

## GCSE Sciences 2006: AQA

### Specifications offered:

GCSE Science (A & B)

GCSE Additional Science  
GCSE Additional Applied Science

GCSE Biology  
GCSE Chemistry  
GCSE Physics

GCSE Applied Science (Double Award)

Entry Level Certificate

### Rationale:

The **GCSE Science** specifications (A & B) cover all aspects of a science education: evaluating evidence and the implications of science for society; explaining, theorising and modelling in science; and procedural and technical knowledge of science practice, though with some emphasis on the first aspect. **GCSE Additional Science** has a greater emphasis on explaining, theorising and modelling in science whereas **GCSE Additional Applied Science** emphasises the procedural and technical knowledge of science practice. The **GCSE Biology, GCSE Chemistry and GCSE Physics** awards provide extension material and, taken together, include the whole KS4 Programme of study. **GCSE Applied Science (Double Award)** would be appropriate for students wanting to specialise in a vocational approach to science from the beginning of KS4. Also offered is an **ELC Science** award for students not yet ready to take GCSE.

The GCSE Criteria for Science require greater emphasis on 'how science works'. The procedural content in the AQA specifications draws on the work done at the University of Durham on 'Concepts of Evidence' and includes: fundamental ideas about 'how science works'; observing objects, organisms and events; making measurements; designing investigations; presenting data; identifying patterns and relationships in data; societal aspects of scientific evidence.

### **Overview of Content and Assessment Models**

| Specification       | Content  | Assessment Model  |
|---------------------|--|---|
| <b>GCSE Science</b> | <p><b>B1a</b><br/>Response, keeping healthy, drug use and misuse, diseases and defence systems.</p> <p><b>B1b</b><br/>Habitats, variation, selective breeding, evolution, extinction, human impact on the environment.</p> <p><b>C1a</b><br/>Rocks and building materials, rocks and metals, fuels from crude oil.</p> <p><b>C1b</b><br/>Polymers and ethanol from crude oil, using plant oils, changes in the Earth and its atmosphere.</p> <p><b>P1a</b><br/>Heat transfer and the factors affecting the rate, efficient use of energy, useful electrical devices.</p> <p><b>P1b</b><br/>Generating electricity, uses and hazards of the electromagnetic spectrum, uses and dangers from radioactive substances.</p> | <p><b><u>GCSE Science (Specification A)</u></b><br/>This specification is intended to provide the best match to the existing AQA GCSE Modular Science specs. 'Bitesize' tests will be available in Nov, Mar and Jun.</p> <p>Each section (B1a, B1b, C1a, C1b, P1a, P1b) is assessed by an 'objective test'. Each test comprises matching and multiple choice questions and takes 30mins. Each test is worth 36 marks (12.5%).</p> <p><b><u>GCSE Science (Specification B)</u></b><br/>This specification has 45min written papers with structured questions, one paper for each of Biology 1 (B1a + B1b), Chemistry 1 (C1a + C1b) and Physics 1 (P1a + P1b). Each paper is worth 45 marks (25%). Papers available in Jan &amp; Jun.</p> <p><b><u>Centre-Assessed Unit – 25% (common to A + B)</u></b></p> <p><b><u>ISA</u></b> (Investigative Skills Assessment – 34 marks)<br/>Activity provide by AQA. Candidates collect own data in a practical lesson. They then do a 45min written test (exam conditions 'in a normal lesson').<br/>Section A = Qs based on candidates' own data (20mks)<br/>Section B = Qs based on 2<sup>o</sup> data from AQA (14mks)</p> <p><b><u>PSA</u></b> (Practical Skills Assessment – 6 marks)<br/>Teacher assessment of candidates' implementation of practical work on a scale of 0-6.</p> |

