LEARNING PLAN AND TOPIC CHECKLIST

GCSE Biology

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 101 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 Biology	Combined Science
AQA	8461	8464 Trilogy / 8465 Synergy
Pearson Edexcel	1BI0	1SC0
OCR Gateway A	J247	J250
OCR Twenty First Century B	J257	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 4.1-4.7 in 8461 or Trilogy. Separate extensions include culture practicals, monoclonal antibodies, additional coordination, detailed DNA, cloning and food production. Synergy rearranges the same national biology across life/environmental themes.

Pearson Edexcel

Use topics 1-9. Add human-evolution evidence, growth/percentile interpretation, DNA extraction and named investigations where specified. A B suffix marks separate-Biology content; bold identifies Higher requirements in the official specification.

OCR

Gateway uses B1-B6 and practical skills. Twenty First Century starts with genes and uses B1-B6 plus Ideas about Science and practical skills. Its contextual order should not be confused with the Gateway order.

Unit map

B01 Cells, microscopy and biological organisation • B02 Cell division, growth and stem cells • B03 Transport, biological molecules and enzymes • B04 Human nutrition, exchange, circulation and health • B05 Infection, immunity and medicines • B06 Plant structures, photosynthesis and growth • B07 Respiration, exercise and metabolism • B08 Coordination, nervous responses and homeostasis • B09 Reproduction, DNA and genetic information • B10 Inheritance, evolution and genetic technologies • B11 Ecosystems, populations and material cycles • B12 Biodiversity, human impacts and food security

B01 Cells, microscopy and biological organisation

SPECIFICATION LOCATORS | AQA 4.1; Edexcel 1-2; OCR Gateway B1.1 and B2.2; OCR Twenty First Century B4.2-4.3

ID / route	Teaching focus and coverage	Track
B01.01 **F/H**	**Cell structures** Identify the nucleus, cytoplasm, membrane, mitochondria, ribosomes, cell wall, chloroplasts and vacuole; explain how structures support functions.	☐
B01.02 **F/H**	**Bacteria and other cell types** Compare animal, plant and bacterial cells, including bacterial circular DNA and plasmids; distinguish prokaryotes from eukaryotes.	☐
B01.03 **F/H**	**Specialised cells** Relate sperm, nerve, muscle, root-hair, xylem and phloem cell adaptations to their roles; link cells, tissues, organs and systems.	☐
B01.04 **F/H**	**Microscopy** Compare light and electron microscopes, resolution and magnification; prepare and interpret labelled biological drawings and micrographs.	☐
B01.05 **F/H**	**Size calculations** Calculate magnification, image size and actual size; use scale bars, standard form and conversions between millimetres, micrometres and nanometres.	☐
B01.06 **S**	**Microbial cultures** Explain aseptic culture methods, growth media and incubation conditions; interpret colony counts, zones of inhibition and binary-fission calculations where specified.	☐

B02 Cell division, growth and stem cells

SPECIFICATION LOCATORS | AQA 4.1 and 4.6; Edexcel 2-3; OCR Gateway B1.1 and B5.1; OCR Twenty First Century B4.3-4.5 and B1

ID / route	Teaching focus and coverage	Track
B02.01 **F/H**	**Chromosomes and the cell cycle** Locate genes on chromosomes; explain DNA replication, chromosome separation and division of the cytoplasm in the cell cycle.	☐
B02.02 **F/H**	**Mitosis** Explain production of genetically matching cells for growth, repair and asexual reproduction; include interphase, prophase, metaphase, anaphase, telophase and cytokinesis where specified, including Edexcel.	☐
B02.03 **F/H**	**Differentiation and growth** Explain cell differentiation, growth by cell division and elongation, and the continuing growth potential of plant meristems.	☐
B02.04 **R**	**Measuring growth** Interpret growth curves and percentile charts to monitor growth, including the Edexcel Combined and separate requirement.	☐
B02.05 **F/H**	**Stem cells** Compare embryonic and adult stem cells and plant meristems; evaluate therapeutic uses, risks and ethical questions.	☐
B02.06 **F/H**	**Cancer** Connect uncontrolled cell division with tumours; distinguish benign/malignant growth and interpret genetic, environmental and lifestyle risk evidence.	☐
B02.07 **F/H**	**Meiosis and gametes** Explain chromosome-number reduction in meiosis, fertilisation restoring chromosome pairs, and the origin of genetically different offspring; detailed meiotic stage names are not assumed.	☐

