



## AIM AND PURPOSE

Science gives us the tools to look at the world around us and understand it, to see the world around us and to begin to see how things work, and to understand the scale of what we are looking at. It allows us to see ourselves as part of a greater whole. Philosopher Frank Jackson proposes a thought experiment:

*Mary is a scientist. She knows everything there is to know about light, about colour, however she has not personally ever experienced the full range of visible light. She has been raised in one room her whole life where everything is black and white and grey. Mary knows everything there is to know about light, she just has never experienced colours. One day, a door in Mary's room opens and the full spectrum of visible light enters. She experiences trees of green, skies of blue, the bold yellow of a buttercup. Surrounded by these colours, she finally understands what it is to see colours.*

Adam Boxer suggests as teachers we need to take Jackson's thought experiment further. He suggests that Mary has a brother – Declan. Declan is not the super scientist that Mary is. He lives in the same grey room, but he doesn't learn all there is to learn about light, about colours. He too passes through the door into the colourful world. But he doesn't have the same experience. His experience of colour is likely to be a positive one, but it won't have the same effect on him as it does on his sister, Mary. It will not be the final piece in a puzzle. It will not be the thing that brings together years of research and learning. It will simply be "nice".

Without equipping our students with the knowledge to understand the world around them, we are allowing students to leave schools as "Declans" - enjoying their experiences, but not being able to understand them on any greater level. This is why we teach science.

## HOW DOES THE CURRICULUM INDUCT STUDENTS INTO THE DISCIPLINE OF THE SUBJECT?

Scientific discoveries are made by people hypothesising, conducting experiments, and then applying their knowledge of certain fields to the results. Without knowledge of what discoveries have been made previously, science cannot progress. One cannot make a hypothesis without an understanding of what could happen. To do otherwise is not a hypothesis, it is a guess. Our curriculum is designed to ensure students have that knowledge to be able to hypothesise and to be able to conduct accurate experiments, should they wish to.





**OVERVIEW**

The Curriculum in Science is based on the National Curriculum, but is modified to allow completion before GCSE Science begins in Year 9. Lessons include practical work, deliberate practice of maths related to science, and working scientifically.

We currently teach the Springboard Science scheme of work at Key Stage 3.

Term	Focus	Assessment
Aut 1	<ul style="list-style-type: none"> <li><b>Chemistry: The Particle Model.</b> Simple particle models, Properties of different states of matter, Changes of State, Gas pressure</li> <li><b>Biology: Cells.</b> Microscopes, Cell structure, Animal and Plant cells, Magnification, Unicellular organisms, Diffusion, Specialised cells</li> </ul> <p><b>Practicals: Heating water, using Bunsen burners and Microscopes</b></p>	Find Out Fortnight assessments – short Core Question assessments
Aut 2	<ul style="list-style-type: none"> <li><b>Physics: Energy.</b> Fuels and Energy stores, Energy stores and transfers, Power, Energy resources</li> <li><b>Biology: The Skeletal and Muscular Systems and Organisation.</b> The skeleton, Biomechanics, Principles of organisation</li> </ul> <p><b>Practical: Testing core strength</b></p>	Find Out Fortnight assessments – short Core Question assessments
Spr 1	<ul style="list-style-type: none"> <li><b>Biology continued: Principles of Organisation</b></li> <li><b>Chemistry: Atoms, Elements and Compounds.</b> The atomic model, Symbols and formulae, Elements and compounds</li> <li><b>Physics: Speed.</b> Speed, Distance-time graphs. Relative motion</li> </ul> <p><b>Practical: Investigating properties of elements and compounds</b></p>	Mid-year assessment, FOFs
Spr 2	<ul style="list-style-type: none"> <li><b>Physics Continued: Relative motion</b></li> <li><b>Chemistry: Pure and Impure Substances.</b> Diffusion, Pure and impure substances, Separation techniques</li> </ul> <p><b>Practical: measuring speed</b></p>	Find Out Fortnight assessments – short Core Question assessments
Sum 1	<ul style="list-style-type: none"> <li><b>Chemistry continued: Separation techniques</b></li> <li><b>Physics: Forces.</b> Basic forces and diagrams, Naming and categorising forces, Stretching and squashing forces, Hooke's Law and work done, Moments and simple machines</li> </ul> <p><b>Practical: Investigating chromatography and separating techniques</b></p>	Find Out Fortnight assessments – short Core Question assessments
Sum 2	<ul style="list-style-type: none"> <li><b>Physics: Forces continued.</b> Balanced forces, Forces and motion</li> </ul> <p><b>Practical: Investigating balanced moments</b></p> <ul style="list-style-type: none"> <li><b>Physics: Light and Space.</b> Light and ray models, Interactions of light waves with materials, Mirrors, pinhole cameras and the eye, detecting light and colour.</li> </ul> <p><b>Practical: light rays, reflection and refraction</b></p>	End of year assessment to include all material

**Home Learning:**

- Students will often be asked to complete classwork at home
- Students are expected to complete a Carousel quiz each week, as set by their teacher

**Useful resources:**

- Core Questions – found at the front of each booklet.



