**Year 8 Science curriculum map**

**Beths Grammar School**

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| **Beths Grammar School - HomeSubject** | **INTENT** | **IMPLEMENTATION** | **IMPACT** |
| **Substantive Knowledge**  This is the specific, factual content for the topic, which should be connected into a careful sequence of learning. | **Disciplinary Knowledge (Skills)**  This is the action taken within a particular topic in order to gain substantive knowledge. | **Assessment opportunities**  What assessments will be used to measure student progress?  Evidence of how well students have learned the intended content. |
| **Biology** | **B2.1 – Health and Lifestyle**  (*Typically covered within 6 weeks, with 2 double lessons per fortnight*)   * Nutrients * Food tests * Unhealthy diet * Digestive system * Bacteria and enzymes in digestion * Drugs * Alcohol * Smoking | * Describe the components of a balanced diet (carbohydrates, proteins, lipids, vitamins, minerals, water and fibre). * Describe the role of nutrients. * Describe how to test for starch, sugar, proteins and lipids. * Describe the consequences of an unhealthy diet (underweight, overweight and deficiencies). * Plan and investigate the energy content of food. * Calculate the energy content of food. * Describe the structure and function of the digestive system (mouth, gullet, stomach, small and large intestines, rectum, anus and liver (bile)). * Describe the process of digestion. * Explain the role of villi in absorption. * Describe the roles of carbohydrase, protease and lipase in digestion. * Explain how enzymes denature. * Describe the different types of drugs (medicinal and recreational). * Describe how drugs can lead to addiction and withdrawal. * Describe how alcohol affects health, behaviour and pregnancy. * Describe the components of cigarettes (tar, nicotine and carbon monoxide). * Explain how smoking effects the airways, alveoli, cilia and mucus. * Explain how smoking can lead to heart disease, emphysema and respiratory infections. | * B2.1 end-of-unit test * Year 8 end-of-year exam |
| **Biology** | **B2.2 – Ecosystem Processes**  (*Typically covered within 6 weeks, with 2 double lessons per fortnight*)   * Ecosystems * Food chains and webs * Disruption to food chains and webs * Photosynthesis * Leaves * Plant minerals * Chemosynthesis * Aerobic and anaerobic respiration | * Define the terms *ecosystem*, *habitat*, *community*, *population* and *niche*. * Describe food chains in terms of producers and consumers. * Explain interdependence between organisms in food chains and webs. * Explain how bioaccumulation effects food chains. * Describe the process of photosynthesis. * Write and balance the symbol equation for photosynthesis. * Explain the factors affecting photosynthesis (temperature and light intensity) * Describe the roles of the xylem and phloem. * Describe the structure and function of leaves (palisade and spongy layers, and stomata). * Describe and explain the adaptations of leaves (chlorophyll, thin, large surface area and veins). * Describe the roles of nitrates (proteins and DNA), phosphates (proteins and DNA) and magnesium (chlorophyll). * Explain how fertilisers can be used to treat mineral deficiencies in plants. * Describe the process of chemosynthesis. * Describe symbioses/mutualisms between organisms. * Write and balance the symbol equation for aerobic respiration. * Describe and explain the role of the blood (oxygen, glucose and carbon dioxide transport). * Plan and investigate exercise and the rate of aerobic respiration. * Describe lactic acid and alcoholic fermentation and the oxygen debt. * Write the word equations for anaerobic respiration. * Describe the uses of alcoholic fermentation. | * B2.2 end-of-unit test * Year 8 end-of-year exam |
| **Chemistry** | **C2.1 & C2.2 – The Periodic Table and Separation Techniques**  *(Typically covered within 7 weeks, with 2 double lessons a fortnight)*   * Metals and non-metals * Groups and periods * The elements of Group 1, 7 and 0 * Mixtures * Solutions and solubility * Filtration, evaporation and distillation * Chromatography | * Use the Periodic table to identify elements and their properties. * Describe how the Periodic table is split into metals and non-metals. * Describe the physical and chemical properties of metals and non-metals. * Identify and describe the general patterns and trends of groups and periods. * Describe the physical and chemical properties of elements in Groups 1, 7 and 0. * Identify and describe patterns and trends in Groups 1, 7 and 0 (melting