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| Specification                  | Content   | Assessment Model  |
|--------------------------------|---|---|
| <b>GCSE Additional Science</b> | <p><b>Biology 2</b><br/>Cells (plant &amp; animal); photosynthesis; food chains, energy and biomass; waste, decay and recycling; enzymes; respiration; homeostasis; inheritance, reproduction (meiosis &amp; mitosis); inherited diseases.</p> <p><b>Chemistry 2</b><br/>The atom; electron structures; ionic, metallic and covalent bonding; Gp1 &amp; Gp 7; structure &amp; properties; nanoscience; how much?; reversible reactions &amp; equilibria (Haber); rates of reaction; concentration; gas volumes; energy changes; ions in solution; electrolysis; acids, alkalis and salts.</p> <p><b>Physics 2</b><br/>Speed, velocity, acceleration; forces &amp; motion; road safety; KE, work, momentum; static electricity, electric current and circuits (series &amp; parallel); circuit components; mains electricity &amp; safety; electrical appliances; radioactivity, nuclear fission &amp; fusion.</p>   | <p>This specification has 45 min written papers with structured questions, one paper for each of <b>Biology 2</b>, <b>Chemistry 2</b> and <b>Physics 2</b>.</p> <p>Each paper is worth 45 marks (25%). Papers available in Jan &amp; Jun.</p> <p><b>Centre-Assessed Unit – 25%</b><br/>(same model as for GCSE Science)</p> <p><b>ISA</b> (Investigative Skills Assessment – 34 marks)<br/>Activity provide by AQA. Candidates collect own data in a practical lesson. They then do a 45min written test (exam conditions ‘in a normal lesson’).<br/>Section A = Qs based on candidates’ own data (20mks)<br/>Section B = Qs based on 2<sup>o</sup> data from AQA (14mks)</p> <p><b>PSA</b> (Practical Skills Assessment – 6 marks)<br/>Teacher assessment of candidates’ implementation of practical work on a scale of 0-6.</p> |
| <b>GCSE Additional Applied</b> | <p><b>Unit 1 Science in the Workplace</b><br/>Students investigate and report on:<br/>(i) workplaces that use scientific skills, describing the work of scientists or those that use scientific skills and how science is important in a wide variety of jobs.<br/><br/>(ii) working safely in a scientific workplace and a comparison with the health &amp; safety precautions in their school or college.</p> <p><b>Unit 2 Science at Work</b><br/>Students learn about some of the science used in three specific areas in which scientists work:</p> <ul style="list-style-type: none"> <li>the work of food scientists and how they contribute to a healthy diet</li> <li>how scientists use forensic science techniques to help solve crime</li> <li>how science helps in the understanding of appropriate diet and fitness needed in sport and contributes to the design of sports equipment and sports clothing.</li> </ul> <p><b>Unit 3 Using Scientific Skills</b><br/>Students use a range of practical skills and the knowledge gained in Unit 2 to carry out 3 investigations and report and explain their findings.</p> | <p><b>Unit 1 Science in the Workplace</b><br/>Centre-assessed using the Assessment Evidence Grid. Portfolio should include two reports. Portfolio is worth max 25 marks (20%).</p> <p><b>Unit 2 Science at Work</b><br/>Externally marked, written paper lasting 1 hour comprising compulsory, short answer questions.<br/>Max 60 marks (40%)</p> <p><b>Unit 3 Using Scientific Skills</b><br/>Centre-assessed using the Assessment Evidence Grid. Portfolio should include 3 investigation reports. Each investigation is marked out of 40 (40%). The final mark awarded is the average.</p>   |

Continued .....

| Specification  | Content  | Assessment Model   |
|--|--|--|
| <p><b>GCSE Biology</b></p> <p><b>GCSE Chemistry</b></p> <p><b>GCSE Physics</b></p> | <p>Biology 1 &amp; Biology 2<br/><b>Biology 3</b><br/>Diffusion; osmosis; gas exchange; cell membranes; transpiration; transport – blood; exercise and its effects on the body; aerobic and anaerobic respiration; the kidney; using microorganisms.</p> <p>Chemistry 1 &amp; Chemistry 2<br/><b>Chemistry 3</b><br/>Development of the Periodic Table and patterns in the Periodic Table; strong &amp; weak acids and alkalis; what’s in the water we drink; energy in chemical reactions; identifying and analysing substances.</p> <p>Physics 1 &amp; Physics 2<br/><b>Physics 3</b><br/>Forces &amp; turning, moving in a circle, centripetal forces; mirrors, lenses and light; sound and ultrasound; using electricity to make things move, generators, transformers; life history of stars.</p>   | <p><b>Each GCSE</b> has 4 units of assessment:</p> <p>Biology 1    Chemistry 1    Physics 1<br/>Biology 2    Chemistry 2    Physics 2<br/>Biology 3    Chemistry 3    Physics 3</p> <p>i.e. 9 written papers if all 3 sciences studied. Each paper is 45mins, is worth 45 marks (25%) &amp; comprises compulsory short answer Qs assessing subject content (~ 36 marks) &amp; ‘how science works’ (~ 9 marks). Papers available in Jan &amp; Jun.</p> <p>The 4<sup>th</sup> unit for <b>each GCSE</b> is the <b>Centre-Assessed unit</b>.</p> <p><b>Centre-Assessed Unit – 25%</b></p> <p><b>ISA</b> (Investigative Skills Assessment – 34 marks)<br/>Activity provide by AQA. Candidates collect own data in a practical lesson. They then do a 45min written test (exam conditions ‘in a normal lesson’).<br/>Section A = Qs based on candidates’ own data (20mks)<br/>Section B = Qs based on 2<sup>o</sup> data from AQA (14mks)</p> <p><b>PSA</b> (Practical Skills Assessment – 6 marks)<br/>Teacher assessment of candidates’ implementation of practical work on a scale of 0-6.</p> |
| <p><b>GCSE Applied Science (Double Award)</b></p>                                  | <p><b>Unit 1 Science in the Workplace</b><br/>Students investigate &amp; report on:<br/>(i) workplaces that use scientific skills, describing the work of scientists or those that use scientific skills &amp; how science is important in a wide variety of jobs.</p> <p>(ii) working safely in a scientific workplace &amp; compare this with the H &amp; S precautions in their school or college.</p> <p><b>Unit 2 Science for the Needs of Society</b><br/>Students learn about how science is used to benefit our everyday lives. They learn about the work &amp; procedures carried out in order to help maintain &amp; improve quality of life in:</p> <ul style="list-style-type: none"> <li>• Health &amp; medicine</li> <li>• Countryside &amp; Environmental Management</li> <li>• Transport &amp; Communication</li> <li>• The Home Environment</li> </ul> <p><b>Unit 3 Developing Scientific Skills</b><br/>Students perform a range of practical tasks to help them learn about the skills needed to carry out experiments/work in scientific workplaces. The tasks involve: following standard procedures, handling scientific equipment &amp; materials and recording &amp; analysing scientific data.</p> <p>The tasks illustrate important uses of science: investigating living organisms and the properties of materials and using chemical analysis techniques.</p> <p><b>Unit 4 Using Scientific Skills .....</b><br/>Students will carry out 4 investigations (using the skills developed in Unit 3) and report on: monitoring living organisms, making useful products and instruments and machines. Students will be required to carry out a Risk Assessment for each investigation.</p> | <p>This award has <b>4</b> assessment units.</p> <p><b>Unit 1 Science in the Workplace</b><br/>Centre-assessed portfolio of evidence including 2 reports. Worth 25 marks (10%).</p> <p><b>Unit 2 Science for the Needs of Society</b><br/>Externally marked, written paper lasting 90mins comprising compulsory short answer questions. Worth 90 marks (35%).</p> <p><b>Unit 3 Developing Scientific Skills</b><br/>Centre-assessed portfolio of evidence including records of 3 practical exercises covering 6 areas. Worth 50 marks (27½%).</p> <p><b>Unit 4 Using Scientific Skills for the Benefit of Society</b><br/>Centre-assessed portfolio of evidence including records of 4 activities. Worth 50 marks (27½%).</p>  |

