Beamont Collegiate Academy Curriculum Map

Year: 8

Subject: Science

Intent	Implementation	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Clarity around knowledge	**Theme / topic**	Diet and Digestion Chemical Reactions (Continues into HT2)	Chemical Reactions Energy Stores and Transfers	Classification and Biomechanics The Earth's Resources (Continues into HT4)	The Earth's Resources Waves (Light and Sound) (Continues into HT5)	Waves (Light and Sound) Respiration and Breathing	Electricity Plant Biology
	Key substantive knowledge	**Biology:** **Structure and function of living organisms** **Nutrition and digestion** Content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed. Calculations of energy requirements in a healthy daily diet. The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases.	**Biology:** **N/A**	**Biology:** **Structure and function of living organisms** **The skeletal and muscular systems** The skeletal and muscular systems. The structure and functions of the human skeleton, to include support, protection, movement and making blood cells. Biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles.	**Biology:** **N/A**	**Biology:** **Gas Exchange Systems** The structure and functions of the gas exchange system in humans, including adaptations to function. The mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume. The impact of exercise, asthma and smoking on the human gas exchange.	**Biology:** **Nutrition and Digestion** Plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots. **Photosynthesis** The reactants in, and products of, photosynthesis, and a word equation. The dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to

		The tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts). The importance of bacteria in the human digestive system.		The function of muscles and examples of antagonistic muscles.		**Cellular Respiration** Aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life. A word summary for aerobic respiration. The process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration. The differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism.	use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere. The adaptations of leaves for photosynthesis. **Reproduction** Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. **Interactions and interdependencies** The importance of plant reproduction through insect pollination in human food security.

		Chemistry: **Atoms, elements and compounds** Chemical symbols and formulae for elements and compounds. Conservation of mass changes of state and chemical reactions. **Chemical Reactions** Chemical reactions as the rearrangement of atoms. Representing chemical reactions using formulae and using equations. Combustion, thermal decomposition, oxidation and displacement reactions. Reactions of acids with metals to produce a salt plus hydrogen. Reactions of acids with alkalis to	**Chemistry:** **See HT1**	**Chemistry:** **Earth and Atmosphere** The composition of the Earth. The structure of the Earth. The rock cycle and the formation of igneous, sedimentary and metamorphic rocks. Earth as a source of limited resources and the efficacy of recycling. **Materials** The order of metals and carbon in the reactivity series. The use of carbon in obtaining metals from metal oxides.	**Chemistry:** **See HT3**	**Chemistry:** **Chemical reactions** Chemical reactions as the rearrangement of atoms. Representing chemical reactions using formulae and using equations.	**Chemistry:** **Chemical reactions** Chemical reactions as the rearrangement of atoms. Representing chemical reactions using formulae and using equations.

		produce a salt plus water. **Energetics** Exothermic and endothermic chemical reactions (qualitative).					
		Physics: **Energy** Comparing energy values of different foods (from labels) (kJ). **Energy Changes and Transfers** Other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels.	**Physics:** **Energy** Comparing power ratings of appliances in watts (W, kW). Comparing amounts of energy transferred (J, kJ, kW hour). Domestic fuel bills, fuel use and costs. Fuels and energy resources. **Energy and Energy Transfers** Heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction)	**Physics:** **See HT2**	**Physics:** **Observed Waves** Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition. **Sound Waves** Frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound. Sound needs a medium to travel, the speed of sound in air, in water, in solids. Sound produced by vibrations of objects,	**Physics:** **See HT4**	**Physics:** **Forces** Forces as pushes or pulls, arising from the interaction between two objects. Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. Non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity. **Electricity** Electric current, measured in

			or radiation; such transfers tending to reduce the temperature difference: use of insulators. Other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels. **Changes in Systems** Energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change. Comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic		in loudspeakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal. Auditory range of humans and animals. **Energy and Waves** Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound; waves transferring information for conversion to electrical signals by microphone. **Light Waves** The similarities and differences between light waves and waves in matter. Light waves travelling through a vacuum; speed of light. The transmission of light through		amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge. Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. Differences in resistance between conducting and insulating components (quantitative). **Static Electricity** Separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects. The idea of electric field, forces acting across the space between objects not in contact.

			distortions and in chemical compositions. Using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes.		materials: absorption, diffuse scattering and specular reflection at a surface. Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye. Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras. Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.		

