

## Science Department Curriculum Map 2023-24

**Class of 2030** – Following year 1 of the Astrea 5-year science curriculum.

Autumn Term	Spring Term	Summer Term
<ul style="list-style-type: none"> <li>★ Working like a scientist – Safety in science, planning an investigation, collecting data and analysing and evaluating results.</li> </ul>	<ul style="list-style-type: none"> <li>★ Energy costs – Food and fuels, energy resources and power.</li> <li>★ Energy transfers – Work, temperature, energy transfer (particles), radiation and insulation.</li> </ul>	<ul style="list-style-type: none"> <li>★ Forces – Balanced and unbalanced forces, speed, distance-time graphs, gravity, friction, changing the shape of objects and turning forces.</li> <li>★ Pressure – Pressure in gases, pressure in liquids and stress on solids.</li> </ul>
<ul style="list-style-type: none"> <li>★ Particle model – Solids, liquids and gases, changes of state and diffusion.</li> <li>★ Separating mixtures – Pure substances and mixtures, solutions and separation techniques.</li> </ul>	<ul style="list-style-type: none"> <li>★ Elements – Atoms, elements, compounds, classifying substances and polymers.</li> </ul>	<ul style="list-style-type: none"> <li>★ Relationships in ecosystems – Food chains and webs, ecosystems, competition, flowers and pollination, fertilisation and germination and seed dispersal.</li> </ul>
<ul style="list-style-type: none"> <li>★ Cells – Animal and plant cells and unicellular organisms.</li> <li>★ Movement – Levels of organisation, skeleton, joints and muscles.</li> </ul>	<ul style="list-style-type: none"> <li>★ Digestion – Nutrients, food tests, unhealthy diet, digestive system and enzymes in digestion.</li> <li>★ Breathing – Gas exchange, breathing, drugs, alcohol and smoking.</li> </ul>	<ul style="list-style-type: none"> <li>★ Working scientifically and STEM project week.</li> </ul>

**Class of 2029 – Following year 2 of the Astrea 5-year science curriculum.**

Autumn Term	Spring Term	Summer Term
<p>★ Working like a Chemist – Chromatography.</p>	<p>★ Photosynthesis and respiration – Photosynthesis, leaves, investigating photosynthesis, plant minerals, aerobic respiration, anaerobic respiration and biotechnology.</p>	<p>★ Working like a Biologist – Practical.</p>
<p>★ Waves properties, light and sound – waves and energy, radiation and energy, waves and speed, loudness and amplitude, frequency and pitch, the ear and hearing, modelling waves, light, reflection, refraction, the eye and vision and colour.</p>	<p>★ Energy revisited – Energy stores, energy dissipation and energy project.</p>	<p>★ Earth structure – Earth structure, sedimentary rock, igneous and metamorphic rock, rock cycle and ceramics.</p> <p>★ Climate – Global warming, carbon cycle, climate change, extracting metals and recycling.</p>
<p>★ Acids and alkalis – Chemical reactions, acids and alkalis, indicators and pH, acid strength, neutralisation and making salts.</p> <p>★ Metals and non-metals – Chemical reactions of metals and non-metals, metals and acid, metals and oxygen, metals and water and displacement reactions.</p>	<p>★ Current and P.D – Potential difference, resistance, series and parallel, current and charging up.</p> <p>★ Electricity and magnetism – Magnets and magnetic fields, electromagnets, investigating electromagnets and using electromagnets.</p>	<p>★ Reproduction – Adolescence, reproductive systems, fertilisation and implantation, development of a foetus and menstrual cycle.</p>
<p>★ Working like a Physicist and STEM project week.</p>		<p>★ Working scientifically and STEM project week.</p>

**Class of 2028 – Following year 3 of the Astrea 5-year science curriculum.**

Autumn Term	Spring Term	Summer Term
★ Chemical reactions – Atoms in chemical reactions, combustion, thermal decomposition, conservation of mass, endothermic and exothermic reactions, energy level diagrams and bond energies.	★ Matter – Atoms and elements, mixtures, development of the atomic model, atomic structure, electron structure, the periodic table, group 1 elements, group 7 elements and group 0 elements.	★ Photosynthesis and respiration – Photosynthesis, rate of photosynthesis, building organic molecules, respiration and exercise.
★ Variation, evolution and inheritance – Variation, natural selection, extinction, preserving biodiversity, inheritance, DNA, genetics and genetic modification.	★ Cells – Animal and plant cells, microscopes, using microscopes, specialised cells and cell transport.	
★ Space – Night sky, Solar system, Earth, Moon and gravity.	★ Energy – Energy stores, gravitational potential energy, kinetic energy, elastic potential energy, power, energy dissipation, efficiency, energy demand, renewable energy and nuclear power.	★ Working scientifically week – chemistry based investigation. ★ Working scientifically week – physics based investigation. ★ Working scientifically week – biology based investigation. ★ End of year project.

## Class of 2027 – Following year 4 of the Astrea 5-year science curriculum.

Exam board and specification – AQA Trilogy Combined Science.

