



Year 9, 10 and 11: Topics Covered

1. Biology (B1 – B7)

2. Chemistry (C1 – C10)

3. Physics (P1 - P8)

Key Stage 4 Overview

The GCSE Science course is taught using the AQA GCSE specification. The content covered is detailed below and incorporates Separate Science (Biology/Chemistry/Physics only) and Combined Science, of which there are two tiers, higher and foundation. Higher content is denoted by (HT only).

The GCSE course is taught over 3 years. In Year 9, pupils study B1, B2, C1, C2, P1 and P2 on a rotation basis. In Year 10, pupils cover B3-B6, C3-5, C9, P3-5 and part of P6. In Year 11, pupils cover B7, C8-8, C10, part of P6 and P7 and, in the lead up to both their mock exams and the summer GCSEs will review and revise all content covered over the full GCSE course.

REQUIRED PRACTICALS

Each subject has required practicals that pupils must undertake during the GCSE course. The content can form part of the exams.

1. For details of the required practicals in GCSE Biology see [here](#).
2. For details of the required practicals in GCSE Chemistry see [here](#).
3. For details of the required practicals in GCSE Physics see [here](#).
4. For details of the required practicals in GCSE Combined Science (Trilogy) see [here](#).

For full details of the content for each section please see the individual specifications listed below:

1. GCSE Biology [here](#).
2. GCSE Chemistry [here](#).
3. GCSE Physics [here](#).
4. GCSE Combined (Trilogy) [here](#).

Throughout the GCSE course, pupils will be assigned homework activities that allow them to review and consolidate their understanding of the content. At the end of every unit pupils will take an assessment compiled using Testbase, an online resource containing banks of AQA past exam questions. This gives them the opportunity to experience the style of questions that they will see in the GCSE exams at the end of the course.



BIOLOGY

| Unit Topic | What is covered? |
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| B1 Cell Biology | <ol style="list-style-type: none"> 1. B1.1 Eukaryotes vs Prokaryotes 2. B1.2 Animal vs plant cells 3. B1.3 Cell Specialisation 4. B1.4 Cell Differentiation 5. B1.5 Microscopy 6. B1.6 Culturing Microorganisms (Biology only) 7. B1.2.1 Chromosomes 8. B1.2.2 Cell Cycle and Mitosis 9. B1.2.3 Stem Cells 10. B1.3.1 Diffusion 11. B1.3.2 Osmosis 12. B1.3.3 Active Transport |
| B2 Organisation | <ol style="list-style-type: none"> 1. B2.1 Principles of Organisation 2. B2.1 Human Digestive System 3. B2.2 The heart 4. B2.2 Blood vessels 5. B2.3 Blood 6. B2.4 Coronary Heart Disease 7. B2.5 Health issues 8. B2.6 Effect of lifestyle on non-communicable diseases 9. B2.7 Cancer 10. B2.3.1 Plant Tissues 11. B2.3.2 Plant Organ Systems |
| B3 Communicable Disease | <ol style="list-style-type: none"> 1. B3.1 Infectious Diseases 2. B3.2 Viral Diseases 3. B3.3 Bacterial Diseases 4. B3.4 Fungal Diseases 5. B3.5 Protist Diseases 6. B3.6 Human Defence System 7. B3.7 Vaccinations 8. B3.8 Antibiotics and Painkillers |



