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GCSE COMBINED SCIENCE

COMPLETE GUIDE

Biology • Chemistry • Physics

AQA | Edexcel | OCR — Full Specification Coverage

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Welcome to Eclassopedia's GCSE Combined Science Guide 2026

Eclassopedia is proud to present the definitive revision resource for GCSE Combined Science students sitting their examinations in 2026. Whether you are studying AQA, Edexcel, or OCR, this guide has been carefully designed to cover the core content across all three science disciplines: Biology, Chemistry, and Physics.

Combined Science is one of the most popular GCSE options in England and Wales, allowing students to gain two GCSEs (graded on a double award scale from 1-1 to 9-9) through a single, integrated programme of study. This guide brings together everything you need to know in one place — clear explanations, memorable summaries, key equations, practical skills, and examination tips.

At Eclassopedia, we believe every student deserves access to outstanding educational resources. Our team of expert educators has written this guide with one goal: to help you understand, remember, and apply scientific knowledge with confidence in your examinations.

How to Use This Guide

Work through each subject section systematically. Use the key term tables to build your scientific vocabulary. Revisit the exam tips before practice papers. The guide is structured to mirror the three exam papers you will sit, making targeted revision straightforward and efficient.

Subject	Topics Covered
Biology	Cell Biology, Organisation, Infection & Response, Bioenergetics, Homeostasis, Inheritance, Ecology
Chemistry	Atomic Structure, Bonding, Quantitative Chemistry, Chemical Changes, Energy Changes, Rates, Organic Chemistry, Chemical Analysis, Atmosphere, Resources
Physics	Forces, Energy, Waves, Electricity, Magnetism, Particle Model, Atomic Structure, Space

PART ONE: BIOLOGY

1.1 Cell Biology

The cell is the fundamental unit of life. Understanding cells — their structures, functions, and processes — forms the foundation of all biological knowledge. In GCSE Combined Science, you are expected to understand the differences between prokaryotic and eukaryotic cells, the function of sub-cellular structures, and the processes by which materials move in and out of cells.

Eukaryotic vs Prokaryotic Cells

Eukaryotic cells are found in animals, plants, and fungi. They possess a true nucleus enclosed by a nuclear membrane, as well as membrane-bound organelles such as mitochondria, the endoplasmic reticulum, and the Golgi apparatus. Plant cells additionally contain chloroplasts and a rigid cell wall made of cellulose.

Prokaryotic cells, such as bacteria, are significantly smaller and simpler. They have no membrane-bound nucleus — their genetic material floats freely as a circular loop of DNA in the cytoplasm. They may also contain small rings of DNA called plasmids.

Structure	Function
Nucleus	Contains DNA; controls cell activities and protein synthesis
Mitochondria	Site of aerobic respiration; produces ATP energy
Ribosome	Site of protein synthesis
Cell membrane	Controls what enters and exits the cell (selective permeability)
Chloroplast	Site of photosynthesis (plant cells only)
Cell wall (plant)	Provides structural support; made of cellulose
Vacuole (plant)	Stores cell sap; maintains turgor pressure
Plasmid	Small circular DNA loop found in bacteria

Cell Division: Mitosis and Meiosis

Mitosis is the process by which a parent cell divides to produce two genetically identical daughter cells. It is essential for growth, repair, and asexual reproduction. The cell cycle includes a period of DNA replication (interphase) followed by division. In the context of stem cell research, mitosis is central to understanding how undifferentiated cells can become specialised.

Meiosis, by contrast, produces four genetically unique daughter cells, each with half the chromosome number of the original cell. This process is essential for sexual reproduction and generates variation through crossing over and independent assortment.

Exam Tip — Cell Division

Students frequently confuse mitosis and meiosis. Remember: Mitosis = 2 identical cells (for growth); Meiosis = 4 unique cells (for gametes). The number of chromosomes in humans is 46 in body cells, 23 in gametes.

