


Science Department - Year 8

 Shirley High Curriculum Map	Year8: "Advanced Beginner" = Increasing situational perception and competency. Challenge pupils to: Develop the understanding of causal effect and deliberate planning of scientific investigations.					
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:
	Forces + Matter	Organism +	Electromagnets + Reactions	Ecosystem	Energy + Genes	Waves + Earth
Why Now?	With the fundamentals of forces and matter covered in Yr7, this half-term will focus on evolving their general conceptual understandings into specific situations	With the basic understanding how cells work and the normal understanding of different organ systems, learners will look at how some of these can be impaired by lifestyle choices.	Pupils will build on KS2 magnets knowledge and develop understanding of the use of electromagnets. They will also study some of major chemical reactions and concepts.	Learners will be introduced to some of the chemical reactions that underpin the biology of life.	The energy unit that will help pupils understand concepts like the production of heat in living organisms Having looked at variation in Yr7 pupils can now extend their ideas to the most important idea in biology 'natural selection'.	The Earth unit will prepare them for the climate change term in Yr9
Fundamental Concepts	(1) Forces can change the speed, size and direction of an object (2) Elements are grouped based on their chemical properties	(1) Enzymes are used to break down nutrients	(2) Electromagnets work using fields (3) Energy is absorbed to break bonds and released when bonds are made	(1) Glucose and oxygen are used to release energy	(1) Temperature is a measure of the average kinetic energy of particles (2) Traits are passed on via genes	(1) Radiation is a type of EM wave (2) Natural resources come from the Earth's atm, ground or biome.
Students will...	Force: * identify examples of drag forces and friction. * state an example of a force deforming an object. * state the law of moments. * describe the motion of particles in a fluid. * write down the equation for calculating fluid pressure. * state the equation of stress. Matter: * state what an element is. * state what an atom is. * state what a compound is. * name simple compounds. * state what a polymer is. * state that as you go down a group and across a period the elements show patterns in physical properties. * use data to describe a trend in physical properties of Group 1 elements. * use data to describe a trend in physical properties of Group 7 elements. * state that the elements in Group 0 are unreactive.	Organism: * Explain how the lungs are adapted for gas exchange * Explain the actions of the ribcage and diaphragm * Compare the effects of different types of drugs on health and behaviour * name one effect of alcohol on health or behaviour. * name an effect of tobacco smoke on health. * name some nutrients in a given diet. * state that food tests show colour changes. * describe some health issues caused by an unhealthy diet. * describe the process of digestion. * describe the role of enzymes in digestion.	Electromagnets: * describe features of a magnet. * state the main features of an electromagnet. * state some uses of electromagnets. Reaction: * identify possible hazards in a demonstration. * explain why a given reaction is an example of combustion. * use a particle diagram to show what happens in a reaction. * explain observations about mass in a chemical or physical change. * compare the characteristics of exothermic and endothermic reactions. * state that an exothermic reaction is one in which energy is given out, usually as heat or light. * use ideas about bond energies to explain energy changes in chemical reactions.	Ecosystem: * state the requirements for aerobic respiration. * state the products of anaerobic respiration. * state what is meant by fermentation. * describe the process of photosynthesis. * name the main structures of a leaf. * carry out an experiment to test for the presence of starch in a leaf. * name the minerals required by plants.	Energy: * state how work is calculated. * describe how energy is transferred through solids, liquids, and in air. * describe simply what happens in conduction and convection. * state some sources of infrared radiation. Genes: * state how survival rates differ for successful adaptation. * name the process by which organisms evolve. * describe some factors that may lead to extinction. * describe what is meant by captive breeding. * state what is meant by a mutation. * describe the structure of DNA * describe the difference between dominant and recessive alleles. * state how an organism can be genetically modified.	Waves: * describe the link between amplitude or frequency and energy. * describe the electromagnetic spectrum. * compare transverse and longitudinal waves. Earth: * describe and explain what is meant by global warming. * use the carbon cycle to identify carbon sinks. * describe how human activities affect the carbon cycle. * describe how Earth's resources are turned into useful materials or recycled. * describe how Earth's resources are turned into useful materials or recycled.