Autumn Term	Spring Term	Summer Term
<ul style="list-style-type: none"> <li>★ Cells – Eukaryotic cells, prokaryotic cells, specialised cells, growth and differentiation, cell division, stem cells and cell transport.</li> <li>★ Microscopy required practical.</li> <li>★ Osmosis required practical.</li> </ul>	<ul style="list-style-type: none"> <li>★ Organisation – Tissues and organs, digestive system, chemistry of food, enzymes, the heart, blood vessels, blood, health and disease, cancer, smoking, diet and exercise, alcohol, tissues and organs in plants, transport in plants and transpiration.</li> <li>★ Food tests required practical.</li> <li>★ Enzymes required practical.</li> </ul>	<ul style="list-style-type: none"> <li>★ Communicable Disease – Pathogens, the immune system, vaccination and testing drugs.</li> </ul>
<ul style="list-style-type: none"> <li>★ Atomic structure and the periodic table – History of them atom, structure of the atom, ions and isotopes, electronic structure and trends in the periodic table.</li> </ul>	<ul style="list-style-type: none"> <li>★ Energy Changes – Endothermic and exothermic reactions, energy level diagrams and calculating energy changes.</li> <li>★ Temperature changes required practical.</li> </ul>	<ul style="list-style-type: none"> <li>★ Chemical Changes – Reactivity series, reactions of group 1 metals, extracting metals, reactions of acids and electrolysis.</li> <li>★ Preparing a salt required practical.</li> <li>★ Electrolysis required practical.</li> </ul>
<ul style="list-style-type: none"> <li>★ Atomic Structure and Radiation – Atomic structure, development of the atomic model, isotopes, radioactivity including uses and dangers.</li> </ul>	<ul style="list-style-type: none"> <li>★ Electricity – Current, charge, PD, resistance, series and parallel circuits, national grid, cables and plugs, electrical power and current and energy transfer.</li> <li>★ Resistance of a wire required practical.</li> <li>★ Resistance n components required practical.</li> </ul>	<ul style="list-style-type: none"> <li>★ Forces – Contact and non-contact forces, weight, mass and gravity, work and energy transfer, force and extension, speed, velocity, acceleration, graphing motion, reaction times and stopping distances.</li> <li>★ Force and extension required practical.</li> <li>★ Acceleration required practical.</li> </ul>
<ul style="list-style-type: none"> <li>★ Energy – Energy stores, kinetic energy, gravitational potential energy, elastic potential energy, specific heat capacity, efficiency and energy resources.</li> <li>★ Specific heat capacity required practical.</li> </ul>	<ul style="list-style-type: none"> <li>★ Quantitative Chemistry – Calculating relative formula mass, conservation of mass and balancing equations.</li> </ul>	
<ul style="list-style-type: none"> <li>★ Bioenergetics – Photosynthesis and respiration.</li> <li>★ Photosynthesis required practical.</li> </ul>	<ul style="list-style-type: none"> <li>★ Particle Model – Solids, liquids and gases and density.</li> <li>★ Density required practical.</li> </ul>	
<ul style="list-style-type: none"> <li>★ Structure and bonding – States of matter, ions, ionic bonding and properties, covalent bonding, simple molecules, giant covalent structures, metallic bonding and properties.</li> </ul>		

## Class of 2026 – Following year 5 of the Astrea 5-year science curriculum.

Exam board and specification – AQA Trilogy Combined Science.

Autumn Term	Spring Term	Summer Term
<ul style="list-style-type: none"> <li>★ Homeostasis and Response – Homeostasis, the nervous system, reflex actions, endocrine system, regulating blood glucose and diabetes, regulating water and the kidneys, menstrual cycle and contraception.</li> <li>★ Reaction time required practical.</li> </ul>	<ul style="list-style-type: none"> <li>★ Chemical Analysis – Pure and impure substances, formulations, chromatography and testing gases.</li> <li>★ Chromatography required practical.</li> </ul>	★ REVISION.
<ul style="list-style-type: none"> <li>★ Rates of Reaction – Measuring rates of reaction and factors affecting rate of reaction.</li> <li>★ Rates of reaction required practical.</li> </ul>	<ul style="list-style-type: none"> <li>★ Ecology – Adaptations, interdependence, competition, predator-prey cycles, carbon cycle, water cycle, biodiversity and the effect of human interaction on ecosystems.</li> <li>★ Sampling habitats required practical.</li> </ul>	
<ul style="list-style-type: none"> <li>★ Variation and Inheritance – Sexual and asexual reproduction, variation, DNA and inheritance, inherited disorders, selective breeding, genetic modification and genetic engineering.</li> </ul>	<ul style="list-style-type: none"> <li>★ Atmospheric Chemistry – Composition and evolution of the Earth's atmosphere, greenhouse gases, carbon footprint and atmospheric pollutants and their effects.</li> </ul>	
<ul style="list-style-type: none"> <li>★ Organic Chemistry – Crude oil, fractional distillation, alkanes and alkenes, combustion of fuels and cracking.</li> </ul>	<ul style="list-style-type: none"> <li>★ Magnetism and Electromagnetism – Magnetism, Earth's magnetic field, electromagnets and the motor effect.</li> </ul>	
<ul style="list-style-type: none"> <li>★ Waves – Transverse and longitudinal waves, wave speed and electromagnetic spectrum.</li> <li>★ Wave speed required practical.</li> </ul>	<ul style="list-style-type: none"> <li>★ Using Resources – Obtaining potable water, sewage treatment and life cycle assessments.</li> <li>★ Analysis and purification of water required practical.</li> </ul>	