B03 Transport, biological molecules and enzymes

SPECIFICATION LOCATORS | AQA 4.1-4.2; Edexcel 1 and 8; OCR Gateway B1.2 and B2.1; OCR Twenty First Century B4.2 and B5.1

ID / route	Teaching focus and coverage	Track
B03.01 **F/H**	**Diffusion** Explain net movement down a concentration gradient; identify biological examples and factors affecting diffusion rate.	☐
B03.02 **F/H**	**Osmosis** Explain water movement through a partially permeable membrane; predict changes in cells and calculate percentage mass changes in plant tissue.	☐
B03.03 **F/H**	**Active transport** Explain movement against a concentration gradient using energy; compare active transport with diffusion and osmosis in roots and the gut.	☐
B03.04 **F/H**	**Exchange surfaces** Calculate surface-area-to-volume ratios; explain why large organisms need specialised exchange surfaces and transport, using lungs, roots and gills where specified.	☐
B03.05 **F/H**	**Biological molecules** Relate carbohydrates, proteins and lipids to their building blocks and roles; understand food and energy requirements.	☐
B03.06 **F/H**	**Enzyme action** Explain active sites, substrate specificity and enzyme-controlled reactions; interpret changes caused by temperature, pH and substrate availability.	☐
B03.07 **F/H**	**Enzyme investigations** Plan controlled enzyme-rate investigations, identify the endpoint, convert time to a rate and distinguish denaturation from a slow reaction.	☐
B03.08 **R**	**Food-test methods** Use iodine, Benedict-type, protein and lipid tests. Required-practical status differs: AQA includes food tests in Combined; Edexcel labels its food-test core practical Biology-only.	☐

B04 Human nutrition, exchange, circulation and health

SPECIFICATION LOCATORS | AQA 4.2; Edexcel 5 and 8; OCR Gateway B2.2 and B6.3; OCR Twenty First Century B2.5 and B5.1

ID / route	Teaching focus and coverage	Track
B04.01 **F/H**	**Digestive system** Identify digestive organs and explain ingestion, digestion, absorption and egestion; connect enzymes and their products to food breakdown.	☐
B04.02 **F/H**	**Digestion chemistry** Describe carbohydrases, proteases and lipases; explain stomach acid, bile, neutralisation and fat emulsification.	☐
B04.03 **F/H**	**Absorption** Relate small-intestine and villus structures to efficient absorption; connect absorption with diffusion and active transport.	☐
B04.04 **F/H**	**Gas exchange** Relate lungs, airways and alveoli to gas exchange; explain ventilation and diffusion between air and blood.	☐
B04.05 **F/H**	**Blood and blood vessels** Explain the roles of plasma, red cells, white cells and platelets; relate artery, vein and capillary structures to function.	☐
B04.06 **F/H**	**Heart and circulation** Trace double circulation through heart chambers, valves, lungs and body; interpret pulse/heart-rate and transport data.	☐
B04.07 **F/H**	**Cardiovascular disease** Explain coronary artery disease and evaluate prevention or treatments such as lifestyle change, medicines, stents and replacement procedures where specified.	☐
B04.08 **F/H**	**Non-communicable disease** Explain how diet, smoking, alcohol, exercise, genes and environment affect health; distinguish risk factors from proof of causation.	☐
B04.09 **F/H**	**Interpreting health data** Use incidence, risk, BMI or other supplied measures; compare treatment evidence, sample sizes and limitations without overstating conclusions.	☐

