Year 7

Half term 1		Half term 2	Half term 3	Half term 4	Half term 5	Half term 6	
Introduction to science	**Particle Model and separating techniques**	**Physical energy transfers**	**Organisms cells and movement (bones, muscles etc)**	**Speed, gravity and space**	**Matter (Atomic structure, Periodic Table, acids and alkali)**	**Energy transfers by Heating and in the home**	**Ecosystems and interdependence**
Observing and recording chemical reactions. Evaluating risks, health and safety in the science laboratory	*Plan and carry out scientific enquiries. Accuracy and precision. Measuring, reading a scale. Developing graph skills, plotting a heating curve.*	*Making predictions. Presenting and recording data. Developing graph skills, applying mathematical techniques, calculating results. Identify further questions from results.*	*Accuracy and precision. Using a scale, using microscopes, converting units Understanding how scientific models develop over time*	*Asking questions based upon understanding of the world. Testing predictions. Applying calculations, showing working. Identifying variables. Presenting and recording data in tables and graphs identifying patterns in data and drawing conclusions. Using equations and SI units.*	*Organising tables. Making predictions based on understanding. Health and safety, evaluating risks. Understanding how scientific theories develop over time.*	*Making predictions. Presenting and recording data. Developing graph skills, applying mathematical techniques, calculating results. Identify further questions from results.*	*Using new techniques. Testing predictions. Applying sampling techniques, calculating averages, analysing data and suggesting improvements. Undertaking data analysis Posing scientific questions. Selecting the most appropriate techniques to plan and carrying out a scientific enquiry. Identifying questions based on results.*
	The particulate nature of matter • The properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure changes of state in terms of the particle model. • Changes of state in terms of particle model.	**Calculation of fuel uses and costs in the domestic context** • comparing energy values of different foods (from labels) (kJ) **Changes in systems** • energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change • comparing the starting with the final	**Cells and organisation** • cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope • the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts	**Describing motion** • speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time) • the representation of a journey on a distance-time graph • relative motion: trains and cars passing one another. **Forces**	**Atoms, elements and compounds** • a simple (Dalton) atomic model • differences between atoms, elements and compounds • chemical symbols and formulae for elements and compounds • conservation of mass changes of state and chemical reactions.	**Calculation of fuel uses and costs in the domestic context** • comparing power ratings of appliances in watts (W, kW) • comparing amounts of energy transferred (J, kJ, kW hour) • domestic fuel bills, fuel use and costs • fuels and energy resources. **Energy in matter**	**Interactions and interdependencies Relationships in an ecosystem** • the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops • the importance of plant reproduction through insect pollination in human food security

	Pure and impure substances • the concept of a pure substance • mixtures, including dissolving • diffusion in terms of the particle model • simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography • the identification of pure substances. • energy changes on changes of state (qualitative) **Physical changes** (Physics) • Conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving • Similarities and differences, including density differences, between solids, liquids and gases • Brownian motion in gases • Diffusion in liquids and gases driven by	conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperature, changes in elastic distortions. • using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes. **Energy changes and transfers** • other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels.	• the similarities and differences between plant and animal cells • the role of diffusion in the movement of materials in and between cells • the structural adaptations of some unicellular organisms • the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms. **The skeletal and muscular systems** • the structure and functions of the human skeleton, to include support, protection, movement and making blood cells • biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles • the function of muscles and examples of antagonistic muscles.	• forces as pushes or pulls, arising from the interaction between two objects • using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces • forces measured in newtons, **Forces and motion** • forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only) • change depending on direction of force and its size. **Space physics** • gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only) • our Sun as a star, other stars in our galaxy, other galaxies • the seasons and the Earth's tilt, day length at different times of year, in different hemispheres	**The periodic Table** • the varying physical and chemical properties of different elements **Matter** (physics) • the difference between chemical and physical changes. **Particle model** (physics) • atoms and molecules as particles. **Chemical reactions** • chemical reactions as the rearrangement of atoms • representing chemical reactions using formulae and using equations • defining acids and alkalis in terms of neutralisation reactions • the pH scale for measuring acidity/alkalinity; and indicators • reactions of acids with metals to produce a salt plus hydrogen • reactions of acids with alkalis to produce a salt plus water	• changes with temperature in motion and spacing of particles internal energy stored in materials. **Energy changes and transfers** • heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference: use of insulators	• how organisms affect, and are affected by, their environment, including the accumulation of toxic materials.

	differences in concentration.			• the light year as a unit of astronomical distance.			