and boiling points, reactivity and density) * Describe the chemical reactions between alkali metals and water. * Predict the products of halogen displacement reactions. * Write and balance simple chemical equations. * Explain the differences between mixtures and compounds. * Identify pure substances using graphical data. * Describe dissolution in terms of the particle model. * Explain how temperature affects solubility. * Describe the uses of filtration, evaporation and distillation. * Plan and investigate filtration and evaporation to obtain salt. * Describe the uses of chromatography. * Use chromatography to identify an unknown substance. | * C2.1 & C2.2 end-of-unit test * Year 8 end-of-year exam |
| **Chemistry** | **C2.3 – Acids and Alkalis**  *(Typically covered within 6 weeks, with 2 double lessons a fortnight)*   * Metals acids, oxygen and water * Metal displacement reactions * Extracting metals * Ceramics * Polymers * Composites | * Use state symbols in chemical equations. * Describe chemical reactions between metals and acids. * Identify and describe trends in the reactivity series. * Plan and investigate reactions between metals and hydrochloric acid followed by testing for hydrogen. * Describe chemical reactions between metals and oxygen. * Describe chemical reactions between metals and water. * Predict the products of metals displacement reactions. * Write and balance simple chemical equations. * Describe how metals can be extracted from ores. * Calculate the mass of metals in ores. * Describe the uses and properties of ceramics, polymers (natural and synthetic) and composites. | * C2.3 end-of-unit test * Year 8 end-of-year exam |
| **Physics** | **P2.1 – Electricity and Magnetism**  *(Typically covered within 7 weeks, with 2 double lessons a fortnight)*   * Charging up * Circuits and current * Potential difference * Resistance * Magnets and magnetic fields * Electromagnets | * Describe the structure of the atom (protons, neutrons and electrons). * Describe how charged objects interact (attraction and repulsion). * Describe electric fields. * Explain how static electricity is generated. * Identify circuit components and their symbols (cell, battery, bulb, switch, ammeter, voltmeter, motor and wires). * Define the terms *current*, *potential difference* and *resistance*. * Draw and assemble a range of simple circuits (series and parallel). * Measure current and potential difference in a range of series and parallel circuits. * Describe how current and potential difference are distributed in series and parallel circuits. * Recall and apply the equation: potential difference = *current* × *resistance* * Explain the differences between conductors and insulators. * Describe how magnetic objects interact (attraction and repulsion). * Describe magnetic fields and how they can be generated when an electric current flows through a wire. * Describe the differences between permanent and electromagnets. * Explain the factors affecting the strength of an electromagnet (current, number of turns and type of core) * Plan and investigate the factors affecting the strength of an electromagnet. * Describe the uses of electromagnets. | * P2.1 end-of-unit test * Year 8 end-of-year exam |
| **Physics** | **P2.2 – Energy**  *(Typically covered within 6 weeks, with 2 double lessons a fortnight)*   * Food and fuels * Energy and temperature * Energy transfer * Energy resources * Power * Work, energy and machines | * Describe the daily energy requirements for a person. * Explain how energy balance affects body mass. * Describe the different energy stores (chemical, thermal, kinetic, gravitational potential and elastic potential energy stores) * Explain the law of conservation of energy. * Describe thermal energy in terms of the particle model. * Describe the different types of thermal energy transfer (conduction, convection and radiation). * Explain the differences between conductors and insulators. * Describe the use of infrared radiation in thermal imaging. * Describe the differences between renewable and non-renewable energy resources. * Explain how a thermal power station generates electricity. * Define the terms *power* and *work*. * Recall and apply the equation: *power* = *energy* / *time* * Convert between kilowatt hours and joules. * Recall and apply the equation: *work done* = *force* × *distance* * Describe how simple machines (levers and gears) work. | * P2.2 end-of-unit test * Year 8 end-of-year exam |

*N.B. Due to timetabling, the time of year in which the above topics are taught will vary between classes.*