GCSE Physics: Triple Science

Curriculum Overview, Years 9–11

AQA GCSE Physics (8463) · Teaching sequence from the department Teaching Overview (Physics: Triple Science)

Course at a glance

This overview sets out the AQA GCSE Physics (8463) course in the order taught on the Triple Science route, with the specification content for each unit. Unit codes (P1–P16) follow the textbook chapters. Specification references are to the AQA 8463 specification.

Assessment

Paper	Specification content	Units	Format
Paper 1	4.1 Energy 4.2 Electricity 4.3 Particle model of matter 4.4 Atomic structure	P1, P2, P3, P4, P5, P6, P7	Written exam, 1 h 45 min, 100 marks, 50% of GCSE
Paper 2	4.5 Forces 4.6 Waves 4.7 Magnetism and electromagnetism 4.8 Space physics **Triple only**	P8, P9, P10, P11, P12, P13, P14, P15, P16	Written exam, 1 h 45 min, 100 marks, 50% of GCSE

- Both papers are sat at Foundation tier (grades 1–5) or Higher tier (grades 4–9) and include multiple choice, structured, closed short answer and open response questions.
- At least 15% of marks draw on the ten required practical activities; at least 30% assess mathematical skills.
- Assessment objectives: AO1 knowledge and understanding 40%, AO2 application 40%, AO3 analysis, interpretation and evaluation 20%.
- Two units contain content from the other paper: work done (4.5.2) is taught in P1 and black body radiation (4.6.3) in P2; both are assessed on Paper 2.

