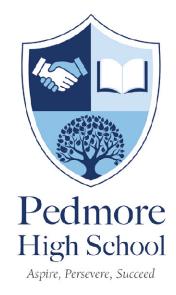
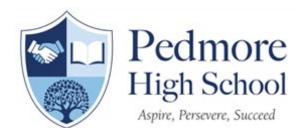
Subject Curriculum Information Pack



Curriculum Intent





Curriculum statement:

Science

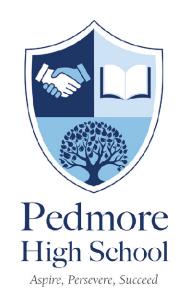
Intent

KS3— Our curriculum is a broad and balanced curriculum that promotes the joy of science amongst our young people through linked and discrete topics. It is a spiral curriculum that has been designed to ensure that content is sequential and develops in difficulty as a child moves through the school, with simpler content taught earlier and more difficult content taught later on. The curriculum builds up knowledge ready for Key Stage 4.

KS4— Our curriculum continues to spiral from key stage 3, revisiting and developing prior knowledge and understanding. It also builds upon the KS3 Curriculum intent with a joy of science key amongst our pupils. Pupils develop skills to question and critique and develop problem solving skills. Our pupils will learn how to use scientific language to articulate their thinking and engage with the wider world through a rounded knowledge of science. Tasks across both key stages enhance literacy and numeracy with these skills taught explicitly in relevant lessons. How science works skill are developed with multiple and repeated practice of the key skills across all key stages.

We value resilience and logical thinking. We expect our students to question their understanding of science and reflect upon real world situations.

Year 10 Curriculum Assessment Map



Curriculum Assessment Map: Year 10 Biology



		Autumn Term	Spring Term	Summer Term
	Inheritance, Variation and Evoluti		Chemical Changes	Waves
	Bonding Structure and Properties		Quantitative Chemistry	Revision for Mocks
Topic			Forces	REVISION TO WIGERS
	Atomic Structure			
	Homeostasis		Using Resources	Warra
	Inheritance, Variation and Evolution	nosomes are halved during meiosis and then	Chemical Changes and Quantitative Chemistry Understanding of chemical changes began when people began	Waves Wave behaviour is common in both natural
		ilisation to produce unique offspring. Gene mutations	experimenting with chemical reactions in a systematic way and organising	and man-made systems. Waves carry energy
		ffect the functioning of the animal or plant. These	their results logically. Knowing about these different chemical changes	from one place to another and can also carry
		to a number of genetic disorders or death. Very rarely	meant that scientists could begin to predict exactly what new substances	information. Designing comfortable and safe
	, ,	riation generated by mutations and sexual	would be formed and develop a wide range of different materials and	structures such as
	reproduction is the basis for natural s	,	processes. It also helped biochemists to understand the complex reactions	bridges, houses and music performance halls
		has allowed scientists to intervene through selective	that take place in living organisms. Chemists use quantitative analysis to	requires an understanding of mechanical
		voured characteristics. Once new varieties of plants or	determine the formulae of compounds and the equations for reactions.	waves. Modern technologies such as imaging
	animals have been produced it is poss	sible to clone individuals to produce larger numbers of	Given this information, analysts can then use quantitative methods to	and communication systems show how we
	identical individuals all carrying the fa	avourable characteristic.	determine the purity of chemical samples and to monitor the yield from	can make the most of electromagnetic
			chemical reactions.	waves.
	Bonding, Structure and Properties of Matter		Identifying different types of chemical reaction allows chemists to make	
	Chemists use theories of structure and bonding to explain the physical and chemical		sense of how different chemicals react together, to establish patterns and to	
	properties of materials. Analysis of structures shows that atoms can be arranged in a variety		make predictions about the behaviour of other chemicals.	
	of ways, some of which are molecular while others are giant structures. Theories of bonding		Forces	
		n these structures. Scientists use this knowledge of	Engineers analyse forces when designing a great variety of machines and	
Key	0 0	v materials with desirable properties. The properties of	instruments, from road bridges and fairground rides to atomic force	
	these materials may offer new applications in a range of different technologies.		microscopes. Anything mechanical can be analysed in this way. Recent	
Learning	Atomic Structure Ionising radiation is hazardous but can be very useful. Although radioactivity was discovered over a century ago, it took many nuclear physicists several decades to understand the		developments in artificial limbs use the analysis of forces to make movement possible.	
			Using Resources	
	structure of atoms, nuclear forces and stability. Early researchers suffered from their exposure		Industries use the Earth's natural resources to manufacture useful products.	
	to ionising		In order to operate sustainably, chemists seek to minimise the use of limited	
	8	tion were first introduced in the 1930s and	resources, use of energy, waste and environmental impact in the	
	= :	ctive materials are widely used in medicine, industry,	manufacture of these products. Chemists also aim to develop ways of	
	agriculture and electrical power gener	·	disposing of products at the end of their useful life in ways that ensure that	
			materials and stored energy are utilised. Environmental chemists study how	
	Homeostasis		human activity has affected the Earth's natural cycles, and how to minimise	
	Cells in the body require a constant temperature and pH as well as a constant supply of		damaging effects.	
		do this the body requires control systems that		
	constantly monitor and adjust the composition of the blood and tissues. These control			
	-	e changes and effectors that bring about		
	changes. Understand the structure and function of the nervous system and how it can bring			
	•	nal system which usually brings about much slower		
		rticularly important in reproduction since it controls		
	the menstrual cycle. An understanding of the role of hormones in reproduction has allowed scientists to develop not only contraceptive drugs but also drugs which can increase fertility.			
	Analyse	Communicate	Enquire Enquire	Solve
	Analyse Patterns	Communicate ideas	Collect data	Estimate risks
Skills across	Discuss Limitations	Construct explanations	Devise guestions	Examine consequences
	Draw Conclusions	Critique claims	Plan variables	Review theories
the year	Present data	Justify Opinions	Test hypotheses	Interrogate sources