**Specifications offered:**

GCSE Science  
GCSE Additional Science  
GCSE Biology; GCSE Chemistry; GCSE Physics

**Rationale:**

The design of this suite of specifications is based on all three approaches identified in the new GCSE Science Criteria: evaluating evidence and the implications of science for society; explaining, theorising and modelling in science and procedural & technical knowledge of science.

The suite offers a variety of different assessment models, allowing a flexible approach for centres in terms of the balance of internal and external assessment.

**Overview of Content and Assessment Models**

| Specification                  | Content  | Assessment Model  |
|--------------------------------|--|---|
| <b>GCSE Science</b>            | <p><b>Unit B1: Variation</b><br/>Topic 1 – Environment<br/>Topic 2 – Genes</p> <p><b>Unit B2: Messages &amp; Medicines</b><br/>Topic 3 – Electrical &amp; Chemical signals in the body<br/>Topic 4 – Use, Misuse &amp; Abuse (drugs)</p> <p><b>Unit C1: Chemical Reactions</b><br/>Topic 5 – <i>It's all symbolic</i><br/>Topic 6 – <i>Making Changes</i></p> <p><b>Unit C2: Making New Products</b><br/>Topic 7 – <i>There's only One Earth</i><br/>Topic 8 – <i>Designer Products</i></p> <p><b>Unit P1: Electricity</b><br/>Topic 9 – Producing &amp; Measuring Electricity<br/>Topic 10 – You're in Charge?</p> <p><b>Unit P2: Waves &amp; space</b><br/>Topic 11 – Now You see It, Now You Don't<br/>Topic 12 – Holidays in space</p> | <p><b>External assessment</b> (all multiple-choice papers)</p> <p>Unit B1 [20min, 10%]<br/>Unit B2 [20min, 10%]</p> <p>Unit C1 [20min, 10%]<br/>Unit C2 [20min, 10%]</p> <p>Unit P1 [20min, 10%]<br/>Unit P2 [20min, 10%]</p> <p><b>Internal assessment</b></p> <ul style="list-style-type: none"> <li>Edexcel-provided &amp; moderated activities. Activities take 25min and are <b>each worth</b> 10%. The highest mark is submitted for each of Bio, Chem and Phys. [Total = 30%]</li> <li>Non-moderated, internal assessment of practical skills across all 3 sciences. [10%]</li> </ul>  |
| <b>GCSE Additional Science</b> | <p><b>Unit B3: Cells and Growth</b><br/>Topic 1 – Inside Living Cells<br/>Topic 2 – Divide &amp; Develop</p> <p><b>Unit B4: Energy Flow &amp; Element Cycle</b><br/>Topic 3 – Energy Flow<br/>Topic 4 – Interdependence</p> <p><b>Unit C3: Holding It Together</b><br/>Topic 5 – <i>Organics</i><br/>Topic 6 – <i>Structure &amp; Bonding</i></p> <p><b>Unit C4: Getting What You Want</b><br/>Topic 7 – <i>How Much? How Pure</i><br/>Topic 8 – <i>How Fast? How Furious?</i></p> <p><b>Unit P3: Feel the Force</b><br/>Topic 9 – Life's a Roller Coaster<br/>Topic 10 – As fast As You Can!</p> <p><b>Unit P4: Nuclear and Electrical</b><br/>Topic 11 – Radioactivity<br/>Topic 12 – Chain Reaction</p>                                 | <p><b>Compulsory Internal Assessment:</b></p> <ul style="list-style-type: none"> <li>Edexcel-provided &amp; moderated activities. Activities take 25min and are <b>each worth</b> 10%. The highest mark is submitted for each of Bio, Chem and Phys [Total = 30%]</li> <li>Non-moderated, internal assessment of practical skills across all 3 sciences. [10%]</li> </ul> <p><b>Additional assessment options</b></p> <ul style="list-style-type: none"> <li>Multiple choice paper [20min, 10%]</li> <li>Short answer paper [30min, 10%]</li> </ul> <p align="center">[For <b>each science</b>, hence total = 60%]</p> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Multiple choice/short answer paper x 3 [30%]</li> <li>Edexcel-provided &amp; moderated activities. Length 25min, worth 10%. Highest mark submitted for <b>each of</b> B, C &amp; P. [30%]</li> </ul> |