	Disciplinary knowledge	Scientific attitudes Experimental skills and investigations Analysis and evaluation Measurement	Scientific attitudes Experimental skills and investigations Analysis and evaluation Measurement	Scientific attitudes Experimental skills and investigations Analysis and evaluation Measurement	Scientific attitudes Experimental skills and investigations Analysis and evaluation Measurement	Scientific attitudes Experimental skills and investigations Analysis and evaluation Measurement	Scientific attitudes Experimental skills and investigations Analysis and evaluation Measurement
Clarity around sequencing	**Main links across the curriculum**	Diet and Digestion builds on the Cells and Organisation unit (Y7). Chemical Reactions builds on the Core Chemistry unit (Y7) and underpins the Further Chemical Reactions unit (Y9).	Energy Stores and Transfers underpins the Electricity unit (Y8) and the Electricity Generation unit (Y9).	Classification and Biomechanics builds on the Cells and Organisation unit (Y7), the Fundamental Forces unit (Y7) and underpins the Respiration and Breathing unit (Y8).	Waves (Light and Sound) builds on the Energy Stores and Transfers unit (Y8) Earth's Resources builds on the Chemical Reactions unit (Y8) and underpins the Further Chemical Reactions unit (Y9)	Respiration and Breathing builds on the Cells and Organisation unit (Y7) and the Classification and Biomechanics unit (Y8). It underpins the Plant Biology unit (Y8).	Electricity underpins the Electricity Generation unit (Y9). Plant Biology develops on the Cells and Organisation unit (Y7) and the Respiration and Breathing unit (Y8).
	Authentic cross curricular links	Maths: Data, graphs, calculating mean values Food Tech: Nutritional groups PSHE: physical health & wellbeing	Maths: Data, graphs, calculating mean values	PE: Structure and function of the human body Geography: Structure of the Earth and the Rock Cycle	Geography: Structure of the Earth and the Rock Cycle	PE: Structure and function of the human body	Maths: Data, graphs, calculating mean values Technology: Electricity

Vocabulary	**Key words**	Selected key words: Digestion, organ, Oesophagus, stomach, carbohydrate, protein, lipid, chemical, physical, reactant, product, exothermic, endothermic	Selected key words: Energy store, transfer, efficient, thermal, kinetic, conduction, convection, radiation, gravitational	Selected key words: Classification, group, Linnaean system, Vertebrates, Invertebrates, skeleton, exoskeleton, endoskeleton, muscle	Selected key words: Earth, structure, crust, rock, minerals, igneous, intrusive, extrusive, sedimentary, metamorphic, wave, transverse, longitudinal	Selected key words: Respiration, aerobic, anaerobic, oxygen, lungs, trachea, alveoli, gas exchange, surface area	Selected key words: Electrical current Circuit Potential difference Efficiency Electromagnet
Assessment	**Summative assessment**	End of Unit Summative Test Formative Assessment Throughout	End of Unit Summative Test Formative Assessment Throughout	End of Unit Summative Test Formative Assessment Throughout	End of Unit Summative Test Formative Assessment Throughout	End of Unit Summative Test Formative Assessment Throughout	End of Unit Summative Test Formative Assessment Throughout
Links to the real world / careers / PD		Nutritionist Science teacher Food scientist Chef Health Visitor Dentist Doctor / surgeon Nurse Midwife Sports scientist Personal trainer Food industry PHYS: Sports science	Sports science Engineer Nuclear scientist Chemist Pharmaceutical industry Chemical engineer Agriculture	Zoology Sports scientist Personal trainer Physiotherapist	Geologist Space science Engineer Nuclear scientist Meteorologist	Doctor Nurse Healthcare practitioner Therapist Sleep therapist Health scientist Pharmaceutical industry	Electrician Electrical engineer Plant biologist Ecologist Farming Agricultural scientist