LEARNING PLAN AND TOPIC CHECKLIST

GCSE Physics

Foundation and Higher | Combined and separate science

A subject-by-subject learning plan for Year 11 students taking AQA, Pearson Edexcel or Cambridge OCR GCSE Science (9-1). It brings the shared content, Higher demand and separate-science extensions into one teaching checklist.

A complete topic framework, selected for each child

12 teaching units and 96 coverage entries. This is a union of the listed routes: a child follows the rows relevant to their school qualification, rather than every extension automatically.

Qualifications covered

Board / suite	Separate Physics	Combined Science
AQA	8463	8464 Trilogy / 8465 Synergy
Pearson Edexcel	1PH0	1SC0
OCR Gateway A	J249	J250
OCR Twenty First Century B	J259	J260

Both Foundation and Higher are covered. Separate sciences are often called triple science. This plan covers England GCSE routes; International GCSE, A-level and other awarding organisations need a separate specification check.

What is included

Subject knowledge • Applied calculations • Working scientifically • Required/core practical and PAG preparation • Board-specific differences • Evidence of progress

How we use this learning plan

This is the full topic coverage map for a Year 11 GCSE revision programme. Weekly lessons prioritise diagnosed gaps, school deadlines and exam practice. Topics are revisited rather than treated as complete after one explanation.

Record the correct student route first

Record	What staff need
Student and group	Full name, tutor, group slot, starting assessment and individual support needs.
Qualification	Exam board, exact specification code and Combined or separate science route.
Evidence of progress	Topic ID, date taught, independent practice, assessment evidence, misconception and next action.

A suggested 60-minute lesson

Minutes	Learning activity
0-5	Retrieval questions and a short check of prior learning.
5-20	Teach or revisit one focused objective with a worked example.
20-40	Guided practice with active checks and corrections.
40-55	Independent exam-style application, matched to board and tier.
55-60	Exit question, feedback and clear homework or revision action.

Track competence, not just attendance

Use the blank tracking box beside each objective: N = not yet taught; T = taught; P = practising; S = secure independently. Record evidence in the group learning record. Revisit an S judgement if later retrieval shows a gap.

Suggested review cycle: baseline assessment; focused teaching blocks; a short mixed assessment after each block; correction and re-teaching; then timed papers with a question-level gap review. The exact order and pace are set for the group.

At the end of each week, send attendance, actual teaching time, content covered and private individual concerns to Asad Patel or Aman. They issue the parent update and arrange resources through the community or private channels.

Choosing the right content

Teach the relevant shared content together, with matched Foundation, Higher and separate-science tasks. Triple science means three separate GCSEs; Combined Science is a different qualification, not a tier. Mixed groups do not make every row examinable for every child.

Tag	How to use it
F/H	Shared Foundation and Higher teaching. Match the wording, examples and depth to the named board; Higher students also need extension and application.
H	Higher-tier extension; use it for the Higher routes that specify it.
S	Additional separate-science content; it is not automatically required for Combined Science. Foundation/Higher depth may differ.
S-H	Separate science at Higher depth.
R or a combined tag	Route-dependent content or a tier boundary that varies. The row or board notes identify the variation; the official specification resolves the precise requirement.
☐ tracking box	Enter N/T/P/S for not yet taught / taught / practising / independently secure, with dated evidence in the learning record.

Board differences that matter

AQA

Use sections 4.1-4.8 in 8463; Trilogy physics uses 6.1-6.7. Space is separate Physics. Several light, thermal, forces and electromagnetism additions are also separate or Higher-only.

Pearson Edexcel

Use topics 1-15. Astronomy, static electricity and further electromagnetism add separate-Physics scope. A P suffix marks separate content. Refraction is a Combined core practical here, despite its different AQA practical placement.

OCR

Gateway separate Physics uses P1-P8 plus practical skills; Combined reorganises into P1-P6. Twenty First Century uses P1-P6 plus Ideas about Science and practical skills, placing cosmology within matter/models.