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<b>Aut 1</b>	<ul style="list-style-type: none"> <li>• <b>Biology: Nutrition and Digestion.</b> Healthy diet, energy requirements, dietary imbalances, Digestive organs, Gut bacteria</li> <li>• <b>Chemistry: Chemical reactions.</b> Reactions, chemical conventions, Combustion, Thermal decomposition, Oxidation, Displacement, Conservation of mass</li> </ul> <p><b>Practicals: Investigating combustion time, displacement</b></p>	Find Out Fortnight assessments – short Core Question assessments
<b>Aut 2</b>	<ul style="list-style-type: none"> <li>• <b>Chemistry: Chemical reactions continued.</b> Acids, alkalis and pH, reactions of acids with metals and alkalis</li> <li>• <b>Physics: Pressure in Fluids.</b> Pressure in liquids, Atmospheric pressure, Pressure calculations</li> </ul> <p><b>Practicals: universal indicator and pH; testing for Hydrogen gas</b></p>	Find Out Fortnight assessments – short Core Question assessments
<b>Spr 1</b>	<ul style="list-style-type: none"> <li>• <b>Biology: Gas Exchange Systems.</b> Ventilation, Gas exchange, Exercise, Asthma, Smoking</li> <li>• <b>Chemistry: Energy Changes.</b> Changes of state, Exothermic reactions, Endothermic reactions.</li> </ul> <p><b>Practicals: Lung capacity; investigating exothermic and endothermic reactions</b></p>	Mid-year assessment, FOFs
<b>Spr 2</b>	<ul style="list-style-type: none"> <li>• <b>Physics: Sound.</b> Types of waves, Sound waves, Microphones, Ultrasound</li> <li>• <b>Biology: Reproduction.</b> Sexual reproduction, Reproductive organs, Fertilisation.</li> </ul> <p><b>Practical: Investigating the speed of sound</b></p>	Find Out Fortnight assessments – short Core Question assessments
<b>Sum 1</b>	<ul style="list-style-type: none"> <li>• <b>Biology: Reproduction continued.</b> Foetal development, The menstrual cycle, Plant reproduction</li> <li>• <b>Physics: Light revisited.</b> Mirrors, pinhole cameras and the eye, detecting light and colour</li> </ul> <p><b>Practical: investigating seed dispersal; investigating reflection</b></p>	Find Out Fortnight assessments – short Core Question assessments
<b>Sum 2</b>	<ul style="list-style-type: none"> <li>• <b>Biology: Photosynthesis.</b> Plant tissues and organs, Photosynthesis, Energy storage.</li> </ul> <p><b>Practical: Testing for starch</b></p>	End of year assessment to include all material

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**OVERVIEW**

**GCSE Combined Science** begins in Year 9 and we follow the **AQA Trilogy curriculum**. Combined Science leads to 2 GCSE awards. To support with this, Year 9 are taught four times over a fortnight in 100-minute lessons. For higher-attaining students, we also offer Separate Sciences, beginning in Year 10, as one of their three option subjects.

Term	Focus	Assessment
Aut 1	<ul style="list-style-type: none"> <li>• <b>Chemistry 1: Atomic structure and the periodic table</b></li> <li>• <b>Biology 1: Cell biology</b></li> <li>• <b>Physics 1: Energy</b></li> </ul>	FOFs  Required practicals
Aut 2	<ul style="list-style-type: none"> <li>• <b>Chemistry 1: Atomic structure and the periodic table</b></li> <li>• <b>Biology 1: Cell biology</b> Core Practical: Microscopy</li> <li>• <b>Physics 1: Energy</b></li> </ul>	FOFs  Required practicals
Spr 1	<ul style="list-style-type: none"> <li>• <b>Chemistry 1: Atomic structure and the periodic table</b></li> <li>• <b>Biology 1: Cell biology</b> Core Practical: Osmosis</li> <li>• <b>Physics 1: Energy</b></li> </ul>	FOFs  Required practicals
Spr 2	<ul style="list-style-type: none"> <li>• <b>Chemistry 1: Atomic structure and the periodic table</b></li> <li>• <b>Biology 1: Cell biology</b></li> <li>• <b>Physics 1: Energy</b> Core Practical: Specific Heat Capacity</li> </ul>	Spring assessment: 1 exam paper, combining Biology, Chemistry and Physics
Sum 1	<ul style="list-style-type: none"> <li>• <b>Chemistry 1: Atomic structure and the periodic table</b></li> <li>• <b>Biology 1: Cell biology</b></li> <li>• <b>Physics 1: Energy</b></li> </ul>	FOFs  Required practicals
Sum 2	<ul style="list-style-type: none"> <li>• <b>Biology 7: Ecology</b> Core Practical: field investigations</li> <li>• <i>Based on the results of the Year 9 mock exams, and assessments of progress throughout Year 9, the highest-attaining student will be offered the chance to study Separate Science in Years 10 and 11.</i></li> </ul>	Summer exams: 1 Biology paper, 1 Chemistry paper, 1 Physics paper

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**OVERVIEW**

**GCSE Combined Science** begins in Year 9 and we follow the **AQA Trilogy** curriculum. Combined Science leads to 2 GCSE awards. From Y10, students learn in 6 fortnightly lessons of 100 minutes. For higher-attaining students, we also offer **Separate Sciences**, beginning in Year 10 as one of their three option subjects. Separate Science content is embedded within combined science content. Dedicated Separate Science units will be taught in year 11. Students learn in 9 fortnightly lessons of 100 minutes.