| Specification   | Content   | Assessment Model  |
|-----------------|---|---|
| GCSE<br>Biology | Unit B1: Variation<br>Topic 1 – Environment<br>Topic 2 – Genes<br><br>Unit B2: Messages & Medicines<br>Topic 3 – Electrical & Chemical signals in the body<br>Topic 4 – Use, Misuse & Abuse (drugs)<br><br>Unit B3: Cells and Growth<br>Topic 1 – Inside Living Cells<br>Topic 2 – Divide & Develop<br><br>Unit B4: Energy Flow & Element Cycle<br>Topic 3 – Energy Flow<br>Topic 4 – Interdependence<br><br><b>Unit B5: Biotechnology</b><br><br><b>Unit B6: Behaviour in Humans &amp; Other Animals</b>   | <b>For each science:</b><br><br>Unit 1 [multiple choice paper:20min, 10%]<br>Unit 2 [multiple choice paper:20min, 10%]<br><br><b>plus</b><br><br>Edexcel-provided & moderated activity<br>[25min, 10%]<br><br><b>plus for Units 3 &amp; 4</b><br><br><ul style="list-style-type: none"> <li>Compulsory Edexcel-provided &amp; moderated activity [25min, 10%]</li> <li>Multiple choice paper [20min, 10%]</li> <li>Short answer paper [30min, 10%]</li> </ul> |
|                 | <b>GCSE<br/>Chemistry</b><br><br><i>Unit C1: Chemical Reactions</i><br>Topic 5 – It's all symbolic<br>Topic 6 – Making Changes<br><br><i>Unit C2: Making New Products</i><br>Topic 7 – There's only One Earth<br>Topic 8 – Designer Products<br><br><i>Unit C3: Holding It Together</i><br>Topic 5 – Organics<br>Topic 6 – Structure & Bonding<br><br><i>Unit C4: Getting What You Want</i><br>Topic 7 – How Much? How Pure<br>Topic 8 – How Fast? How Furious?<br><br><b>Unit C5: Chemical detection</b><br><br><b>Unit C6: Chemistry Working For Us</b> | <b>OR</b><br><br><ul style="list-style-type: none"> <li>Multi-choice <b>OR</b> short answer paper [10%]</li> <li>Edexcel-provided &amp; moderated activity. [25min, 10%]</li> </ul> <b>plus for Units 5 &amp; 6</b><br><br><ul style="list-style-type: none"> <li>externally assessed structured exam [60min, 30%]</li> </ul> <b>OR</b><br><br><ul style="list-style-type: none"> <li>internally assessed portfolio [30%]</li> </ul>                          |
| GCSE<br>Physics | Unit P1: Electricity<br>Topic 9 – Producing & Measuring Electricity<br>Topic 10 – You're in Charge?<br><br>Unit P2: Waves & space<br>Topic 11 – Now You see It, Now You Don't<br>Topic 12 – Holidays in space<br><br>Unit P3: Feel the Force<br>Topic 9 – Life's a Roller Coaster<br>Topic 10 – As fast As You Can!<br><br>Unit P4: Nuclear and Electrical<br>Topic 11 – Radioactivity<br>Topic 12 – Chain Reaction<br><br><b>Unit P5: Particles In Action</b><br><br><b>Unit P6: Medical Physics</b>   |   |

## GCSE Sciences 2006: OCR - Gateway Science Suite

### Specifications offered:

GCSE Science  
GCSE Additional Science  
GCSE Biology  
GCSE Chemistry  
GCSE Physics

### Rationale:

This suite of GCSEs emphasises explanations, theories and modelling in science along with the implications of science for society. Strong emphasis is placed on the active involvement of students in the learning process and the specification encourages a wide range of teaching and learning activities. The suite offers the opportunity for Centres to use a co-ordinated teaching approach by subject specialists in Biology, Chemistry and Physics. The suite allows for staged assessment or for terminal assessment. Coursework is internally marked and externally moderated by OCR.

### **Overview of Content and Assessment Models**

| Specification       | Content   | Assessment Model  |
|---------------------|---|---|
| <b>GCSE Science</b> | <p><b>B1 Understanding ourselves</b><br/>Breathing, respiration, digestion, disease, immune system, medicines, senses &amp; coordination, hormones, homeostasis, DNA, genetics.</p> <p><b>B2 Understanding our environment</b><br/>Ecology, classification, photosynthesis, competition, adaptation, evolution, population, sustainability.</p> <p><b>C1 Carbon Chemistry*</b><br/>Cooking &amp; food chemistry, esters &amp; smells, solutes &amp; solvents, polymers, crude oil, fuels, combustion &amp; energy changes.</p> <p><b>C2 Rocks and metals</b><br/>Paints, pigments, construction materials, earthquakes &amp; volcanoes, metals &amp; alloys, corrosion, air pollution, rates of reaction.</p> <p><b>P1 Energy for the home</b><br/>Heat, specific heat capacity, insulation, radiation (ir, wireless communication, light), earthquakes, ozone, global warming.</p> <p><b>P2 Living for the future</b><br/>Energy from the Sun, power stations, radioactivity, magnetic fields, the solar system, asteroids, Big Bang theory.</p> | <p>Q paper assessing: B1, C1, P1 [60min, 33%]<br/>Q paper assessing: B2, C2, P2 [60min, 33%]</p> <p><b>Skills Assessment 1</b> [34%]<br/>(internally assessed)</p> <ul style="list-style-type: none"> <li>- <b>'Can-do' tasks</b><br/>Students can do any number of tasks but max of 8 can be submitted. Internally marked, not moderated. Max 24 marks.</li> <li>- <b>Science in the News – science report</b><br/>Stimulus material provided by OCR. Article to research and evaluate (will include data). Students then complete a written report of not more than 800 words, based on Qs given. Any number may be attempted but only 1 submitted. Teacher marked using detailed markscheme provided by OCR. OCR moderated. Max 36 marks.</li> </ul> |

\* fundamental concepts (formulae, equations etc) are threaded through all the chemistry units.

