Year 8

Half term 1		Half term 2		Half term 3	Half term 4	Half term 5	Half term 6
Genes, variation and reproduction, menstrual cycle	**Waves, light and sound**	**Breathing, respiration and digestion**	**Matter (Atomic structure, Periodic Table, metals and non-metals)**	**Plant cells, photosynthesis**	**Contact forces, moments/levers and Hooke's law**	**Climate, Earths resources and rocks**	**Electricity**
Developing graph skills – continuous and categoric variation. Evaluating data.	*Organising tables. Recording data, applying calculations, measuring angles, suggesting improvements to techniques. Suggesting reasons for errors. Identifying variables. Repeatability.*	*Applying calculations.*	*Organising tables. Making predictions based on understanding. Health and safety, evaluating risks. Understanding how scientific theories develop over time.*	*Analysing data, using graphs*	*Making predictions. Presenting and recording data. Developing graph skills, applying mathematical techniques, calculating results. Repeatability and reproducing results.*	*Analysing data, using graphs. Describing changes to understanding based on the new evidence available, the importance of peer review.*	*Making predictions. Presenting and recording data. Analysing data, using graphs.*
Reproduction • reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the	Observed waves • waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition. Sound waves • frequencies of sound waves, measured in hertz (Hz); echoes,	Gas exchange systems • the structure and functions of the gas exchange system in humans, including adaptations to function • the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of	Atoms, elements and compounds • a simple (Dalton) atomic model • differences between atoms, elements and compounds • chemical symbols and formulae for elements and compounds The periodic Table • the varying physical and chemical properties of different elements • the principles underpinning the	Material cycles and energy Photosynthesis • the reactants in, and products of, photosynthesis, and a word summary for photosynthesis • the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to	Forces • forces as pushes or pulls, arising from the interaction between two objects • using force arrows in diagrams, adding forces in one direction • moment as the turning effect of a force • forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water	Earth and atmosphere • the composition of the Earth • the structure of the Earth • the rock cycle and the formation of igneous, sedimentary and metamorphic rocks • Earth as a source of limited resources and the efficacy of recycling • the carbon cycle • the composition of the atmosphere • the production of carbon dioxide by human activity and the impact on climate.	Current electricity • electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge • potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current • differences in resistance between conducting and insulating components (quantitative).

effect of maternal lifestyle on the foetus through the placenta • reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. **Inheritance, chromosomes, DNA and genes** • heredity as the process by which genetic information is transmitted from one generation to the next • the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical	reflection and absorption of sound • sound needs a medium to travel, the speed of sound in air, in water, in solids • sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal • auditory range of humans and animals. **Energy and waves** • pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound; waves transferring information for conversion to electrical signals by microphone. **Light waves** • the similarities and differences	gases, including simple measurements of lung volume • the impact of exercise, asthma and smoking on the human gas exchange system **Cellular respiration** • aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life • a word summary for aerobic respiration • the process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration the differences between aerobic and anaerobic	Mendeleev Periodic Table • the Periodic Table: periods and groups; metals and non-metals • how patterns in reactions can be predicted with reference to the Periodic Table • the properties of metals and non-metals • the chemical properties of metal and non-metal oxides with respect to acidity. **Chemical reactions** • chemical reactions as the rearrangement of atoms • representing chemical reactions using formulae and using equations **Materials** • properties of ceramics, polymers and composites (qualitative). **Matter** (physics) • the difference between chemical and physical changes.	maintain levels of oxygen and carbon dioxide in the atmosphere • the adaptations of leaves for photosynthesis. **Gas exchange systems** • the role of leaf stomata in gas exchange in plants. **Nutrition and digestion** • Planta making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots	• forces measured in newtons, measurements of stretch or compression as force is changed • force-extension linear relation; Hooke's Law as a special case • work done and energy changes on deformation • comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions **Balanced forces** • opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface. **Pressure in fluids** • atmospheric pressure, decreases with increase of height as weight of air above decreases with height • pressure in liquids, increasing with depth; upthrust effects, floating and sinking • pressure measured by ratio of force over area – acting normal to any surface.		

representation of variation	between light waves and waves in matter • light waves travelling through a vacuum; speed of light • the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface • use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye • light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras	respiration in terms of the reactants, the products formed and the implications for the organism. **Nutrition and digestion** • content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed • calculations of energy requirements in a healthy daily diet • the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases • the tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes			**Forces effect on 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. **Particle model** • the differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density, the anomaly of ice-water transition		

	• colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.	simply as biological catalysts) • the importance of bacteria in the human digestive system Health • the effects of recreational drugs (including substance misuse) on behaviour, health and life processes.					