Curriculum Assessment Map: Year 10 Biology



This course runs alongside Physics and Chemistry. The Biology components have been highlighted on this document in bold. High School			
End points	Order DNA, chromosome, double helix, nucleus and cell by size Name the male and female gametes in animals State the type of cell division that makes gametes in humans Know a gene is a short section of DNA that codes for a characteristic Define alleles, genotype, phenotype, heterozygous and homozygous Use punnet squares to determine that probability of sex, some characteristics and inherited diseases Recognise genotypes as heterozygous or homozygous Give arguments for and against screening embryos Describe how evolution leads to variation and antibiotic resistant bacteria Know the stages of selective breeding and genetic engineering State how fossils are formed and can be used to support the theory of evolution Classify organisms using the Linnaean system Describe how the formation of ions leads to ionic bonding and ionic compounds Describe using dot and cross diagrams how covalent bonds form Use the atomic model to describe metallic bonding State the properties of covalent, metallic and ionic substances Explain the differences in properties of simple molecular and giant covalent compounds Describe the bonding in polymers and how this causes properties Identify states of matter in symbol equations Draw and label an atom Define the terms isotope, mass number, atomic number, ion and half-life Know the properties of the three types of ionising radiation Interpret half-life graphs Give example of how to prevent contamination and irradiation Compare the hazards of the three types of ionising radiation Define homeostasis Identify key parts of the nervous system Describe the purpose of a reflex action Udentify factors that affect reaction time Give similarities and difference between nervous and hormonal responses Describe the role of hormones in controlling blood glucose concentration and the menstrual cycle State the roles of different contraceptives	 Calculate relative formula mass Use the law of conservation of mass Use the concentration equation Define acid, alkali and neutral Write word equation for reactions between an acid and a base, a metal and an acid, metals and oxygen and metals and water. State what the reactivity series tells us about the reactivity of metals State how different metals can be extracted Define electrolyte, anode, cathode, cation and anion Predict the products of electrolysis Explain the differences between scalar and vector quantities Explain the differences between contact and non-contact forces Use the weight equation Calculate resultant forces Use the work done equation Describe a method for investigating the relationship between force and extension Use the equation for spring constant Explain the differences between displacement and distance Estimate the speed of a person walking, running and cycling Use the equations of acceleration Interpret distance-time and velocity-time graphs State Newton's three laws of motion Describe an experiment to investigate Newton's second law State factors that effect a person's reaction time Calculate stopping distance Identify factors that effect stopping distance Describe an experiment to compare human reaction time Give examples of different types of materials Create a life cycle assessment for a product State sustainable methods of product disposal Define potable water Describe processes to purify water Describe the processes of treating waste water 	Order the electromagnetic spectrum by wavelength State the uses and dangers of electromagnetic waves Describe an experiment to measure the infrared emission and absorption of different surfaces Revise key topics from Biology Paper 1 Revise key topics from Chemistry Paper 1
Informal (formative) Assessment	GRIT and Live Marking DIRT for mock exams Think Pink sheets	GRIT and Live Marking DIRT for mock exams Think Pink sheets	GRIT and Live Marking DIRT for mock exams Think Pink sheets
Formal (summative) Assessment	Two 45 minute tests on: Inheritance, Variation and Evolution Bonding Structure and Properties of Matter Atomic Structure Homeostasis	Two 45 minute tests on: Chemical Changes Quantitative Chemistry Forces	Two 45 minute tests on: Using Resources Waves Part 2 Mock Exams

