Beamont Collegiate Academy Curriculum Map

Year: 10

Subject: Science

Intent	Implementation	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Clarity around knowledge	Theme / topic	• Transport in Cells • Disease • Reactivity of Metals •Particle Model of Matter	• Transport Systems • Bonding • The Periodic Table • Electrical Circuits	• The Digestive System • Quantitative Chemistry •Radioactivity	• Bioenergetics • Acids and Bases • Energy Changes • Forces in Action	• Defence Against Disease • Using Resources • Chemical Analysis	• The Nervous System • Chemistry of the Atmosphere •Energy Transfer
	Key substantive knowledge	**Transport in Cells** • Diffusion, osmosis and active transport. • Surface area to volume ratios. • Transport of molecules in unicellular structures. • Specialised exchange surfaces in multicellular organisms. **Diseases** •Relationship between health and disease. •Communicable and non- communicable disease. •Pathogens in plants and animals. •Body defences against pathogens.	**Transport Systems** • Importance of transport systems in multicellular organisms. • Relationship between structure and function of the human circulatory. **Bonding** • Changes of states of matter. • Types of chemical bonding: ionic, covalent and metallic. • Bulk properties of materials related to bonding and intermolecular forces. • Structures, bonding and properties of	**The Digestive System** • Enzymes. • Factors affecting the rate of enzymatic reactions. • Carbohydrates, proteins, nucleic acids and lipids as key biological molecules. **Quantitative Chemistry** • Determination of empirical formulae from the ratio of atoms of different kinds. • Balanced chemical equations, ionic equations and state symbols.	**Bioenergetics** • Photosynthesis as the key process for food production and therefore biomass for life. • The process of photosynthesis. • Factors affecting the rate of photosynthesis. • Importance of cellular respiration; aerobic and anaerobic. **Acids and bases** • The chemistry of acids; reactions with some metals and carbonates.	**Defence Against Disease** • Body defences against pathogens and the role of the immune system against disease. • Reducing and preventing the spread of infectious diseases in animals and plants. • The process of discovery and development of new medicines. **Using Resources.** • Life cycle assessment and recycling to assess environmental impacts.	**The Nervous System** • Principles of nervous coordination and control in humans. • The relationship between the structure and function of the human nervous system. • The relationship between structure and function in a reflex arc. **Chemistry of the Atmosphere** •Earth early atmosphere and how its evolved into todays. • Humans impact on the atmosphere.

		•Reducing and preventing spread of disease. •Impact of lifestyle on non-communicable diseases. **Reactivity of metals** •The chemistry of acids; reactions with some metals and carbonates. •Reduction and oxidation in terms of loss or gain of oxygen. •Extraction and purification of metals related to the position of carbon in a reactivity series. **Particle Model of Matter** • Particle model for states of matter. •Gas pressure • Density and density calculations.	diamond, graphite, fullerenes and graphene. **The Periodic Table** • The modern Periodic Table, showing elements arranged in order of atomic number. • Position of elements in the Periodic Table in relation to their atomic structure and arrangement of outer electrons. • Properties and trends in properties of elements in the same group. • Characteristic properties of metals and non-metals. • Chemical reactivity of elements in relation to their position in the Periodic Table. **Electrical Circuits** •Measuring resistance using p.d. and current measurements. •Quantity of charge flowing as the	**Radioactivity** • Nuclear models and its development. • Masses and sizes of nuclei, atoms and small molecules. • Differences in number of sub atomic particles in nuclei and isotopes. • Nuclear equations. • Ionisations of radiation. • Radioactive nuclei. • Radioactive materials, half- life, irradiation, contamination and hazards. • Nuclear fission, fusion and the suns energy.	**Energy changes** • Measurement of energy changes in chemical reactions (qualitative). • Bond breaking, bond making, activation energy and reaction profiles (qualitative). **Forces in action.** • Newton's First Law. • Resultant forces.	• Viability of recycling of certain materials. • The Earth's water resources and obtaining potable water. **Chemical Analysis** • Test for gases. •Chromatography and calculating Rf values. • Identification of ions.	• Greenhouse effect. **Energy transfer** • Energy change in systems. • Conservation of energy in a closed system.