Transport in and out of Cells

Materials move into and out of cells by three main processes: diffusion, osmosis, and active transport.

- Diffusion: The net movement of particles from an area of high concentration to low concentration down a concentration gradient. No energy is required.
- Osmosis: The diffusion of water molecules across a partially permeable membrane from a region of high water potential (dilute solution) to low water potential (concentrated solution).
- Active transport: The movement of substances against a concentration gradient, requiring energy (ATP) from respiration. Used by root hair cells to absorb mineral ions.

1.2 Organisation

Multicellular organisms are organised into a hierarchy: cells form tissues, tissues form organs, and organs form organ systems. Understanding how this organisation allows organisms to function efficiently is key to GCSE Biology.

The Digestive System

The human digestive system breaks down large, insoluble food molecules into small, soluble molecules that can be absorbed into the bloodstream. Key organs include the mouth, oesophagus, stomach, small intestine, large intestine, liver, and pancreas. Enzymes play a central role — amylase digests starch into sugars, proteases break down proteins into amino acids, and lipases convert fats into fatty acids and glycerol.

The Circulatory System

The human circulatory system is a double circulatory system: blood travels from the heart to the lungs and returns (pulmonary circulation), and separately from the heart to the rest of the body and returns (systemic circulation). The heart has four chambers — two atria and two ventricles. Arteries carry oxygenated blood away from the heart; veins carry deoxygenated blood back. Capillaries are the sites of gas and nutrient exchange.

Key Equation — Heart

Cardiac output (cm^3/min) = Stroke volume (cm^3) × Heart rate (beats/min). This equation may appear in calculation questions.

1.3 Infection and Response

The body is constantly exposed to pathogens — microorganisms that cause disease. Understanding how diseases are transmitted, how the immune system responds, and how medicines and vaccines work is an important area of the specification.

Pathogen Type	Example Disease
Bacteria	Salmonella, Gonorrhoea, Tuberculosis
Virus	Measles, HIV, Influenza, COVID-19
Fungi	Athlete's foot, Rose black spot (plants)
Protist	Malaria (spread by mosquito vectors)

The immune system defends the body through a layered response. Physical barriers (skin, mucus, cilia) prevent pathogen entry. If a pathogen enters, white blood cells (phagocytes and lymphocytes) respond: phagocytes engulf pathogens by phagocytosis, while lymphocytes produce specific antibodies that bind to antigens on the pathogen, neutralising them. Memory lymphocytes remain after infection, providing long-lasting immunity.

1.4 Bioenergetics

Bioenergetics covers the processes by which organisms transfer energy — primarily photosynthesis and respiration.

Word Equation — Photosynthesis

Carbon dioxide + Water → Glucose + Oxygen (in the presence of light and chlorophyll). This is an endothermic process — it requires energy input from light.

Word Equations — Respiration

Aerobic: Glucose + Oxygen → Carbon dioxide + Water (releases large amounts of ATP)Anaerobic (animals): Glucose → Lactic acid (releases less energy; causes fatigue)Anaerobic (plants/yeast): Glucose → Ethanol + Carbon dioxide (fermentation)

1.5 Homeostasis and Response

Homeostasis is the regulation of internal conditions to maintain a stable environment for cells. Key systems include blood glucose regulation (insulin and glucagon from the pancreas), body temperature regulation (thermoregulation by the skin and hypothalamus), and water balance (osmoregulation by the kidneys).

The nervous system detects stimuli via receptors, processes information in the brain or spinal cord, and initiates a response via effectors (muscles or glands). The reflex arc is a rapid, involuntary response pathway that bypasses conscious thought, protecting the body from harm. The endocrine system uses hormones — chemical messengers transported in the blood — to coordinate slower, longer-lasting responses.