B05 Infection, immunity and medicines

SPECIFICATION LOCATORS | AQA 4.3; Edexcel 5; OCR Gateway B6.3; OCR Twenty First Century B2

ID / route	Teaching focus and coverage	Track
B05.01 **F/H**	**Pathogens and transmission** Compare disease caused by viruses, bacteria, fungi and protists; explain transmission through air, water, contact and vectors.	☐
B05.02 **R**	**AQA disease examples** Learn the required AQA examples: measles, HIV, tobacco mosaic virus, salmonella, gonorrhoea, rose black spot and malaria; connect each pathogen with effects, spread and prevention.	☐
B05.03 **R**	**Edexcel disease examples** Include cholera, tuberculosis, Chalara ash dieback, malaria, HIV and chlamydia; separate Biology also includes Helicobacter ulcers and Ebola. Use the OCR examples required by the selected suite.	☐
B05.04 **S/R**	**Virus life cycles** Explain lytic and lysogenic pathways where required, including Edexcel separate Biology, and connect these with infection and viral replication.	☐
B05.05 **F/H**	**Reducing infection** Explain hygiene, sanitation, vaccination, isolation and vector control; evaluate public-health measures using evidence.	☐
B05.06 **F/H**	**Body defences** Explain physical and chemical barriers, including skin, mucus, cilia and stomach acid; describe phagocytosis, antibodies and antitoxins.	☐
B05.07 **F/H**	**Immunity and vaccination** Explain immune memory and vaccination; interpret community-protection and effectiveness data, including benefits and limitations.	☐
B05.08 **F/H**	**Antibiotics and resistance** Distinguish antibiotics from painkillers; explain why antibiotics do not treat viruses and how natural selection produces antibiotic resistance.	☐
B05.09 **F/H**	**Developing medicines** Describe drug discovery, preclinical tests, clinical trials, placebos, double-blind design, dose, efficacy, toxicity and peer review.	☐
B05.10 **S-H**	**Monoclonal antibodies** Explain their production and diagnostic/therapeutic applications and evaluate limitations; the detailed AQA content is Biology Higher-only.	☐
B05.11 **S**	**Plant health and diagnosis** Recognise plant disease signs, physical/chemical defences and mineral-deficiency symptoms; compare observation, culture and laboratory diagnosis where required.	☐

B06 Plant structures, photosynthesis and growth

SPECIFICATION LOCATORS | AQA 4.2, 4.4 and 4.5; Edexcel 6 and 7; OCR Gateway B1.4, B2 and B3; OCR Twenty First Century B3.1-3.2 and B4.4

ID / route	Teaching focus and coverage	Track
B06.01 **F/H**	**Leaf and root adaptations** Relate leaf layers, stomata, guard cells and root hairs to photosynthesis, gas exchange and water/mineral uptake.	☐
B06.02 **F/H**	**Plant transport** Explain xylem and phloem functions, transpiration and translocation; follow water from soil to leaves.	☐
B06.03 **F/H**	**Transpiration rate** Explain effects of temperature, humidity, light and air movement; interpret potometer data and distinguish water uptake from water loss.	☐
B06.04 **F/H**	**Photosynthesis** Describe photosynthesis as an energy-requiring process; use word and balanced symbol equations and explain the use of glucose.	☐
B06.05 **F/H**	**Limiting factors** Interpret effects of light intensity, carbon dioxide and temperature on photosynthetic rate; identify limiting factors from tables and graphs.	☐
B06.06 **H**	**Interacting factors** Explain interacting limiting factors; use quantitative light-distance relationships and evaluate greenhouse conditions where the route requires them.	☐
B06.07 **F/H**	**Mineral supply** Explain why plants need mineral ions, including nitrate and magnesium, and link deficiencies to reduced growth or chlorophyll production.	☐
B06.08 **S**	**Plant responses** Explain phototropism and gravitropism and how auxin affects growth; evaluate investigations using germinating seedlings.	☐
B06.09 **S-H**	**Applied plant hormones** Explain commercial use of auxins, gibberellins and ethene in rooting, weed control, germination and fruit ripening, to the depth specified by the board.	☐