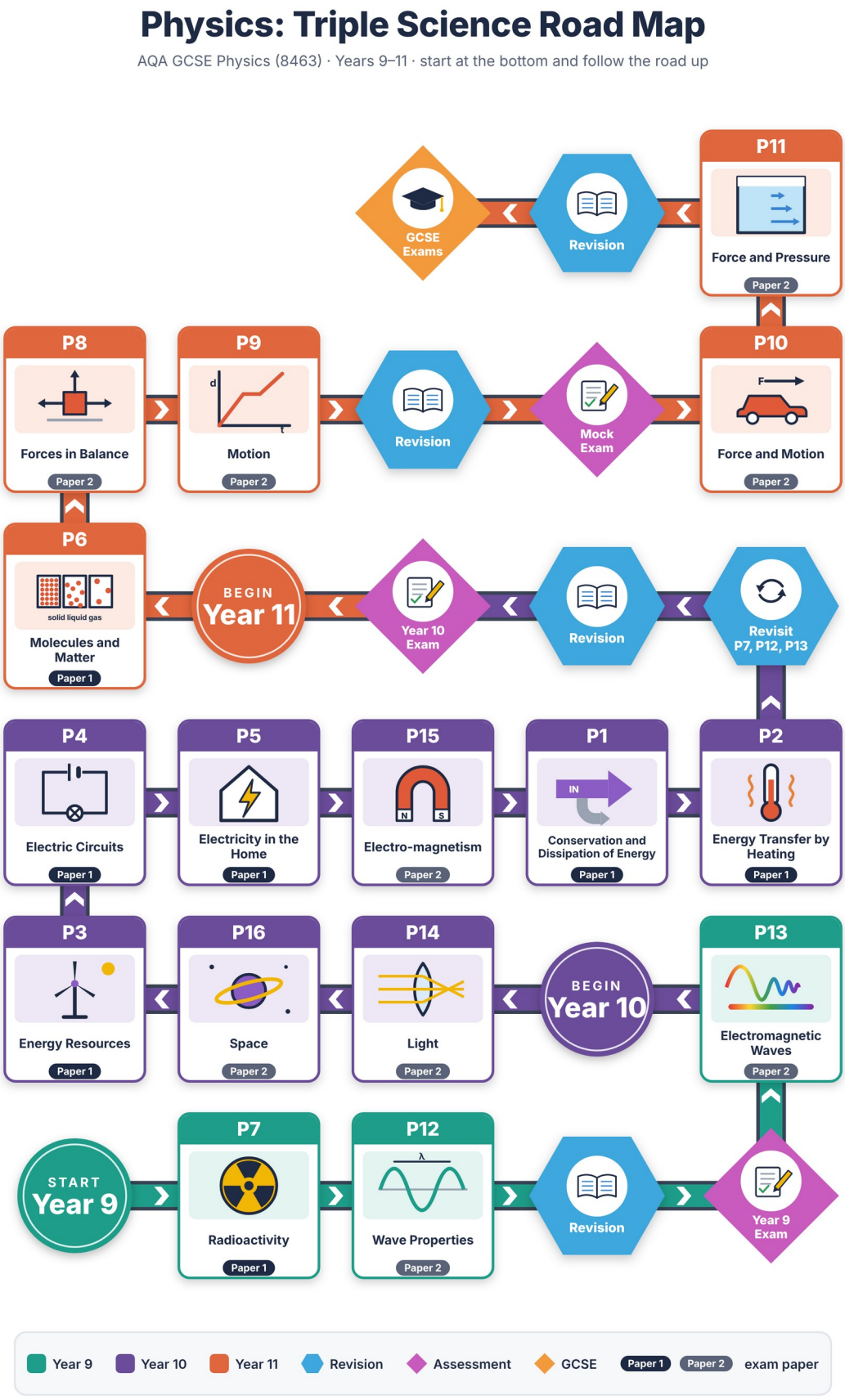
Key to labels

Triple only Content in GCSE Physics that is not in Combined Science: Trilogy.

HT only Assessed on the Higher tier paper only.

A label beside a topic heading applies to the whole subsection; a label at the start of a bullet applies to that point only.

Teaching sequence



#	Unit	AQA spec ref	Paper	Triple-only content
Year 9				
1	**P7 Radioactivity**	4.4	1	Uses and hazards of radiation; fission and fusion
2	**P12 Wave Properties**	4.6.1	2	Reflection; sound; ultrasound and seismic waves
Revision → Year 9 assessment				
3	**P13 Electromagnetic Waves**	4.6.2.1–4.6.2.4	2	–
Year 10				
4	**P14 Light**	4.6.1.3, 4.6.2.5–4.6.2.6	2	Whole unit
5	**P16 Space**	4.8	2	Whole unit
6	**P3 Energy Resources**	4.1.3	1	–
7	**P4 Electric Circuits**	4.2.1, 4.2.2, 4.2.5	1	Static electricity and electric fields
8	**P5 Electricity in the Home**	4.2.3, 4.2.4	1	–
9	**P15 Electromagnetism**	4.7	2	Loudspeakers; generator effect; transformers
10	**P1 Conservation and Dissipation of Energy**	4.1.1, 4.1.2, 4.5.2	1	–
11	**P2 Energy Transfer by Heating**	4.1.1.3, 4.1.2.1, 4.6.3	1	Thermal insulation (RP2); black body radiation
Revisit P7, P12 and P13 → Revision → Year 10 exams				
Year 11				
12	**P6 Molecules and Matter**	4.3	1	Pressure in gases
13	**P8 Forces in Balance**	4.5.1, 4.5.4	2	Moments, levers and gears
14	**P9 Motion**	4.5.6.1	2	–
Revision → Year 11 mock exam				
15	**P10 Force and Motion**	4.5.3, 4.5.6.2–4.5.6.3, 4.5.7	2	Terminal velocity; momentum calculations; impact forces
16	**P11 Force and Pressure**	4.5.5	2	Whole unit
Revision → GCSE exams (Paper 1 and Paper 2)				

Year 9

Year 9 begins with radioactivity and wave properties, followed by revision and the Year 9 assessment, and then electromagnetic waves.

P7 Radioactivity

Specification: 4.4 **Exam:** Paper 1 **Required practicals:** None

The first GCSE unit in Year 9: atomic structure, the development of the atomic model, radioactive decay, nuclear equations and half-life. Triple Science adds uses and hazards of radiation, and fission and fusion. Revisited at the end of Year 10.

