Birches Head Academy

Science

Part of the Frank Field Education Trust

KS4 Curriculum Plan

Year 10

	LP1	LP2	LP3	LP4	LP5
TOPIC	***Cells, Atomic Structure & Energy***	***Organisation***	***Bonding & Electricity***	***Infection, Quantative Chemistry & Bioenergetics***	***Chemical changes and the particle model***
Knowledge	Students will learn about the structure of eukaryotic and prokaryotic cells, mitosis and stem cells. Students will learn about the structure of the atom, isotopes and ion structures. Finally, Students will learn about different types of energy and how to calculate energy in a system.	Students will learn about the human digestive system and the respiratory system. Students will also learn about plants transport system and how they are dependent on environmental conditions,	Students will learn that atoms can be arranged in a variety of ways, some which are molecular whilst some are giant structures. Theories of bonding explain hoe atoms are held together in these structures. Students will also learn how electric charge is a fundamental property of matter everywhere and understanding the difference in the microstructure of conductors, semi conductors and insulators makes it possible to design components and build electric circuits.	Students will learn how plants harness the Sun's energy in photosynthesis in order to make food. Students will learn how plants and animals use oxygen to oxidise food in a process called respiration in order to supply energy but also causes the build up of lactic acid which causes muscle fatigue. Students will determine the formulae of compounds and the equations for reactions. Students will learn how identifying different types of chemical reaction allows chemists to make sense of how different chemicals react together.	Students will learn that understanding chemical reactions began with people experimenting in a systematic way and organising their results logically and allowed scientists to predict exactly what new substances would be formed. Students will also learn how this allowed scientists to understand the complex reactions that take place in living organisms. Students will learn how the particle model is widely used to predict the behaviour of solids, liquids and gases and that this has many applications in everyday life. How it helps us to explain a wide range of observations and engineers use these principles when designing vessels to withstands high pressure and temperatures.
Procedural knowledge	Scientific enquiry: Students will further develop enquiry skills from Ks3, they will develop a greater confidence in using more complex scientific equipment in order to explain scientific phenomena in greater depth. Evaluating skills, Students will develop greater evaluating skills in order to competently evaluate results from experiments to answer questions to a GCSE level. Communicating about science: Students will explain scientific concepts using command words and apply to questions where more in depth knowledge is required.				
Key Vocab	Prokaryotic, Eukaryotic, specialised, mitosis, cell division, Proton, neutron, electron, ion, isotope, energy, system, potential, store	cell, tissue, organ, system, organism, xylem, phloem,	Covalent, molecule, ionic, metallic, giant, conductors, insulators, voltage, potential difference, current, resistance.	Infection, response, lymphocyte, vaccine, placebo, mole, mass, RAM, respiration, aerobic, anaerobic.	Prediction, reactants, products, reaction, solids, liquids, gases, energy, forces

Year 11

	LP1	LP2	LP3	LP4	LP5
TOPIC	***Homeostasis, Chemical changes & Forces***	***Genetics***	***Organic Chemistry & Waves***	***Ecology, Electromagnetism & Using resources***	
Knowledge	Students will learn that body can only survive within narrow physical and chemical limits. That they require a content temperature and pH as well as a constant supply of dissolved food and water. Students will also learn how engineers analyse forces when designing a great variety of machines and instruments, from road bridges and fairground rides to atomic force microscopes.	Students will discover how the number of chromosomes are halved during meiosis and then combined with new genes from the sexual partner to produce unique offspring. Gene mutations occur constantly and on rare occasions can affect the functioning of the animal of plant. Very rarely a new mutation can be beneficial and consequently, lead to increased fitness in the individual. Students will learn about genetic engineering,	Students will learn the importance of carbon chemistry and how this branch of chemistry gets its name from the fact that the main sources of organic compounds are living, or once-living materials from plants and animals. Students will learn that wave behaviour is common in both natural and man-made systems. Waves carry energy from one place to another and their importance in carrying information.	Students will learn how industries use the Earths natural resources to manufacture useful products and in order to operate sustainably, chemists seek to minimise the use of limited resources, energy waste and environmental impact. Students will learn that electromagnets effects are used in a wide variety of devices. Engineers make use of the fact that a magnet moving through a coil can produce electric current and can in turn produce movement	
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Key Vocab	homeostasis, internal environment, nervous system, endocrine system, reflex arc. Temperature, Vectors, scalars, resultant forces	Chromosomes, DNA, Genes, mutations, genetic engineering	Carbon, hydrocarbon, alkane, alkene, alcohol, wave, longitudinal, transverse, electromagnetic, frequency, velocity	Quadrat, sampling, random, systematic. Electromagnet, force, magnetism, current, natural, synthetic, cost, energy, reduction.	