Language for Life (Key terms/Vocabulary)	Friction, Newtons, Contact forces, Lubricant, Tension, Deformation, Hooke's Law, Elastic limit, Pivot, Moment, Fluid, Pressure, Upthrust, Element, Chemical symbol, Atom, Compound, molecule, Nitrate, Hydroxide, Sulfate, Polymer, Periods, Group, Group 1, Alkali metals, Group 7, Halogens, Noble gases	Gas exchange, Lungs, Ribs, Respiratory system, Breathing, Diaphragm, Contract, Lung volume, Asthma, Drugs, Addiction, Ethanol, Depressant, Alcoholics, Passive smoking, Stimulant, Nutrients, Carbohydrates, Lipids, Proteins, Food tests, Starvation, Deficiency, Obese, Digestive system, Digestion, Villi, Gut bacteria, Enzyme, Bile, Protease, Lipase, Carbohydrase, Stress,	Magnet, Core, Solenoid, Circuit breaker, Loudspeaker, Work, Deform, Lever, Temperature, Radiation, Convection, Conduction, Reactants, Products, Fuel, Combustion, Fossil fuels, Renewable, Thermal decomposition, Endothermic, Exothermic, Energy level diagrams,	Aerobic respiration, Plasma, Haemoglobin, Anaerobic respiration, Fermentation, Oxygen debt, Biotechnology, Algae, Producers, Chlorophyll, Stomata, Iodine, Nitrates, Phosphates, Potassium, Magnesium, Deficiency, Fertilisers, Work, Deform, Lever, Temperature, Radiation, Convection, Conduction,	Evolution, Natural selection, Fossil, Peer review, Extinct, Biodiversity, Populations, Competition, Endangered species, Conservation, Captive breeding, Gene banks, DNA, Chromosomes, Genes, Alleles, Dominant, Recessive, Punnett squares,	Compressions, Rarefactions, Pressure waves, Ultrasounds, Ionisation, EM waves, Superpose, Transverse wave, Longitudinal wave, Atmosphere, Greenhouse effect, Global warming, Respiration, Photosynthesis, Carbon cycle, Carbon sinks, Climate change, Mineral, Ore, Extraction, Electrolysis, Recycling,
Extended writing Opportunities	Forces Extended Writing, Matter Extended writing	Organism Extended Writing,	Electromagnets Extended Writing, Reaction Extended Writing,	Ecosystem Extended Writing,	Energy Extended Writing, Genes Extended Writing,	Waves Extended Writing, Earth Extended Writing,
Maths Across the Curriculum	Interpret graphs showing Hooke's law, Calculating moment, Calculating pressure, Calculating stress, Calculate moles, Interpret bar charts of group 1 and 7,	Interpret pie charts, Work out the BMR of an individual	Calculate work done, Balance chemical equations, Calculate bond energies	Draw line graphs showing how factors affect photosynthesis rate,	Interpret pie charts, Work out probability from Punnett squares	Interpreting graphs, Drawing graphs
Links to careers/aspirations	Mechanical Engineer, Robotic Engineering,	Microbiologist, Medical doctor	Heating engineer, Chemist	Haematologist Ecologist, Farmer	Data analyst	Palaeontologist, Engineer
Cultural Capital	To demonstrate examples of physical oracy skills. This is the first oracy focused lesson. Here we tackle various ethical issues due our advancing scientific knowledge. The ethical issue in this lesson is: "Should scientists allow people to add animal DNA to their genes?"	To demonstrate examples of linguistic oracy skills. This is the second oracy focused lesson. Here we tackle various ethical issues due our advancing scientific knowledge. The ethical issue in this lesson is: "Should scientists use the data Nazi human experiments?"	To demonstrate examples of cognitive oracy skills. This is the third oracy focused lesson. Here we tackle various ethical issues due our advancing scientific knowledge. The ethical issue in this lesson is: "Should we allow animal testing?"	To demonstrate examples of social/emotional oracy skills. This is the fourth oracy focused lesson. Here we tackle various ethical issues due our advancing scientific knowledge. The ethical issue in this lesson is: "Should we give robots the right to kill?"	This is the fifth oracy focused lesson. Here we tackle various ethical issues due our advancing scientific knowledge. The ethical issue in this lesson is: "Should we impose population control?"	To demonstrate examples of physical oracy skills. This is the first oracy focused lesson. Here we tackle various ethical issues due our advancing scientific knowledge. The ethical issue in this lesson is: "Should scientists allow people to add animal DNA to their genes?"
Practical Application of Skills	Investigating the effect of friction on the force needed to move an object	Investigating the decomposition of different substances	Investigating thermal exothermic and endothermic reactions	Investigate the distribution of starch on a leaf	Measuring variation in a population	Investigate the link between wavelength and frequency