Spec ref and topic	Content to be covered
4.4.1 **Atoms and isotopes**	• Atomic structure: radius about 1×10^{-10} m; nucleus, protons, neutrons and electrons; electrons can change orbit by absorbing or emitting EM radiation. • Atomic number, mass number and isotopes; atoms become positive ions by losing outer electrons. • Development of the model of the atom: plum pudding model, alpha scattering, Bohr's energy levels, Chadwick's neutron.
4.4.2.1–4.4.2.2 **Radioactive decay and nuclear equations**	• Unstable nuclei emit alpha particles, beta particles, gamma rays or neutrons; activity in becquerels; count rate. Penetration, range and ionising power of each type. • Balance nuclear equations for alpha and beta decay.
4.4.2.3 **Half-lives and the random nature of decay**	• Radioactive decay is random; half-life is the time for the number of unstable nuclei, or the count rate, to halve. Determine half-life from graphs. • HT only Calculate the net decline, as a ratio, after a given number of half-lives.
4.4.2.4 **Radioactive contamination**	• Contamination versus irradiation; precautions to protect against hazards; importance of peer review in publishing findings.
4.4.3 **Hazards and uses of radioactive emissions and background radiation** Triple only	• Background radiation from natural and man-made sources; radiation dose in sieverts. • Different half-lives of isotopes and their hazards; uses in medicine for exploring internal organs and controlling or destroying unwanted tissue; evaluate risks and benefits.
4.4.4 **Nuclear fission and fusion** Triple only	• Fission: splitting a large unstable nucleus (e.g. uranium or plutonium), usually after absorbing a neutron; chain reactions controlled in a reactor. • Fusion: joining two light nuclei to form a heavier nucleus, with some mass converted into energy.

P12 Wave Properties

Specification: 4.6.1 **Exam:** Paper 2 **Required practicals:** RP8 Waves

Transverse and longitudinal waves and their properties, reflection and refraction. Triple Science adds sound, ultrasound and seismic waves. Taught in Year 9 and revisited at the end of Year 10.

Spec ref and topic	Content to be covered
4.6.1.1 **Transverse and longitudinal waves**	• Waves transfer energy, not matter; oscillations are perpendicular (transverse) or parallel (longitudinal) to the direction of energy transfer.
4.6.1.2 **Properties of waves**	• Amplitude, wavelength, frequency and period ($T = 1/f$); wave speed $v = f\lambda$; measuring the speed of sound in air and of ripples on water. • **Required practical 8:** measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid. • Triple only Show how changes in velocity, frequency and wavelength in transmission from one medium to another are inter-related.

Spec ref and topic	Content to be covered
4.6.1.3 **Reflection of waves** Triple only	• Waves can be reflected, absorbed or transmitted at a boundary; construct ray diagrams for reflection. (Required practical 9 is taught in P14.)
4.6.1.4 **Sound waves** Triple only HT only	• Sound travels as longitudinal waves in solids, liquids and gases; how the ear detects sound; the human hearing range is about 20 Hz to 20 kHz.
4.6.1.5 **Waves for detection and exploration** Triple only HT only	• Ultrasound for medical and industrial imaging and echo sounding (sonar). • Seismic waves: P-waves (longitudinal) and S-waves (transverse) and how they give evidence for the structure of the Earth's interior.

Revision → Year 9 assessment. Revision and assessment on the units taught so far.

P13 Electromagnetic Waves

Specification: 4.6.2.1–4.6.2.4 **Exam:** Paper 2 **Required practicals:** RP10 Infrared radiation

The electromagnetic spectrum, the properties, uses and dangers of electromagnetic waves. Taught at the end of Year 9 and revisited at the end of Year 10.

Spec ref and topic	Content to be covered
4.6.2.1 **Types of electromagnetic waves**	• EM waves are transverse and form a continuous spectrum; all travel at the same speed through a vacuum. Order: radio, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays.
4.6.2.2 **Properties of electromagnetic waves 1**	• Different substances absorb, transmit, refract or reflect EM waves depending on wavelength. • **Required practical 10:** investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface. • HT only Explain refraction using wave front diagrams.
4.6.2.3 **Properties of electromagnetic waves 2**	• Changes in atoms and nuclei can generate or absorb EM radiation; ultraviolet, X-rays and gamma rays can have hazardous effects on body tissue; radiation dose in sieverts. • HT only Radio waves can be produced by oscillations in electrical circuits and can induce an alternating current in a receiver.
4.6.2.4 **Uses and applications of electromagnetic waves**	• Radio (TV and radio), microwaves (satellite communications, cooking), infrared (heaters, cooking, cameras), visible light (fibre optics), ultraviolet (energy-efficient lamps, sun tanning), X-rays and gamma rays (medical imaging and treatments). • HT only Explain why each type of EM wave is suitable for its practical application.

Year 10

Year 10 opens with light and space, building on the waves units from Year 9. It then moves to energy resources, electricity and electromagnetism, and finishes with energy and heating. P7, P12 and P13 are revisited before revision and the Year 10 exams.