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| Specification                  | Content   | Assessment Model  |
|--------------------------------|---|---|
| <b>GCSE Additional Science</b> | <p><b>B3 Living and Growing</b><br/>Molecules of life - cells, enzymes, DNA; diffusion, blood &amp; transport, mitosis &amp; meiosis, growth, hormones, cloning.</p> <p><b>B4 It's a green world</b><br/>Photosynthesis, water, osmosis, plant transport, fertilisers, energy transfers, biomass, biofuels, farming, decay, recycling.</p> <p><b>C3 The Periodic Table</b><br/>Atomic structure, ionic and covalent bonding, Gp1, Gp 7, electrolysis, transition elements, metals – structure &amp; properties.</p> <p><b>C4 Chemical Economics</b><br/>Acids &amp; bases, reacting masses, fertilisers &amp; crop yields, Haber process &amp; ammonia, detergents, batch / continuous process, nanochemistry (carbon allotropes), purity of water.</p> <p><b>P3 Forces for transport</b><br/>Speed, road safety, acceleration, forces &amp; motion, work &amp; power, KE and energy sources, collisions, falling, games and them park rides.</p> <p><b>P4 Radiation for Life</b><br/>Electrostatics, safe electricals, ultrasound, medical physics, radioactivity, uses of radioisotopes, nuclear fission.</p> | <p>Q paper assessing: B3, C3, P3 [60min, 33%]<br/>Q paper assessing: B4, C4, P4 [60min, 33%]</p> <p><b>Skills Assessment 2</b> [34%]<br/>(internally assessed)</p> <ul style="list-style-type: none"> <li>- <b>Research Study</b><br/>OCR provide the task, research prompts and assessment criteria. Students have 1 week to carry out their research and submit a report on this. They then complete the case Study report (not more than 800 words). Teacher marked using the assessment criteria provided. OCR moderated. Max 24 marks.</li> <li>- <b>Data Task</b><br/>Analysis and evaluation of data and experimental task. 1° and 2° data. OCR-set task. Teacher marked using detailed markscheme provided by OCR. OCR moderated. Max 30 marks.</li> <li>- <b>Practical Skills</b><br/>The ability of students to carry out practical tasks safely and skilfully is assessed by teachers at the end of the course using OCR provided criteria. Not moderated. Max 6 marks.</li> </ul> |
| <b>GCSE Biology</b>            | <p><b>B1-B4, C1-C4, P1-P4.</b></p> <p><b>B5 The Living Body</b><br/>Skeletal &amp; muscle systems, the heart, the respiratory system &amp; problems, waste – skin, kidneys, liver, fertility, reproduction &amp; problems, organ replacement, factors affecting growth.</p> <p><b>B6 Beyond the microscope</b><br/>Bacteria &amp; viruses, fermentation, biofuels, life in soil &amp; in water, enzymes in action, genetic genetic engineering.</p>   | <p>Q paper assessing: B1, B2, B3 [60min, 33%]<br/>Q paper assessing: B4, B5, B6 [60min, 33%]</p> <p>Q paper assessing: C1, C2, C3 [60min, 33%]<br/>Q paper assessing: C4, C5, C6 [60min, 33%]</p> <p>Q paper assessing: P1, P2, P3 [60min, 33%]<br/>Q paper assessing: P4, P5, P6 [60min, 33%]</p>  |
| <b>GCSE Chemistry</b>          | <p><b>C5 How much?</b><br/>Moles, empirical formulae, electrolysis, quantitative analysis, titrations, gas volume, equilibria, strong and weak acids, ionic equations, precipitation reactions.</p> <p><b>C6 Chemistry out there!</b><br/>Energy transfers – fuel cells, redox reactions, alcohols, sodium chloride, the ozone layer, water hardness, fats &amp; oils, analgesics.</p>  | <p>For each GCSE, candidates have <b>a choice</b> of:</p> <p><b>Skills Assessment 1</b> (from GCSE Science) or<br/><b>Skills Assessment 2</b> (from GCSE Additional Science)</p>  |
| <b>GCSE Physics</b>            | <p><b>P5 Space for reflection</b><br/>Satellites, gravity, circular motion, vectors, equations of motion, projectiles, momentum, nature of waves, refraction, optics.</p> <p><b>P6 Electricity for gadgets</b><br/>Resistors, motors, generators, transformers, AC, DC, logic circuits.</p>   |   |

Note: **taken together**, GCSE Biology, GCSE Chemistry and GCSE Physics include the whole KS4 Programme of Study, enabling the legal requirement to be met.

**Specifications offered:**

- GCSE Science
- GCSE Additional Science
- GCSE Additional Applied Science
- GCSE Biology
- GCSE Chemistry
- GCSE Physics

**Rationale:**

The content is based on a set of 'Science Explanations' and 'Ideas about Science' devised by the University of York Science Education Group as part of a project on Science in the 21<sup>st</sup> Century.

The suite emphasises the evaluation of evidence and the implications of science for society. The Additional Science, Biology, Chemistry and Physics specifications provide an emphasis on explanations, theories and modelling in science.

