Science Intent and Curriculum Plans

Science plays an important role in everyone's life. It explains what happens inside us and around us. At St Margaret Ward Catholic Academy, we believe that when our students leave, they should be equipped with the essential knowledge and skills that allow them to make informed decisions and form opinions with economic, sociocultural, religious, ecological and political connections. As such we have developed a rigorous curriculum, covering all aspects of science. Embedded within the knowledge are skills that are transferable to everyday life.

This overview has been reviewed in the light of school closures and therefore sequencing of content has been carefully considered and adjusted where appropriate.

	Year 7	Year 8	Year 9
Term 1a **Term 1b**	**Safety** An introduction into the use of laboratory equipment and rules and basic science skills. **Atoms** Atomic structure and use of Periodic table. **Cells** Cell structure and use of microscopes. **Forces** Types of forces; Balanced and unbalanced forces **Atoms** Separation techniques	**Systems** Breathing and effects of lung damage. **Electricity** From power stations to modelling circuits; series and parallel circuits. **Radiation** Properties of waves; Sound waves and the ear. **Atoms** Writing chemical formula and reaction equations.	**Systems** Heart and circulatory system **Reactions** The reactivity series; extraction of metals. **Bonding** Ionic; Covalent and metallic bonding **Energy** Types of energy and using equations
Term 2a **Term 2b**	**Forces (continued)** Types of forces; Balanced and unbalanced forces **Atoms (continued)** Separation techniques **Energy** Types of energy; Efficiency **Systems** Animal reproduction; Plant reproduction; the skeleton **Reactions** Acids and alkali's; neutralisation.	**Radiation (continued)** Properties of waves; Sound waves and the ear. **Atoms (continued)** Writing chemical formula and reaction equations. **Atoms** Patterns of reactivity in the Periodic table. **Interdependence** Communicable and noncommunicable disease; pathogens; Development of drugs; Immunity **Earth science** Composition of the earth and atmosphere and changes. Rock cycle; global climate change. **Forces** Density and pressure in gases and fluids. **Interdependence**	**Interdependence** Cycles in nature, Biodiversity and how humans affect it. **Reactions** Redox reactions and reaction profiles **Inheritance** Human genome project, structure of DNA and cell division **Forces** Velocity and acceleration and use of graphs. Stopping distances and momentum. **Analytical chemistry** Tests used in identification of elements. **Radiation** Interaction of waves and uses of ultrasound. Properties and uses of electromagnetic waves.

		Communities in the ecosystem and adaptations of plants and animals; Sampling techniques.	
Term 3a **Term 3b**	**Systems (continued)** Animal reproduction; Plant reproduction; the skeleton **Reactions (continued)** Acids and alkali's; neutralisation. **Radiation** Light; Reflection and refraction **Fields** The solar system; stars and the moon. **Electricity** Static charge	**Interdependence (continued)** Communities in the ecosystem and adaptations of plants and animals; Sampling techniques. **Forces (continued)** Density and pressure in gases and fluids. **Electricity** Potential difference, current and resistance in series and parallel circuits **Electricity (continued)** Potential difference, current and resistance in series and parallel circuits **Earth science** Greenhouse gases; global climate change; carbon footprint; atmospheric pollutants.	**Cells** Movement of substances in and out of cells. **Bonding** Relationship between the type of bonding and properties of compounds. **Systems** Bacteria and growing in a lab; plant organs; plant disease and protection; transpiration and translocation **Electricity** Resistance and types of resistor

Year 10 Science

All Year 10 students will study the curriculum for GCSEs in Biology, Chemistry and Physics. Throughout the year students will complete Required Practical's. Required practical's are specified by the examination board. During these lessons students are taught skills in using apparatus and investigative skills, all of which are examined in the final GCSE examinations in the summer of year 11.