P14 Light

Specification: 4.6.1.3, 4.6.2.5 and 4.6.2.6 **Exam:** Paper 2 **Required practicals:** RP9 Light Triple only

Triple-only unit opening Year 10: reflection, refraction, colour and lenses. Builds on wave properties and EM waves from Year 9.

Spec ref and topic	Content to be covered
4.6.1.3 **Reflection and refraction of light** Triple only	• Specular and diffuse reflection; construct ray diagrams for reflection and refraction. • **Required practical 9:** investigate the reflection of light by different types of surface and the refraction of light by different substances.
4.6.2.5 **Lenses** Triple only	• Convex and concave lenses, principal focus and focal length; real and virtual images. • Magnification = image height ÷ object height; construct ray diagrams for images formed by lenses.
4.6.2.6 **Visible light** Triple only	• Each colour has a narrow band of wavelength and frequency. Reflection, transmission and absorption of colours explain the colour of opaque objects; colour filters. • Transparent, translucent and opaque materials.

P16 Space

Specification: 4.8 **Exam:** Paper 2 **Required practicals:** None Triple only

Triple-only unit: the Solar System, the life cycle of stars, orbits and satellites, red-shift and the Big Bang.

Spec ref and topic	Content to be covered
4.8.1.1 **Our solar system** Triple only	• The Solar System within the Milky Way; the Sun formed from a cloud of dust and gas (nebula) pulled together by gravity.
4.8.1.2 **The life cycle of a star** Triple only	• Stars about the size of the Sun and much larger stars; fusion in stars produces all naturally occurring elements, and supernovas distribute them through the universe.
4.8.1.3 **Orbital motion, natural and artificial satellites** Triple only	• Gravity provides the force for planets and satellites to maintain circular orbits. • HT only Explain qualitatively how, for circular orbits, a change in speed must lead to a change in the radius of the orbit.
4.8.2 **Red-shift** Triple only	• Light from distant galaxies is red-shifted; the further away, the faster they are moving away. This supports the Big Bang theory of an expanding universe. • Dark mass and dark energy show there is still much about the universe that is not understood.

P3 Energy Resources

Specification: 4.1.3 **Exam:** Paper 1 **Required practicals:** None

The main energy resources, renewable and non-renewable, and the environmental, political, social and economic issues of using them.

Spec ref and topic	Content to be covered
4.1.3 **National and global energy resources**	• Main energy resources: fossil fuels, nuclear fuel, bio-fuel, wind, hydro-electricity, geothermal, tides, the Sun and water waves. • Distinguish renewable and non-renewable resources; uses for transport, electricity generation and heating. • Compare reliability and environmental impact; explain patterns and trends in use; consider environmental issues and the limits on what science can do.

P4 Electric Circuits

Specification: 4.2.1, 4.2.2 and 4.2.5 **Exam:** Paper 1 **Required practicals:** RP3 Resistance; RP4 I–V characteristics

Charge, current, potential difference and resistance, component characteristics, and series and parallel circuits. Triple Science adds static electricity and electric fields.

Spec ref and topic	Content to be covered
4.2.5 **Static electricity and electric fields** Triple only	• Insulators become charged by rubbing as electrons are transferred; like charges repel and unlike charges attract; sparking. • A charged object creates an electric field; draw field patterns for an isolated charged sphere and explain non-contact forces and sparking.
4.2.1.1–4.2.1.2 **Circuit symbols, charge and current**	• Standard circuit diagram symbols. • Current is the rate of flow of charge: $Q = It$; current is the same at any point in a single closed loop.
4.2.1.3 **Current, resistance and potential difference**	• $V = IR$. • **Required practical 3:** investigate factors affecting resistance, including wire length and resistors in series and parallel.
4.2.1.4 **Resistors**	• Ohmic conductors; resistance of filament lamps, diodes, thermistors and LDRs; I–V graphs. • **Required practical 4:** investigate the I–V characteristics of a filament lamp, a diode and a resistor at constant temperature.
4.2.2 **Series and parallel circuits**	• Rules for current, potential difference and resistance in series and parallel circuits; $R_{t}otal = R_1 + R_2$ in series; adding resistors in parallel decreases total resistance. • Solve problems for circuits including resistors in series.

P5 Electricity in the Home

Specification: 4.2.3 and 4.2.4 **Exam:** Paper 1 **Required practicals:** None

Direct and alternating current, mains electricity and safety, electrical power and energy transfers in appliances, and the National Grid.