B07 Respiration, exercise and metabolism

SPECIFICATION LOCATORS | AQA 4.4; Edexcel 8; OCR Gateway B1.3; OCR Twenty First Century B4.1

ID / route	Teaching focus and coverage	Track
B07.01 **F/H**	**Aerobic respiration** Explain respiration as cellular energy transfer; use the aerobic word and symbol equations and identify uses of released energy.	☐
B07.02 **F/H**	**Anaerobic respiration** Compare aerobic respiration with anaerobic respiration in muscle and fermentation in yeast or plants, including products and relative energy transfer.	☐
B07.03 **F/H**	**Exercise responses** Explain changes in breathing, heart rate and blood flow during exercise and interpret data on activity and recovery.	☐
B07.04 **H**	**Oxygen debt and lactate** Explain oxygen debt and the removal or conversion of lactic acid after exercise; apply the detail required by the selected board.	☐
B07.05 **F/H**	**Metabolism** Connect respiration, synthesis and breakdown reactions, including carbohydrate/lipid/protein metabolism and the formation of urea where specified.	☐
B07.06 **R**	**Respiration investigations** Interpret respirometer or temperature data, controls and living-organism respiration investigations; distinguish a practical named by the board from additional teaching examples.	☐

B08 Coordination, nervous responses and homeostasis

SPECIFICATION LOCATORS | AQA 4.5; Edexcel 2 and 7; OCR Gateway B3; OCR Twenty First Century B5.2-5.6

ID / route	Teaching focus and coverage	Track
B08.01 **F/H**	**Homeostasis** Explain receptors, coordination centres and effectors; describe control of internal conditions and the role of nervous and hormonal communication.	☐
B08.02 **F/H**	**Nervous system and reflexes** Trace impulses through sensory, relay and motor neurones; explain synapses, neurotransmitters, myelin and reflex arcs, and distinguish automatic from conscious responses.	☐
B08.03 **F/H**	**Reaction-time investigations** Plan and interpret ruler-drop or other reaction-time tests; identify control variables, repeats and limits of the measurement.	☐
B08.04 **S**	**Brain and nervous-system treatment** Relate major brain regions to functions; consider methods of studying the brain, injury, treatment and ethical difficulties where specified.	☐
B08.05 **S**	**The eye** Identify eye structures; explain focusing and responses to light; compare short/long sight and corrective lenses, with Higher detail where specified.	☐
B08.06 **F/H**	**Endocrine communication** Locate major endocrine glands; compare hormones with nerve impulses and explain hormone transport in blood.	☐
B08.07 **F/H**	**Blood glucose and diabetes** Explain insulin, blood-glucose regulation and type 1/type 2 diabetes; evaluate treatment, diet and lifestyle approaches.	☐
B08.08 **H**	**Hormonal feedback** Explain glucagon and negative feedback; apply feedback to adrenaline and thyroxine where included in the selected route.	☐
B08.09 **S**	**Temperature and water balance** Explain sweating, shivering and blood-flow changes; describe kidneys, filtration and selective reabsorption, and compare dialysis with transplantation.	☐
B08.10 **S-H**	**ADH and detailed renal control** Explain ADH, osmoregulation, water reabsorption and feedback at the board-required Higher depth; link protein breakdown with urea removal.	☐

B09 Reproduction, DNA and genetic information

SPECIFICATION LOCATORS | AQA 4.5-4.6; Edexcel 3 and 7; OCR Gateway B3.2 and B5.1; OCR Twenty First Century B1 and B5.5

