**Year 7 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**  | **B1.1 – Cells**(*Typically covered within 4 weeks, with 2 double lessons per fortnight*)* Plant and animal cells
* Specialised cells
* Observing cells
* Unicellular organisms
* Movement of substances
 | * 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* ´ *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 *diffusion*.
* 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).
 | * B1.1 end-of-unit test
* Year 7 end-of-year exam
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| **Biology** | **B1.2 – Structure and Function of Body Systems**(*Typically covered within 4 weeks, with 2 double lessons per fortnight*)* Levels of organisation
* Gas exchange
* Breathing
* Skeleton
* Joints
* Muscles
 | * Define the terms *cell*, *tissue*, *organ*, *organ system* and *organism*.
* 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.
 | * B1.2 end-of-unit test
* Year 7 end-of-year exam
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| **B1.3 – Reproduction**(*Typically covered within 5 weeks, with 2 double lessons per fortnight*)* Adolescence
* Reproductive systems
* Fertilisation and implantation
* Development of a foetus
* The menstrual cycle
* Flowers and pollination
* Fertilisation and germination
* Seed dispersal
 | * 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).
 | * B1.3 end-of-unit test
* Year 7 end-of-year exam
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| **Biology** | **B2.3 – Adaptations and Inheritance**(*Typically covered within 5 weeks, with 2 double lessons per fortnight*)* Competition and adaptation
* Variation
* Inheritance
* Natural selection
* Extinction
 | * 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).
 | * B2.3 end-of-unit test
* Year 7 end-of-year exam
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| **Chemistry**  | **C1.1 – Particles and Their Behaviour***(Typically covered within 5 weeks, with 2 double lessons a fortnight)** The particle model
* States of matter
* Melting, freezing and boiling
* More changes of state
* Diffusion
 | * 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).
 | * C1.1 end-of-unit test
* Year 7 end-of-year exam
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| **Chemistry** | **C1.2 & C1.3 – Elements, Atoms, Compounds and Reactions***(Typically covered within 6 weeks, with 2 double lessons a fortnight)** Elements and atoms
* Compounds
* Chemical formulae
* Word and symbol equations
* Burning fuels
* Thermal decomposition
* Conservation of mass
* Exothermic and endothermic reactions
 | * 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.
 | * C1.2 & C1.3 end-of-unit test
* Year 7 end-of-year exam
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| **C1.4 – Acids and Alkalis***(Typically covered within 4 weeks, with 2 double lessons a fortnight)** Acids and alkalis
* Indicators and pH
* Neutralisation
* Making salts
 | * 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.
 | * C1.4 end-of-unit test
* Year 7 end-of-year exam
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| **Physics**  | **P1.1 – Forces** *(Typically covered within 4 weeks, with 2 double lessons a fortnight)** Forces
* Squashing and stretching
* Drag forces and friction
* Balanced and unbalanced forces
* Forces at a distance
 | * 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* ´ *acceleration*
* Describe gravitational, magnetic and electrostatic forces and fields.
* Recall and apply the equation: *weight* = *mass* ´ *gravitational field strength*
 | * P1.1 end-of-unit test
* Year 7 end-of-year exam
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| **Physics** | **P1.2 & P1.3 – Sound and Light** *(Typically covered within 6 weeks, with 2 double lessons a fortnight)** Waves
* Sound and energy transfer
* Loudness and pitch
* Detecting sound
* Echoes and ultrasound
* Light
* Reflection
* Refraction
* The eye and the camera
* Colour
 | * 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.
 | * P1.2 & P1.3 end-of-unit test
* Year 7 end-of-year exam
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| **Physics** | **P2.3 – Motion and Pressure***(Typically covered within 5 weeks, with 2 double lessons a fortnight)** Speed
* Motion graphs
* Pressure in solids, liquids and gases
* Turning forces
 | * 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 ´ perpendicular distance from pivot
 | * 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.*