Spec ref and topic	Content to be covered
4.2.3 **Domestic uses and safety**	• Direct and alternating potential difference; UK mains is ac at 50 Hz and about 230 V. • Three-core cables: live (brown), neutral (blue) and earth (green and yellow) wires and their functions; dangers of touching the live wire.
4.2.4.1–4.2.4.2 **Power and energy transfers in appliances**	• $P = VI$ and $P = I^2R$; energy transferred $E = Pt$ and $E = QV$. • Everyday appliances transfer energy to kinetic and thermal stores; power ratings and how much energy an appliance transfers depends on time and power.

Spec ref and topic	Content to be covered
4.2.4.3 **The National Grid**	• A system of cables and transformers; step-up transformers increase the potential difference for transmission, reducing current and energy loss; step-down transformers make it safer for domestic use.

P15 Electromagnetism

Specification: 4.7 **Exam:** Paper 2 **Required practicals:** None

Magnets and magnetic fields, electromagnets and the motor effect. Triple Science adds loudspeakers, the generator effect, microphones and transformers (Higher tier).

Spec ref and topic	Content to be covered
4.7.1 **Permanent and induced magnetism, magnetic forces and fields**	• Poles of a magnet; attraction and repulsion; permanent and induced magnets. • Magnetic field patterns and direction; plotting fields with a compass; the Earth's magnetic field.
4.7.2.1 **Electromagnetism**	• A current in a wire produces a magnetic field; a solenoid increases the field strength, and an iron core makes an electromagnet. • Triple only Interpret diagrams of electromagnetic devices to explain how they work.
4.7.2.2–4.7.2.3 **Fleming's left-hand rule and electric motors** HT only	• The motor effect: F = BIl; use Fleming's left-hand rule to find the direction of the force. • A coil carrying a current in a magnetic field rotates, which is the basis of an electric motor.
4.7.2.4 **Loudspeakers** Triple only HT only	• Loudspeakers and headphones use the motor effect to convert variations in current into pressure variations in air (sound).
4.7.3 **Induced potential, transformers and the National Grid** Triple only HT only	• The generator effect: a potential difference is induced when a conductor moves relative to a magnetic field; factors affecting its size and direction. • Alternators and dynamos; moving-coil microphones. • Transformers: $V_p/V_s = n_p/n_s$ and $V_s I_s = V_p I_p$; step-up and step-down transformers in the National Grid.

P1 Conservation and Dissipation of Energy

Specification: 4.1.1, 4.1.2 and 4.5.2 **Exam:** Paper 1 **Required practicals:** None

Energy stores and transfers, work, power, conservation and dissipation of energy, and efficiency. Follows electricity so pupils can apply energy ideas to appliances.

Spec ref and topic	Content to be covered
4.1.1.1–4.1.1.2 **Energy stores, systems and changes in energy**	• Describe changes in the way energy is stored when a system changes (e.g. a falling object, a vehicle braking, water being heated). • Calculate kinetic energy ($E_k = ½ mv^2$), elastic potential energy ($E_e = ½ ke^2$) and gravitational potential energy ($E_p = mgh$).
4.5.2 **Work done and energy transfer**	• Work is done when a force moves an object: W = Fs; one joule of work is done when a force of one newton moves an object one metre. • Work done against friction causes a rise in temperature.
4.1.1.4 **Power**	• Power is the rate of energy transfer or work done: P = E/t and P = W/t; one watt is one joule per second.
4.1.2.1 **Energy transfers in a system**	• Energy can be transferred, stored or dissipated but cannot be created or destroyed; in all changes some energy is dissipated to the surroundings. • Reducing unwanted transfers by lubrication and thermal insulation; thermal conductivity (see P2).

Spec ref and topic	Content to be covered
4.1.2.2 **Efficiency**	• Efficiency = useful output energy transfer ÷ total input energy transfer (or using power). • HT only Describe ways to increase the efficiency of an intended energy transfer.

P2 Energy Transfer by Heating

Specification: 4.1.1.3, 4.1.2.1 and 4.6.3 **Exam:** Paper 1 (4.6.3 on Paper 2) **Required practicals:** RP1 Specific heat capacity; RP2 Thermal insulation

Conduction, specific heat capacity and insulating buildings. Triple Science adds infrared and black body radiation and the thermal insulation practical.

