


YEAR 7 SCIENCE CURRICULUM MAP

Beths Grammar School

Subject	INTENT	IMPLEMENTATION	IMPACT
	<p>Substantive Knowledge</p> <p>This is the specific, factual content for the topic, which should be connected into a careful sequence of learning.</p>	<p>Disciplinary Knowledge (Skills)</p> <p>This is the action taken within a particular topic in order to gain substantive knowledge.</p>	<p>Assessment opportunities</p> <p>What assessments will be used to measure student progress?</p> <p>Evidence of how well students have learned the intended content.</p>
<p>Biology</p>	<p>B1.1 – Cells (Typically covered within 4 weeks, with 2 double lessons per fortnight)</p> <ul style="list-style-type: none"> • Plant and animal cells • Specialised cells • Observing cells • Unicellular organisms • Movement of substances 	<ul style="list-style-type: none"> • Describe the structure and function of plant and animal cells (nucleus, mitochondrion, cell membrane, cytoplasm, chloroplast, vacuole and cell wall). • Describe and explain the adaptations of specialised cells (sperm, red blood, palisade and root hair cells). • Describe the parts and function of a microscope (stage, eyepiece lens, objective lenses, coarse focus, fine focus, light, slide, cover slip and stain). • Recall and apply the equation: $total\ magnification = eyepiece\ magnification \times objective\ magnification$ • Use a microscope to observe cells. • Mount and stain onion epidermal cells using iodine and cheek cells using methylene blue. • Produce biological drawings of prepared specimens. • Describe the structure and function of amoeba (pseudopod, food vacuole and contractile vacuole), euglena (flagellum, eyespot and contractile vacuole) and bacteria (no nucleus, cell wall and flagellum). • Define the term <i>diffusion</i>. • Describe the roles of diffusion (oxygen and glucose for respiration; water for photosynthesis and plant cell turgor). • Explain the factors affecting diffusion (temperature, surface area and distance). 	<ul style="list-style-type: none"> • B1.1 end-of-unit test • Year 7 end-of-year exam

Biology	<p>B1.2 – Structure and Function of Body Systems (Typically covered within 4 weeks, with 2 double lessons per fortnight)</p> <ul style="list-style-type: none"> • Levels of organisation • Gas exchange • Breathing • Skeleton • Joints • Muscles 	<ul style="list-style-type: none"> • Define the terms <i>cell</i>, <i>tissue</i>, <i>organ</i>, <i>organ system</i> and <i>organism</i>. • Describe the structure and function of different organ systems (circulatory, nervous, respiratory, skeletal and muscular systems). • Describe the processes of inhalation and exhalation, with reference to the ribcage, intercostal muscles, diaphragm, chest cavity and pressure differences. • Compare the composition of inhaled and exhaled air. • Use a bell jar as a model for the lungs. • Describe the structure and function of the skeleton (support, protection, movement and production of blood cells). • Describe the types of joints (hinge, ball-and-socket and fixed joints). • Describe the structure and function of a synovial joint (ligaments, tendons, cartilage and synovial fluid). • Explain the role of antagonistic muscle pairs. 	<ul style="list-style-type: none"> • B1.2 end-of-unit test • Year 7 end-of-year exam
	<p>B1.3 – Reproduction (Typically covered within 5 weeks, with 2 double lessons per fortnight)</p> <ul style="list-style-type: none"> • Adolescence • Reproductive systems • Fertilisation and implantation • Development of a foetus • The menstrual cycle • Flowers and pollination • Fertilisation and germination • Seed dispersal 	<ul style="list-style-type: none"> • Describe puberty in males and females and the roles of sex hormones (testosterone and oestrogen). • Describe the structure and function of the male reproductive system (testes, glands, sperm ducts, penis, urethra and sperm cell). • Describe the structure and function of the female reproductive system (ovaries, oviducts, uterus, cervix, vagina, urethra and egg cell). • Describe the stages of fertilisation and implantation (ovulation, cilia, ejaculation, fertilisation and implantation). • Describe and explain the structure and function of the uterus, placenta (large surface area and rich blood supply), umbilical cord, amniotic fluid and cervix. • Describe the stages of gestation and foetal development. • Describe the stages of the menstrual cycle. • Describe the different types of contraception (condom and pill). • Describe the structure and function of a flower (sepal, petal, stamen (anther and filament) and carpel (stigma, style and ovary)). • Describe the types of pollination (insect and wind pollination). • Dissect and identify the structures of a flower. • Produce biological drawings of the structures of a flower. • Describe the stages of fertilisation and germination in plants, including the roles of fruits and seeds. • Explain the requirements for germination (water, oxygen and warm temperature). • Describe the types of seed dispersal (wind, animal, water and explosive dispersal). 	<ul style="list-style-type: none"> • B1.3 end-of-unit test • Year 7 end-of-year exam