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| | <ul style="list-style-type: none"> 9. B3.9 Discovery and development of drugs 10. B3.2.1 Producing monoclonal antibodies (Biology only) 11. B3.2.2 Use of monoclonal antibodies (Biology only) 12. B3.3.1 Detection and identification of plant diseases (Biology only) 13. B3.3.2 Plant defence responses (Biology only) |
| <p>B4 Bioenergetics</p> | <ul style="list-style-type: none"> 1. B4.1/4.2 Photosynthetic Reaction / Rate of reaction 2. B4.3 Uses of glucose in photosynthesis 3. B4.4 Aerobic Respiration 4. B4.4 Anaerobic Respiration 5. B4.5 Impact of exercise on respiration 6. B4.6 Metabolism |
| <p>B5 Homeostasis and Response</p> | <ul style="list-style-type: none"> 1. B5.1 Homeostasis 2. B5.2.1 The Human nervous system 3. B5.2.2 The brain (Biology only) 4. B5.2.3 The eye (Biology only) 5. B5.2.4 Control of body temperature (Biology only) 6. B5.3.1 Human endocrine system 7. B5.3.2 Control of blood glucose concentration 8. B5.3.3 Maintaining water and nitrogen balance in the body (Biology only) 9. B5.3.4 Hormones in human reproduction 10. B5.3.5 Contraception 11. B5.3.6 The use of hormones to treat infertility (HT only) 12. B5.3.7 Negative feedback (HT only) 13. B5.4.1 Control and coordination 14. B5.4.2 Use of plant hormones (HT only) |
| <p>B6 Inheritance, Variation and Evolution</p> | <ul style="list-style-type: none"> 1. B6.1.1 Sexual and asexual reproduction 2. B6.1.2 Meiosis 3. B6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only) 4. B6.1.4 DNA and the genome 5. B6.1.5 DNA structure (Biology only) 6. B6.1.6 Genetic inheritance 7. B6.1.7 Inherited disorders 8. B6.1.8 Sex determination 9. B6.2.1 Variation |



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| | <ul style="list-style-type: none">10. B6.2.2 Evolution11. B6.2.3 Selective breeding12. B6.2.4 Genetic engineering13. B6.2.5 Cloning (Biology only)14. B6.3.1 Theory of evolution (Biology only)15. B6.3.2 Speciation (Biology only)16. B6.3.3 The understanding of genetics (Biology only)17. B6.3.4 Evidence for evolution18. B6.3.5 Fossils19. B6.3.6 Extinction20. B6.3.7 Resistant bacteria15. B6.4 Classification of living organisms |
| B7 Ecology | <ul style="list-style-type: none">1. B7.1.1 Communities2. B7.1.2 Abiotic factors3. B7.1.3 Biotic factors4. B7.1.4 Adaptations5. B7.2.1 Levels of organisation6. B7.2.2 How materials are cycled7. B7.2.3 Decomposition (Biology only)8. B7.2.4 Impact of environmental change (Biology only) (HT only)9. B7.3.1 Biodiversity10. B7.3.2 Waste management11. B7.3.3 Land use12. B7.3.4 Deforestation13. B7.3.5 Global warming14. B7.3.6 Maintaining biodiversity15. B7.4.1 Trophic levels16. B7.4.2 Pyramids of biomass17. B7.4.3 Transfer of biomass18. B7.5.1 Factors affecting food security19. B7.5.2 Farming techniques20. B7.5.3 Sustainable fisheries21. B7.5.4 Role of biotechnology |



CHEMISTRY

Topic

What is covered?

C1 ATOMIC STRUCTURE AND THE PERIODIC TABLE

1. C1.1.1 Atoms, elements and compounds
2. C1.1.2 Mixtures
3. C1.1.3 The development of the model of the atom (common content with Physics)
4. C1.1.4 Relative electrical charges of subatomic particles
5. C1.1.5 Size and mass of atoms
6. C1.1.6 Relative atomic mass
7. C1.1.7 Electronic structure
8. C1.2.1 The periodic table
9. C1.2.2 Development of the periodic table
10. C1.2.3 Metals and non-metals
11. C1.2.4 Group 0
12. C1.2.5 Group I
13. C1.2.6 Group 7
14. C1.3.1 Comparison with Group I elements
1. C1.3.2 Typical properties

C2 BONDING, STRUCTURE, AND THE PROPERTIES OF MATTER

2. C2.1.1 Chemical bonds
3. C2.1.2 Ionic bonding
4. C2.1.3 Ionic compounds
5. C2.1.4 Covalent bonding
6. C2.1.5 Metallic bonding
7. C2.2.1 The three states of matter
8. C2.2.2 State symbols
9. C2.2.3 Properties of ionic compounds
10. C2.2.4 Properties of small molecules
11. C2.2.5 Polymers
12. C2.2.6 Giant covalent structures
13. C2.2.7 Properties of metals and alloys