Spec ref and topic	Content to be covered
4.1.1.3 **Energy changes in systems: specific heat capacity**	• The energy needed to raise the temperature of 1 kg of a substance by 1 °C: $\Delta E = mc\Delta\theta$. • **Required practical 1:** determine the specific heat capacity of one or more materials.
4.1.2.1 **Energy transfers by heating and insulation**	• Higher thermal conductivity means a higher rate of energy transfer by conduction; the rate of cooling of a building depends on wall thickness and thermal conductivity. • Triple only **Required practical 2:** investigate the effectiveness of different materials as thermal insulators and the factors that affect their performance.
4.6.3.1 **Emission and absorption of infrared radiation** Triple only	• All bodies emit and absorb infrared radiation; the hotter the body, the more infrared radiation it radiates in a given time.
4.6.3.2 **Perfect black bodies and radiation** Triple only	• A perfect black body absorbs all incident radiation and is the best possible emitter. The intensity and wavelength distribution of emitted radiation depend on temperature. • HT only A body at constant temperature absorbs radiation at the same rate as it emits it; the temperature of the Earth depends on the balance of absorbed and emitted radiation.

Revisit P7, P12 and P13 → Revision → Year 10 exams. The Year 9 units are revisited before revision and exams on the units taught so far.

Year 11

Year 11 starts with the particle model of matter, completing the Paper 1 content, then covers forces: forces in balance and motion, followed by revision and the Year 11 mock, then force and motion and pressure, before revision for the GCSE exams.

P6 Molecules and Matter

Specification: 4.3 (except 4.3.2.2) **Exam:** Paper 1 **Required practicals:** RP5 Density

Opens Year 11: density, changes of state, internal energy, specific latent heat and gas pressure. Triple Science adds pressure in gases and doing work on a gas.

Spec ref and topic	Content to be covered
4.3.1.1 **Density of materials**	• ρ = m/V; explain differences in density of solids, liquids and gases using the particle model. • **Required practical 5:** determine the densities of regular and irregular solid objects and liquids.
4.3.1.2 **Changes of state**	• Mass is conserved when substances change state; changes of state are physical changes that can be reversed.
4.3.2.1 **Internal energy**	• Internal energy is the total kinetic and potential energy of the particles; heating increases internal energy, raising temperature or changing state.
4.3.2.3 **Changes of state and specific latent heat**	• Specific latent heat: E = mL; latent heat of fusion and of vaporisation. Interpret heating and cooling graphs.
4.3.3.1 **Particle motion in gases**	• Gas molecules are in constant random motion; temperature is related to average kinetic energy; increasing temperature at constant volume increases pressure.
4.3.3.2 **Pressure in gases** Triple only	• Gas pressure produces a net force at right angles to a container's walls. At constant temperature, increasing volume decreases pressure: pV = constant.
4.3.3.3 **Increasing the pressure of a gas** Triple only HT only	• Doing work on a gas increases its internal energy and can raise its temperature (e.g. a bicycle pump).

P8 Forces in Balance

Specification: 4.5.1 and 4.5.4 **Exam:** Paper 2 **Required practicals:** None

Scalars and vectors, contact and non-contact forces, resultant forces and centre of mass. Triple Science adds moments, levers and gears.

Spec ref and topic	Content to be covered
4.5.1.1–4.5.1.2 **Scalars, vectors and types of force**	• Scalars have magnitude only; vectors have magnitude and direction and can be shown by arrows. • Contact forces (friction, air resistance, tension, normal contact force) and non-contact forces (gravitational, electrostatic, magnetic).
4.5.1.3 **Gravity**	• Weight is the force acting on an object due to gravity: W = mg; weight acts at the object's centre of mass; weight is measured with a newtonmeter.
4.5.1.4 **Resultant forces**	• Calculate the resultant of forces acting along a line. • HT only Use free body diagrams; resolve a force into two components; use vector diagrams (parallelogram of forces) to show equilibrium.
4.5.4 **Moments, levers and gears** Triple only	• Moment of a force: M = Fd; balanced moments for an object in equilibrium. • Levers and gears transmit the rotational effects of forces.

P9 Motion

Specification: 4.5.6.1 **Exam:** Paper 2 **Required practicals:** None

Describing motion: distance, displacement, speed, velocity and acceleration, and interpreting motion graphs.