Unit map

P01 Energy stores, transfers, efficiency and resources • P02 Particles, density, internal energy and gases • P03 Describing motion and interpreting graphs • P04 Forces, Newton laws, momentum and stopping • P05 Work, elasticity, turning effects and pressure • P06 Electric charge, current and circuits • P07 Electrical energy, mains safety and static electricity • P08 Wave behaviour and sound • P09 The electromagnetic spectrum, light and thermal radiation • P10 Atomic structure, radioactivity and nuclear energy • P11 Magnetism, motors, generators and transformers • P12 Space physics, astronomy and the universe

P01 Energy stores, transfers, efficiency and resources

SPECIFICATION LOCATORS | AQA 4.1; Edexcel 3 and 8; OCR Gateway P7-P8; OCR Twenty First Century P2 and P4.4

ID / route	Teaching focus and coverage	Track
P01.01 **F/H**	**Systems and stores** Describe changes in kinetic, thermal/internal, chemical, gravitational, elastic, magnetic, electrostatic and nuclear stores; distinguish stores from transfer pathways.	☐
P01.02 **F/H**	**Conservation and dissipation** Track transfers mechanically, electrically, by heating and by radiation; explain conservation in a closed system and energy becoming less useful.	☐
P01.03 **F/H**	**Mechanical energy** Calculate kinetic energy, gravitational potential energy, work done and appropriate elastic energy; select equations, units and sensible precision.	☐
P01.04 **F/H**	**Power** Explain power as energy transferred or work done per second; calculate power and compare devices performing a task.	☐
P01.05 **F/H**	**Efficiency** Calculate useful-output / total-input efficiency using energy or power; interpret transfer diagrams and evaluate methods of improving efficiency.	☐
P01.06 **F/H**	**Thermal transfers** Explain conduction and convection where included; relate insulation, thickness and thermal conductivity to heating/cooling and energy loss.	☐
P01.07 **F/H**	**Energy resources** Compare fossil fuels, nuclear fuel, biofuels, wind, solar, water, tidal and geothermal resources as required; distinguish renewable from finite resources.	☐
P01.08 **F/H**	**Energy decisions** Evaluate reliability, response time, environmental effects, costs and demand; interpret local, national and global energy-use evidence.	☐

P02 Particles, density, internal energy and gases

SPECIFICATION LOCATORS | AQA 4.3; Edexcel 14; OCR Gateway P1; OCR Twenty First Century P6.1-6.2

ID / route	Teaching focus and coverage	Track
P02.01 **F/H**	**Particle model and density** Relate solid, liquid and gas properties to particles; calculate density and explain reliable measurements of regular/irregular solids and liquids.	☐
P02.02 **F/H**	**Changes of state** Explain melting, freezing, boiling, evaporation, condensation and sublimation as physical changes; distinguish evaporation from boiling.	☐
P02.03 **F/H**	**Internal energy** Explain changes in particle kinetic/potential energy during heating; distinguish temperature from the total internal energy of a sample.	☐
P02.04 **F/H**	**Specific heat capacity** Use energy = mass x specific heat capacity x temperature change; interpret experimental heating and cooling data.	☐
P02.05 **F/H**	**Specific latent heat** Use energy = mass x specific latent heat; explain flat sections on temperature-time graphs and distinguish fusion from vaporisation.	☐
P02.06 **F/H**	**Gases and pressure** Explain pressure through particle collisions; relate gas temperature to average kinetic energy and describe changes caused by heating a fixed volume.	☐
P02.07 **S/R**	**Gas relationships and absolute temperature** Use kelvin conversion, pressure-temperature or pressure-volume relationships where required; include pV = constant at the route-specified tier.	☐
P02.08 **S-H/R**	**Compression and work on gases** Explain energy transfer when gas is compressed and apply gas relationships quantitatively only where the qualification includes them.	☐

P03 Describing motion and interpreting graphs

SPECIFICATION LOCATORS | AQA 4.5.6; Edexcel 2; OCR Gateway P2.1; OCR Twenty First Century P4.2

