

YEAR 9 GCSE SCIENCE: A PARENT'S GUIDE

Welcome to GCSE Science! Year 9 serves as the vital foundation year where students transition to GCSE-level concepts across Biology, Chemistry, and Physics. The focus is on building solid practical skills (working scientifically) and mastering fundamental cell, atomic, and energy theories that underpins the entire AQA 9-1 GCSE Science curriculum. Below is a term-by-term breakdown designed to help you support your child's academic progress at home.

Subject	Topic & What Students Learn	AQA Spec Link
BIOLOGY	Cell Biology: Prokaryotic vs. eukaryotic cells, microscopes (onion/cheek cell slides Required Practical), cell transport (diffusion, osmosis, active transport), cell division (mitosis), and stem cells.	Cell Biology (Spec 4.1.1 & 4.1.2)
BIOLOGY	Organisation: Human digestive organs, testing food for biological molecules (iodine for starch, Benedict's for sugar, Biuret for protein), digestive enzymes (amylase temperature/pH Required Practicals), blood/heart structures, and plant transport (xylem/phloem).	Organisation (Spec 4.2.2 & 4.2.3)
BIOLOGY	Infection & Response: Pathogens (bacteria, viruses, fungi, malaria protists), how human barriers and white blood cells defend us, vaccination, antibiotics vs. painkillers, clinical drug trials, and cancer.	Infection & Response (Spec 4.3.1)
CHEMISTRY	Atoms & The Periodic Table: Elements, compounds, mixtures, separation techniques (filtration, chromatography, distillation), atomic history models (plum pudding vs. nuclear), isotopes, and group trends (Group 1, 7, and 0).	Atomic Structure (Spec 4.1.1 & 4.1.2)
CHEMISTRY	Bonding & Matter: Exploring ionic, covalent, and metallic structures, giant carbon molecules (diamond, graphite, graphene), polymers, states of matter, and the revolutionary applications of nanoparticles.	Bonding & Matter (Spec 4.2.1 & 4.2.2)
PHYSICS	Energy Stores & Resources: The 8 energy stores, pathways of transfer, conservation of energy, specific heat capacity (Required Practical), power, thermal conductivity (insulation Required Practical), and renewable/non-renewable energy sources.	Energy Resources (Spec 4.1.1 & 4.1.2)

■ **Parent Support Tip (Year 9):** Help your child visualise scales of magnitude! Ask them to explain the difference between a prokaryotic cell (bacterium) and a eukaryotic cell (like a plant cell). At the dinner table, look at nutritional labels together and talk about how Benedict's or Biuret reagents could test for those hidden sugars or proteins.

YEAR 10 GCSE SCIENCE: A PARENT'S GUIDE

Year 10 represents the most academically rigorous period of the GCSE journey. Students dive deeply into complex, high-weight areas including quantitative math calculations (chemical moles), electrical circuit mechanics, thermodynamics, and global ecological relationships. Practical laboratory investigations become heavily assessed. This guide outlines these major topics to help you track and support their progress.

Subject	Topic & What Students Learn	AQA Spec Link
BIOLOGY	Bioenergetics: Photosynthesis equations, light intensity effects (pondweed Required Practical), limiting factors, aerobic vs. anaerobic respiration, responses to exercise, and cell metabolism.	Bioenergetics (Spec 4.4.1 & 4.4.2)
BIOLOGY	Ecology: Ecosystems, competition, extremophile adaptations, ecological sampling (quadrats/transects Required Practical), carbon and water cycles, decomposition, biodiversity, and global food security.	Ecology (Spec 4.7.1 & 4.7.2)
CHEMISTRY	Quantitative Chemistry: The law of conservation of mass, relative formula mass (Mr), calculating moles, concentration limits, theoretical/percentage yields, and green atom economy.	Quantitative Chemistry (Spec 4.3.1 & 4.3.2)
CHEMISTRY	Chemical Reactions: Metal reactivity series, reduction/oxidation (extracting metals), acid-base neutralisation (making copper sulfate Required Practical), the pH scale, and molten/aqueous electrolysis.	Chemical Changes (Spec 4.4.1 & 4.4.2)
CHEMISTRY	Energy Changes: Exothermic vs. endothermic reactions (temperature change Required Practical), reaction profiles, bond energy calculations, batteries, and sustainable hydrogen fuel cells.	Energy Changes (Spec 4.5.1 & 4.5.2)
CHEMISTRY	Reaction Rates & Equilibrium: Collision theory, factors affecting rates (concentration, temperature, catalysts Required Practical), reversible reactions, and dynamic equilibrium (Le Chatelier).	Rates & Equilibrium (Spec 4.6.1 & 4.6.2)
CHEMISTRY	Using Resources: Sustainable development, clean potable water treatment, wastewater management, biological metal extraction (phytomining, bioleaching), Life Cycle Assessments (LCAs), and the Haber Process.	Resource Management (Spec 4.10.1 & 4.10.2)
PHYSICS	Electricity: Circuit diagrams, current-voltage rules (Ohm's Law, diode/filament lamp Required Practicals), LDRs/thermistors, series/parallel circuit rules, domestic plugs/safety, and the National Grid.	Electricity (Spec 4.2.1 & 4.2.2)
PHYSICS	Particle Model & Radioactivity: Density calculations (Required Practical), latent heats, gas laws, atomic history, nuclear decay equations (alpha, beta, gamma), half-life graphs, and fission vs. fusion.	Matter & Atoms (Spec 4.3.1 & 4.4.2)
PHYSICS	Forces: Scalars/vectors, gravity (mass vs. weight), work done, spring stretching (Hooke's Law Required Practical), turning moments (gears/levers), fluid pressure, and atmospheric depth.	Forces & Pressure (Spec 4.5.1 & 4.5.5)

