Year 7 Science

Term	Topic(s) and links to other subjects	Core Knowledge	Core Vocabulary	Assessment	Resources
Autumn 1	Particle Cells (Links to Biology and Health – cell structure and function)	• Matter is made up of many different kinds of atoms and molecules, and these can all look very different. • A molecule of water looks different to a molecule of oxygen. • The different structures of atoms and molecules result in them having many different properties • All living things are made of cells.	• Collide • Concentration • Pressure • Matter • Diffusion • Energy • Model • Particle • Variable • Dependent • Independent • Vibrate • Cell, • Nucleus • Cytoplasm, • Cell membrane, • Chloroplast, • Mitochondria	Microscopy practical and worksheet	• https://education.nationalgeographic.org/resource/cells-and-versatile-functions-their-parts/ • https://senecalearning.com/en-GB/revision-notes/ks3/science/national-curriculum/1-1-13-animal-cells • https://sepup.lawrencehallofscience.org/cells-unit-modeling-cell-structure-and-function/

		Everything from plants to people starts with a single cell. • There are many types of cells with special jobs. • Cells have key parts that do different things which help the cell function properly. • Some organisms are made of just one cell, while others have billions. • Microscopes use to observe plant and animal cells. • Cells work together in tissues and organs as part			

		of a system to keep us alive.			
Autumn 2	Cell Conti. Energy (Links to Physics and Geography – energy sources and sustainability)	• Energy powers everything we do. It comes from different sources and can be stored in different ways. • Comparing energy use and costs using calculations to work out how much energy things use or waste.	• **Thermal** energy store, • **Kinetic** energy store, • **Potential** energy store, • **Gravitational potential** energy store • **Elastic** energy store • **Dissipated** • **Renewable** and **non-renewable** • **Conservation**	End-of-topic assessment on energy types and sources.	• https://education.nationalgeographic.org/resource/energy-transfers-and-transformations/ • https://phet.colorado.edu/en/simulations/energy-forms-and-changes • https://senecalearning.com/en-GB/revision-notes/ks3/maths/national-curriculum/2-1-8-rearranging-formulae
Spring 1	Reproduction (Links to Biology and PSHE – human biology and health)	• Reproduction allows living things to sexually and asexually create the next generation. • The human reproductive	• Reproduction, • Fertilisation • Gametes • Embryo • Sexual and asexual reproduction	End of unit test on reproduction	• https://education.nationalgeographic.org/resource/sexual-reproduction/ • https://education.nationalgeographic.org/resource/plant-and-animal-reproduction/ • https://www.bbc.co.uk/bitesize/topics/zybbkqt

		system has specialised parts that allow fertilisation to happen. • Pregnancy is the development of a baby inside the uterus. • Puberty brings physical and emotional changes controlled by hormones. • Menstrual cycles prepare the body for pregnancy. • Looking after reproductive health is important.			

	Chemical Reactions (Links to Chemistry – matter and changes)	• Chemical reactions create new substances with different properties. • Metals and non-metals react differently with oxygen, water and acids. • Acids and alkalis react to form neutral substances such as salts and water. • The pH scale measures how acidic or alkaline	Reaction, acid, alkali, indicator, pH, physical change, chemical change	Practical: acid-base reactions	• https://education.nationalgeographic.org/resource/changes-matter-physical-vs-chemical-changes/

		a substance is. • Combustion is a chemical reaction that releases energy. • Chemical energy is stored in substances and released in reactions.			

Year 8 Science

Term	Topic(s) and links to other subjects	Core Knowledge	Core Vocabulary	Assessment	Resources
Autumn 1	• Light • Space Links to Physics and Geography – space science, optics	• Properties of light, reflection, refraction and colour Eclipses and their presentation Colours and the result of mixing these Impact of filters on object Correcting vision using different lenses • Position of planets in the solar system Placement of moons around planets Rotation of the Earth and day and night	• Light Opaque Transparent Reflection Refraction Retina • Galaxy Light year Stars Orbit Exoplanet	Low stakes assessment on Light properties and space PPE1 PPE2	Light and Space lesson materials, learning booklet, videos, simulations Light - IGCSE Physics - BBC Bitesize Bending Light - Snell's Law | Refraction | Reflection - PhET Interactive Simulations Science 101: The Solar System Space 101: Solar Eclipse
Autumn 2	• Atoms • Periodic Table Links to Chemistry and History of Science	• Chemical symbols of elements and formulae Particle diagrams of atoms, molecules and elements, mixtures and compounds Identify the element/ compound in a chemical reaction • The trends in the periodic table Physical properties of elements Reactions of Group 7 and 1 element	• Atom Element Molecule Compound Chemical Formula • Periodic table Physical properties Chemical properties Groups	Low stakes assessment on atoms and the periodic table PPE1 PPE2	Atoms and Periodic Table unit, charts, models Atomic theory - Atomic structure - National 5 Chemistry Revision - BBC Bitesize The periodic table - The periodic table - 3rd level Science Revision - BBC Bitesize