ID / route	Teaching focus and coverage	Track
P03.01 **F/H**	**Scalars and vectors** Distinguish distance/displacement and speed/velocity; use vector direction correctly in descriptions and simple calculations.	☐
P03.02 **F/H**	**Speed and units** Calculate average speed, distance and time; convert units and estimate typical everyday speeds and free-fall acceleration.	☐
P03.03 **F/H**	**Distance-time graphs** Plot and interpret stationary and moving sections; calculate speed from straight-line gradients.	☐
P03.04 **H/R**	**Changing speed on curves** Find a tangent gradient to estimate instantaneous speed where the route requires this Higher graphical skill.	☐
P03.05 **F/H**	**Acceleration** Calculate acceleration from velocity change and time; describe deceleration and interpret acceleration units.	☐
P03.06 **F/H**	**Velocity-time graphs** Find acceleration from gradient; distinguish positive/negative velocity from acceleration and calculate distance/displacement from simple areas where specified.	☐
P03.07 **H**	**Uniform-acceleration calculations** Use v^2 - u^2 = 2as and more demanding motion-graph areas at the route-required Higher depth.	☐
P03.08 **S-H/R**	**Circular motion** Explain constant speed with changing velocity and a resultant force towards the centre, without assuming A-level circular-motion equations.	☐

P04 Forces, Newton laws, momentum and stopping

SPECIFICATION LOCATORS | AQA 4.5; Edexcel 2 and 9; OCR Gateway P2 and P8.1; OCR Twenty First Century P4.1-4.3

ID / route	Teaching focus and coverage	Track
P04.01 **F/H**	**Interactions and force diagrams** Identify contact/non-contact forces, including gravity, friction, normal contact, electrostatic and magnetic forces; draw and interpret force diagrams.	☐
P04.02 **F/H**	**Mass, weight and fields** Distinguish mass from weight and calculate weight = mass x gravitational field strength; explain measurement and field variation.	☐
P04.03 **F/H**	**Resultant forces** Combine collinear forces and explain balanced/unbalanced situations; distinguish zero resultant force from zero speed.	☐
P04.04 **H**	**Vector force diagrams** Use scale diagrams to combine or resolve forces and identify equilibrium in two dimensions at GCSE depth.	☐
P04.05 **F/H**	**Newton laws** Apply the first, second and third laws to motion and interactions; calculate force = mass x acceleration and distinguish action/reaction pairs.	☐
P04.06 **H/R**	**Inertial mass and terminal speed** Explain inertia and inertial mass, and analyse changing forces during falling/terminal motion to the tier depth required.	☐
P04.07 **H**	**Momentum and collisions** Calculate momentum, apply its conservation in closed systems and explain force as the rate of momentum change where specified.	☐
P04.08 **F/H**	**Stopping distance** Separate thinking and braking distance; explain effects of speed, reaction time, road conditions, vehicle condition and braking force.	☐
P04.09 **H/R**	**Safety and impact** Use momentum, energy and stopping-time reasoning to evaluate seat belts, airbags, crumple zones and injury reduction where these calculations are required.	☐

P05 Work, elasticity, turning effects and pressure

SPECIFICATION LOCATORS | AQA 4.5.2-4.5.5; Edexcel 8-9 and 15; OCR Gateway P1.3, P2.3 and P7; OCR Twenty First Century P4.4 and P6.3-6.4

ID / route	Teaching focus and coverage	Track
P05.01 **F/H**	**Work done** Calculate work = force x distance moved in the force direction; connect work with energy transfers and joules/newton metres.	☐
P05.02 **F/H**	**Deformation and Hooke law** Explain elastic/inelastic deformation; plot force-extension data, identify proportional behaviour and calculate spring constant.	☐
P05.03 **F/H**	**Elastic energy** Use energy stored = 0.5 x spring constant x extension^2 within the relevant linear range; distinguish this from force x extension.	☐
P05.04 **S/R**	**Moments and equilibrium** Calculate moment = force x perpendicular distance; explain balance, levers and gears. AQA treats this as separate Physics; route placement differs elsewhere.	☐
P05.05 **S/R**	**Pressure on surfaces** Calculate pressure = force / area and explain why forces act normally to a surface; apply the route-specific content.	☐
P05.06 **S-H/R**	**Liquid pressure and buoyancy** Use pressure difference = depth x density x g where required; explain upthrust, floating and sinking using pressure differences.	☐
P05.07 **S**	**Atmospheric pressure** Explain atmospheric pressure using the gas model and why it changes with altitude; interpret relevant evidence.	☐
P05.08 **S/R**	**Applications of materials** Interpret force-extension or stress-related information about materials only to the GCSE specification depth; avoid introducing A-level mechanics.	☐

P06 Electric charge, current and circuits

SPECIFICATION LOCATORS | AQA 4.2; Edexcel 10; OCR Gateway P3; OCR Twenty First Century P3.2-3.4

