



Progression Map - Science

Curriculum Intent

The secondary curriculum at Bradford Academy intends to:

- Develop individuals who are respectful, responsible, and resilient and encourage them to be a shining light in their community.
- Ensure that learners develop knowledge and skills that lead to academic success and future opportunities.
- Create a culture of reading by maximising opportunities to read and broaden vocabulary during the school day and at home.
- Provide a breadth of subjects and experiences so that every individual can find and nurture their strengths and talents.
- Be ambitious for all of our learners by carefully planning for excellent achievement.
- Make use of a sound evidence base to ensure that lessons and teaching techniques are effective.

Science at Bradford Academy

The Science curriculum at Bradford Academy is designed to spark curiosity in and make Science relevant for all learners. The curriculum equips learners with the knowledge and skills required to respectfully question the world around them, critically evaluate information, and find innovative solutions to problems. It encourages learners to be responsible for their actions that impact the planet, future generations and the local environment. During Science lessons, learners are consistently provided with opportunities to develop a wide range of transferable and desirable skills such as evaluating information and testing hypothesis. By doing so, the curriculum produces resilient learners who aren't afraid to rise to a challenge and seek solutions to problems in a modern world. Science opens doors to a wide variety of career pathways and enables the learners to succeed in the choices that they make.



			By the end of Year 12	By the end of Year 13
Knowledge and Skills	Biology	Term 1	Unit 1 exam content – Cell structure, function and specialisation. Tissue structure and function (focusing on epithelial and endothelial tissue), and the nervous system (including electrocardiograms, neurotransmitters and a case study of Parkinson's disease) Unit 2 coursework content – Paper and Thin-Layer Chromatography of spinach and amino acids	Unit 5 exam content – Cardiovascular system and the cardiac cycle, ventilation and gas exchange in the lungs, renal system, cell transport mechanisms
		Term 2	Unit 3 exam content – Investigations into enzyme action and growing plants	Unit 8 coursework content - Structure, Function of, and health issues relating to Digestive System Unit 6 coursework content – investigating the effect of caffeine and alcohol on daphnia
		Term 3	Unit 3 exam content – Investigations into enzyme action and growing plants Unit 8 coursework content – Structure, Function of, and health issues relating to Musculoskeletal system, and Lymphatic System.	Project related tasks
	Chemistry	Term 1	Unit 1 exam content – Structure and Bonding of atoms (detailed study of covalent, ionic and metallic bonding, plus types of intermolecular forces). Patterns of reactivity and physical property trends across and down the periodic table. Unit 2 coursework content – Titration and Colorimetry to determine the concentration of an unknown solution	Unit 5 exam content – uses and production of substances, including aluminium, titanium, metal hydroxides, reactions in organic chemistry including stereoisomers, energy changes and cycles in chemical reactions
		Term 2	Unit 3 exam content – Investigations into rates of diffusion and burning fuels	Unit 14 coursework content – reactions and properties of aromatic compounds, types, uses and properties of isomers and an investigation into preparative organic reactions
		Term 3	Unit 3 exam content – Investigations into rates of diffusion and burning fuels	Project related tasks



			Unit 14 coursework content – Applications of Functional groups in Organic Chemistry	
	Physics	Term 1	Unit 1 exam content – Waves in communication – comparisons of transverse and longitudinal waves, the industrial application of diffraction gratings. Applications of fibre optics, and other waves in the electromagnetic spectrum. Unit 2 coursework content – Calorimetry – studying cooling curves of stearic acid and paraffin wax	Unit 5 exam content – Thermal physics in domestic and industrial applications, including idealised engine cycles (isothermal and adiabatic processes), materials in domestic and industrial applications including stress-strain graphs, elastic hysteresis and Young's modulus, Fluids in motion (looking at viscosity, Bernoulli's principle and rate of flow)
		Term 2	Unit 3 exam content – Investigations into electrical circuits	-
		Term 3	Unit 3 exam content – Investigations into electrical circuits	Project related tasks
	Working Scientifically	Term 1	Practical skills are developed through practical work of titration, colorimetry, calorimetry and chromatography. Numeracy skills are developed in calculating magnification, concentration of solutions and extensive graph work.	Dissection techniques are developed (heart, lungs and whole organism [rat]) Unit 5 Chemistry and Physics numeracy skills are deeply embedded as learners use new equations, and analyse and interpret complex graphs. Unit 4 coursework content – looking at health and safety, and communications in science organisations, as well as expert level organic synthesis techniques and analysis



		Term 2	Practical investigation techniques are developed in a range of scenarios, focusing on the planning, methodology, analysis (including an introduction to statistical analytical techniques), conclusions and evaluations	Unit 6 coursework content - investigating the effect of caffeine and alcohol on daphnia – researching for a literature review, planning an investigation, carrying out practical research and analysing results and outcomes
		Term 3	Research and extended writing skills are developed as individual coursework tasks are undertaken.	-
	Assessment		The Unit 1 exam is in January of Y12, with results coming through in April. The Unit 3 exam is in May. There is an opportunity to resit if required. Coursework deadlines are set in accordance with Pearson/Edexcel guidelines.	The Unit 5 exam is in January of Y13, with results coming through in April. There is an opportunity to resit if required. Coursework deadlines are set in accordance with Pearson/Edexcel guidelines.
	Knowledge and Skills Revisited		Biology – Cells Chemistry – Structure and Bonding Physics – Waves - All these topics are studied at GCSE Sciences, but extended, broadened and deepened at BTEC L3 Applied Science. Practical skills and investigative techniques are part of GCSE studies	Unit 8 content on Biological Systems revisits a lot of GCSE content.