			product of current and time. •Drawing circuit diagrams. •Calculating energy efficiency for any energy transfers •The domestic a.c. supply; live, neutral and earth mains wires, safety measures. •Power transfer related to p.d. and current, or current and resistance.				
	Disciplinary knowledge	•The development of scientific thinking. •Experimental skills and strategies. • Analysis and evaluation. • Vocabulary, units, symbols and nomenclature.	• The development of scientific thinking. • Experimental skills and strategies. • Analysis and evaluation. • Vocabulary, units, symbols and nomenclature.	• The development of scientific thinking. • Experimental skills and strategies. • Analysis and evaluation. • Vocabulary, units, symbols and nomenclature.	• The development of scientific thinking. • Experimental skills and strategies. • Analysis and evaluation. • Vocabulary, units, symbols and nomenclature.	• The development of scientific thinking. • Experimental skills and strategies. • Analysis and evaluation. • Vocabulary, units, symbols and nomenclature.	• The development of scientific thinking. • Experimental skills and strategies. • Analysis and evaluation. • Vocabulary, units, symbols and nomenclature.
Clarity around sequencing	Main links across the curriculum	**Transport in Cells:** •Y7 Cells and Organisms •Y8 Diet and digestions •Y9 Advanced Diet and Digestion, Microscopy	**Transport systems:** • Y7 Cells and organisation. • Y8 Cellular respiration and the breathing system. • Y9 Microscopy.	**The digestive system:** • Y8 Diet and Digestion •Y9 Advanced Diet and Digestion.	**Bioenergics:** • Y7 Cells and organisation. • Y8 Cellular respiration and breathing systems •Y8 Bioenergetics and classification.	**Defence against disease:** • Y7 Cells and organisation. • Y9 Microscopy. • Y11 Homeostasis and response. **Using Resources:**	**The nervous system.** • Y8 Classification and biomechanics. • Y11 Homeostasis and Response.

		•Y11 Homeostasis and Response. **Disease:** •Y7 Cells and organisation. •Y8 Nutrition, classification & biomechanics. •Y9 Microscopy. •Y11 Homeostasis and response. **Reactivity of metals:** •Y7 Core chemistry. •Y8 Physical change and chemical reactions. •Y9 Further chemical reactions •Y9 Atoms, elements and compounds. •Y11 Rates and equilibrium •Y11 Electrochemistry. **Particle Model of Matter** •Y7 The Particle Model •Pressure •Y9 Forces and motion •Y11 Acceleration.	**Bonding**: •Y7 The particle model •Y7 Core Chemistry. • Y9 Further chemical reactions • Atoms, elements and compounds. • Y11 Electrochemistry. **The periodic table:** • Y7 Particle model • Y7 Core chemistry •Y9 Atoms, elements and compounds. **Electrical Circuits** • Y8 Electricity and electromagnets. • Y9 Energy and Energy Resources. •Y11 Electricity in the home.	**Quantitative chemistry.** • Y7 Core chemistry. • Y9 Atoms, elements and compounds. **Radioactivity:** •Y7 The particle model. •Y9 Energy and Energy Resources.	**Acid and bases** • Y7 Core chemistry. • Y8 Physic changes and chemical reactions. • Y8 Further chemical reactions. • Y11 Rates and equilibrium. **Energy changes** • Y7 Core chemistry. • Y8 Physical and chemical reactions. • Y9 Further chemical reactions. • Y11 Rates and equilibrium. **Forces in action:** • Y7 Fundamental forces. • Y9 Forces and motion • Y9 Energy and Energy Resources. •Y11 Acceleration.	• Y8 The Earth's resources. • Y9 Atoms, elements and compounds. • Y11 Sustainability. **Chemical Analysis** •Y7 Solubility and Separation •Y7 Core Chemistry •Y9 Atoms, elements and compounds. •Y10 The Periodic Table.	**Chemistry of the Atmosphere:** •Y8 Earths Resources •Electrical Generation •Y10 Using Resources •Organic Chemistry **Energy transfer:** • Y8 Energy stores and transfers. • Y9 Energy and Energy Resources.

	Authentic cross curricular links	**Disease** •PE	**Transport Systems** •PE **Electrical Circuits** •Maths	**The Digestive System** •Hospitality. **Quantitative Chemistry** •Maths	**Forces in Action** •Maths	**Using Resources** •Geography.	**The Nervous System** •PE **Chemistry of the Atmosphere** •Geography **Energy Transfer** •Maths

