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| **Biology** | **Chemistry** | **Physics** |

**CURRICULUM OVERVIEW 2024 – 2025**

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| **YR 7** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Content** | Particles & their behaviour  The particle model  States of matter  Diffusion  Elements, atoms & compounds  Elements  Atoms | Elements, atoms & compounds  Compounds  Chemical formulae  Reactions  Chemical reactions  Word equations  Exothermic & endothermic | Cells  Observing cells  Plant vs animal cells  Specialised cells  Structure & function of body systems  Skeleton  Movement: joints & muscles | Reproduction in plants & animals  Reproductive systems  Fertilisation & implantation  Development of a Foetus  Flowers and pollination  Fertilisation & germination | Forces  Squashing & stretching  Drag forces & friction  Forces at a distance  Sound  Waves  Sound  Loudness & pitch | Light  Light  Reflection  Refraction  Space  The Solar System  The Earth  The Moon |
| **Key new knowledge** | **The Particle Model:**  Know the properties of different states of matter (solid, liquid, gas) in terms of the particle model, including gas pressure  **States of matter:**  Know the three different states (solid, liquid, gas)  Describe the different changes of state (melting, freezing, condensing, boiling, evaporating)  Know the arrangement, separation and movement of particles in the three states  **Diffusion:**  Define diffusion in terms of the particle model  State the three factors that affect diffusion  **Elements & atoms:**  Define elements and atoms  Describe differences between elements and atoms  Recognise chemical symbols for elements | **Compounds:**  Define a compound  Describe differences between elements, atoms and compounds  Use molecule diagrams  **Chemical formulae:**  Recognise chemical symbols and formulae for elements and compounds  Know how to give chemical formulae from given atoms and labelled molecule diagrams  **Chemical reactions:**  Define a chemical reaction  Know the difference between chemical reactions and physical changes  Know that chemical reactions are the rearrangement of atoms  Describe a catalyst  **Word equations:**  Represent chemical reactions using formulae and equations  Identify reactants and products in given chemical equations  **Endothermic & exothermic:**  Describe combustion (burning), thermal decomposition, oxidation, and displacement reactions | **Observing cells:**  Define a cell as the building blocks of lfe  Know how to use a microscope to observe cells  **Plant vs animal cells:**  Discuss the similartities and differences between plant and animal cells  List the components of plant and animal cells and their functions  Recognise a plant and animal cell diagram  Use a microscope to view plant and animal cells  **Specialised cells:**  State the functions and adapatations of specialised cells e.g. red blood cells, sperm cells, egg cells, nerve cells  **Skeleton:**  Know the structure and function of the human skeleton  State why we need a skeleton  Label the main bones in the skeleton  **Movement: joints & muscles:**  Understand the interaction between skeleton and muscles, including the measurement of force exerted by different muscles  Understand the function of muscles and examples of antagonistic muscles | **Reproductive systems:**  Understand reproduction in humans.  Label and explain the structure and function of the male and female reproductive systems  **Fertilisation & implantation:**  Define the male and female gametes (sex cells)  Understand the process of fertilisation and the steps for implantation to happen  **Development of a foetus:**  Define gestation  Understand the effect of maternal lifestyle on the foetus through the placenta  Describe the stages in the process of birth  **Flowers & pollination:**  Describe and label the structure of a flower  Know the process of reproduction in plants and wind and insect pollination  **Fertilisation & germination:**  Understand the process of fertilisation in plants  Know about seed and fruit formation  Describe the steps in germination | **Squashing & stretching:**  Know forces associated with deforming objects  Describe Hooke’s Law  **Drag forces & friction:**  Know forces associated with rubbing and friction between surfaces  Describe resistance to motion of air and water  Give examples of how drag forces and friction can be reduced  **Forces at a distance:**  Know that force is measured in newtons  Give examples of non-contact forces: gravity acting at a distance on Earth and in space  Calculate weight using the equation  **Waves:**  Describe different types of waves  Know features of waves and their behaviours  **Sound:**  Know that sound needs a medium to travel  Understand that sound is produced by vibrations of objects  **Loudness & pitch:**  Define frequency  Know that frequency of soundwaves is measured in hertz (Hz) | **Light:**  Know how light waves travel through a vacuum  Understand the transmission of light through materials: absorption, reflection at a surface  Understand the light year as a unit of astronomicasl distance  **Reflection:**  Understand diffuse scattering and specular reflection at a surface  **Refraction:**  Understand the use of ray model to explasin the refraction of light and action of convex lens in focusing  **The Solar System:**  Name the planets in the solar system  Understand our sun is a star in our solar system  **The Earth:**  Understand the seasons and the Earths tilt, day length at different times of year, in different hemispheres  **The Moon:**  Understand the phases of the moon  Know why we see the phases of the moon |
| **Assessments** | End of chapter test – kerboodle smart activate  Retrieval tasks  Questioning | End of chapter test – kerboodle smart activate | End of chapter test – kerboodle smart activate | End of chapter test – kerboodle smart activate | End of chapter test – kerboodle smart activate | End of chapter test – kerboodle smart activate |

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| **YR 8** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Content** | Health & Lifestyle  Nutrients  Food Tests  Digestive System  Drugs & alcohol Smoking  Biological Processes  Photosynthesis  Plant minerals  Aerobic & anaerobic respiration | Ecosystems  Food chains & webs  Ecosystems  Competition  Adapting to change  Inheritance  Variation  Inheritance  Extinction | The Periodic Table  Physical & chemical properties of metals and non-metals  Groups and periods  Separation Techniques  Pure substances  Mixtures  Solutions  Evaporation & distillation  Chromatography | The Earth  The Earth & its atmosphere  The Rock Cycle  The Carbon Cycle  Climate change  Recycling | Electricity & magnetism  Circuits and current  Potential difference  Resistance  Series & parallel  Electromagnets  Energy  Food and fuels  Energy resources  Energy adds up  Energy & power | Motion & pressure  Speed  Motion graphs  Pressure in gases  Pressure in liquids  Pressure on solids |
| **Key new knowledge** | **Nutrients:**  Understand the content of a healthy human diet  Give examples of carbohydrates, lipids, proteins, vitamins, minerals, fibre and water and explain why each is needed  **Food tests:**  Know the positive result of simple food tests for starch, sugars, protein and lipids.  **Digestive system:**  Know the tissues and organs of the human digestive system  Know the adaptations of the tissues and organs to function  Know how the digestive system digests food  **Drugs & smoking:**  Understand the effects of recreational drugs on behaviour, health, and life processes  **Photosynthesis:**  Know the reactants in, and products of, photosynthesis, and a word summary for photosynthesis  Understand the dependence of almost all life on Earth on the ability of photosynthetic organisms  **Plant minerals:**  Understand that plants make carbohydrrates in their leaves by photosynthesis  Understand that plants get minerals and water from the soil via their roots  **Aerobic & anaerobic respiration:**  Know that aerobic respiration in living organisms ebnables all the other chemical processes necessary for life  Understand the process of anaerobic respiration in humans and microorganisms  Give the word summary for aerobic and anaerobic respiration  Know the reactants and products formed in aerobic and anaerobic respiration | **Food chains & webs:**  Understand the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops  Construct a food chain and food web  **Ecosystems:**  Define the terms; habitat, community and ecosystem  Understand how different organisms exist within an ecosystem  **Competition:**  Understand the variation between species and individuals of the same species meaning some organisms compete more successfully than others  **Adapting to change:**  Understand changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce  **Variation:**  Know the differences between species and give examples of inherited and environmental variation  **Inheritance:**  Understand hereditary is the process by which genetic information is transmitted from one generation to the next  Give examples of inherited charactertics  **Extinction:**  Understand factors that may lead to extinction  Know the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material | **Physical & chemical properties of metals and non-metals:**  Understand the periodic table; periods and groups; metals and non-metals  Know the properties of metals and non-metals  Understand the varying physical and chemical properties of different elements  **Groups and periods:**  Understand the principles underpinning the Mendeleev periodic table  Recognise how patterns in reactions can be predicted with reference to the periodic table  **Pure substances:**  Understand the concept of a pure substance  Know how to identify pure substances  **Mixtures:**  Define a mixture as something which contains two or more substances  Know the difference between mixtures and compounds  **Solutions:**  Define solution, solute, solvent, and dissolve  Understand mixtures and dissolving.  **Evaporation & distillation:**  Know simple techniques for separating mixtures  Explain how evaporation works  Use distillation to separate mixtures  **Chromatography:**  To analyse chromatograms  Use chromatography to separate substances in a mixture | **The Earth & its atmosphere:**  Know the composition of the Earth  Understand the structure of the Earth  Understand the composition of the atmosphere  **The Rock Cycle:**  Understand the rock cycle and the formation of igneous, sedimentary, and metamorphic rocks  **The Carbon Cycle:**  Understand the production of carbon dioxide by human activity and the impact on the climate  **Climate change:**  Define climate change  Give examples of ways climate change can be prevented  **Recycling:**  Know the Earth is a source of limited resources and the efficacy of recycling  Give the advantages and disadvantages of recycling | **Circuits & current:**  Know that electric current is measured in amps,  Draw circuit diagrams  Use ammeters to measure current in a simple circuit  **Potential difference:**  Know that potential difference is measured in volts  Measure potential difference in a circuit  **Resistance:**  Know that resistance is measured in ohms  Understand the differences in resistance between conducting and insulating components  Investigate the resistance of a wire  **Series and parallel:**  Know the difference between series and parallel circuits  Know how current varies in series and parallel circuits  **Electromagnets:**  Know the magnetic effect of a current  Change the strength of electromagnets  **Food and fuels:**  Understand comparing energy values of different foods – from labels  Investigate energy in food  **Energy resources:**  Understand fuels and energy resources  Give examples of renewable and non-renewable energy resources  **Energy adds up:**  Understand other processes that involve energy transfer  Understand energy as a quantity that can be quantified and calculated  Know how to compare the starting with the final conditions of a system  **Energy and power:**  Comparing power ratings of appliances in watts  Understand domestic fuel bills, fuel cost and use  Calculate power and energy | **Speed:**  Understand speed and the quantitative relationship between average speed, distance, and time  Calculate average speed  **Motion graphs:**  Understand the representation of a journey on a distance-time graph  Plot motion graphs from given data  **Pressure in gases:**  Know that atmospheric pressure decreases with increase of height, as weight of air above decreases with height  **Pressure in liquids:**  Know that pressure in liquids increases with depth  Know why some objects float and some sink  **Pressure on solids:**  Know that pressure measured by ratio of force over area – acting normal to any surface  Calculate pressure  Give examples of situations where high and low pressures are useful |
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| **YR 9** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Content** | Cells  Plant and animal cells  Cell specialisation  Diffusion  Prokaryotic cells  Cell Systems  Digestive system & enzymes  Respiratory system & gas exchange  Circulatory system | Variation & Natural Selection  Natural selection & resistant bacteria  Maintaining biodiversity  Ecosystems  Particle model & state change  The particle model  States of matter  Sublimation  Energy transfer | Atoms & the Periodic Table  The development of the periodic table  Inside atoms  Elements, compound & mixtures  Electronic structure  Bonding | Chemical Changes  Conservation of mass  Energy in chemical reactions  Exothermic & endothermic  Forces & Motion  Forces & interactions  Mass, weight & fields  Balanced & unbalanced  Resultant forces | Energy  Energy stores  Energy transfers  Conservation & dissipation  Efficiency  Waves, sound & light  Wave properties  Reflection & refraction  Light & colour  The electromagnetic spectrum | Electricy & Magnetism  Static electricity & charge  Current, potential difference & resistance  Series and parallel  Magnetism  Alternating current & The National Grid |