1.6 Inheritance, Variation and Evolution

Genetic information is carried on chromosomes in the nucleus. Genes are sections of DNA that code for proteins. In humans, the sex chromosomes XX (female) and XY (male) determine biological sex. Alleles are different versions of the same gene; dominant alleles are expressed when present, while recessive alleles are only expressed in homozygous individuals.

Punnett squares are used to predict the probability of offspring inheriting particular traits. Variation in a population arises from genetic differences (mutations, sexual reproduction) and environmental factors. Natural selection acts on this variation: individuals with advantageous traits survive to reproduce, passing on those traits — driving evolution over many generations. Charles Darwin's theory of evolution by natural selection is supported by evidence from the fossil record, comparative anatomy, and molecular biology.

1.7 Ecology

Ecology studies the relationships between organisms and their environment. Key concepts include food chains and webs, energy transfer between trophic levels (approximately 10% efficiency), the carbon cycle, the water cycle, and the nitrogen cycle. Biodiversity — the variety of life in an ecosystem — is important for ecosystem stability. Threats to biodiversity include habitat destruction, pollution, climate change, and invasive species. Conservation efforts, including seed banks, captive breeding programmes, and international treaties, aim to protect biodiversity.

PART TWO: CHEMISTRY

2.1 Atomic Structure and the Periodic Table

All matter is made of atoms. An atom consists of a central nucleus containing protons (positive charge) and neutrons (no charge), surrounded by electrons (negative charge) arranged in shells (energy levels). The atomic number of an element equals the number of protons; the mass number equals the sum of protons and neutrons.

Particle	Relative Mass / Charge
Proton	Mass: 1 / Charge: +1
Neutron	Mass: 1 / Charge: 0
Electron	Mass: negligible (~1/1836) / Charge: -1

Isotopes are atoms of the same element with the same number of protons but different numbers of neutrons (and thus different mass numbers). Relative atomic mass (Ar) is the weighted average mass of an element's isotopes relative to 1/12 the mass of carbon-12.

The Periodic Table organises elements by increasing atomic number. Elements in the same group share the same number of outer electrons, giving them similar chemical properties. Periods represent the filling of electron shells. Key groups include Group 1 (alkali metals), Group 7 (halogens), Group 0 (noble gases), and the transition metals in the central block.

2.2 Bonding, Structure, and Properties

Chemical bonds form when atoms interact to achieve more stable electron arrangements. The three main types of bonding — ionic, covalent, and metallic — result in substances with very different properties.

- Ionic bonding: Transfer of electrons from a metal to a non-metal, forming oppositely charged ions held together by electrostatic attraction. Ionic compounds have high melting points, are brittle, and conduct electricity when dissolved in water or melted.
- Covalent bonding: Sharing of electron pairs between non-metal atoms. Simple covalent molecules (e.g. H_2O, CO_2) have low melting points. Giant covalent structures (e.g. diamond, graphite, silicon dioxide) have very high melting points.
- Metallic bonding: A lattice of positive metal ions surrounded by a 'sea' of delocalised electrons. This explains metals' conductivity, malleability, and high melting points.

Key Fact — Graphite and Diamond

Both are pure carbon, but with very different structures. Diamond has four covalent bonds per carbon atom (tetrahedral, very hard, no free electrons — does not conduct). Graphite has three bonds per carbon atom, with layers of hexagonal rings; the fourth electron is delocalised, making graphite a good electrical conductor.

2.3 Quantitative Chemistry

Quantitative chemistry involves calculations using moles. The mole is the unit for amount of substance; one mole of any substance contains 6.02×10^{23} particles (Avogadro's number). The molar mass of a compound is found by summing the relative atomic masses of all atoms in its formula.

Essential Equations

Number of moles = Mass (g) ÷ Molar mass (g/mol)Concentration (mol/dm^3) = Moles ÷ Volume (dm^3)Percentage yield = (Actual yield ÷ Theoretical yield) × 100Atom economy = (Molar mass of desired product ÷ Total molar mass of all products) × 100

Atom economy is an important concept in green chemistry — reactions with high atom economy produce less waste and are more sustainable. Percentage yield is always less than 100% in practice due to incomplete reactions, side reactions, or product lost during separation.