Year 11 Curriculum Assessment Map



Curriculum Assessment Map: Year 11 Biology



	Autumn Term	Spring Term	Summer Term
Topic	Ecology Electromagnetism Organic Chemistry Chemical Analysis Space (triple only)	Cell Biology Organisation Infection and Response Chemistry of the atmosphere Electricity	Revision for Summer 2023 GCSE exams
Key Learning	The Sun is a source of energy that passes through ecosystems. Materials including carbon and water are continually recycled by the living world, being released through respiration of animals, plants and decomposing microorganisms and taken up by plants in photosynthesis. All species live in ecosystems composed of complex communities of animals and plants dependent on each other and that are adapted to particular conditions, both abiotic and biotic. These ecosystems provide essential services that support human life and continued development. In order to continue to benefit from these services humans need to engage with the environment in a sustainable way. In this section we will explore how humans are threatening biodiversity as well as the natural systems that support it. We will also consider some actions we need to take to ensure our future health, prosperity and well-being. Electromagnetis effects are used in a wide variety of devices. Engineers make use of the fact that a magnet moving in a coil can produce electric current and also that when current flows around a magnet it can produce movement. It means that systems that involve control or communications can take full advantage of this. Organic Chemistry The chemistry of carbon compounds is so important that it forms a separate branch of chemistry. A great variety of carbon compounds is possible because carbon atoms can form chains and rings linked by C-C bonds. 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. These sources include fossil fuels which are a major source of feedstock for the petrochemical industry. Chemists are able to take organic molecules and modify them in many ways to make new and useful materials such as polymers, pharmaceuticals, perfumes and flavourings, dyes and detergents. Chemical Analysis Analysts have developed a range of qualitative tests to detect specific chemicals. The tests are based on reactions that produce	Cell Biology Cells are the basic unit of all forms of life. In this section we explore how structural differences between types of cells enables them to perform specific functions within the organism. These differences in cells are controlled by genes in the nucleus. For an organism to grow, cells must divide by mitosis producing two new identical cells. If cells are isolated at an early stage of growth before they have become too specialised, they can retain their ability to grow into a range of different types of cells. This phenomenon has led to the development of stem cell technology. This is a new branch of medicine that allows doctors to repair damaged organs by growing new tissue from stem cells Organisation In this section we will learn about the human digestive system which provides the body with nutrients and the respiratory system that provides it with oxygen and removes carbon dioxide. In each case they provide dissolved materials that need to be moved quickly around the body in the blood by the circulatory system. We will also learn how the plant's transport system is dependent on environmental conditions to ensure that leaf cells are provided with the water and carbon dioxide that they need for photosynthesis Infection and Response Pathogens are microorganisms such as viruses and bacteria that cause infectious diseases in animals and plants. They depend on their host to provide the conditions and nutrients that they need to grow and reproduce. They frequently produce toxins that damage tissues and make us feel ill. Chemistry of the Atmosphere The Earth's atmosphere is dynamic and forever changing. The causes of these changes are sometimes man-made and sometimes part of many natural cycles. The problems caused by increased levels of air pollutants require scientists and engineers to develop solutions that help to reduce the impact of human activity. Electricity Electricity Electricity Electricity batteries of some kind. The fundamentals of	