ID / route	Teaching focus and coverage	Track
P06.01 **F/H**	**Circuit symbols and quantities** Use symbols for cells, switches, lamps, resistors, variable resistors, diodes, LEDs, thermistors, LDRs, ammeters and voltmeters where specified.	☐
P06.02 **F/H**	**Charge and current** Explain current as charge flow; calculate charge = current x time and describe charge conservation in circuits.	☐
P06.03 **F/H**	**Potential difference** Explain potential difference as energy transferred per unit charge; connect cell potential difference, current and component behaviour.	☐
P06.04 **F/H**	**Resistance** Use V = IR, select correct meter connections and interpret resistance changes with wire length, temperature or material.	☐
P06.05 **F/H**	**Current-potential difference characteristics** Interpret resistor, filament lamp and diode curves; explain non-ohmic behaviour at the route-required depth.	☐
P06.06 **F/H**	**Series circuits** Use common current, shared potential difference and total resistance; calculate missing circuit quantities and explain changes.	☐
P06.07 **F/H**	**Parallel circuits** Use common potential difference and divided current; explain effects of adding branches and compare equivalent resistance qualitatively or quantitatively as required.	☐
P06.08 **F/H**	**Sensing and control** Explain how thermistors and LDRs respond to conditions and how component choices affect a circuit; include potential-divider detail only when specified.	☐
P06.09 **F/H**	**Charge-energy relationships** Apply energy = charge x potential difference; connect energy per coulomb with potential difference and solve circuit-energy problems at the selected tier depth.	☐

P07 Electrical energy, mains safety and static electricity

SPECIFICATION LOCATORS | AQA 4.2; Edexcel 10-11; OCR Gateway P3 and P8.2; OCR Twenty First Century P2 and P3

ID / route	Teaching focus and coverage	Track
P07.01 **F/H**	**Electrical energy and power** Use power, energy and time relationships and P = VI / P = I^2R as required; compare appliance ratings and calculate consumption/cost from supplied tariffs.	☐
P07.02 **F/H**	**AC and DC** Compare direct and alternating current/potential difference; describe UK mains electricity and interpret relevant graphs.	☐
P07.03 **F/H**	**Domestic safety** Explain live, neutral and earth wires, insulation, fuses/circuit breakers and earthing; identify hazards and distinguish safe school work from mains work.	☐
P07.04 **F/H**	**Electricity distribution** Explain transmission, transformers and high-voltage distribution at the route-required depth; link current, heating losses and efficiency.	☐
P07.05 **S**	**Static charge** Explain charging by electron transfer, attraction/repulsion, sparking and applications or hazards of static electricity.	☐
P07.06 **S**	**Electric fields** Draw and interpret simple field patterns; explain non-contact forces on charges and the connection between fields and sparks.	☐
P07.07 **H/R**	**Extended electrical calculations** Apply combined energy, charge, current, voltage and time relationships where marked Higher; equation tier labels differ across boards.	☐

P08 Wave behaviour and sound

SPECIFICATION LOCATORS | AQA 4.6; Edexcel 4; OCR Gateway P5.1 and P5.3; OCR Twenty First Century P1.3-1.4

ID / route	Teaching focus and coverage	Track
P08.01 **F/H**	**Wave descriptions** Use amplitude, wavelength, frequency, period and wave speed; distinguish transverse from longitudinal waves.	☐
P08.02 **F/H**	**Energy transfer** Explain how waves transfer energy/information without net transfer of the medium; compare water, sound and electromagnetic examples.	☐
P08.03 **F/H**	**Wave calculations** Use wave speed = frequency x wavelength and period = 1 / frequency; convert units and interpret diagrams or traces.	☐
P08.04 **F/H**	**Wave measurements** Compare methods for measuring speed, wavelength and frequency in solids and fluids; evaluate uncertainty and suitability of equipment.	☐
P08.05 **F/H**	**Boundaries** Describe reflection, transmission, absorption and refraction; explain changes of wave speed/wavelength without changing source frequency.	☐
P08.06 **S**	**Sound and hearing** Explain sound as longitudinal pressure waves; relate pitch/loudness to frequency/amplitude and describe human hearing limits.	☐
P08.07 **S**	**Detection and exploration** Explain echoes, ultrasound and seismic-wave evidence in medicine, sonar or Earth structure where specified; use time-of-flight calculations.	☐
P08.08 **H/R**	**Refraction explanations** Explain refraction and wave-front behaviour using changing speed at the Higher or route-specific depth.	☐