■ **Parent Support Tip (Year 10):** Quantitative Chemistry and Electricity are areas where students frequently lose confidence due to the maths formulas involved. Encourage your child by reviewing essential equations like $V=IR$ (Voltage = Current x Resistance) or practicing rearranging simple algebraic formulas together. Point out household fuses and plug wires as physical examples of circuit safety!

YEAR 11 GCSE SCIENCE: A PARENT'S GUIDE

The final stretch of the GCSE program! Year 11 completes the remaining advanced topics—including complex hormonal endocrine feedback loops, crude oil hydrocarbons, organic polymer synthesis, and waves/space physics—before shifting into intensive exam board preparation. Students are tested on both Paper 1 and Paper 2 content in their final summer examinations. Use this roadmap to help them balance their revision.

Subject	Topic & What Students Learn	AQA Spec Link
BIOLOGY	Homeostasis & Response: The human nervous system, reflex arcs (reaction time Required Practical), the brain, the eye (correcting vision), insulin/diabetes, human reproduction hormones, IVF, and plant tropisms.	Homeostasis (Spec 4.5.1 & 4.5.2)
BIOLOGY	Reproduction & Genetics: DNA double helix structure, the human genome, mitosis vs. meiosis, genetic inheritance (Punnett squares), selective breeding, cloning, and genetic engineering.	Genetics & Breeding (Spec 4.6.1 & 4.6.2)
BIOLOGY	Evolution: Gregor Mendel's history of genetics, Darwin's theory of natural selection, fossils, extinction, antibiotic resistance in bacteria (like MRSA), and the modern 3-domain classification system.	Evolution (Spec 4.6.3 & 4.6.4)
CHEMISTRY	Organic Chemistry: Fractional distillation of crude oil, hydrocarbons (alkanes vs. alkenes), complete/incomplete combustion, catalytic cracking, alcohols, carboxylic acids, and synthetic/natural polymers.	Organic Chemistry (Spec 4.7.1 & 4.7.2)
CHEMISTRY	Chemical Analysis & Atmosphere: Pure substances vs. formulations, chromatography (R _f values), testing common gases (H ₂ , O ₂ , CO ₂ , Cl ₂), early atmosphere evolution, global warming, and carbon footprints.	Analysis & Atmosphere (Spec 4.8.1 & 4.9.1)
PHYSICS	Motion: Speed vs. velocity, distance-time and velocity-time graphs, Newton's three laws of motion, reaction times, braking/thinking distances, terminal velocity, and momentum calculations.	Motion & Laws (Spec 4.5.6 & 4.5.7)
PHYSICS	Waves: Transverse/longitudinal wave mechanics, wave speed (Required Practical), the Electromagnetic (EM) spectrum, reflection/refraction ray tracing, sound, ultrasound, seismic waves, lenses, and black body radiation.	Waves & Lenses (Spec 4.6.1, 4.6.2 & 4.6.3)
PHYSICS	Magnetism & Electromagnetism: Magnetic fields, solenoids, the motor effect (Fleming's Left-Hand rule), electric motors, loudspeakers, electromagnetic induction (generators, microphones), and transformers.	Electromagnetism (Spec 4.7.1 & 4.7.2)
PHYSICS	Space Physics: Satellites and orbital motion, the lifecycles of average and massive stars (supernovas, black holes), and cosmic red-shift evidence supporting the Big Bang theory.	Space Physics (Spec 4.8.1)

■ **Parent Support Tip (Year 11):** With Paper 1 and Paper 2 exams approaching, help your child by encouraging them to teach YOU a topic! Asking them to explain Darwinian natural selection or the steps in fractional distillation is the ultimate memory test. Help them construct quick 10-minute flashcards of the Electromagnetic (EM) spectrum and its real-world medical/communication uses.