



Biology units are grouped into these key areas of study:

BBL (Building blocks of life)

THB (The human body)

IOL (Interaction of life)

Chemistry units are grouped into these key areas of study:

BOM (Behaviour of matter)

CR (Chemical reactions)

OE (Our Earth)

Physics units are grouped into these key areas of study:

BOE (Behaviour of energy)

OEOO (Objects' effects on other objects)

BE (Beyond Earth)

	Unit	Overview of learning intent
Autumn	Building blocks of life (BBL5): Inheritance	- Heredity as the process by which genetic information is transmitted from one generation to the next. - A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. - Differences between species; continuous and discontinuous variation between individuals within a species. - The variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation. - Natural selection and the gradual change of populations over generations (evolution). - Changes in the environment that may leave individuals within a species less well adapted to compete successfully, which may result in extinction.
	Objects' effects on other objects (OEOO8): Magnetism	- Magnetic poles, attraction and repulsion; magnetic fields shown by plotting with a compass and representation by field lines. - Earth's magnetism, compass and navigation. - Permanent and temporary magnets. - The magnetic effect of a current; electromagnets made from a coil around an iron core; increasing current increases strength. - D.C. motors (principles only): the motor effect.
	Interaction of life (IOL13): Interdependence	- The interdependence of organisms in an ecosystem: populations, species, communities and ecosystems. - Producers, consumers and decomposers; food chains and food webs showing the flow of biomass. - The importance of plant reproduction through insect pollination in human food security. - How organisms affect, and are affected by, their environment, including the accumulation of toxic materials (bioaccumulation).
	Objects' effects on other objects (OEOO9): Gas pressure	- Atmospheric pressure, which decreases with increase of height as the weight of air above decreases. - Pressure in liquids, increasing with depth; upthrust effects and floating and sinking. - Pressure measured by ratio of force over area, acting normal to any surface. - Drag forces as objects move through fluids; air resistance and streamlining.

	Behaviour of energy (BOE14): Light	- The similarities and differences between light waves and waves in matter; light travelling at 3×10^8 m/s in a vacuum without needing a medium. - Light waves travelling through a vacuum; speed of light. - The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface; the law of reflection. - Use of ray models to explain imaging in mirrors, the pinhole camera, the refraction of light and action of a convex lens in focusing (qualitative); the human eye. - Light transferring energy from source to absorber, leading to chemical and electrical effects; photosensitive material in the retina and in cameras. - Colours and the different frequencies of light; white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.
Spring	Chemical reactions (CR5): Reactivity series of metals	- The order of metals and carbon in the reactivity series. - The use of carbon in obtaining metals from metal oxides. - Properties of ceramics, polymers and composites (qualitative). - What catalysts do.
	Objects' effects on other objects (OEO10): Static electricity	- Separation of positive or negative charges when objects are rubbed together; transfer of electrons. - Forces between charged objects: like charges repel, opposite charges attract. - The idea of the electric field, forces acting across the space between objects not in contact. - Build-up of charge and static shocks (sparks jumping a gap).
	Beyond Earth (BE5): Life on Earth	- Our Sun as a star and the Earth's rotation causing day and night (24 hours). - The seasons and the Earth's tilt (23.5°); day length at different times of year, in different hemispheres. - The angle of the Sun's rays and its effect on heating intensity.
	Building blocks of life (BBL6): Cells to systems (GCSE)	- Eukaryotic and prokaryotic cells; sub-cellular structures and their functions; specialised cells and cell differentiation. - Microscopy: light and electron microscopes, magnification and resolution; magnification calculations. - Stem cells (embryonic, adult, meristem) and their uses in medicine and agriculture, including ethical issues. - The heart, lungs and blood vessels; blood components; the heart as a double pump and its natural pacemaker. - Coronary heart disease and its treatments (stents, statins, valve replacement, transplants). - Health and disease: communicable and non-communicable disease, risk factors (diet, smoking, alcohol, carcinogens) and interpreting disease data.
	Behaviour of matter (BOM10): Atoms and the periodic table (GCSE)	- Atoms, elements and compounds; writing formulae and balanced symbol equations. - The development of the model of the atom: plum pudding, nuclear model, Bohr and Chadwick. - Relative charge and mass of protons, neutrons and electrons; atomic number, mass number and isotopes; relative atomic mass. - Electronic structure of the first 20 elements. - The development of the periodic table and its modern arrangement; metals and non-metals. - Trends in Group 0 (noble gases), Group 1 (alkali metals) and Group 7 (halogens).
Summer	Behaviour of matter (BOM11): Energy and the particle model (GCSE)	- The three states of matter and the particle model; state symbols in equations; (HT) limitations of the simple model. - Density of materials and its calculation ($\rho = m/V$); conservation of mass in changes of state. - Internal energy; temperature changes and specific heat capacity ($\Delta E = mc\Delta\theta$). - Changes of state and specific latent heat ($E = mL$); heating and cooling graphs. - Particle motion in gases and the relationship between temperature and pressure of a gas at constant volume.

	Chemical reactions (CR6): Chromatography and analysis (GCSE)	- Pure substances and mixtures; using melting and boiling point data to distinguish pure from impure substances. - Formulations as mixtures designed as useful products (fuels, cleaning agents, paints, medicines, alloys, fertilisers, foods). - Paper chromatography: stationary and mobile phases; calculating and interpreting R_f values. - Tests for common gases: hydrogen, oxygen, carbon dioxide and chlorine.
	Objects' effects on other objects (OE0011): Defining force (GCSE)	- Scalar and vector quantities; distance and displacement. - Contact and non-contact forces; weight, gravitational field strength and centre of mass ($W = mg$). - Resultant forces and free body diagrams; (HT) resolving forces. - Work done and energy transfer ($W = Fs$). - Elastic and inelastic deformation; extension and the spring constant ($F = ke$); elastic potential energy.