Term	Focus	Assessment
Aut 1	<ul style="list-style-type: none"> <li><b>Biology 2: Organisation</b></li> </ul> <b>Core practical: Enzymes</b> <ul style="list-style-type: none"> <li><b>Chemistry 2: Structure and Bonding</b></li> <li><b>Physics 2: Electricity</b></li> </ul> <b>Core Practical: Current/Voltage characteristics</b>	FOFs - fortnightly short assessments  Required practicals
Aut 2	<ul style="list-style-type: none"> <li><b>Biology 2: Organisation</b></li> </ul> <b>Core Practical: Food tests</b> <ul style="list-style-type: none"> <li><b>Chemistry 2: Structure and Bonding</b></li> <li><b>Physics 2: Electricity</b></li> </ul> <b>Core Practical: Resistance</b>	End of term test  Required Practicals
Spr 1	<ul style="list-style-type: none"> <li><b>Biology 3: Infection and Response</b></li> <li><b>Chemistry 3: Quantitative Chemistry</b></li> </ul> <ul style="list-style-type: none"> <li><b>Physics 3: Particle Model</b></li> </ul> <b>Core Practical: Density</b>	FOFs - fortnightly short assessments  Required practicals
Spr 2	<ul style="list-style-type: none"> <li><b>Biology 3: Infection and Response</b></li> <li><b>Chemistry 4: Chemical Changes</b></li> </ul> <b>Core Practicals: Making salts and Electrolysis</b> <ul style="list-style-type: none"> <li><b>Physics 3: Particle Model</b></li> </ul>	Spring assessment: 1 exam paper, combining Biology, Chemistry and Physics
Sum 1	<ul style="list-style-type: none"> <li><b>Biology 4: Bioenergetics</b></li> </ul> <b>Core Practical: Photosynthesis</b> <ul style="list-style-type: none"> <li><b>Chemistry 5: Energy Changes</b></li> </ul> <ul style="list-style-type: none"> <li><b>Physics 4: Atomic Structure</b></li> </ul>	FOFs - fortnightly short assessments  Required practicals
Sum 2	<ul style="list-style-type: none"> <li><b>Continuation of content from Sum 1 half term</b></li> </ul> <ul style="list-style-type: none"> <li><i>Results of summer mocks will determine the tier students are entered into for their November mocks in year 11</i></li> </ul>	Summer mock: 1 Biology paper, 1 Chemistry paper, 1 Physics paper

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- Core Questions – found at the front of student booklets



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Term	Focus	Assessment
Aut 1	<ul style="list-style-type: none"> <li><b>Biology 5: Homeostasis and response</b></li> <li><b>Core Practical: Reaction time</b></li> <li><b>Chemistry 6: The rate and extent of chemical change</b></li> <li><b>Chemistry 7: Organic chemistry</b></li> <li><b>Physics 5: Forces (Core practicals: force and extension; Acceleration)</b></li> </ul>	FOFs - fortnightly short assessments  Required practicals
Aut 2	<ul style="list-style-type: none"> <li><b>Biology 6: Inheritance, variation and evolution</b></li> <li><b>Chemistry 8: Chemical Analysis (Core practical: chromatography)</b></li> <li><b>Physics 6: Waves (core practical: waves)</b></li> </ul> <p><i>Results of November mocks will determine the tier students are entered into for March mocks and GCSE exams</i></p>	FOFs – fortnightly short assessments Required practicals <b>November Mocks: Paper 1</b>
Spr 1	<ul style="list-style-type: none"> <li><b>Biology 6: Inheritance, Variation and Evolution</b></li> <li><b>Chemistry 9: Chemistry of the Atmosphere</b></li> <li><b>Physics 7: Magnetism and Electromagnetism</b></li> <li><b>Core Practical: Radiation and Absorption</b></li> </ul> <p><i>Revision will run concurrently during Prep sessions after school</i></p>	FOFs - fortnightly short assessments  Required practicals
Spr 2	<ul style="list-style-type: none"> <li><b>Biology 7: Ecology (core practical: field investigations)</b></li> <li><b>Chemistry 10: Using Resources (core practical: water purification)</b></li> <li><b>Physics 8: Space (separate only)</b></li> </ul> <p><i>Revision will run concurrently during Prep sessions after school</i></p>	<b>March mocks: Paper 1 and Paper 2</b>
Sum 1	<ul style="list-style-type: none"> <li><b>Revision and exam preparation</b></li> <li>Exam preparation and consolidation</li> </ul>	Summer exams: 2 Biology papers, 2 Chemistry papers, 2 Physics papers
Sum 2		Summer exams: 2 Biology papers, 2 Chemistry papers, 2 Physics papers

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**Useful resources:**

- Carousel
- Core Questions – found at the front of student booklets