P09 The electromagnetic spectrum, light and thermal radiation

SPECIFICATION LOCATORS | AQA 4.6; Edexcel 5; OCR Gateway P5.2-5.3; OCR Twenty First Century P1

ID / route	Teaching focus and coverage	Track
P09.01 **F/H**	**Spectrum order** Place radio, microwave, infrared, visible, ultraviolet, X-ray and gamma radiation in order; connect wavelength, frequency and energy.	☐
P09.02 **F/H**	**Electromagnetic properties** Describe transverse waves, propagation through a vacuum and a common vacuum speed; connect sources, absorption and interactions with matter.	☐
P09.03 **F/H**	**Uses and hazards** Compare communication, heating, imaging, treatment and detection uses; explain risks, including ionisation where relevant.	☐
P09.04 **H/R**	**Producing and detecting radiation** Explain radio oscillations and radiation from changes in atoms/nuclei to the board-required depth.	☐
P09.05 **F/H/R**	**Reflection and refraction of light** Draw appropriate ray diagrams and explain behaviour in transparent media; practical and tier placement varies between routes.	☐
P09.06 **S**	**Lenses and images** Use converging/diverging lens ray diagrams; distinguish real/virtual images, focal length and image magnification without A-level lens equations.	☐
P09.07 **S**	**Colour and surfaces** Explain colour through absorption, transmission, reflection and scattering; compare filters and surfaces under different illumination.	☐
P09.08 **S**	**Infrared absorption and emission** Explain how surface properties affect thermal radiation and compare experiments using different colours or finishes.	☐
P09.09 **S-H/R**	**Black bodies and temperature balance** Explain temperature-dependent emission and the balance between absorption and emission, including Earth where required; detailed tier boundaries differ.	☐

P10 Atomic structure, radioactivity and nuclear energy

SPECIFICATION LOCATORS | AQA 4.4; Edexcel 6; OCR Gateway P6; OCR Twenty First Century P5

ID / route	Teaching focus and coverage	Track
P10.01 **F/H**	**Atomic and nuclear models** Describe atoms, nuclei, electrons and isotopes; explain how scattering evidence supported the nuclear model and distinguish excitation from ionisation.	☐
P10.02 **F/H**	**Nuclear emissions** Compare alpha, beta and gamma radiation, penetration, ionisation and deflection where specified; include positrons or neutrons only for routes requiring them.	☐
P10.03 **F/H**	**Nuclear equations** Complete decay equations conserving charge and nucleon number; explain how isotopes change during decay.	☐
P10.04 **F/H**	**Random decay and activity** Explain random decay, activity and count rate; account for background radiation and interpret detector data.	☐
P10.05 **F/H**	**Half-life** Find half-life from graphs or repeated halving; solve decay questions at the required tier and distinguish activity from remaining mass.	☐
P10.06 **F/H**	**Exposure and contamination** Distinguish irradiation from contamination; compare radiation hazards, exposure time, distance, shielding and safe use.	☐
P10.07 **S/R**	**Applications and monitoring** Evaluate medical diagnosis/treatment, tracers, sterilisation, industrial monitoring and isotope choice using half-life and radiation type.	☐
P10.08 **S**	**Fission and fusion** Explain induced fission, chain reactions, reactor control and nuclear fusion; compare energy production, waste and practical limitations.	☐
P10.09 **S-H/R**	**Medical and environmental evaluation** Interpret dose/risk information and balance benefits against risks, using only the terms and calculations specified by the selected board.	☐

P11 Magnetism, motors, generators and transformers

SPECIFICATION LOCATORS | AQA 4.7; Edexcel 12-13; OCR Gateway P4; OCR Twenty First Century P3.5-3.7