ID / route	Teaching focus and coverage	Track
B09.01 **F/H**	**Sexual and asexual reproduction** Compare parents, gametes and genetic variation; relate fertilisation and meiosis to inheritance and compare reproductive strategies.	☐
B09.02 **F/H**	**Reproductive hormones** Explain puberty and the basic menstrual cycle, including oestrogen and progesterone, at the depth required by the board.	☐
B09.03 **H**	**Cycle interactions and fertility treatment** Explain FSH/LH interactions and hormonal feedback; describe fertility medicines and IVF and evaluate success data and concerns.	☐
B09.04 **F/H**	**Contraception** Compare hormonal and non-hormonal methods and evaluate effectiveness, practical considerations and prevention of sexually transmitted infection.	☐
B09.05 **F/H**	**DNA, genes and the genome** Explain chromosomes, genes and DNA as inherited information; link genes with proteins and characteristics and understand applications of genome research.	☐
B09.06 **R**	**DNA structure** Describe nucleotides, complementary bases and the double helix. Edexcel includes this in Combined; AQA identifies its detailed DNA-structure section as separate Biology.	☐
B09.07 **R**	**DNA extraction** Explain extraction of DNA from fruit, including the purpose of the key steps and reagents, as specified in Edexcel Combined and separate Biology.	☐
B09.08 **S-H**	**Protein synthesis** Explain transcription/translation at GCSE depth, the roles of messenger RNA and ribosomes, and how base sequence determines amino-acid order.	☐
B09.09 **H/R**	**Genetic variants** Explain how mutations or variants can affect proteins, gene expression and phenotype; coding/non-coding detail and tier placement differ between routes.	☐

B10 Inheritance, evolution and genetic technologies

SPECIFICATION LOCATORS | AQA 4.6; Edexcel 3-4; OCR Gateway B5; OCR Twenty First Century B1 and B6.1-6.3

ID / route	Teaching focus and coverage	Track
B10.01 **F/H**	**Inheritance vocabulary** Use allele, dominant, recessive, genotype, phenotype, homozygous and heterozygous; recognise polygenic characteristics.	☐
B10.02 **F/H**	**Genetic crosses** Use Punnett squares, genetic diagrams, family trees and probability to predict single-gene inheritance and human sex determination.	☐
B10.03 **R**	**Inherited conditions** Apply inheritance to board-named conditions and evaluate genetic screening; AQA includes cystic fibrosis and polydactyly.	☐
B10.04 **F/H**	**Variation and natural selection** Distinguish genetic, environmental and combined variation; explain selection, adaptation, evolution, extinction and resistant populations.	☐
B10.05 **S/R**	**Evidence and development of ideas** Interpret fossils, evolutionary trees, selective breeding evidence and historical work; include human-evolution evidence for Edexcel and named scientists required by each board.	☐
B10.06 **R**	**Human evolution and comparative anatomy** For Edexcel, include Ardi, Lucy, Richard Leakey fossil evidence and the development/dating of stone tools; separate Biology also includes pentadactyl-limb evidence.	☐
B10.07 **F/H**	**Classification** Use classification systems and evolutionary relationships; compare kingdom and three-domain models to the detail required by the route.	☐
B10.08 **F/H**	**Selective breeding and genetic modification** Explain selection for desired traits, benefits and risks; discuss GM crops and microbes producing useful substances.	☐
B10.09 **H**	**Engineering methods** Explain gene isolation, vectors, transfer and selection at GCSE depth where the specification marks these steps Higher-only.	☐
B10.10 **S**	**Cloning and biotechnology** Compare cuttings, tissue culture, embryo splitting and adult-cell cloning; evaluate uses in medicine, farming and conservation.	☐

B11 Ecosystems, populations and material cycles

SPECIFICATION LOCATORS | AQA 4.7; Edexcel 9; OCR Gateway B4 and B6.1; OCR Twenty First Century B3 and B6.4

