


Science Department – Year 7

 Shirley High Curriculum Map	Year7: "Novice" = Developing context and the general rules and laws of several scientific processes. Challenge pupils to: Develop and appetite to construct their own ideas that although deviate from the "rules" show extension of the scientific principles					
	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:
	Introductory science + Force + Matter	Organisms + Energy	Reactions +	Electromagnets + Genes +	Waves +	Ecosystems + Earth
Why Now?	Science is based on materialism which is the interplay between matter and forces. A foundational understanding of these two ideas is fundamental to logical progression of thought	After understanding matter and forces, this is the next logical progression towards more complex biological ideas. Having studied a term of secondary science, learners should be receptive to the conceptual ideas of energy.	Having learnt about matter and energy, learners will be able to apply these principles to the reason why certain chemical reactions happen.	More than half-way through the course they should have developed learners' formulation and appreciation of the importance of models (which is heavy for electromagnets). Genes are the bridge between individual cells and the wider behaviour and characteristics of organisms.	By now pupils are moving away from being "Novices" and are becoming "Advanced beginners". There are several misconceptions in Waves. Learners should be better able to use social constructivism to address and correct their misconception with priming activities.	With the finer idea of cells worked out, learners will be able to see the other extreme of the ecosystem with greater detail. Lastly they should work on the Earth topic to explore our planets structure, as well as that of the wider Universe.
Fundamental Concepts	(1) Scientific method (2) Forces can change the speed, size and direction of an object (3) All matter is made up of particles	(1) Cells are the basic unit of life (2) Energy is transferred, never created or destroyed	(1) Acids can be neutralised by alkalis/bases	(1) A flow of charge produces a current (2) The reproductive systems are specialised to produce offspring	(1) Light waves are transverse and soundwaves are longitudinal	(1) Organisms in ecosystems depend on each other (2) The Earth is arranged in layers
Students will...	Introductory science: * Ask scientific questions * Plan scientific investigations * Collect, analyse and evaluate data Forces: * Categorise forces as either contact or non-contact * Calculate resultant forces * Calculate speed * Calculate speed using a distance-time graph * Calculate weight = mass x gravitational field strength Matter: * Explain why different substances have different properties * Compare the properties of a substance in its three states * Can explain melting and freezing * Explain why different substances have different boiling points * Describe the difference between evaporation and boiling * Describe the evidence for diffusion * Explain gas pressure * Use the particle model to explain what a mixture is * Explain how substances dissolve using the particle model * Explain observations about dissolving * Choose the most suitable techniques to separate a mixture of substances * Explain how chromatography separates mixtures	Organisms: * Use a microscope * Distinguish between plant and animal cells * Describe the structure and function of different specialised cells * Describe diffusion * Evaluate the differences between unicellular and multicellular organisms * Describe the levels of organisation from cells to organs * Name the main parts of the skeleton * State how a muscle exerts force during movement * Explain how antagonistic muscles cause movement Energy: * Compare the energy values of food and fuels * Name renewable and non-renewable energy resources * Explain the difference between energy and power * Explain what brings about transfers in energy between stores * Calculate useful and wasted energy from inputs and outputs	Reactions: * explain what a chemical reaction is, giving examples * compare the properties of acids and alkalis * use the pH scale to measure acidity and alkalinity * explain the difference between a strong acid and a weak acid * describe a method for making a neutral solution from an acid and an alkali * describe what a salt is * state what an element is * use particle diagrams to represent oxidation reactions * compare the reactions of different metals with dilute acids * compare the reactions of different metals with oxygen * use the reactivity series to explain displacement reactions	Electromagnets: * Describe potential difference * Calculate resistance * Describe the difference between series and parallel circuits * Describe how current changes in series and parallel circuits * Describe how charged objects interact Genes: * Describe how variation in species occurs * Describe the difference between continuous and discontinuous variation * Describe how organisms are adapted to their environment * State the