Year 10	Biology	Chemistry	Physics
Term 1a **Term 1b**	**Systems** Photosynthesis and factors affecting it; aerobic and anaerobic respiration. **Cells** Movement in and out of cells	**Earth science** Life cycle assessment and sustainability; potable and wastewater. **Earth science** Greenhouse gases; global climate change; carbon footprint; atmospheric pollutants. **Analytical chemistry** Moles and Avogadro's constant.	**Radiation** Light; Reflection and refraction **Fields** Electromagnets and motor effect; Loudspeakers and generators. **Electricity** Resistance and types of resistor
Term 2a **Term 2b**	**Cells (continued)** Movement in and out of cells **Interdependence** Communicable and noncommunicable disease; pathogens; Development of drugs; Immunity **Systems** Control of blood glucose and body temperature. Control of water levels and kidney treatment.	**Analytical chemistry (continued)** Using moles. **Reactions** Calculating rates of reaction. Collision theory; catalysts	**Electricity** Resistance and types of resistor **Electricity** Mains electricity; National grid and transformers **Radiation** Radioactive decay
Term 3a **Term 3b**	**Evolution** Theories of evolution. Evidence of evolution	**Reactions (continued)** Calculating rates of reaction. Collision theory; catalysts **Atoms** Crude oil. Fractional distillation.	**Radiation (continued)** Background radiation; half-life. Radioactive contamination

Year 11 Science

All Year 11 will study the curriculum for GCSEs in Biology, Chemistry and Physics.

Year 11	Biology	Chemistry	Physics
Term 1a	**Interdependence** Communicable and noncommunicable disease; pathogens; Development of drugs; Immunity **Evolution** Theories of evolution. Evidence of evolution	**Atoms** Crude oil. Fractional distillation. **Atoms** Alcohols and carboxylic acids **Reactions** Titrations and electrolysis; Electrolysis, cells and batteries.	**Radiation** Interaction of waves and uses of ultrasound. Properties and uses of electromagnetic waves. **Radiation** Reflection, refraction and uses of light.
Term 1b			
Term 2a	**Interdependence** Communities in the ecosystem and adaptations of plants and animals; Sampling techniques. Carbon cycle and transpiration and translocation. **Evolution** Genetic engineering, cloning and selective breeding **Cells** Monoclonal antibodies and their uses; hormones. **Mock 2** **Revision**	**Reactions** Reversible reactions, equilibrium; Haber process and NPK fertilisers **Mock 2** **Revision**	**Radiation** Radioactive decay. Background radiation; half-life. Radioactive contamination **Mock 2** **Revision**
Term 2b			
Term 3a	**GCSE examinations start**	**GCSE examinations start**	**GCSE examinations start**

Year 12 Biology, Chemistry and Physics

Year 12	Biology	Chemistry	Physics
Term 1a **Term 1b**	**Maths and statistics** **Biological molecules** **Genetic information, variation and relationships between organisms**	**Physical chemistry** Atomic structure; amount of substances; bonding; enthalpy; rates and kinetics. **Inorganic chemistry** Periodicity; Group 2 and Group 7 elements.	**Introduction to physics** Measurements and errors; Maths skills **Electricity** **Particle physics** **Mechanics 1**
Term 2a **Term 2b**	**Cells** **Organisms exchange substances with their environment**	**Physical chemistry** Equilibrium **Organic chemistry**	**Materials** **Mechanics 2** **Waves**
Term 3a **Term 3b**	**Genetics, populations, evolution and ecosystems**	**Physical chemistry** Rate equations **Organic chemistry** Alkanes; halogenoalkanes; alkenes; alcohols; organic analysis	**Further mechanics 1** **Thermal physics 1**

Year 13 Biology, Chemistry and Physics

<table>
<tr><th>Year 13</th><th>Biology</th><th>Chemistry</th><th>Physics</th></tr>
<tr><td>Term 1a</td><td>Energy transfers in and between organisms</td><td>Physical chemistry
Acids and bases

Organic chemistry
Optical isomerism; aldehydes and ketones; carboxylic acids and derivatives; aromatic chemistry</td><td>Further mechanics 2

Thermal physics 2</td></tr>
<tr><td>Term 1b</td><td rowspan="2">Organisms respond to changes in their internal and external environments

The control of gene expression</td><td rowspan="2">Physical chemistry
Thermodynamics

Organic chemistry
Amines; Polymers; Amino acids, proteins and DNA; Organic synthesis

Inorganic chemistry
Transition metals; reactions of ions in aqueous solution.</td><td>Field physics 1

Nuclear physics</td></tr>
<tr><td>Term 2a</td><td>Field physics 2

Astrophysics</td></tr>
<tr><td>Term 2b</td><td>Revision</td><td>Revision</td><td>Revision</td></tr>
<tr><td>Term 3a</td><td>A-level examinations start</td><td>A-level examinations start</td><td>A-level examinations start</td></tr>
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