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| | <ul style="list-style-type: none">14. C2.2.8 Metals as conductors15. C2.3.1 Diamond16. C.2.3.2 Graphite17. C2.3.3 Graphene and fullerenes18. C2.4.1 Sizes of particles and their properties19. C2.4.2 Uses of nanoparticles |
| C3 QUANTITATIVE CHEMISTRY | <ul style="list-style-type: none">1. C3.1.1 Conservation of mass and balanced chemical equations2. C3.1.2 Relative formula mass3. C3.1.3 Mass changes when a reactant or product is a gas4. C3.1.4 Chemical measurements5. C3.2.1 Moles (HT only)6. C3.2.2 Amounts of substances in equations (HT only)7. C3.2.3 Using moles to balance equations (HT only)8. C3.2.4 Limiting reactants (HT only)9. C3.2.5 Concentration of solutions10. C3.3.1 Percentage yield (Chemistry only)11. C3.3.2 Atom economy (Chemistry only)12. C4.3.4 Using concentrations of solutions in mol/dm³ (Chemistry only) (HT only)13. C4.3.5 Use of amount of substance in relation to volumes of gases (Chemistry only) (HT only) |
| C4 CHEMICAL CHANGES | <ul style="list-style-type: none">1. C4.1.1 Metal oxides2. C4.1.2 The reactivity series3. C4.1.3 Extraction of metals and reduction4. C4.1.4 Oxidation and reduction in terms of electrons (HT only)5. C4.2.1 Reactions of acids with metals6. C4.2.2 Neutralisation of acids and salt production7. C4.2.3 Soluble salts8. C4.2.4 The pH scale and neutralisation9. C4.2.5 Titrations (Chemistry only)10. C4.2.6 Strong and weak acids (HT only)11. C4.3.1 The process of electrolysis12. C4.3.2 Electrolysis of molten ionic compounds13. C4.3.3 Using electrolysis to extract metals14. C4.3.4 Electrolysis of aqueous solutions15. C4.3.5 Representation of reactions at electrodes as half equations (HT only) |



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| C5 ENERGY CHANGES | <ol style="list-style-type: none">1. C5.1.1 Energy transfer during exothermic and endothermic reactions2. C5.1.2 Reaction profiles3. C5.1.3 The energy change of reactions (HT only)4. C5.2.1 Cells and batteries5. C5.2.2 Fuel cells |
| C6 THE RATE AND EXTENT OF CHEMICAL CHANGE | <ol style="list-style-type: none">1. C6.1.1 Calculating rates of reactions2. C6.1.2 Factors which affect the rates of chemical reactions3. C6.1.3 Collision theory and activation energy4. C6.1.4 Catalysts5. C6.2.1 Reversible reactions6. C4.2.2 Energy changes and reversible reactions7. C6.2.3 Equilibrium8. C6.2.4 The effect of changing conditions on equilibrium (HT only)9. C6.2.5 The effect of changing concentration (HT only)10. C6.2.6 The effect of temperature changes on equilibrium (HT only)11. C6.2.7 The effect of pressure changes on equilibrium (HT only) |
| C7 ORGANIC CHEMISTRY | <ol style="list-style-type: none">1. C7.1.1 Crude oil, hydrocarbons and alkanes2. C7.1.2 Fractional distillation and petrochemicals3. C7.1.3 Properties of hydrocarbons4. C7.1.4 Cracking and alkenes5. C7.2.1 Structure and formulae of alkenes (Chemistry only)6. C7.2.3 Alcohols (Chemistry only)7. C7.2.4 Carboxylic acids (Chemistry only)8. C7.3.1 Addition polymerisation (Chemistry only)9. C7.3.2 Condensation polymerisation (HT only) (Chemistry only)10. C7.3.3 Amino acids (HT only) (Chemistry only) |
| C8 CHEMICAL ANALYSIS | <ol style="list-style-type: none">1. C8.1.1 Pure substances2. C8.1.2 Formulations3. C8.1.3 Chromatography4. C8.2.1 Test for hydrogen5. C8.2.2 Test for oxygen6. C8.2.3 Test for carbon dioxide7. C8.2.4 Test for chlorine |



