


Science – Year 11

Year11: "Expert scientist" = Learners are now able to complete their GCSE studies and progress to their exams. Challenge pupils to: Apply their knowledge in an intuitive way to unfamiliar situations						
 Shirley High Curriculum Map	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:
	5 Homeostasis and response 22 Forces	PPES 13 The rate and extent of chemical change 23 Waves 24 Magnetism and electromagnetism	12 EM spectrum 15 Chemical analysis 16 Chemistry of the atmosphere	PPES 7 Ecology 17 Using resources	GCSE revision	GCSE exams
Why Now?	Pupils will learn how bodies self-regulate and sense their world around them. They will delve into the ideas of fuel and how we gain our important metal resources from ores, which links back to Spring 2 in year 10.	The pupils will explore practically the way that rates of reactions can be altered. Pupils will learn how humans have developed techniques and machines based on our understanding of waves and forces. We all rely on electricity – but how is it produced? This half term pupils will find out.	They will understand the vital uses of waves on the EM spectrum. With many pupils looking at careers and next courses the chemistry of analysis will be key to now understand. Pupils will also link the changing climate to the chemistry of our atmosphere and its evolution	With the spring weather pupils can get out into the school grounds and explore the diverse life there – they will learn field techniques to sample it. They also will become good global citizens by looking at the importance of recycling and reusing resources	Students will revise and recap learning for their GCSE exams this term.	Students will revise and recap learning for their GCSE exams this term.
Fundamental Concepts	5 How an organisms senses and controls 22 How to draw forces and their effects	13 Chemical reactions are caused by successful collisions causing bonds to break and new ones to be formed 23 Waves transfer energy and the EM spectrum has many uses 24 How magnetism and electricity are linked	15 Quantitative and qualitative analysis of chemicals 16 The atmosphere of the Earth has changed drastically over time to now support life.	The link between organisms in an ecosystem and the energy flow 17 How resources on Earth can be used, reused and recycled.		
Students will learn...	Homeostasis and control principles of nervous coordination and control in humans the relationship between the structure and function of the human nervous system the relationship between structure and function in a reflex arc principles of hormonal coordination and control in humans hormones in human reproduction, hormonal and non-hormonal methods of contraception homeostasis Forces forces and fields: electrostatic, magnetic, gravity forces as vectors calculating work done as force x distance; elastic and inelastic stretching pressure in fluids acts in all directions: variation in Earth's atmosphere with height, with depth for liquids, up-thrust force (qualitative)	The rate and extent of chemical change factors that influence the rate of reaction: varying temperature or concentration, changing the surface area of a solid reactant or by adding a catalyst factors affecting reversible reactions Waves amplitude, wavelength, frequency, relating velocity to frequency and wavelength transverse and longitudinal waves electromagnetic waves, velocity in vacuum; waves transferring energy; wavelengths and frequencies from radio to gamma-rays velocities differing between media: absorption, reflection, refraction effects production and detection, by electrical circuits, or by changes in atoms and nuclei uses in the radio, microwave, infra-red, visible, ultra-violet, X-ray and gamma-ray regions, hazardous effects on bodily tissues Magnetism and electromagnetism exploring the magnetic fields of permanent and induced magnets, and the Earth's magnetic field, using a compass magnetic effects of currents, how solenoids enhance the effect how transformers are used in the national grid and the reasons for their use	Chemical analysis To know how to chemically identify pure and impure substances To be able to analyse chromatograms To know how to test for different gases Chemistry of the atmosphere evidence for composition and evolution of the Earth's atmosphere since its formation evidence, and uncertainties in evidence, for additional anthropogenic causes of climate change potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate common atmospheric pollutants: sulphur dioxide, oxides of nitrogen, particulates and their sources the Earth's water resources and obtaining potable water Evolution, inheritance and variation the genome as the entire genetic material of an organism how the genome, and its interaction with the environment, influence the development of the phenotype of an organism the potential impact of genomics on medicine most phenotypic features being the result of multiple, rather than single, genes single gene inheritance and single gene crosses with dominant and recessive phenotypes sex determination in humans genetic variation in populations of a species the process of natural selection leading to evolution the evidence for evolution developments in biology affecting classification the importance of selective breeding of plants and animals in agriculture the uses of modern biotechnology including gene technology; some of the practical and ethical considerations of modern biotechnology	Ecology Levels of organisation within an ecosystem some abiotic and biotic factors which affect communities; the importance of interactions between organisms in a community how materials cycle through abiotic and biotic components of ecosystems the role of microorganisms (decomposers) in the cycling of materials through an ecosystem organisms are interdependent and are adapted to their environment the importance of biodiversity methods of identifying species and measuring distribution, frequency and abundance of species within a habitat positive and negative human interactions with ecosystems Using resources life cycle assessment and recycling to assess environmental impacts associated with all the stages of a product's life the viability of recycling of certain materials carbon compounds, both as fuels and feedstock, and the competing demands for limited resources		
Language for Life (Key terms/Vocabulary)	Homeostasis, communication, nerves, neurones, hormones, reproduction, endocrine, Force, field, electrostatic, magnetism, vector, up-thrust, amplitude, wavelength,	Temperature, rate of reaction, pressure, concentration, catalyst reversible, transverse, longitudinal, ultraviolet, infrared, gamma ray, velocity,	Selective breeding, genetic engineering, agriculture, biotechnology, evolution, genotype, phenotype pure, impure, distillation, filtration, chromatography,	Ecology, biotic, abiotic, trophic, resources, microorganism, cycling, decomposers, ecosystem, interdependent, biodiversity, habitat, pollution		

		absorption, reflection, refraction, microwave Magnet, solenoids, transformers, National grid,	solvent, solution, solute, atmosphere, pollutant, sulphur dioxide, particulates, potable, global warming			
Extended writing Opportunities	Homeostasis and response Extended Writing, Forces Extended Writing,	Waves Extended Writing, Rates of reaction Extended Writing,	Chemical analysis, Inheritance Extended Writing,	Ecology Extended Writing, Using resources Extended Writing,		
Maths Across the Curriculum	Transformation of seconds to milliseconds BP and MP	Transposing formulas Standard form Calculating rates of reaction, tangents	Percentages and ratios, Fractions	Sampling techniques, calculating percentages and graphs		
Links to careers/ aspirations	Doctor, surgeon, engineer, pilot	Sound engineer, fluid technician, Aeronautical engineer	Energy scientist, farmer, Biotechnician, Gene scientist, Atmospheric Scientist, Weather presenter, Chemist, Climate scientist	Ecologist, Zoo keeper, Resource manager		
Cultural Capital	Is diabetes the next big killer?	How can we get a better WiFi signal if lost in the countryside?	Should we be able to design our babies?	What are the effects of the increase of seabirds in the SHS playgrounds on other species?		
Practical Application of Skills	Investigating reaction rates	Investigating waves Investigating absorption, Making motors, Chemical analyst	Antibiotics and plating techniques, potable water			