The Additional Applied Science specification offers the student the perspective of the practitioner by focussing on the procedural and technical knowledge of science practice. Activities are included which develop a range of practical competencies in work-related contexts.

**Overview of Content and Assessment Models**

| Specification                          | Content  | Assessment Model  |
|--|--|---|
| <b>GCSE Science</b>                    | B1: You and your genes<br>B2: Keeping healthy<br>B3: Life on Earth<br><b>C1: Air Quality</b><br><b>C2: Material choices</b><br><b>C3: Food matters</b><br>P1: The Earth in the Universe<br>P2: Radiation & Life<br>P3: Radioactive materials                                 | Q paper assessing: B1, <b>C1</b> , P1 [40min, 16.7%]<br>Q paper assessing: B2, <b>C2</b> , P2 [40min, 16.7%]<br>Q paper assessing: B3, <b>C3</b> , P3 [40min, 16.7%]<br><br>Q paper based on pre-release materials [45min, 16.7%]<br><br><b>Skills Assessment 1</b> (internally assessed):<br>- Practical Data Analysis [13.3%]<br>- Case Study [20.0%] |
| <b>GCSE Additional Science</b>         | B4: Homeostasis<br>B5: Growth & Development<br>B6: Brain & Mind<br><b>C4: Chemical Patterns</b><br><b>C5: Chemicals in the natural environment</b><br><b>C6: Chemical Synthesis</b><br>P4: How & why things move<br>P5: Electric Circuits<br>P6: The wave model of radiation | Q paper assessing: B4, <b>C4</b> , P4 [40min, 16.7%]<br>Q paper assessing: B5, <b>C5</b> , P5 [40min, 16.7%]<br>Q paper assessing: B6, <b>C6</b> , P6 [40min, 16.7%]<br><br>Q paper based on pre-release materials [45min, 16.7%]<br><br><b>Skills Assessment 2</b> (internally assessed):<br>- Practical Investigation [33.3%]                         |
| <b>GCSE Additional Applied Science</b> | Optional units - choose <b>3</b> from:<br><br>Ap1: Life Care<br>Ap2: Agriculture and food<br>Ap3: Scientific detection<br>Ap4: Harnessing chemicals<br>Ap5: Communications<br>Ap6: Materials & performance   | 3 Q papers, one per unit. [Each: 45min, 16.7%]<br><br><b>Work-related portfolio (internally assessed):</b><br>- standard procedures [12%]<br>- suitability test [21%]<br>- work-related report [16.7%]  |

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| Specification  | Content   | Assessment Model  |
|--|---|---|
| <b>GCSE Biology</b>  | B1: You and your genes  | Q paper assessing: B1, B2, B3 [40min, 16.7%]  |
|  | B2: Keeping healthy   | Q paper assessing: B4, B5, B6 [40min, 16.7%]  |
|  | B3: Life on Earth<br>B4: Homeostasis<br>B5: Growth & Development<br>B6: Brain & Mind<br>B7: Further Biology   | Terminal Q paper which includes pre-release materials and draws on B1-B7 [45min, 33.3%] |
| <b>GCSE Chemistry</b>  | <b>C1: Air Quality</b>  | Q paper assessing: C1, C2, C3 [40min, 16.7%]  |
|  | <b>C2: Material choices</b>   | Q paper assessing: C4, C5, C6 [40min, 16.7%]  |
|  | <b>C3: Food matters</b><br><b>C4: Chemical Patterns</b><br><b>C5: Chemicals in the natural environment</b><br><b>C6: Chemical Synthesis</b><br><b>C7: Further Chemistry</b><br>- alcohols, carboxylic acids & esters<br>- energy changes in chemistry<br>- reversible reactions & equilibria<br>- analysis<br>- green chemistry | Terminal Q paper which includes pre-release materials and draws on C1-C7 [45min, 33.3%] |
| <b>GCSE Physics</b>  | P1: The Earth in the Universe   | Q paper assessing: P1, P2, P3 [40min, 16.7%]  |
|  | P2: Radiation & Life  | Q paper assessing: P4, P5, P6 [40min, 16.7%]  |
|  | P3: Radioactive materials<br>P4: How & why things move<br>P5: Electric Circuits<br>P6: The wave model of radiation<br>P7: Further Physics (observing the universe)  | Terminal Q paper which includes pre-release materials and draws on P1-P7 [45min, 33.3%] |
| <p><b>Coursework</b></p> <p>For <b>each</b> GCSE, candidates have <b>a choice</b> of:</p> <p><b>Skills Assessment 1</b> (internally assessed):</p> <ul style="list-style-type: none"> <li>- Practical Data Analysis [13.3%]</li> <li>- Case Study [20.0%]</li> </ul> <p><b>OR</b></p> <p><b>Skills Assessment 2</b> (internally assessed):</p> <ul style="list-style-type: none"> <li>- Practical Investigation [33.3%]</li> </ul> |   |   |

Note: **taken together**, GCSE Biology, GCSE Chemistry and GCSE Physics include the whole KS4 Programme of Study, enabling the legal requirement to be met.

**OCR – Applied Science (Double Award) and Environmental & Land-Based Science**

**Rationale:**

GCSE Applied Science (Double Award):

This specification has been designed to form a qualification which provides some of the technical knowledge, understanding and skills that students will need in the workplace or in further education or training.