2.4 Chemical Changes

Chemical changes involve the formation of new substances through rearrangement of atoms. Key topics include the reactivity series of metals, acid-base reactions, electrolysis, and the extraction of metals.

The reactivity series ranks metals from most reactive (potassium) to least reactive (gold). More reactive metals displace less reactive metals from their compounds. Metals more reactive than carbon must be extracted by electrolysis (e.g. aluminium, sodium); less reactive metals can be extracted by reduction with carbon (e.g. iron in a blast furnace).

Acids and alkalis: Acids have pH below 7 and release H^+ ions in solution. Alkalis have pH above 7 and release OH^- ions. Neutralisation reactions produce a salt and water. Strong acids (e.g. HCl, H_2SO_4) fully ionise; weak acids (e.g. ethanoic acid) only partially ionise.

Electrolysis Key Points

Electrolysis uses electrical energy to decompose ionic compounds (when molten or in aqueous solution). At the cathode (negative electrode), cations (positive ions) gain electrons (reduction). At the anode (positive electrode), anions (negative ions) lose electrons (oxidation). OIL RIG: Oxidation Is Loss, Reduction Is Gain.

2.5 Energy Changes in Chemistry

Chemical reactions involve energy transfers. Exothermic reactions release energy to the surroundings (temperature increases, e.g. combustion, neutralisation, oxidation). Endothermic reactions absorb energy from the surroundings (temperature decreases, e.g. thermal decomposition, citric acid with sodium bicarbonate).

Bond energies: Energy is required to break bonds (endothermic) and released when bonds form (exothermic). The overall energy change of a reaction = Energy required to break bonds – Energy released forming bonds. If this value is negative, the reaction is exothermic overall.

2.6 Rate of Reaction and Equilibrium

The rate of reaction can be increased by raising the temperature, increasing concentration or pressure, reducing particle size (increasing surface area), or using a catalyst. Collision theory explains why: increasing temperature gives particles more kinetic energy, leading to more frequent and more energetic collisions that exceed the activation energy.

Reversible reactions reach dynamic equilibrium when the forward and reverse reaction rates are equal. Le Chatelier's Principle states that if conditions change, the equilibrium shifts to oppose that change. The Haber Process ($N_2 + 3H_2 \rightleftharpoons 2NH_3$) is the key industrial application, using a compromise of 450°C, 200 atm, and an iron catalyst.

2.7 Organic Chemistry

Organic chemistry studies carbon-containing compounds. The key homologous series at GCSE are alkanes (single bonds, C_nH_{2n+2}), alkenes (one double bond, C_nH_{2n}), and alcohols. Crude oil is a mixture of hydrocarbons separated by fractional distillation. Cracking breaks large hydrocarbons into smaller, more useful ones. Alkenes undergo addition polymerisation to form plastics such as polyethene, polypropene, and PVC.

2.8 The Earth's Atmosphere and Resources

The Earth's early atmosphere was largely carbon dioxide, nitrogen, and water vapour (released by volcanoes). Over billions of years, photosynthesis by early plants reduced CO_2 levels and increased oxygen. Today's atmosphere is approximately 78% nitrogen, 21% oxygen, and 1% other gases including CO_2 and argon.

Human activities — burning fossil fuels, deforestation, agriculture — are increasing greenhouse gas concentrations (CO_2, CH_4, water vapour), enhancing the greenhouse effect and driving climate change. The carbon footprint of products can be reduced through renewable energy, improved efficiency, and carbon capture. Sustainable use of resources (water treatment, recycling, life cycle assessments) is a growing area of chemistry with real-world importance.