ID / route	Teaching focus and coverage	Track
P11.01 **F/H**	**Magnetic fields** Describe poles, attraction/repulsion and permanent/induced magnets; draw field lines and explain compass behaviour and Earth magnetism.	☐
P11.02 **F/H**	**Electromagnets** Draw fields around a straight current-carrying wire and solenoid; explain strength/direction changes and applications.	☐
P11.03 **H**	**Motor effect** Explain forces on current-carrying conductors in magnetic fields, use Fleming left-hand rule where required and connect this with motor rotation.	☐
P11.04 **H/R**	**Motor-force calculation** Use F = BIl for a conductor at right angles to a magnetic field where the route includes this relationship.	☐
P11.05 **S-H/R**	**Induction and generators** Explain induced potential difference/current, factors affecting size and direction, and generator operation at the specified tier.	☐
P11.06 **S-H/R**	**Transformers** Explain transformer construction and operation and apply turns-ratio or power relationships where specified; distinguish qualitative from Higher calculations.	☐
P11.07 **S-H/R**	**Microphones and loudspeakers** Explain conversion between electrical signals and sound using the motor or generator effect where the route includes these applications.	☐

P12 Space physics, astronomy and the universe

SPECIFICATION LOCATORS | AQA 4.8; Edexcel 7; OCR Gateway P8.3; OCR Twenty First Century P6.5

ID / route	Teaching focus and coverage	Track
P12.01 **S**	**Solar system and objects** Describe planets, moons, artificial satellites, asteroids and other required objects; distinguish solar systems from galaxies and the universe.	☐
P12.02 **S**	**Gravity and orbits** Explain gravitational attraction and circular orbital motion; compare stable orbits and qualitative effects of changing orbital speed/radius.	☐
P12.03 **S**	**Stars and their life cycles** Describe star formation, the main sequence, fusion, later evolution and the different outcomes for lower- and higher-mass stars.	☐
P12.04 **S**	**Elements and stellar processes** Explain the origin of elements through fusion and explosive stellar events at the route-required GCSE depth.	☐
P12.05 **S/R**	**Redshift and cosmology** Interpret Doppler/redshift evidence for an expanding universe; explain the Big Bang and cosmic microwave background where specified. Basic AQA redshift/cosmology is included at both tiers.	☐
P12.06 **S/R**	**Models and uncertainty** Evaluate observations and limitations of cosmological models; include dark matter/energy, distances or evidence only where required by the board.	☐

Practical knowledge and investigations

Online tuition develops understanding of methods, variables, apparatus, data and evaluation. Watching a demonstration or discussing results does not certify that a pupil has completed the hands-on work required through their school or exam centre.

RP = AQA required practical; CP = Edexcel core practical; PAG = OCR practical activity group. AQA numbers below refer to the separate subject specification; Combined practicals may use different numbering. For Synergy, use its own practical list.

Investigation focus	Official route pointer / teaching connection
Specific heat capacity	AQA RP1; Edexcel CP14.11 includes water heating and melting-ice data; OCR thermal investigations
Thermal insulation	AQA RP2 (separate); OCR/Edexcel relevant heat-loss investigations
Resistance against wire length / circuit changes	AQA RP3; Edexcel CP10.17 circuit work; OCR circuit investigations
Current-potential difference characteristics	AQA RP4; Edexcel CP10.17; OCR circuit investigations
Density of regular/irregular solids and liquids	AQA RP5; Edexcel CP14.3; OCR density investigations
Force, extension and elastic work	AQA RP6; Edexcel CP15.6; OCR forces investigations
Force, mass and acceleration	AQA RP7; Edexcel CP2.19; OCR motion investigations
Wave speed, wavelength and frequency	AQA RP8; Edexcel CP4.17; OCR waves investigations
Reflection/refraction and ray diagrams	AQA RP9 (separate); Edexcel CP5.9 (also Combined); OCR optical investigations
Infrared absorption/emission by surfaces	AQA RP10; Edexcel CP5.19P (separate); OCR thermal-radiation work

For every relevant investigation, students should be able to:

- State a testable question or prediction and choose independent, dependent and control variables.
- Select apparatus, ranges, intervals, controls, repeats and appropriate safety precautions; explain why the method measures the intended quantity.
- Record readings with units and sensible precision; use tables, means, rates, graphs and calculations appropriate to the subject.
- Identify anomalies and random/systematic errors; distinguish accuracy, precision, repeatability and reproducibility; propose specific improvements.
- Draw a conclusion supported by results, discuss uncertainty and avoid claiming causation or certainty beyond the evidence.

OCR permits suitable activities that collectively cover the prescribed apparatus and techniques. A familiar experiment is not a substitute for checking the actual PAG/skills requirements.