The specification emphasises the procedural and technical knowledge of science practice. In order to understand the nature of Applied Science, students must actively experience science in a workplace environment. This can be achieved through a variety of approaches including work experience, links with local employers and research establishments, case studies and research.

GCSE Environmental & Land-Based Science

This is a wholly e-assessed qualification with optional units to be selected by the centre depending on centre location. Expectations are that the specification will cover aspects of agriculture (including animal husbandry), horticulture, land use in rural and urban environments and enterprise.

**Overview of Content and Assessment Models**

| Specification                                      | Content  | Assessment Model   |
|--|--|--|
| <b>GCSE Applied Science (Double Award)</b>         | <b><u>Unit 1 Developing Scientific Skills</u></b>  | <b><u>Unit 1</u></b> [33.3%]<br>Portfolio: report on research into working safely in science, including: hazards, first aid, using a microscope, culturing organisms, analysis.  |
|  | <b><u>Unit 2 Science for the needs of society</u></b><br>Includes: living organisms, obtaining useful chemicals, materials, energy, the Earth and the Universe.<br>There will be 6 teaching modules, 2 each in Biology, Chemistry and Physics.   | <b><u>Unit 2</u></b> [33.3%]<br>Externally marked, written exam.   |
|  | <b><u>Unit 3 Science at work</u></b>   | <b><u>Unit 3</u></b> [33.3%]<br>Portfolio: report on science in the workplace including: making useful products, measuring yield, making electrical or optical devices, efficiency of a mechanical device.   |
| <b>GCSE Environmental &amp; Land-Based Science</b> | Students will study <b>3 units</b> chosen from the following proposed six optional units. The approximate teaching time for each of the units will be 35 hours.<br><br><b>Optional Units:</b> <ul style="list-style-type: none"> <li>• Plant cultivation</li> <li>• Amenity horticulture</li> <li>• Management of the Natural Environment</li> <li>• Care of animals kept for recreation</li> <li>• Livestock husbandry</li> <li>• Using and maintaining equipment.</li> </ul> | <b>3 external exams</b> to test the optional units.<br><br><b>Unit 4</b> is an internally assessed unit comprising: <ul style="list-style-type: none"> <li>• Practical skills (6, 2 from each of the units studied),</li> <li>• Work-related report set in the context of one of the optional units,</li> <li>• Scientific investigation report based on one of the optional units.</li> </ul> |

**Specifications offered:**

GCSE Science  
GCSE Additional Science

GCSE Biology  
GCSE Chemistry  
GCSE Physics

GCSE Applied Science (Double Award)

**Rationale:**

The GCSE science specification provides the basic study of science and incorporates fundamental concepts and ideas whilst also including an understanding of the wider issues of science in society and scientific methods. The Additional Science specification allows for further development of concepts and ideas, along with the introduction of new material fundamental to an ongoing understanding of science. The separate science specifications explore further scientific knowledge and concepts for those students wanting a wider range of knowledge and a more detailed understanding.

The Applied Science (Double Award) is about the science used by people in a wide variety of jobs. It is also about management of time and resources, working alongside others, and effective and unambiguous communication between scientists and with other people who are not experts.

**Overview of Content and Assessment Models**

| Specification       | Content   | Assessment Model   |
|---------------------|---|--|
| <b>GCSE Science</b> | <b>Unit B1 Body Maintenance &amp; Protection</b><br>Nutrition; homeostasis; nervous system; hormones.   | <b>External assessment</b> [75%]<br><br>6 written papers: units B1, B2, C1, C2, P1 and P2.   |
|                     | <b>Unit B2 Genes and Variety</b><br>Adaptation & competition; variation; inheritance; selective breeding & gene technology; evolution.  | Each paper takes <b>45min</b> and is worth <b>12.5%</b> . The paper includes short answer and objective questions as well as the opportunity for extended writing.   |
|                     | <b>Unit C1 Elements, the Periodic Table, Compounds &amp; Patterns in Reactions</b><br>Atomic structure, elements, the Periodic Table, Groups 1, 7 and 0, compounds, chemical reactions.   | <b>Internal assessment</b> [25%]<br><br>Practical work (4 skill areas) is assessed by teachers according to a mark scheme provided by the board. For each of the 3 sciences, teachers select from a range of possible assessed practicals. Practical should be completed in no more than 2 hours, wholly within class time. One piece of work is required in each of Bio, Chem and Phys. |
|                     | <b>Unit C2 The Production and Use of Fuels, Controlling Rates of Reactions and Earth Science</b><br>Making new materials, rates of chemical change, fossil fuels and combustion, geological processes, evolution and maintenance of the atmosphere.                 |  |
|                     | <b>Unit P1 Energy and the Home</b><br>Energy sources; generation of electricity; transmission of electricity; heating and home; energy, temperature and the transfer of heat energy; electrical energy and the home; cost of energy in the home; energy efficiency. |  |
|                     | <b>Unit P2 Electromagnetic radiation and the Universe</b><br>The characteristics of waves; the electromagnetic spectrum - energy transfer, information transfer, communication; the Solar system, stars and the universe.   |  |

Continued .....

