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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 behaviourThe particle modelStates of matterDiffusion Elements, atoms & compoundsElements Atoms | Elements, atoms & compoundsCompoundsChemical formulaeReactionsChemical reactionsWord equationsExothermic & endothermic | Cells Observing cellsPlant vs animal cellsSpecialised cellsStructure & function of body systemsSkeleton Movement: joints & muscles | Reproduction in plants & animalsReproductive systemsFertilisation & implantationDevelopment of a FoetusFlowers and pollinationFertilisation & germination | ForcesSquashing & stretchingDrag forces & frictionForces at a distanceSoundWavesSound Loudness & pitch  | LightLight ReflectionRefractionSpaceThe Solar SystemThe EarthThe 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 modelState the three factors that affect diffusion**Elements & atoms:**Define elements and atomsDescribe differences between elements and atomsRecognise chemical symbols for elements | **Compounds:**Define a compoundDescribe differences between elements, atoms and compoundsUse molecule diagrams**Chemical formulae:**Recognise chemical symbols and formulae for elements and compoundsKnow how to give chemical formulae from given atoms and labelled molecule diagrams**Chemical reactions:**Define a chemical reactionKnow the difference between chemical reactions and physical changesKnow that chemical reactions are the rearrangement of atomsDescribe a catalyst**Word equations:**Represent chemical reactions using formulae and equationsIdentify 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 lfeKnow how to use a microscope to observe cells**Plant vs animal cells:**Discuss the similartities and differences between plant and animal cellsList the components of plant and animal cells and their functionsRecognise a plant and animal cell diagramUse 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 skeletonState 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 musclesUnderstand 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 gestationUnderstand the effect of maternal lifestyle on the foetus through the placentaDescribe the stages in the process of birth**Flowers & pollination:**Describe and label the structure of a flowerKnow 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 formationDescribe the steps in germination | **Squashing & stretching:**Know forces associated with deforming objectsDescribe Hooke’s Law**Drag forces & friction:**Know forces associated with rubbing and friction between surfacesDescribe resistance to motion of air and waterGive examples of how drag forces and friction can be reduced**Forces at a distance:**Know that force is measured in newtonsGive examples of non-contact forces: gravity acting at a distance on Earth and in spaceCalculate weight using the equation**Waves:**Describe different types of wavesKnow features of waves and their behaviours**Sound:**Know that sound needs a medium to travelUnderstand that sound is produced by vibrations of objects**Loudness & pitch:**Define frequencyKnow that frequency of soundwaves is measured in hertz (Hz) | **Light:**Know how light waves travel through a vacuumUnderstand the transmission of light through materials: absorption, reflection at a surfaceUnderstand 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 systemUnderstand 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 moonKnow why we see the phases of the moon |
| **Assessments** | End of chapter test – kerboodle smart activateRetrieval tasksQuestioning  | 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 & LifestyleNutrientsFood TestsDigestive SystemDrugs & alcohol SmokingBiological ProcessesPhotosynthesis Plant mineralsAerobic & anaerobic respiration | EcosystemsFood chains & websEcosystems CompetitionAdapting to changeInheritanceVariationInheritanceExtinction  | The Periodic TablePhysical & chemical properties of metals and non-metalsGroups and periods Separation TechniquesPure substancesMixtures SolutionsEvaporation & distillationChromatography  | The EarthThe Earth & its atmosphereThe Rock CycleThe Carbon CycleClimate changeRecycling | Electricity & magnetismCircuits and currentPotential differenceResistanceSeries & parallelElectromagnets EnergyFood and fuelsEnergy resourcesEnergy adds upEnergy & power | Motion & pressureSpeedMotion graphsPressure in gasesPressure in liquidsPressure on solids |
| **Key new knowledge** | **Nutrients:**Understand the content of a healthy human dietGive 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 systemKnow the adaptations of the tissues and organs to functionKnow 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 photosynthesisUnderstand 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 photosynthesisUnderstand 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 lifeUnderstand the process of anaerobic respiration in humans and microorganisms Give the word summary for aerobic and anaerobic respirationKnow 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 cropsConstruct a food chain and food web**Ecosystems:**Define the terms; habitat, community and ecosystemUnderstand 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 nextGive examples of inherited charactertics **Extinction:**Understand factors that may lead to extinctionKnow 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-metalsKnow the properties of metals and non-metalsUnderstand the varying physical and chemical properties of different elements**Groups and periods:**Understand the principles underpinning the Mendeleev periodic tableRecognise how patterns in reactions can be predicted with reference to the periodic table**Pure substances:**Understand the concept of a pure substanceKnow how to identify pure substances **Mixtures:**Define a mixture as something which contains two or more substancesKnow the difference between mixtures and compounds **Solutions:**Define solution, solute, solvent, and dissolveUnderstand mixtures and dissolving. **Evaporation & distillation:**Know