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| | <ol style="list-style-type: none"> 8. C8.3.1 Flame tests (Chemistry only) 9. C8.3.2 Metal hydroxides (Chemistry only) 10. C8.3.3 Carbonates (Chemistry only) 11. C8.3.4 Halides (Chemistry only) 12. C8.3.5 Sulfates (Chemistry only) 13. C8.3.6 Instrumental methods (Chemistry only) 14. C8.3.7 Flame emission spectroscopy (Chemistry only) |
| <p>C9 CHEMISTRY OF THE ATMOSPHERE</p> | <ol style="list-style-type: none"> 1. C9.1.1 The proportions of different gases in the atmosphere 2. C9.1.2 The Earth's early atmosphere 3. C9.1.3 How oxygen increased 4. C9.1.4 How carbon dioxide decreased 5. C9.2.1 Greenhouse gases 6. C9.2.2 Human activities which contribute to an increase in greenhouse gases in the Atmosphere 7. C9.2.3 Global climate change 8. C9.2.4 The carbon footprint and its reduction 9. C9.3.1 Atmospheric pollutants from fuels 10. C9.3.2 Properties and effects of atmospheric pollutants |
| <p>C10 USING RESOURCES</p> | <ol style="list-style-type: none"> 1. C10.1.1 Using the Earth's resources and sustainable development 2. C10.1.2 Potable water 3. C10.1.3 Waste water treatment 4. C10.1.4 Alternative methods of extracting metals (HT only) 5. C10.2.1 Life cycle assessment 6. C10.2.2 Ways of reducing the use of resources 7. C10.3.1 Corrosion and its prevention (Chemistry only) 8. C10.3.2 Alloys as useful materials (Chemistry only) 9. C10.3.3 Ceramics, polymers and composites (Chemistry only) 10. C10.4.1 The Haber process (Chemistry only) 11. C10.4.2 Production and uses of NPK fertilisers (Chemistry only) |



| PHYSICS | |
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| Topic | What is covered? |
| P1 ENERGY | <ol style="list-style-type: none"> 1. P1.1.1 Energy stores and systems 2. P1.1.2 Changes in energy 3. P1.1.3 Energy changes in systems 4. P1.1.4 Power 5. P1.2.1 Energy transfers in a system 6. P1.2.2 Efficiency 7. P1.3 National and global energy resources |
| P2 ELECTRICITY | <ol style="list-style-type: none"> 1. P2.1.1 Standard circuit diagram symbols 2. P2.1.2 Electrical charge and current 3. P2.1.3 Current, resistance and potential difference 4. P2.1.4 Resistors 5. P2.2 Series and parallel circuits 6. P2.3.1 Direct and alternating potential difference 7. P2.3.2 Mains electricity 8. P2.4.1 Power 9. P2.4.2 Energy transfers in everyday appliances 10. P2.4.3 The National Grid 11. P2.5.1 Static charge (Physics only) 12. P2.5.2 Electric fields (Physics only) |
| P3 PARTICLE MODEL OF MATTER | <ol style="list-style-type: none"> 1. P3.1.1 Density of materials 2. P3.1.2 Changes of state 3. P3.2.1 Internal energy 4. P3.2.2 Temperature changes in a system and specific heat capacity 5. P3.2.3 Changes of state and specific latent heat 6. P3.3.1 Particle motion in gases 7. P3.3.2 Pressure in gases (Physics only) 8. P3.3.3 Increasing the pressure of a gas (Physics only) (HT only) |
| P4 ATOMIC STRUCTURE | <ol style="list-style-type: none"> 1. P4.1.1 The structure of an atom 2. P4.1.2 Mass number, atomic number and isotopes 3. P4.1.3 The development of the model of the atom (common content with Chemistry) 4. P4.2.1 Radioactive decay and nuclear radiation |