<p>Biology</p>	<p><u>B2.3 – Adaptations and Inheritance</u> <i>(Typically covered within 5 weeks, with 2 double lessons per fortnight)</i></p> <ul style="list-style-type: none"> • Competition and adaptation • Variation • Inheritance • Natural selection • Extinction 	<ul style="list-style-type: none"> • Describe competition in animals and plants. • Describe and explain how animals and plants are adapted to their environment. • Describe interdependence between organisms. • Analyse and explain predator-prey relationships. • Describe genetic, environmental, continuous and discontinuous variation. • Measure and analyse continuous and discontinuous data. • Draw graphs using continuous and discontinuous data. • Describe the structure and function of DNA, chromosomes and genes. • Describe the process of fertilisation in mammals. • Explain the principles of inheritance. • Outline the history of the discovery of DNA. • Explain the process of natural selection (survival, reproduction and genes being passed to offspring) and how this leads to evolution. • Explain how the fossil record provides evidence for evolution. • Describe the methods used to prevent extinction (seed banks, cryobanks and captive breeding). 	<ul style="list-style-type: none"> • B2.3 end-of-unit test • Year 7 end-of-year exam
<p>Chemistry</p>	<p><u>C1.1 – Particles and Their Behaviour</u> <i>(Typically covered within 5 weeks, with 2 double lessons a fortnight)</i></p> <ul style="list-style-type: none"> • The particle model • States of matter • Melting, freezing and boiling • More changes of state • Diffusion 	<ul style="list-style-type: none"> • Describe the properties of mixtures and substances. • Recall and apply the equation: $density = mass / volume$ • Use particle diagrams to describe and explain the different states of matter (solid, liquid and gas). • Explain the different changes of state (melting, freezing, boiling, evaporation, condensation and sublimation). • Use melting and boiling points to identify unknown substances. • Plan and investigate the melting points of substances. • Explain the factors affecting diffusion (temperature, particle size and state). 	<ul style="list-style-type: none"> • C1.1 end-of-unit test • Year 7 end-of-year exam

Chemistry	<p><u>C1.2 & C1.3 – Elements, Atoms, Compounds and Reactions</u> <i>(Typically covered within 6 weeks, with 2 double lessons a fortnight)</i></p> <ul style="list-style-type: none"> • Elements and atoms • Compounds • Chemical formulae • Word and symbol equations • Burning fuels • Thermal decomposition • Conservation of mass • Exothermic and endothermic reactions 	<ul style="list-style-type: none"> • Use the Periodic table to identify elements and their properties. • Describe the structure of the atom (protons, neutrons and electrons). • Describe the properties of elements, molecules and compounds. • State the names and formulae of simple compounds. • Describe chemical reactions and physical changes. • Describe the role of catalysts in chemical reactions. • Write and balance simple chemical equations. • Describe the combustion and oxidation of fossil and hydrogen fuels. • Plan and investigate the burning of fuels. • Describe decomposition and thermal decomposition. • Analyse the thermal decomposition rates of different carbonates using limewater. • Explain the law of conservation of mass. • Calculate the masses of reactants and products in chemical reactions. • Describe exothermic and endothermic changes. 	<ul style="list-style-type: none"> • C1.2 & C1.3 end-of-unit test • Year 7 end-of-year exam
	<p><u>C1.4 – Acids and Alkalis</u> <i>(Typically covered within 4 weeks, with 2 double lessons a fortnight)</i></p> <ul style="list-style-type: none"> • Acids and alkalis • Indicators and pH • Neutralisation • Making salts 	<ul style="list-style-type: none"> • Describe acids and alkalis in terms of H⁺, OH⁻, concentrated and dilute. • Describe the methods used to measure pH (universal indicator, litmus paper and pH probes). • Use the pH scale to determine the pH of an acid or alkali. • Describe bases and their role in neutralisation reactions. • Describe the uses of neutralisation. • Describe the reactions between acids and metals, and acids and bases, to make salts. • Write and balance simple chemical equations. • Plan and investigate the making of salts. 	<ul style="list-style-type: none"> • C1.4 end-of-unit test • Year 7 end-of-year exam