ID / route	Teaching focus and coverage	Track
B11.01 **F/H**	**Ecosystem organisation** Distinguish organism, population, community and ecosystem; explain interdependence, stability and competition for resources.	☐
B11.02 **F/H**	**Adaptation and environmental factors** Relate structural, behavioural and functional adaptations to survival; analyse biotic and abiotic effects on distribution and abundance.	☐
B11.03 **F/H**	**Food webs** Identify producers, consumers, predators and prey; interpret food chains, food webs and population fluctuations.	☐
B11.04 **F/H**	**Sampling** Use random quadrats and transects; estimate abundance and distribution, choose appropriate sample sizes and evaluate bias.	☐
B11.05 **F/H**	**Carbon and water cycles** Explain cycling of carbon and water through organisms and the environment, including photosynthesis, respiration, decomposition and combustion.	☐
B11.06 **S/R**	**Decomposition and other nutrient cycles** Explain effects of oxygen, temperature and water on decay; include nitrogen-cycle processes, fertilisers and microbes where specified.	☐
B11.07 **S/R**	**Biomass and transfer efficiency** Interpret trophic levels and biomass/energy pyramids; calculate transfer efficiency and explain losses. Combined/separate placement differs between boards.	☐
B11.08 **S-H/R**	**Changing distributions** Evaluate how environmental change alters species distribution and ecosystem interactions; use the route-specific Higher requirements.	☐

B12 Biodiversity, human impacts and food security

SPECIFICATION LOCATORS | AQA 4.7; Edexcel 4 and 9; OCR Gateway B6; OCR Twenty First Century B3 and B6

ID / route	Teaching focus and coverage	Track
B12.01 **F/H**	**Biodiversity and conservation** Explain biodiversity and the value of maintaining it; evaluate breeding programmes, habitat protection, conservation and sustainable use.	☐
B12.02 **F/H**	**Human environmental impacts** Assess population growth, pollution, waste, land use, deforestation, peat destruction and climate change using evidence.	☐
B12.03 **F/H**	**Sustainability** Compare strategies for reducing environmental damage and protecting ecosystems; consider competing social, economic and environmental demands.	☐
B12.04 **S**	**Food security** Explain threats from population growth, conflict, changing diets, pests, pathogens, environmental change and unequal access to resources.	☐
B12.05 **S**	**Food production** Evaluate farming methods, biological control, controlled environments and strategies that improve crop or livestock yields.	☐
B12.06 **S**	**Sustainable fisheries** Explain fish-stock conservation and evaluate quotas, net size and other approaches to sustainable fishing.	☐
B12.07 **S**	**Biotechnology in food production** Explain microorganisms, fermentation, fermenter-condition control and biotechnology in producing food or useful proteins; interpret growth or yield data.	☐
B12.08 **H/R**	**Efficiency and evaluation** Use quantitative evidence to evaluate food-production efficiency, biotechnology and environmental decisions at the depth required by the student route.	☐

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
Microscopy and labelled drawings	AQA RP1; Edexcel CP1.6; OCR microscopy PAG/skills
Aseptic cultures and inhibition zones	AQA RP2 (separate); Edexcel CP5.18B (separate); OCR microbiology skills
Osmosis and percentage mass change	AQA RP3; Edexcel CP1.16; OCR transport investigations
Food identification	AQA RP4 (also Combined); Edexcel CP1.13B (separate); OCR biochemical tests
Enzyme rate and pH	AQA RP5; Edexcel CP1.10; OCR enzyme investigations
Photosynthesis and light intensity	AQA RP6; Edexcel CP6.5; OCR photosynthesis investigations
Human reaction time	AQA RP7; OCR/Edexcel relevant response investigations
Seedling responses to light or gravity	AQA RP8 (separate); OCR/Edexcel plant-response work
Ecology: quadrats and transects	AQA RP9; Edexcel CP9.5; OCR sampling PAG/skills
Decay and environmental conditions	AQA RP10 (separate); OCR/Edexcel relevant decomposition work
Respiration rate in organisms	Edexcel CP8.11; OCR respiration work; useful comparative investigation for AQA

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.

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 Biology

Biology 8461 - 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 Biology

Biology 1BI0 - specification, issue 4, March 2024

07 Edexcel Combined

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

08 OCR Biology A

Gateway Biology A J247 - specification, version 4.0, August 2026

09 OCR Biology B

Twenty First Century Biology B J257 - specification, version 4.0, August 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.