simple techniques for separating mixturesExplain how evaporation worksUse distillation to separate mixtures**Chromatography:**To analyse chromatogramsUse chromatography to separate substances in a mixture | **The Earth & its atmosphere:**Know the composition of the EarthUnderstand the structure of the EarthUnderstand 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 changeGive examples of ways climate change can be prevented**Recycling:**Know the Earth is a source of limited resources and the efficacy of recyclingGive the advantages and disadvantages of recycling | **Circuits & current:**Know that electric current is measured in amps, Draw circuit diagramsUse ammeters to measure current in a simple circuit**Potential difference:**Know that potential difference is measured in voltsMeasure potential difference in a circuit**Resistance:**Know that resistance is measured in ohmsUnderstand the differences in resistance between conducting and insulating componentsInvestigate the resistance of a wire**Series and parallel:**Know the difference between series and parallel circuitsKnow how current varies in series and parallel circuits**Electromagnets:**Know the magnetic effect of a currentChange the strength of electromagnets**Food and fuels:**Understand comparing energy values of different foods – from labelsInvestigate energy in food**Energy resources:**Understand fuels and energy resourcesGive examples of renewable and non-renewable energy resources**Energy adds up:**Understand other processes that involve energy transferUnderstand energy as a quantity that can be quantified and calculatedKnow how to compare the starting with the final conditions of a system **Energy and power:**Comparing power ratings of appliances in wattsUnderstand 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 graphPlot 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 depthKnow why some objects float and some sink**Pressure on solids:**Know that pressure measured by ratio of force over area – acting normal to any surfaceCalculate pressureGive examples of situations where high and low pressures are useful |
| **Assessments** | End of chapter test – kerboodle smart activateRetrieval tasksQuestioning  | 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 9** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Content** | Cells Plant and animal cellsCell specialisationDiffusion Prokaryotic cellsCell SystemsDigestive system & enzymesRespiratory system & gas exchangeCirculatory system | Variation & Natural SelectionNatural selection & resistant bacteriaMaintaining biodiversityEcosystems Particle model & state changeThe particle modelStates of matterSublimationEnergy transfer | Atoms & the Periodic TableThe development of the periodic tableInside atomsElements, compound & mixturesElectronic structureBonding  | Chemical ChangesConservation of massEnergy in chemical reactionsExothermic & endothermicForces & MotionForces & interactionsMass, weight & fieldsBalanced & unbalancedResultant forces | EnergyEnergy storesEnergy transfersConservation & dissipationEfficiencyWaves, sound & light Wave propertiesReflection & refractionLight & colourThe electromagnetic spectrum | Electricy & MagnetismStatic electricity & chargeCurrent, potential difference & resistanceSeries and parallelMagnetismAlternating current & The National Grid |
| **Key new knowledge** | **Plant & animal cells:**Know that cells are the fundamental unit of living organismsKnow the functions of the cell wall, cell membrane, cytoplasm, mitochondria, nucleus, vacuole, and chloroplastsKnow 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 cellKnow the main sub-cellular structures of prokaryotic and eukaryotic cells**Digestive system & enzymes:**Know the tissues and organs of the digestive systemDefine an enzyme**Respiratory system & gas exchange:**Know the structure and functions of the gas exchange system in humansUnderstand the mechanism of breathing to move air in and out of the lungsKnow the impact of exercise, asthma, and smoking on the human gas exchange system**Circulatory system:**Know the hierarchial organisation of multicellular organismsUnderstand the relationship between the structure and functions of the human circulatory system | **Natural selection & resistant bacteria:**Know how antibiotic resistant bacteria evolveUnderstand the process of natural selectionHow do species evolve in terms of natural selection**Maintaining biodiversity:**know the importance of biodiversityunderstand positive and negative human interactions with ecosystems**Ecosystems:** Understand how organisms affect, and are affected by, their environment, including the accumulation of toxic materialsGive some biotic and abiotic factors that affect communities**The particle model:**Explain properties of a substance in its three statesKnow about evidence for the particle model – Brownian motion**States of matter:**Interpret dataKnow the movement, arrangement, and separation of particles in foam and aerosols**Sublimation:**Interpret sublimation data in air freshenersUse 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 atomKnow how to use models and analogies**Elements, compounds, and mixtures:**Know how the uses of elements, compounds, and mixtures depend on their propertiesUse ratios to determine chemical formulae**Electronic structure:**Draw the electronic structures of the atoms of the first 18 elements of the periodic tableUse scientific knowledge to make predictions**Bonding:** Understand ionic and covalent bondingDraw 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 reactionsKnow 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 calculationsKnow 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 changedThink 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 analysesKnow 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 refractionUse 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 togetherThe 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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