Skills, assessment and progression

Mathematical skills across the plan

- Use ratios, fractions, percentages, means, significant figures, standard form and appropriate unit/prefix conversions.
- Rearrange and substitute into relevant equations; state units; show working and assess whether an answer is physically or biologically reasonable.
- Plot suitable scales, interpret tables and graphs, recognise proportionality and calculate gradients, areas or rates where the tier requires them.
- Interpret uncertainty, ranges, experimental repeats and numerical evidence when evaluating an investigation or claim.

Scientific reasoning and communication

Explain models and their limitations; distinguish a prediction, observation and explanation; use evidence and peer review to evaluate claims. Practise clear definitions, application to unfamiliar contexts, multi-step calculations and extended responses using correct scientific vocabulary.

How progress is checked

Stage	Evidence
Baseline	A short assessment covering key prior knowledge, calculations and one practical/data question.
During teaching	Retrieval, questioning, worked-example completion and independent application to each selected topic.
Review	A mixed test and analysis of incorrect answers; re-teach the misconception and check again.
Exam preparation	Correct board, qualification and tier papers; timed practice, practical/data questions and targeted follow-up.

What parents will see

Weekly updates summarise the topics covered, practice or resources, next steps and any child-specific concerns. Shared community posts contain general learning content; individual progress and personal concerns are sent privately.

Equation and calculation coverage

This is a teaching checklist, not an official examination equation sheet. Scope and tier differ by qualification; use the live equation list for the student entry. The final row contains separate-science and route-dependent extensions.

Family	Relationships to practise
Kinematics	speed = distance / time; acceleration = velocity change / time; v^2 - u^2 = 2as [H]
Forces and momentum	weight = mg; resultant force = ma; momentum = mv [H]; force = momentum change / time [H/route]
Work and stored energy	work = force x distance; kinetic energy = 0.5mv^2; gravitational energy = mgh; elastic energy = 0.5ke^2
Power and efficiency	power = energy / time = work / time; efficiency = useful output / total input (x 100 for %)
Heating and density	density = mass / volume; energy = mcΔT; energy = mL
Electricity	charge = current x time; V = IR; P = VI; P = I^2R; E = Pt; E = QV; use route labels for extended combinations
Waves	wave speed = frequency x wavelength; period = 1 / frequency
Separate / route extensions	moment = force x perpendicular distance; pressure = force / area; liquid pressure = hρg; pV = constant; F = BIl; transformer turns/voltage relationships

Equation habits

Define symbols and units, convert inputs, rearrange before substituting, retain intermediate precision, and interpret the result. Read a supplied equation sheet accurately; an equation being provided does not make every associated concept Foundation content.

Official sources and specification checks

Research checked on 27 October 2026. Links open the awarding organisation or Department for Education source. The plans paraphrase and organise content for Hikmah teaching; they are not exam-board publications or endorsements.

The national topic framework is based on Department for Education content, © Crown copyright 2013/2015, reused under the Open Government Licence v3.0. Exam-board documents are linked for their own wording, route boundaries and assessment requirements.

01 DfE Separate

GCSE subject content for biology, chemistry and physics

02 DfE Combined

GCSE subject content for combined science

03 AQA Physics

Physics 8463 - subject content and specification

04 AQA Trilogy

Combined Science Trilogy 8464 - specification, version 1.3, October 2026

05 AQA Synergy

Combined Science Synergy 8465 - specification, version 1.4, October 2026

06 Edexcel Physics

Physics 1PH0 - specification, issue 4, March 2024

07 Edexcel Combined

Combined Science 1SC0 - specification, issue 6, March 2024

08 OCR Physics A

Gateway Physics A J249 - specification, version 5.0, July 2026

09 OCR Physics B

Twenty First Century Physics B J259 - specification, version 5.0, July 2026

10 OCR Combined A

Gateway Combined Science A J250 - specification, version 5.0, May 2026

11 OCR Combined B

Twenty First Century Combined Science B J260 - specification, version 5.0, June 2026

12 OCR Practicals

GCSE science practical activities and practical activity groups (PAGs)

Before setting each assignment

Confirm the school entry code, tier and current specification. Select only relevant checklist rows and the correct paper/practical requirements. Recheck board updates before the examination series; provided formula or equation sheets do not remove the need to interpret and use equations.