Vocabulary	Key words	**Transport in Cells** Transport, diffusion, active transport, osmosis, concentration. **Disease** Virus, bacteria, protist, fungi, malignant tumour, benign tumour, non-communicable, communicable. **Reactivity of Metals** Oxidation, reduction, displacement, corrosion, sacrificial protection. **Particle Model of Mater** Density, mass, volume, regular, irregular, solid, liquid, gas, matter, boiling, evaporation, condensation, sublimination, melting, freezing, pressure.	**Transport Systems** Plasma, Platelets, Palisade mesophyll, Spongy mesophyll, Xylem, Phloem, Transpiration, Translocation. **Bonding** metallic bonding, ionic bonding, covalent bonding, intermolecular, electrostatic. **The Periodic Table** halogen, alkali metal, trend, lustrous, tarnish, displacement. **Electrical Circuits** Component, resistor, diode, thermistor, current, potential difference, resistance.	**The digestive system** Enzyme, catalyst, carbohydrates, protein, lipids, substrate, active site, metabolism. **Quantitative Chemistry** relative formula mass (M_r), limiting reactant, Avogadro constant, closed system, concentration, relative atomic mass. **Radioactivity** Nucleus, radioactive, half-life, irradiation, contamination.	**Bioenergics** photosynthesis, aerobic respiration, anaerobic respiration, metabolism, lactic acid. **Acid and Base** acid, base, alkali, concentration, neutralisation. **Energy Changes** endothermic, exothermic, activation energy, bond energy. **Forces in Action** resultant, moment, elasticity, linear, nonlinear, equilibrium, gravity.	**Defence against disease** Pathogen, vaccinations, antibodies, antibiotics. **Using Resources** Finite, renewable, natural resources, synthetic, potable water, pure water, sterilisation. **Chemical Analysis** Hydrogen, oxygen, carbon dioxide, chorine, litmus, sulfate, carbonate, halide, flame emission spectroscopy	**The Nervous System** receptor, sensory neurone, synapse, relay neurone, motor neurone, effector. **Chemistry of the Atmosphere** Evolution, methane, ammonia, carbonates, photosynthesis, deforestations. **Energy transfer** kinetic, elastic, Gravitational potential, latent heat, specific heat capacity, **Advanced Ecology** Ecosystem, interdependence, abiotic, biotic, photosynthetic transect, distribution, biodiversity, pyramid of biomass, tropic level.
Assessment	Summative assessment	**KP1 Biology –** Transport in Cells	**KP2 Biology –** Disease and Transport System	**Y10 PPE**	**KP4 Biology –** The Digestive System.	**KP5 Biology-** Bioenergetics	**Y10 PPE**

		KP1 Physics – Particle Model of Matter **KP1 Chemistry –** Reactivity of Metals	**KP2 Chemistry-** Bonding **KP2 Physics-** Electrical Circuits		**KP4 Chemistry-** Quantitative Chemistry and Acid & Bases **KP4 Physics-** Radioactivity	**KP5 Chemistry-** Energy Changes and Using Resources **KP5 Physics-** Forces in Action	
Links to the real world / careers / PD		**Transport in Cells** • Cell line Engineering. • Pathologist. **Disease** •Clinical Scientist •Medical science liaison •Academic research •Neurologist. **Reactivity of Metals** •Materials chemist. •Welder •Metallurgist **Particle Model of Matter** • Engineering • Geologist • Oceanographer	**Transport Systems** • Cardiologist. •Biomedical scientist. •Operation manager (serious hazards of transfusion). •Haematology. **Bonding** •Analytical chemist •Chemical engineer. •Teacher. **The Periodic Table** •Research chemist. •Forensic scientists. **Electrical Circuits** •Electrician •Electrical engineer •Electricity analyst.	**The Digestive System** •Nutritionist. •Dietitian •Gastroenterology. **Quantitative Chemistry** •Lab technician. •Optical materials researcher. •Analytical scientist. •Quantitative groundwater scientist. •Research scientist. **Radioactivity** •Radiographer •Radioactive waste process systems lead. •Radiation shielding engineer. •Nuclear radiation consultant.	**Bioenergetics** • Bioenergy mechanical engineer. •Research biologist •Respiratory therapist. **Acids and Bases** •Food scientists. •Soil and plant scientists. •Chemical technicians. **Energy Changes** •Chemical analyst. •Plant specialist. **Forces in Action** •Structural engineer. •Hydraulic modeller.	**Defence Against Disease** •Epidemiologist. •Vet. •Research scientist. **Using Resources** •Materials chemist •LCA consultant •LCA analysis. •Clean water engineer. •Water quality scientist. •Wastewater specialist. •Water treatment engineer. **Chemical Analysis** • Analytical Chemist. • Pharmaceutical Specialists. • Material Scientist. • R&D Engineer.	**The Nervous System** •Psychiatrist. •Neuroscience nurse. •Electro neurodiagnostic technician. **Chemistry of the Atmosphere** • Sustainability Analyst. • Plant reliability specialist. • Broadcast Meteorologist. **Energy Transfer** •Energy physics. •Academic research. **Advanced Ecology** •Local government and statutory agencies. •Consultancy •Science research •Media and public relations.