PART THREE: PHYSICS

3.1 Forces

Forces are pushes or pulls that act on objects. They are measured in Newtons (N) and can be contact forces (friction, tension, normal contact force) or non-contact forces (gravity, electrostatic, magnetic). The resultant force is the single force that has the same effect as all forces acting on an object combined.

Key Equations — Forces

Force = Mass × Acceleration (F = ma, Newton's Second Law)Weight = Mass × Gravitational field strength (W = mg, g = 9.8 N/kg)Moment = Force × Perpendicular distance from pivot (M = Fd)Pressure = Force ÷ Area (P = F/A)

Newton's three laws: (1) An object remains at rest or moves at constant velocity unless acted on by a resultant force. (2) Resultant force = mass × acceleration (F = ma). (3) For every action there is an equal and opposite reaction. Stopping distance = thinking distance + braking distance; both are affected by speed, while thinking distance is also affected by reaction time and braking distance by road/tyre conditions.

Work, Power, and Momentum

Work done is the transfer of energy when a force moves an object through a distance in the direction of the force. Power is the rate of energy transfer. Momentum is the product of mass and velocity; in a closed system, total momentum is conserved (Newton's Third Law / law of conservation of momentum).

Key Equations — Work and Momentum

Work done = Force × Distance (W = Fd, in joules)Power = Energy transferred ÷ Time (P = E/t, in watts)Momentum = Mass × Velocity (p = mv, in kg m/s)Impulse = Force × Time = Change in momentum (Ft = Δmv)

3.2 Energy

Energy exists in many forms: kinetic, gravitational potential, elastic potential, chemical, thermal, nuclear, electromagnetic. The law of conservation of energy states that energy cannot be created or destroyed — only transferred between stores or dissipated. Efficiency measures how much useful energy is transferred compared to the total input.

Energy Store	Key Equation
Kinetic energy (KE)	KE = ½mv² (m in kg, v in m/s, KE in joules)
Gravitational PE (GPE)	GPE = mgh (m = mass, g = 9.8 N/kg, h = height in metres)
Elastic PE	E = ½ke² (k = spring constant in N/m, e = extension in m)

Efficiency	Efficiency = Useful output ÷ Total input (as a decimal or × 100 for %)

Energy resources include renewable sources (solar, wind, hydroelectric, tidal, geothermal, biomass) and non-renewable sources (coal, oil, natural gas, nuclear). The UK is transitioning towards greater use of renewables to reduce carbon emissions and combat climate change. Each energy resource has advantages and disadvantages in terms of reliability, cost, environmental impact, and land use.

3.3 Waves

Waves transfer energy without transferring matter. Transverse waves oscillate perpendicular to the direction of travel (e.g. light, water waves). Longitudinal waves oscillate parallel to the direction of travel (e.g. sound). Key properties: amplitude (maximum displacement), wavelength (distance between identical points), frequency (number of complete waves per second, in Hz), and wave speed.

Key Equation — Wave Speed

Wave speed = Frequency × Wavelength ($v = f\lambda$)Also: Wave speed = Distance ÷ Time ($v = d/t$)

The electromagnetic spectrum consists of transverse waves that travel through a vacuum at the speed of light (3×10^8 m/s). From longest to shortest wavelength: radio waves, microwaves, infrared, visible light, ultraviolet, X-rays, gamma rays. Each type has characteristic uses and hazards. Sound waves are longitudinal and cannot travel through a vacuum; ultrasound (above 20,000 Hz) is used in medical imaging and prenatal scanning.

3.4 Electricity

Electric current is the flow of charge. In metals, current is carried by free electrons. Current, voltage, and resistance are related by Ohm's Law: $V = IR$. Resistance (in ohms, Ω) opposes the flow of current; resistors, filament lamps, and diodes show different I-V characteristics.

