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| **YR 10** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Content** | Unit 1: Building Blocks  States of matter  Matter & particles  Density  Internal energy  Specific heat capacity  Specific latent heat  Atomic Structure  Scientific models of the atom  Sub-atomic particles  Electronic structures | Unit 1: Building Blocks  Cells in animals and plants  Eukaryotic and prokaryotic cells  Diffusion  Osmosis  Active transport  Cell division  Waves  The nature of waves  Light, infrared, microwaves & radiowaves  Communications  Ultraviolet, x-rays, & gamma rays  X-rays in medicine | Unit 6: Interactions over small and large distances  Forces and energy changes  Vectors and scalars  Forces between objects  Resultant forces  Forces and elasticity  Structure and bonding  Atoms into ions  Ionic bonding  Giant ionic structures  Covalent bonding  Structure of simple molecules  Giant covalent structures  Bonding in metals  Giant metallic structures  Magnetism and electromagnetism  Magnetic Fields  Electromagnetism | Unit 3: Interactions with the environment  Lifestyle and health  Health & disease  Non-communicable diseases  Smoking & the risk of disease  Diet, exercise and disease  Alcohol and other carcinogens  Principles of homeostasis  The control of blood glucose levels  Human reproduction  Radiation and risk  Atoms and radiation  Radioactivity  Nuclear charges  Penetrating properties of radiation  Radiation hazards | Unit 3: Interactions with the environment  Preventing, treating, and curing diseases  Pathogens & disease  Preventing infections  Viral diseases  Bacterial diseases  Human defence responses  Vaccination  Antibiotics and medicine  Stem cells in medicine | Unit 8: Guiding spaceship Earth to a sustainable future  Carbon chemistry  Fullerenes & graphene  Hydrocarbons  Fractional distillation of oil  Cracking hydrocarbons  Resources of materials and energy  Extracting metals  Energy demands  Energy from wind and water  Solar power  Energy & the environment  Reduce, reuse, recycle |
| **Key new knowledge** | **States of matter:**  Name the changes of state  Changes that occur in terms of energy changes & particle behaviour.  Calculate density.  Measure specific heat capacity & latent heat of vaporisation.  **Atomic Structure:**  Sub-atomic particles & structure of an atom.  Use the periodic table to deduce the number of sub-atomic particles in atoms, ions, & isotopes.  Rules of placing electrons in each energy level of an atom.  Standard electronic notations and electronic structure of some elements. | **Cells in animals & plants:**  Movement occurs in diffusion, osmosis, and active transport.  Interpret diagrams showing diffusion, osmosis, and active transport.  Mitosis and meiosis, relating to cell division.  **Waves:**  Amplitude, wavelength, peak, and trough of a wave.  Wave equations  Different parts of the electromagnetic spectrum. | **Forces and energy changes:**  Examine physical quantities  The nature and representation of vectors and scalars  The action of individual forces on objects  Newton’s First Law of motion  Energy changes  Apply concepts of elastic behaviour and linear stretching  **Structure and bonding:**  Different types of bonding in substances  Formation of ions  Formation of ionic and covalent bonds  Formation of alloys  **Magnetism and electromagnetism:**  Magnetic fields in terms of field lines or lines of force  Explore the shape of fields  The magnetic effect of a current-carrying wire. | **Lifestyle and health:**  Lifestyle factors that can affect health  The difference between communicable and non-communicable diseases  Different treatments for cardiovascular disease, the risks and benefits associated with treatment  Homeostasis in the body and the control of blood sugar levels  Causes, effects, and treatments of type 1 and type 2 diabetes  **Radiation and risk:**  What happens when atoms lose energy  Measuring radioactivity  Radioactive decay in the form of a nuclear equation  Calculate half life  Hazards associated with radiation, including cancer  Different causes of cancer  Benefits and risks of treatments available for cancer | **Preventing, treating, and curing diseases:**  How disease affects the body  How diseases are caused by pathogens  Methods to prevent the spread of disease  The body’s different defence mechanisms  How vaccination works  Uses of other medicinal drugs; antibiotics and painkillers  Double-blind trials  Recent advancements in the treatment of diseases  The role of genetic modification and stem cells in modern medicine | **Carbon chemistry:**  The structure, properties, and uses of large carbon molecules, fullerenes, and graphene’s  The structure of the first four alkanes (methane, ethane, propane, and butane)  Complete and incomplete combustion of hydrocarbons  The structure of the alkenes produced in cracking  **Resources of materials and energy:**  Extraction of metals from their ores  The extraction of aluminium from its oxide through electrolysis  The UK’s energy demands and ways to meet this demand  How systems can be analysed in terms of energy  Calculate the efficiency of a range of energy transfer processes |