| **Key new knowledge** | **Plant & animal cells:**  Know that cells are the fundamental unit of living organisms  Know the functions of the cell wall, cell membrane, cytoplasm, mitochondria, nucleus, vacuole, and chloroplasts  Know the similarities and differences between animal and plant cells  **Cell specialisation:**  Know the adaptations of specialised animal and plant cells  **Diffusion:**  Understand the role of diffusion in the movement of materials in and between cells  **Prokaryotic cells:**  Define a prokaryotic & eukaryotic cell  Know the main sub-cellular structures of prokaryotic and eukaryotic cells  **Digestive system & enzymes:**  Know the tissues and organs of the digestive system  Define an enzyme  **Respiratory system & gas exchange:**  Know the structure and functions of the gas exchange system in humans  Understand the mechanism of breathing to move air in and out of the lungs  Know the impact of exercise, asthma, and smoking on the human gas exchange system  **Circulatory system:**  Know the hierarchial organisation of multicellular organisms  Understand the relationship between the structure and functions of the human circulatory system | **Natural selection & resistant bacteria:**  Know how antibiotic resistant bacteria evolve  Understand the process of natural selection  How do species evolve in terms of natural selection  **Maintaining biodiversity:**  know the importance of biodiversity  understand positive and negative human interactions with ecosystems  **Ecosystems:**  Understand how organisms affect, and are affected by, their environment, including the accumulation of toxic materials  Give some biotic and abiotic factors that affect communities  **The particle model:**  Explain properties of a substance in its three states  Know about evidence for the particle model – Brownian motion  **States of matter:**  Interpret data  Know the movement, arrangement, and separation of particles in foam and aerosols  **Sublimation:**  Interpret sublimation data in air fresheners  Use the particle model to explain applications of sublimation  **Energy transfer:**  Measure energy changes in chemical reactions  Understand the changes of state of matter in terms of particle kinetics, energy transfers and the relative strength of chemical bonds and intermolecular forces | **The development of the periodic table:**  Know the contributions of different scientists to the development of the periodic table  **Inside atoms:**  Understand the structure of an atom  Know how to use models and analogies  **Elements, compounds, and mixtures:**  Know how the uses of elements, compounds, and mixtures depend on their properties  Use ratios to determine chemical formulae  **Electronic structure:**  Draw the electronic structures of the atoms of the first 18 elements of the periodic table  Use scientific knowledge to make predictions  **Bonding:**  Understand ionic and covalent bonding  Draw dot and cross diagrams for ionic and covalent substances | **Conservation of mass:**  Understand and apply the idea of conservation of mass  **Energy in chemical reactions:**  Know about energy changes in combustion reactions  Know how to analyse results and make conclusions  **Exothermic and endothermic:**  Interpret observations and date to decide if a change is exothermic or endothermic  **Forces and interactions:**  Use Newton’s Third Law to explain how forces arise, and change motion  **Mass, weight, & fields:**  Understand the link between forces and fields, and do calculations  Know about systemic and random errors  **Balanced and unbalanced forces:**  Understand equilibrium and circular motion in terms of forces  **Resultant forces:**  Use ideas about vectors and scalers to calculate resultant forces | **Energy stores:**  Know how ideas about energy have changed  Think about situations in terms of energy stores  **Energy transfers:**  Understand different rates of thermal energy transfer and how to investigate them  **Conservation & dissipation:**  Use energy conservation and dissipation in energy analyses  Know how to reduce dissipation  **Efficiency:**  Understand what is meant by efficient and calculate efficiency  **Wave properties:**  Understand properties of waves including seismic waves  **Reflection & refraction:**  Use ray diagrams to explain illusions caused by reflection and refraction  Use reflection and refraction to explain how telescopes and curved mirrors work  **Light & colour:**  Understand how ideas about light have changed, and explain the link between the colours of the spectrum, primary, and secondary colours.  **The electromagnetic spectrum:**  Know the waves of the lectromagnetic spectrum, and describe how and why some of them are dangerous. | **Static electricity & charge:**  Separation of positive or negative charges when objects are rubbed together  The idea of electric field, forces acting across the space between objects not in contact  **Current, potential difference & resistance:**  know the difference between current, potential difference, and resistance using models and ideas about fields  **Series & parallel:**  Know some of the uses of series and parallel circuits, and how they’re used to sense the environment  **Magnetism:**  Explore the magnetic fields of permanent and induced magnets, and the Earth’s magnetic field using a compass  **Alternating current & the National Grid:**  Know how transformers are used in the national grid and the reasons for their use |
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