		Patterns are chemical reactions and physical properties	Periods		
Spring 1	• Digestion Links to Biology and Health – human body systems	• The Organs and tissues involved in digestion The structure of the human digestive system The food requirements for a healthy diet The events that turn a meal into simple food molecules The possible health effects of unbalanced diets	• Digestion Enzyme Stomach intestine absorption Carbohydrate Lipid Protein	Low stakes assessment on digestion system PPE1 PPE2	Digestion unit, diagrams, lab activities
Spring 2	• Matter Links to Chemistry – states of matter and particle theory	States of matter, particle model, changes of state, diffusion	Solid, liquid, gas, particle, diffusion, melting, boiling	Test on particle theory and states of matter	Matter unit, experiments, worksheets
Summer 1	Motion and Pressure (Links to Physics and Maths – forces and calculations)	Speed, velocity, acceleration, pressure in fluids and gases, calculations	Speed, velocity, acceleration, pressure, force, area	Practical and calculation assessment	Motion and Pressure unit, practical kits
Summer 2	Chemical Reactions (Links to Chemistry – bonding, reactions and equations)	Types of reactions, combustion, thermal decomposition, writing balanced equations	Reaction, combustion, thermal decomposition, reactant, product	End of unit test on reactions	Chemical Reactions unit, lab experiments

Year 9 Science

Term	Topic(s) and Links to Other Subjects	Core Knowledge	Core Vocabulary	Assessment	Resources
Autumn 1	**B1: Cell Structure and Transport** & **B2: Cell Division** (Links to Biology, Health, and Genetics)	• Microscopy allows us to see cells and sub-cellular structures, with electron microscopes offering greater detail. • Animal and plant cells have different structures and functions. • Eukaryotic cells have a nucleus; prokaryotic cells (like bacteria) do not. • Specialised cells are adapted to carry out specific functions. • Magnification is calculated using the formula: magnification = size of image ÷ size of real object. • Substances move by diffusion (with the concentration gradient), osmosis (movement of water), and active transport (against the concentration gradient). • Exchange surfaces are adapted to improve the efficiency of material transport. <u>B2-Cell division</u> • Cells go through a cycle of growth and division called the	Cell membrane, nucleus, osmosis, diffusion, mitosis, stem cells Mitochondria Ribosome Plasmid Magnification Resolution Chromosome Eukaryotic Prokaryotic Cell cycle Stem cell Differentiation Therapeutic cloning	Low stake assessment for learning PPE 1 PPE 2	Student booklets My GCSE science platform

		cell cycle, which includes three main stages. • During mitosis, the genetic material is copied and the cell divides to form two identical cells. • The genetic material doubles before a cell divides. • Cell differentiation is how cells become specialised for specific functions. • Specialised cells have adaptations that link to their roles in the body. • Stem cells are undifferentiated cells that can develop into different types of specialised cells. Stem cells have potential uses in medicine, but there are also ethical concerns and risks involved.			
Autumn 2	**P1 & P2: Conservation of Energy** and **energy transfe**r and **C1: Atomic Structure**, **C2: Periodic Table** (Links to Physics, Chemistry, History of Science)	Energy • Energy is stored in different ways and transferred by forces, heating, and electrical currents. • Work is done when a force moves an object, linking to energy changes in motion and stretching. • Energy is conserved, even when some is wasted (dissipated) as heat or sound.	Gravitational potential energy Elastic potential energy Thermal energy Chemical energy Nuclear energy Internal energy Specific heat capacity Power	Low stake assessment for learning PPE 1 PPE 2	Student booklet periodic table models

		• Efficiency compares useful energy to total energy input and helps evaluate device performance. • Power is the rate of energy transfer and helps calculate energy used over time. • Heating and cooling transfer energy within and between objects; metals conduct heat better than non-metals. • Infrared radiation transfers heat, affected by surface colour and temperature; higher-tier students relate this to the greenhouse effect. • Specific heat capacity and insulation are key to understanding temperature changes and reducing energy loss in buildings. Atomic structure and periodic table • Atoms are the fundamental building blocks of matter, and students learn how to interpret chemical formulae. • Students apply the law of conservation of mass by balancing chemical equations, without changing chemical formulas. • They learn the difference between compounds and	Efficiency Dissipation Lubrication Insulation Radiation (infrared) Renewable resource Non-renewable Geothermal Hydroelectric Biofuel Wind turbine Solar cell Sankey diagram Energy transfer Conservation of energy Proton Neutron Electron Nucleus Atomic number Mass number Isotope Ion Relative atomic mass (Ar) Electron shell		

		mixtures, and how mixtures can be separated using methods like filtration, distillation, and chromatography. • Students study the development of the atomic model, understanding how new evidence led to changes over time. • The modern atomic model includes electronic structures, and students learn how to draw and interpret them for elements up to atomic number 20. • The periodic table is introduced as a pattern of elements, highlighting the contributions of Dalton, Newlands, and Mendeleev. • Students explore the trends and reactivity in Groups 0, 1, and 7, and relate these to electronic structure. • Transition metals, their variable ions, and their role as catalysts compared to Group 1 elements.	Energy level Group (Periodic Table) Period (Periodic Table) Alkali metal Halogen Noble gas Plum pudding model Nuclear model Bohr model Subatomic particle Reactivity Displacement reaction		