Concept	Equation / Rule
Ohm's Law	$V = IR$ (V = voltage, I = current, R = resistance)
Power	$P = IV = I^2R = V^2/R$
Energy	$E = Pt = IVt$ (energy in joules, time in seconds)
Series circuits	Total resistance = $R_1 + R_2$; same current throughout; voltages add up
Parallel circuits	$1/R\_total = 1/R_1 + 1/R_2$; same voltage across each branch; currents add up

Mains electricity in the UK is AC (alternating current) at 230 V and 50 Hz. Direct current (DC) flows in one direction only (as in batteries). The national grid transmits electrical energy at high voltage and low current using transformers to reduce energy losses. Step-up transformers increase voltage for transmission; step-down transformers reduce it for safe household use.

Static Electricity
When two insulators are rubbed together, electrons are transferred from one to the other, creating a build-up of static charge. Like charges repel; unlike charges attract. Electrostatic effects can be useful (inkjet printers, paint sprayers) or hazardous (fuel tanker earthing).

3.5 Magnetism and Electromagnetism

Magnets produce a magnetic field — a region in which a magnetic material experiences a force. Magnetic field lines run from north to south pole outside the magnet. When a current flows through a wire, it produces a magnetic field around it (the motor effect). The strength of this field increases with current and with more coil turns — this is the basis of the electromagnet.

The motor effect: A current-carrying conductor in a magnetic field experiences a force. The direction of the force is given by Fleming's Left-Hand Rule (thumb = thrust/motion, index finger = field, middle finger = current). This principle powers electric motors. The generator effect (electromagnetic induction) occurs when a conductor moves through a magnetic field, inducing an EMF — the basis of generators and dynamos. Transformers use mutual induction between two coils to step voltage up or down.

3.6 The Particle Model of Matter

Matter exists in three states — solid, liquid, and gas — described by the particle model. Solids have closely packed particles in fixed positions; liquids have particles close but free to move; gases have widely spaced particles moving rapidly and randomly. Changes of state (melting, boiling, condensing, freezing, sublimation) involve energy changes without temperature change (latent heat).

Key Equations — Thermal Physics
Specific heat capacity: $Q = mc\Delta T$ (Q = energy in J, m = mass in kg, c = SHC in J/kg°C, ΔT = temperature change)Latent heat: $Q = mL$ (L = specific latent heat in J/kg)Pressure × Volume = constant (Boyle's Law, at constant temperature): $P_1V_1 = P_2V_2$

3.7 Atomic Structure and Radioactivity

The atom was once thought to be a solid sphere (Dalton's model), then a 'plum pudding' model (Thomson), before Rutherford's gold foil experiment demonstrated the existence of a concentrated positive nucleus. Bohr later refined the model to include electrons in discrete energy levels.

Radioactive decay occurs when unstable nuclei release radiation. There are three main types: alpha (α) particles (helium nuclei, low penetration, stopped by paper), beta (β) particles (fast electrons, stopped by aluminium), and gamma (γ) rays (electromagnetic radiation, reduced by lead/concrete). Radioactive decay is random and spontaneous; the half-life is the time for half the nuclei in a sample to decay. Nuclear fission (splitting heavy nuclei) and nuclear fusion (combining light nuclei) both release enormous amounts of energy.

Radiation Type	Nature / Penetration / Ionisation
Alpha (α)	2 protons + 2 neutrons; stopped by paper; highly ionising
Beta (β)	Fast electron; stopped by 5mm aluminium; moderately ionising
Gamma (γ)	Electromagnetic wave; reduced by thick lead/concrete; weakly ionising
Neutron	Fast neutrons; stopped by concrete/water; induces radioactivity

3.8 Space Physics

The Universe began approximately 13.8 billion years ago with the Big Bang — supported by evidence from cosmic microwave background radiation and the red-shift of galaxies. Red-shift occurs because galaxies are moving away from us; the further a galaxy, the greater its red-shift (Hubble's Law), indicating the Universe is expanding.

