**Year 8 Science curriculum map**

**Beths Grammar School**

|  |  |  |  |
| --- | --- | --- | --- |
| **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.*