| **Assessments** | End of chapter summary questions.  Required practical notes and observations.  Retrieval tasks.  Practice exam questions. | End of chapter summary questions.  Required practical notes and observations.  Retrieval tasks.  Practice exam questions. | End of chapter summary questions.  Required practical notes and observations.  Retrieval tasks.  Practice exam questions. | End of chapter summary questions.  Required practical notes and observations.  Retrieval tasks.  Practice exam questions. | End of chapter summary questions.  Required practical notes and observations.  Retrieval tasks.  Practice exam questions. | End of chapter summary questions.  Required practical notes and observations.  Retrieval tasks.  Practice exam questions. |

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| **YR 11** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Content** | Unit 5: Building blocks for understanding  The periodic table  Development of the periodic table  Group 1 – the alkali metals  Group 7 – the halogens  Chemical quantities  Atoms, elements & compounds  Chemical equations  Relative masses & moles  Concentrations of solutions | Unit 2: Transport over larger distances  Systems in the human body  Exchanging materials  The blood  The heart  Breathing & gas exchange  How the digestive system works  The human nervous system  Reflex actions  Principles of hormonal control  Plants & photosynthesis  Specialised plant cells  Plant tissues & organs  Evaporation & transpiration  Photosynthesis  Plant diseases  Chlorophyll & chromatograms | Unit 7: Movement & Interactions  Forces and motion  Speed & distance-time graphs  Velocity & acceleration  Analysing motion graphs  Free fall & terminal velocity  Electricity  Series circuits  Parallel circuits  Direct & alternating currents  Energy & power  The rate and extent of chemical change  Measuring rate of reaction  Collision theory & surface area  The effect of temperature  The effect of concentration  The effect of catalysts  Reversible reactions | Unit 4: Explaining change  The Earth’s atmosphere  History of the Earth’s atmosphere  Material recycling  The Carbon Cycle  The greenhouse effect  Atmospheric pollutants  Potable water  Ecosystems and biodiversity  Organisation in ecosystems  Feeding relationships  Competition in animals and plants  Field investigations  Inheritance, variation & evolution  DNA & the genome  Inheritance in action  Variation  Evolution by natural selection  Classification systems  Selective breeding  Genetic engineering | Exam Preparation  Exams | Exam Preparation  Exams |
| **Key new knowledge** | **The Periodic Table:**  The development of the Periodic Table from its experimental origins  Interpret chemical formulae  Physical and chemical properties of group 1 and group 7 elements  Electron configurations  **Chemical quantities:**  How chemical symbols are used and what they represent  Skills in writing chemical equations for different reactions  Balancing equations  Relative atomic mass and relative formula mass for compounds  Calculating the concentration of a solution | **Systems in the human body:**  Outline the processes that occur in the gas exchange system, circulatory system, digestive system, nervous system, and endocrine system  Identify the different blood vessels and major components of blood  know the major parts of the nervous and endocrine systems  **Plants & photosynthesis:**  The adaptation of cells and tissues in a plant  The requirement of photosynthesis  Process of transpiration  Chromatography to separate pigments or dyes | **Forces and motion:**  Analyse distance-time graphs  Use the speed equation  Analyse motion using using velocity-time graphs  Analyse motion using using concepts of kinetic energy and energy transfer  **Electricity:**  Calculate the charge flow in an electric circuit  Calculate the power of an electrical appliance  Work out potential difference and resistance in an electric circuit | **The Earth’s atmosphere:**  The effects of human activity on air and water quality  Why has the atmosphere of the Earth has changed?  Causes of the greenhouse effect  Formation of acid rain  Changes in carbon cycle and water cycle  **Ecosystems & biodiversity:**  Resources that organisms compete for  Organisms living interdependently  Reasons for population changes  Predator-prey relationships  Conduct a field investigation  Use quadrats and transects  Eutrophication and bioaccumulation  Effect of increasing human population  Effects of deforestation and pollution  **Inheritance, variation and evolution;**  Variation - genes and the environment  Sex characteristics and monohybrid inheritance  Genetic diagrams and probability of inheritance characteristics  Genotypes and phenotypes of parents and offspring  Process of evolution  Mechanism of natural selection  Classification systems  Selective breeding and genetic engineering for inherited characteristics | Study leave  Revision  Revision booklets | Study leave  Revision  Revision booklets |
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