Spec ref and topic	Content to be covered
4.5.6.1.1–4.5.6.1.3 **Distance, displacement, speed and velocity**	• Distance is scalar and displacement is a vector. Typical speeds for walking, running, cycling and transport; speed of sound in air. • s = vt; velocity is speed in a given direction. • HT only Motion in a circle involves constant speed but changing velocity.
4.5.6.1.4 **The distance–time relationship**	• The gradient of a distance–time graph gives speed. • HT only Find speed at a given time by drawing a tangent to a curved graph.
4.5.6.1.5 **Acceleration**	• a = Δv/t; $v^2 - u^2 = 2as$; acceleration near the Earth's surface due to gravity is about 9.8 m/s^2. • The gradient of a velocity–time graph gives acceleration. • HT only The area under a velocity–time graph gives distance travelled.

Revision → Year 11 mock exam. Revision and mock exam on the units taught so far.

P10 Force and Motion

Specification: 4.5.6.1.5 (terminal velocity), 4.5.6.2, 4.5.6.3, 4.5.7 and 4.5.3 **Exam:** Paper 2 **Required practicals:** RP6 Force and extension; RP7 Acceleration

Newton's laws, terminal velocity, stopping distances, momentum and the elasticity of springs. Triple Science adds terminal velocity, momentum calculations and impact forces.

Spec ref and topic	Content to be covered
4.5.6.2 **Newton's laws of motion**	• First law: an object stays at rest or at constant velocity unless a resultant force acts. Second law: F = ma. Third law: equal and opposite forces in interactions. • **Required practical 7:** investigate the effect of varying force on the acceleration of an object of constant mass, and of varying mass with constant force. • HT only Inertia; inertial mass as the ratio of force to acceleration.
4.5.6.1.5 **Terminal velocity** Triple only	• Objects falling through a fluid initially accelerate due to gravity until the resultant force is zero and they reach terminal velocity; draw and interpret velocity–time graphs.
4.5.6.3 **Forces and braking**	• Stopping distance = thinking distance + braking distance; factors affecting reaction time (tiredness, drugs, alcohol, distractions) and braking distance (road conditions, tyres, brakes, speed). • Braking reduces kinetic energy through work done by friction; large decelerations can cause brakes to overheat or skid. • Triple only Estimate how distance required to stop varies with speed; interpret stopping distance graphs. • HT only Estimate the forces involved in the deceleration of road vehicles.
4.5.7 **Momentum** HT only	• p = mv; in a closed system, total momentum before an event equals total momentum after (conservation of momentum). • Triple only Complete calculations involving collisions and explosions using conservation of momentum. • Triple only Changes in momentum: F = mΔv/Δt; safety features (air bags, seat belts, gymnasium mats, cycle helmets, cushioned surfaces) increase the time of impact to reduce the force.
4.5.3 **Forces and elasticity**	• Elastic and inelastic deformation; F = ke up to the limit of proportionality; work done in stretching a spring is stored as elastic potential energy. • **Required practical 6:** investigate the relationship between force and extension for a spring.

P11 Force and Pressure

Specification: 4.5.5 **Exam:** Paper 2 **Required practicals:** None Triple only

Triple-only unit on pressure in fluids, atmospheric pressure and upthrust. The final new content before the GCSE exams.

Spec ref and topic	Content to be covered
4.5.5.1.1 **Pressure in a fluid 1** Triple only	• A fluid exerts a force at right angles to any surface; p = F/A.
4.5.5.1.2 **Pressure in a fluid 2** Triple only HT only	• Pressure due to a column of liquid: p = hρg; pressure increases with depth and density. • Upthrust on a submerged object results from greater pressure at the bottom than the top; whether an object floats or sinks depends on its weight and the upthrust.
4.5.5.2 **Atmospheric pressure** Triple only	• The atmosphere is a thin layer of air; atmospheric pressure is created by air molecules colliding with surfaces and decreases with height as the air becomes less dense.

Revision → GCSE exams. Paper 1 covers specification 4.1–4.4 (P1–P7); Paper 2 covers 4.5–4.8 (P8–P16).

Required practical activities

GCSE Physics has ten required practicals; RP2 and RP9 are Triple only. Questions drawing on them make up at least 15% of the exam marks.