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| | <ol style="list-style-type: none">5. P4.2.2 Nuclear equations6. P4.2.3 Half-lives and the random nature of radioactive decay7. P4.2.4 Radioactive contamination8. P4.3 Hazards and uses of radioactive emissions and of background radiation (Physics only)9. P4.3.1 Background radiation10. P4.3.2 Different half-lives of radioactive isotopes11. P4.3.3 Uses of nuclear radiation12. P4.4.1 Nuclear fission (Physics only)13. P4.4.2 Nuclear fusion (Physics only) |
| P5 FORCES | <ol style="list-style-type: none">1. P5.1.1 Scalar and vector quantities2. P5.1.2 Contact and non-contact forces3. P5.1.3 Gravity4. P5.1.4 Resultant forces5. P5.2 Work done and energy transfer6. P5.3 Forces and elasticity7. P5.4 Moments, levers and gears (Physics only)8. P5.5.1.1 Pressure in a fluid 1 (Physics only)9. P5.5.1.2 Pressure in a fluid 2 (Physics only) (HT only)10. P5.5.2 Atmospheric pressure11. P5.6.1.1 Distance and displacement12. P5.6.1.2 Speed13. P5.6.1.3 Velocity14. P5.6.1.4 The distance–time relationship15. P5.6.1.5 Acceleration16. P5.6.2.1 Newton's First Law17. P5.6.2.2 Newton's Second Law18. P5.6.2.3 Newton's Third Law19. P5.6.3.1 Stopping distance20. P5.6.3.2 Reaction time21. P5.6.3.3 Factors affecting braking distance 122. P5.6.3.4 Factors affecting braking distance 223. P5.7.1 Momentum is a property of moving objects (HT only)24. P5.7.2 Conservation of momentum (HT only)25. P5.7.3 Changes in momentum (Physics only) (HT only) |



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| P6 WAVES | <ol style="list-style-type: none">1. P6.1.1 Transverse and longitudinal waves2. P6.1.2 Properties of waves3. P6.1.3 Reflection of waves (Physics only)4. P6.1.4 Sound waves (Physics only) (HT only)5. P6.1.5 Waves for detection and exploration (Physics only) (HT only)6. P6.2.1 Types of electromagnetic waves7. P6.2.2 Properties of electromagnetic waves 18. P6.2.3 Properties of electromagnetic waves 29. P6.2.4 Uses and applications of electromagnetic waves10. P6.2.5 Lenses (Physics only)11. P6.2.6 Visible light (Physics only)12. P6.3.1 Emission and absorption of infrared radiation (Physics only)13. P6.3.2 Perfect black bodies and radiation (Physics only) |
| P7 MAGNETISM AND ELECTROMAGNETISM | <ol style="list-style-type: none">1. P7.1.1 Poles of a magnet2. 4.7.1.2 Magnetic fields3. 4.7.2.1 Electromagnetism4. 4.7.2.2 Fleming's left-hand rule (HT only)5. 4.7.2.3 Electric motors (HT only)6. 4.7.2.4 Loudspeakers (Physics only) (HT only)7. 4.7.3.1 Induced potential (Physics only) (HT only)8. 4.7.3.2 Uses of the generator effect (Physics only) (HT only)9. 4.7.3.3 Microphones (Physics only) (HT only)10. 4.7.3.4 Transformers (Physics only) (HT only) |
| P8 SPACE PHYSICS (PHYSICS ONLY) | <ol style="list-style-type: none">1. 4.8.1.1 Our solar system2. 4.8.1.2 The life cycle of a star3. 4.8.1.3 Orbital motion, natural and artificial satellites4. 4.8.2 Red-shift (Physics only) |