| Specification  | Content  | Assessment Model   |
|--|--|--|
| <p><b>GCSE Additional Science</b></p>  | <p><b>Unit B3 Cells &amp; cell processes</b><br/>Cells, respiration, plant nutrition and transport.</p> <p><b>Unit B4 Interdependence of organisms</b><br/>Energy and nutrient transfer, carbon cycle, nitrogen cycle, impact of human activity on the environment</p> <p><b>Unit C3 Structure, bonding, production and uses of metals and the chemistry of water</b><br/>Atomic structure, chemical bonding, structure and properties, giant metallic &amp; giant ionic structures, covalent molecular &amp; giant covalent substances, the production &amp; uses of metals (e.g iron, aluminium), corrosion of metals, chemical calculations, green chemistry, water.</p> <p><b>Unit C4 Ammonia &amp; Fertilisers, Hydrocarbons, Polymers, Smart Materials &amp; Transition Metals.</b><br/>Ammonia &amp; fertilisers, alkanes, alkenes &amp; polymers, smart materials, transition metals, purification of copper, production of titanium</p> <p><b>Unit P3 Radioactivity &amp; Electricity</b><br/>The existence of radioactivity, types of radioactive emissions, <math>t_{1/2}</math>, uses &amp; dangers of radioactivity, simple electrical circuits, variation of current, mains wiring &amp; safety</p> <p><b>Unit P4 Forces, motion &amp; electromagnetism</b><br/>Distance, speed, acceleration, effect of forces, interactions between objects, magnetic fields, motor effect</p> | <p><b>External assessment</b> [75%]</p> <p>6 written papers: units B3, B4, C3, C4, P3 and P4.</p> <p>Each paper takes <b>45min</b> and is worth <b>12.5%</b>. The paper includes short answer and objective questions as well as the opportunity for extended writing.</p> <p><b>Internal assessment</b> [25%]</p> <p>Practical work (4 skill areas) is assessed by teachers according to a mark scheme provided by the board. For each of the 3 sciences, teachers select from a range of possible assessed practicals. Practical should be completed in no more than 2 hours, wholly within class time. One piece of work is required in each of Bio, Chem and Phys.</p> |
| <p><b>GCSE Biology</b></p> <p><b>GCSE Chemistry</b></p> <p><b>GCSE Physics</b></p> | <p>Units B1-B4</p> <p><b>Unit B5</b><br/>Blood, circulation; transport in plants &amp; transpiration; kidneys &amp; waste; microbes and applications;</p> <p>Units C1-C4</p> <p><b>Unit C5</b><br/>Organic chemistry and alcohol; sulphuric acid; strong and weak acids; chemical calculations; Inorganic qualitative analysis; limestone &amp; cement.</p> <p>Units P1-P4</p> <p><b>Unit P5</b><br/>Electromagnetic induction &amp; generators &amp; transformers; waves; seismic waves; electronic systems; atomic structure &amp; nuclear fission &amp; fusion</p>  | <p><b>External assessment</b><br/>(same for GCSE Biology, GCSE Physics)</p> <p><b>Units C1-4</b> [50%]<br/>Each paper = 45 mins and is worth 12.5%</p> <p><b>Unit C5</b> [25%]<br/>Each paper = 60 mins and is worth 25%</p> <p><b>Internal assessment</b> [25%]<br/>Practical C1<br/>Practical C2<br/>Practical C3</p> <p>[As for GCSE science and GCSE Additional Science]</p>   |

| Specification                                     | Content   | Assessment Model   |
|---|---|--|
| <p><b>GCSE Applied Science (Double Award)</b></p> | <p><b>Unit 1 Developing Scientific Skills</b></p> <p>In this unit students learn about the skills needed to carry out experiments and work in the laboratory. They will learn about: working safely in science; carrying out practical tasks (standard procedures, handling scientific materials and equipment, recording and analysing data); investigating living organisms; chemical analysis and investigating materials.</p>                                     | <p><b>Unit 1 (Internal assessment)</b> [33? %]</p> <p>Students produce a portfolio of evidence which should include:</p> <ul style="list-style-type: none"> <li>• a report of an investigation into working safely in science (25 marks)</li> <li>• records of practical activities – all of which should be in a vocational context and should include evidence relating to the unit content (75 marks)</li> </ul>  |
|   | <p><b>Unit 2 Science for the Needs of Society</b></p> <p>In this unit students learn about the materials and living organisms that scientists work with: organisms and health; chemical and material behaviour; energy, electricity and radiations; the environment, Earth and the Universe.</p>  | <p><b>Unit 2 (external assessment)</b> [33? %]</p> <p>Written paper – 80mins. Two sections A &amp; B. Section B of the Foundation paper is targeted at D, C grade and Section B of the Higher tier paper is targeted at grades B, A and A*.</p>  |
|   | <p><b>Unit 3 Science at Work</b></p> <p>In this unit students find out about how science may be used to the great benefit of industry and society. They will learn about: science in the workplace, making useful products, electrical and electronic devices and monitoring living organisms. Students will need to be able to identify when they need more information, identify likely sources of this information and select the information and data needed.</p> | <p><b>Unit 3 (internal assessment)</b> [33? %]</p> <p>Students will be required to produce a portfolio about the way science is used for the benefit of society. The portfolio will include:</p> <ul style="list-style-type: none"> <li>• an assignment on science in the workplace, describing the work of scientists and the importance of science in a variety of jobs (25 marks)</li> <li>• reports on the production of substances that involve different types of chemical reaction (25 marks)</li> <li>• reports on making and assessing the effectiveness of two devices; electrical and/or electronic (25 marks)</li> <li>• two reports, including a plan, on an investigation into the growth and/or response of living organisms under controlled conditions showing appropriate care and consideration when investigating living organisms (25 marks)</li> </ul> |