Curriculum Assessment Map: Year 11 Biology



			electromagnetism were worked out by scientists of the 19th century. Power stations have a limited lifetime. If we all continue to demand more electricity this means building new power stations in every generation – but what mix of power stations can promise a sustainable future?	
Skills across the year	Analyse Analyse Patterns Discuss Limitations Draw Conclusions Present data	Communicate Communicate ideas Construct explanations Critique claims Justify Opinions	Enquire Collect data Devise questions Plan variables Test hypotheses	Solve Estimate risks Examine consequences Review theories Interrogate sources
End points	Identify abiotic and biotic factors State adaptations and describe Draw food chains and webs Identify feeding relationships Explain how factors can affect percentification in the second of the seco	cosystem, abiotic, biotic, adaptation and community or s their usefulness copulation sizes seed to investigate the distribution of plants in two areas are used a water and carbon cycle a planet protect ecosystems d a magnet of a magnet npass and thumb rule magnetic field lines gith of a solenoid's magnetic field carbons vdrocarbons lete combustion of hydrocarbons lade from crude oil al distillation and its uses and why it is needed can be used to test the purity of a substance tography in separating soluble substances	 Identify cells and the use of microscopy Understand cells differentiate and divide State the uses of stem cells Describe the exchanging of substances Define the terms cell, tissue, organ, organ system and organism Describe common food tests Explain the role of enzymes in the digestive system Identify the role of the lungs and heart in the respiratory system and circulatory system State common non-communicable diseases and risk factors Describe how plants are organised Name the four types of pathogen Identify common communicable diseases Identify how the body prevents and fights diseases Describe preclinical drugs testing State the stages of the evolution of the atmosphere Identify the greenhouse gases Describe the effects of climate change Describe the effects of climate change Describe the greenhouse effect Identify common atmospheric pollutants and their effects Draw simple circuit diagrams and recognise common components Describe how you would investigate how the length of the wire affects resistance Interpret I-V graphs Use equations to calculate current, potential difference, power, charge and resistance Know the properties of series and parallel circuits Know the potential difference and frequency of UK mains supply Know the colours of each wire in a UK plug Explain how transformers are used in the national grid 	Revise key Science topics for summer exams

Curriculum Assessment Map: Year 11 Biology



	Triple Only: Define key cosmological bodies State the stages of the life cycle of a star Describe the orbits of the planets in our Solar System Describe the Big Bang theory and explain evidence for it		
Informal (formative) Assessment	GRIT and Live Marking DIRT for mock exams Think Pink sheets	GRIT and Live Marking DIRT for mock exams Think Pink sheets	GRIT and Live Marking DIRT for mock exams Think Pink sheets
Formal (summative) Assessment	Two 45 minute tests on: Ecology Electromagnetism Organic Chemistry Chemical Analysis Space (triple only)	Mocks	Exams