Our Solar System formed about 4.6 billion years ago from a cloud of gas and dust (nebula). The Sun is a main sequence star that fuses hydrogen into helium in its core. Stars more massive than the Sun may eventually become red supergiants, then supernova, then either neutron stars or black holes. Life cycle stages depend on the mass of the star and the balance between gravitational collapse and radiation pressure.

PART FOUR: EXAM SKILLS AND REVISION STRATEGIES

4.1 Required Practicals

Both AQA and Edexcel specifications include required practicals that are assessed in written examinations. You will not simply be asked to repeat the method — you will be asked to evaluate results, suggest improvements, identify sources of error, and draw conclusions. Key practical skills assessed include:

- Identifying independent, dependent, and control variables
- Understanding accuracy, precision, repeatability, and reproducibility
- Drawing and interpreting graphs (including the line of best fit and anomalous results)
- Calculating gradients from tangents and from straight-line graphs
- Evaluating methods and suggesting improvements to reduce uncertainty

Subject	Example Required Practicals
Biology	Osmosis in potato chips; enzyme activity; microscopy; field investigations
Chemistry	Titration; electrolysis; rates of reaction; preparation of salts; chromatography
Physics	Specific heat capacity; resistance of wires; waves on a string; refraction; radioactivity

4.2 Mathematical Skills in Science

At least 10% of marks in GCSE Combined Science (Higher Tier) involve mathematical calculations. The following skills are regularly assessed:

- Rearranging equations (e.g. from $v = f\lambda$, find $f = v/\lambda$)
- Standard form and orders of magnitude (e.g. 3×10^8 m/s)
- Significant figures and decimal places
- Calculating percentages, percentage change, and ratios
- Plotting and interpreting graphs, including calculating gradients
- Using and converting units (cm to m, g to kg, cm^3 to dm^3)

Golden Rule for Calculation Questions

Always show your working clearly. If you make an arithmetic error but have set up the method correctly, you may still receive method marks. State the equation, substitute the values with units, calculate, and give your answer with the correct unit.

4.3 Six-Mark Extended Writing Questions

Extended writing questions (typically worth 4 or 6 marks) require you to provide a detailed, well-structured scientific explanation. To achieve full marks, your answer should: use correct and precise scientific terminology, include a logical sequence of reasoning, link cause to effect clearly, and address all aspects of the question.

When answering a 'describe and explain' question, remember: describe what is happening, then explain why it happens using scientific reasoning. For 'evaluate' questions, you must present both advantages and disadvantages, or arguments for and against, before reaching a supported conclusion.

4.4 Revision Timetable and Strategies

Effective revision requires active engagement rather than passive re-reading. Eclassopedia recommends the following evidence-based strategies:

- Spaced repetition: Revisit material at increasing intervals to move it into long-term memory.
- Active recall: Test yourself without looking at notes — use flashcards, past paper questions, or write key points from memory.
- Interleaving: Mix topics rather than blocking one subject for days at a time — this improves retrieval and identifies gaps in knowledge.
- Elaborative interrogation: Ask 'why?' and 'how?' as you revise — connect new information to what you already know.
- Practice papers: Complete at least three full mock exams under timed conditions for each paper.

4.5 Approaching the Examination

On the day of each paper, take the following approach to maximise your marks:

- Read each question carefully — underline the command word (describe, explain, calculate, evaluate, compare) before writing.
- For calculations: write the equation, substitute with correct values and units, perform the calculation, write the answer with units.
- For short-answer questions: aim for precision and brevity — do not pad your answer with irrelevant information.
- For extended writing: plan your answer before writing, using a brief bullet-point outline.
- Check mark allocations: a 4-mark question requires at least 4 distinct, creditable points.
- Do not leave blank spaces — attempt every question and make educated guesses if uncertain.

Eclassopedia Top Tip

The best predictor of exam success is practice under exam conditions. Once you have completed your content revision, prioritise past papers. Marking your own answers against mark schemes builds an instinct for what examiners are looking for — and that instinct is worth marks.