<p>Physics</p>	<p>P1.1 – Forces <i>(Typically covered within 4 weeks, with 2 double lessons a fortnight)</i></p> <ul style="list-style-type: none"> • Forces • Squashing and stretching • Drag forces and friction • Balanced and unbalanced forces • Forces at a distance 	<ul style="list-style-type: none"> • Describe contact and non-contact forces. • Identify and describe interaction pairs. • Draw force diagrams. • State Hooke's law and the elastic limit. • Plan and investigate Hooke's law. • Describe air and water resistance, and friction. • Describe how to reduce the effect of drag forces (lubrication and streamlining). • Calculate resultant forces. • Recall and apply the equation: $force = mass \times acceleration$ • Describe gravitational, magnetic and electrostatic forces and fields. • Recall and apply the equation: $weight = mass \times gravitational\ field\ strength$ 	<ul style="list-style-type: none"> • P1.1 end-of-unit test • Year 7 end-of-year exam
<p>Physics</p>	<p>P1.2 & P1.3 – Sound and Light <i>(Typically covered within 6 weeks, with 2 double lessons a fortnight)</i></p> <ul style="list-style-type: none"> • Waves • Sound and energy transfer • Loudness and pitch • Detecting sound • Echoes and ultrasound • Light • Reflection • Refraction • The eye and the camera • Colour 	<ul style="list-style-type: none"> • Describe the features of transverse and longitudinal waves (wavelength, amplitude and frequency). • Describe how waves interact (reflection and superposition). • Describe sound waves in terms of loudness and pitch. • Explain how the speed of sound waves is affected when travelling through different mediums. • Describe the structure and function of the ear (pinna, auditory canal, eardrum, ossicles, cochlea and auditory nerve). • Describe the structure and function of a microphone. • Analyse the audible range of different organisms. • Explain how sound waves produce echoes. • Describe the uses of ultrasound scanning. • State the light waves do not require a medium to travel through. • Describe reflection, specular reflection, diffuse scattering and refraction. • Explain how convex and concave lenses can be used to refract light. • Draw ray diagrams. • Calculate angles of incidence, reflection and refraction. • Describe the structure and function of the eye (cornea, lens, pupil, iris, retina, photoreceptors, optic nerve and brain) • Explain how pinhole and digital cameras work. • Describe primary and secondary colours and the use of filters. 	<ul style="list-style-type: none"> • P1.2 & P1.3 end-of-unit test • Year 7 end-of-year exam

Physics	<p><u>P2.3 – Motion and Pressure</u> <i>(Typically covered within 5 weeks, with 2 double lessons a fortnight)</i></p> <ul style="list-style-type: none"> • Speed • Motion graphs • Pressure in solids, liquids and gases • Turning forces 	<ul style="list-style-type: none"> • Describe instantaneous and average speed, and relative motion. • Recall and apply the equation: $speed = distance / time$ • Plan and investigate speed, distance and time. • Draw and analyse distance-time graphs. • Explain the factors affecting gas pressure (temperature, volume and number of particles) • Explain how depth effects liquid pressure. • Explain how liquid pressure causes object to float and sink. • Recall and apply the equation: $pressure = force / area$ • Explain the principle of moments. • Recall and apply the equation: $moment = force \times perpendicular\ distance\ from\ pivot$ 	<ul style="list-style-type: none"> • P2.3 end-of-unit test • Year 7 end-of-year exam
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N.B. Due to timetabling, the time of year in which the above topics are taught will vary between classes.