RP	Activity	Spec ref	Taught in
1	Determine the specific heat capacity of one or more materials	4.1.1.3	P2 Energy Transfer by Heating (Y10)
2	Triple only Investigate the effectiveness of different materials as thermal insulators	4.1.2.1	P2 Energy Transfer by Heating (Y10)
3	Investigate factors affecting resistance, including wire length and resistors in series and parallel	4.2.1.3	P4 Electric Circuits (Y10)
4	Investigate the I–V characteristics of a filament lamp, a diode and a resistor	4.2.1.4	P4 Electric Circuits (Y10)
5	Determine the densities of regular and irregular solid objects and liquids	4.3.1.1	P6 Molecules and Matter (Y11)
6	Investigate the relationship between force and extension for a spring	4.5.3	P10 Force and Motion (Y11)
7	Investigate the effect of varying force on acceleration (constant mass) and of varying mass (constant force)	4.5.6.2.2	P10 Force and Motion (Y11)
8	Measure the frequency, wavelength and speed of waves in a ripple tank and in a solid	4.6.1.2	P12 Wave Properties (Y9)
9	Triple only Investigate the reflection of light by different surfaces and refraction by different substances	4.6.1.3	P14 Light (Y10)
10	Investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface	4.6.2.2	P13 Electromagnetic Waves (Y9)

Specification coverage map

Every subsection of the AQA 8463 subject content, with the unit that teaches it. All 30 subsections are covered.

Spec	Title	Unit	Year	Paper
4.1.1	Energy changes in a system, and the ways energy is stored (4.1.1.3 specific heat capacity in P2)	P1, P2	10	1
4.1.2	Conservation and dissipation of energy	P1, P2	10	1
4.1.3	National and global energy resources	P3	10	1
4.2.1	Current, potential difference and resistance	P4	10	1
4.2.2	Series and parallel circuits	P4	10	1
4.2.3	Domestic uses and safety	P5	10	1
4.2.4	Energy transfers	P5	10	1
4.2.5	Static electricity Triple only	P4	10	1
4.3.1	Changes of state and the particle model	P6	11	1
4.3.2	Internal energy and energy transfers (4.3.2.2 specific heat capacity in P2)	P6, P2	10–11	1
4.3.3	Particle model and pressure (4.3.3.2–4.3.3.3 Triple only)	P6	11	1
4.4.1	Atoms and isotopes	P7	9	1
4.4.2	Atoms and nuclear radiation	P7	9	1
4.4.3	Hazards and uses of radioactive emissions and of background radiation Triple only	P7	9	1
4.4.4	Nuclear fission and fusion Triple only	P7	9	1
4.5.1	Forces and their interactions	P8	11	2
4.5.2	Work done and energy transfer	P1	10	2
4.5.3	Forces and elasticity	P10	11	2
4.5.4	Moments, levers and gears Triple only	P8	11	2
4.5.5	Pressure and pressure differences in fluids Triple only	P11	11	2
4.5.6	Forces and motion	P9, P10	11	2
4.5.7	Momentum HT only	P10	11	2
4.6.1	Waves in air, fluids and solids (4.6.1.3 reflection also in P14)	P12, P14	9–10	2
4.6.2	Electromagnetic waves (4.6.2.5–4.6.2.6 lenses and visible light Triple only in P14)	P13, P14	9–10	2
4.6.3	Black body radiation Triple only	P2	10	2
4.7.1	Permanent and induced magnetism, magnetic forces and fields	P15	10	2
4.7.2	The motor effect	P15	10	2
4.7.3	Induced potential, transformers and the National Grid Triple only HT only	P15	10	2
4.8.1	Solar system; stability of orbital motions; satellites Triple only	P16	10	2
4.8.2	Red-shift Triple only	P16	10	2

Textbook, revision guides and websites

Textbook used in class

- AQA GCSE Physics Student Book (AQA GCSE Science 3rd Edition), Jim Breithaupt; series editor Lawrie Ryan (Oxford University Press)

Recommended revision guide

- Collins AQA GCSE 9-1 Physics All-in-One Complete Revision & Practice

Useful websites

- **Physics & Maths Tutor:** past paper questions with mark schemes; some have video solutions. Past paper questions at the end of each topic are the best revision. https://www.physicsandmathstutor.com/physics-revision/gcse-aqa/
- **AQA:** all past papers and mark schemes. https://www.aqa.org.uk/subjects/physics/gcse/physics-8463/assessment-resources
- **GCSE Physics Online:** revision videos; the school pays for a subscription and students are given the login in class. https://www.gcsephysicsonline.com/aqa
- **Also useful:** Seneca Learning, Cognito and the Free Science Lessons YouTube channel.

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