PART FIVE: KEY TERMS GLOSSARY

Use this glossary to check your understanding of essential scientific vocabulary. Knowing and using precise terminology is rewarded in examination answers.

Biology Key Terms

Term	Definition
Allele	A version of a gene; individuals have two alleles for each gene (one from each parent)
Anaerobic	Respiration without oxygen; produces lactic acid in animals, ethanol in plants and yeast
Antibody	Protein produced by lymphocytes that binds to specific antigens on pathogens
Eukaryote	An organism whose cells have a true membrane-bound nucleus (e.g. animals, plants, fungi)
Homeostasis	Regulation of internal body conditions to maintain a stable environment for cells
Meiosis	Cell division that produces 4 genetically unique haploid gametes (sex cells)
Mitosis	Cell division producing 2 genetically identical diploid daughter cells for growth and repair
Osmosis	Diffusion of water molecules across a partially permeable membrane down a water potential gradient
Photosynthesis	Process by which plants use light energy to convert CO_2 and water into glucose and oxygen
Prokaryote	An organism without a membrane-bound nucleus (e.g. bacteria)

Chemistry Key Terms

Term	Definition
Atom economy	Percentage of reactant mass converted into desired product; measure of efficiency
Covalent bond	A chemical bond formed by the sharing of electron pairs between non-metal atoms
Electrolysis	Decomposition of an ionic compound using electrical energy
Exothermic	A reaction that releases energy to the surroundings (temperature of surroundings increases)
Half equation	An equation showing the gain or loss of electrons at an electrode during electrolysis

Isotope	Atoms of the same element with the same proton number but different neutron numbers
Mole	The unit of amount of substance; 1 mole = 6.02×10^{23} particles
Oxidation	The loss of electrons (or gain of oxygen); remembered by OIL RIG
Polymer	A large molecule made from many repeated smaller units (monomers) joined together
Reduction	The gain of electrons (or loss of oxygen); remembered by OIL RIG

Physics Key Terms

Term	Definition
Acceleration	Rate of change of velocity; measured in m/s^2. Can be positive (speeding up) or negative (decelerating)
Alpha decay	Emission of an alpha particle (2 protons + 2 neutrons) from an unstable nucleus
Conservation of energy	Energy cannot be created or destroyed; it can only be transferred between stores
Electromagnetic induction	The process by which a changing magnetic field induces an EMF in a conductor
Half-life	The time taken for half the radioactive nuclei in a sample to decay
Momentum	The product of mass and velocity ($p = mv$); conserved in closed systems
Ohm's Law	The relationship $V = IR$, where V is voltage, I is current, and R is resistance
Red-shift	The increase in wavelength of light from galaxies moving away from us; evidence for the expanding Universe
Specific heat capacity	The energy needed to raise the temperature of 1 kg of a substance by 1°C (J/kg°C)
Transverse wave	A wave in which particles oscillate perpendicular to the direction of wave travel

A Final Word from Eclassopedia

Congratulations on taking a proactive approach to your GCSE Combined Science preparation. The science you are studying is not just a collection of facts to be memorised — it is a set of ideas and skills that help us understand the natural world, develop medicines, create new technologies, and address global challenges such as climate change.

Whether you are aiming for a Grade 5-5 or pushing for a 9-9, the same principles apply: understand the concepts deeply, practise applying them to unfamiliar contexts, and develop confidence through consistent, active revision.

Eclassopedia offers a full range of supporting resources for GCSE Combined Science 2026, including:

- Topic-specific video lessons with worked examples
- Timed practice question sets with detailed mark schemes
- Required practical guides with annotated diagrams
- Mock examination papers for AQA, Edexcel, and OCR
- Live online tutoring from experienced science teachers
- Personalised revision plans and progress tracking

Visit us at www.eclassopedia.com to access your full learning portal. Good luck with your examinations — we believe in you!