved, and relate these to the advantages of power transmission at high voltages	
	P.7.3.4d	I can calculate the number of turns on each coil of transformers, and the voltage or current through them, by understanding that ideal transformers' input and output powers are the same, and by applying but not recalling the equations: [$Vs \times Is = Vp \times Ip$] and [$vp / vs = np / ns$]	

KS4 TRIPLE PHYSICS

P8 LEARNING JOURNEY

P8	REF	SKILL	RAG
8.1 SOLAR SYSTEM	P.8.1.1a	I can list the types of body that make up the solar system, and describe our solar system as part of a galaxy	
	P.8.1.1b	I can explain that stars are formed by gas and dust being drawn together by gravity causing fusion reactions which lead to an equilibrium between the gravitational collapse of a star and the expansion of a star due to fusion energy	
	P.8.1.2a	I can describe the life cycle of a star the size of the Sun, and of a star which is much more massive than the Sun	
	P.8.1.2b	I can explain how fusion processes lead to the formation of new elements, and how supernovas have allowed heavy elements to appear in later solar systems	
	P.8.1.3a	I can explain that, for circular orbits, the force of gravity leads to a constantly changing velocity but unchanged speed	
	P.8.1.3b	I can explain that, for a stable orbit, the radius must change if the speed changes	
8.2 RED SHIFT	P.8.2.1a	I can explain, qualitatively, the red-shift of light from galaxies that are receding, and how this red-shift changes with distance from Earth	
	P.8.2.1b	I can explain why the change of each galaxy's speed with distance is evidence of an expanding universe	
	P.8.2.1c	I can explain how scientists are able to use observations to arrive at theories, such as the Big Bang theory, and I can discuss that there is still much about the universe that is not understood, such as dark mass and dark energy	