difference between adolescence and puberty * Describe the functions of the male and female reproductive systems * Describe some causes of infertility * Describe what happens during gestation * State what the menstrual cycle is	Waves: * Describe how sound travels * Describe the link between loudness and amplitude, using diagrams * Describe the auditory range of humans * Describe how the ear works * Explain how ray diagrams explain shadows * Explain how images form on plane mirrors * Describe refraction * Describe how the eye works * Describe how primary colours add to make secondary colours	Ecosystem: * Describe what food chains show * Describe the interdependence of organisms * Describe how different organisms co-exist within an ecosystem * Describe some resources that plants and animals compete for * Identify the main structures in a flower * Describe the process of fertilisation in plants * Explain why seed dispersal is important to the survival of the parent plant and its offspring Earth: * Describe properties of the different layers of the Earth's structure * Identify the causes of weathering and erosion and describe how they occur * Explain in detail how igneous and metamorphic rocks form * Use the rock cycle to explain how the material in rocks is recycled * List some uses of ceramics * Name some objects seen in the night sky * Describe how objects in the Solar System are arranged * Explain why seasonal changes happen * Describe the phases of the Moon
Language for Life (Key terms/Vocabulary)	Contact force, Gravity, Newtons, Resultant force, Equilibrium, Speed, Relative motion, Acceleration, Distance-time graph, Weight, Mass, Particle, Density, Solid, Liquid, Gas, State of matter, Melt, Freeze, Boiling, Evaporation Condensation, Sublimation, Diffusion, Gas pressure,	Microscope, Nucleus, Mitochondria, Chloroplast, Cell wall, Vacuole, Ribosome, Cytoplasm, Diffusion, Tissue, Organ, Bones, Skeleton, Cartilage, Ligament, Antagonistic pairs, Tendons	Chemical reaction, Acid, Alkali, Corrosive, Dilute, Irritant, Indicator, Litmus, pH scale, Neutral, Concentration, Base, Salt, Periodic Table, metal, Non-metal, Reactants, Products, Word equation, Oxidation Reactivity series, Displacement,	Cell, Voltmeter, Volts, Battery, Resistance, Ohms, Series, Parallel, Current, Ammeter, Motor, Energy, Joules, Renewable, Fossil fuels, Watt, Power, Thermal energy, Dissipation, Petals, Sepals, Stamen, Anther, Pollen, Filament, Carpel, Stigma, Style, Ovary, Ovules, Pollination, Fruits, Seeds, Germination, Seed dispersal,	Vibrations, Medium, Sound, Amplitude, Wavelength, Frequency, Transverse, Longitudinal, Pitch, Hertz, Ultrasound, Ear, Pinna, Eardrum, Cochlea, Reflect, Absorb, Opaque, Refract, lens, Convex, Concave, Retina, Pupils Iris, Prism, Dispersion,	Producer, Consumer, Prey, Predator, Food chain, Food web, Interdependence, Population, Bioaccumulation, Ecosystem, Habitat, Community, Environment, Competition, Crust, Mantle, Core, Minerals, Sedimentary, Igneous, Metamorphic, Porous, Weathering, Sediments, Erosion, Deposition, Strata, Magma, Rock cycle, Uplift, Ceramic, Satellite, Orbit, Earth, moon, Planet, Galaxy, Star, Universe, Asteroid, Axis, Day, Night, Year, Seasons, Constellations, Heliocentric, Geocentric
Extended writing Opportunities	Forces Extended Writing, Matter Extended Writing,	Organisms Extended Writing, Energy Extended Writing,	Reactions Extended Writing,	Electromagnets Extended Writing, Genes Extended Writing	Waves Extended Writing	Ecosystems Extended Writing Earth Extended Writing
Maths Across the Curriculum	Workout resultant force, Calculate speed, Draw and interpret distance-time graphs, Compare densities, Deduce the melting point/boiling point from numerical data,	Calculate magnification, Calculate means, Draw lines of best fit,	Plot a graph showing the reactivity of different metals, Interpret a predator-prey cycle,	Calculate current, Calculate resistance, Compare energy values, Calculate power, Calculate efficiency,	Wave calculations Angles in waves (transverse/longitudinal) Measuring angles	Interpret a pie chart showing the composition of Earth, Use light years as a scale for distance
Links to careers/ aspirations	Mechanical Engineer, Material scientist,	Microbiologist, Medical doctor	Pharmacist, chemist	Robotic Engineering,	Astrophysicist, Sound engineer,	Ecologist

<p>Cultural Capital</p>	<p>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?"</p>	<p>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?"</p>	<p>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?"</p>	<p>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?"</p>	<p>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?"</p>	<p>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?"</p>
<p>Practical Application of Skills</p>	<p>Investigating friction, Investigating the cooling of steric acid</p>	<p>Using a microscope,</p>	<p>Reacting Magnesium with oxygen</p>	<p>Building series and parallel circuits, Investigating friction</p>	<p>Investigating reflection Investigating refraction</p>	<p>Ecology sampling</p>