## Subject Curriculum Information Pack

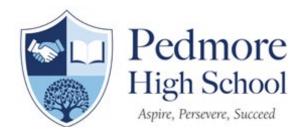


### Curriculum

### Intent



Aspire, Persevere, Succeed



#### **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 Chemistry**

		Autumn Term	Spring Term	Summer Term
Торіс	Inheritance, Variation and Evoluti Bonding Structure and Properties Atomic Structure Homeostasis		Chemical Changes Quantitative Chemistry Forces Using Resources	Waves Revision for Mocks
Key Learning	with new genes during fertilisation to continuously and occasionally affect ti may be damaging and lead to a numb mutation can be beneficial. Variation p basis for natural selection; this is how An understanding of these processes be breeding to produce livestock with fava animals have been produced it is poss- identical individuals all carrying the fa <i>Bonding, Structure and Properties of</i> <b>Chemists use theories of structure an</b> <b>properties of materials. Analysis of st</b> <b>of ways, some of which are molecula</b> <b>explain how atoms are held together</b> <b>structure and bonding to engineer ner</b> <b>of these materials may offer new app</b> <b>Atomic Structure</b> Ionising radiation is hazardous but car over a century ago, it took many nucles structure of atoms, nuclear forces and to ionising radiation. Rules for radiological protect subsequently improved. Today radioa agriculture and electrical power gener <i>Homeostasis</i> Cells in the body require a constant te dissolved food and water. In order to a constantly monitor and adjust the con systems include receptors which sensi- changes. Understand the structure an about fast responses. Also the hormor changes. Hormonal coordination is pa menstrual cycle. An understanding of	as allowed scientists to intervene through selective roured characteristics. Once new varieties of plants or ible to clone individuals to produce larger numbers of yourable characteristic. Matter d bonding to explain the physical and chemical ructures shows that atoms can be arranged in a variety r while others are giant structures. Theories of bonding in these structures. Scientists use this knowledge of w materials with desirable properties. The properties volications in a range of different technologies. he be very useful. Although radioactivity was discovered ar physicists several decades to understand the stability. Early researchers suffered from their exposure tion were first introduced in the 1930s and ctive materials are widely used in medicine, industry,	Chemical Changes and Quantitative Chemistry Understanding of chemical changes began when people began experimenting with chemical reactions in a systematic way and organising their results logically. Knowing about these different chemical changes meant that scientists could begin to predict exactly what new substances would be formed and develop a wide range of different materials and processes. It also helped biochemists to understand the complex reactions that take place in living organisms. Chemists use quantitative analysis to determine the formulae of compounds and the equations for reactions. Given this information, analysts can then use quantitative methods to determine the purity of chemical samples and to monitor the yield from chemical reactions. Identifying different types of chemical reaction allows chemists to make sense of how different chemicals react together, to establish patterns and to make predictions about the behaviour of other chemicals. <i>Forces</i> Engineers analyse forces when designing a great variety of machines and instruments, from road bridges and fairground rides to atomic force microscopes. Anything mechanical can be analysed in this way. Recent developments in artificial limbs use the analysis of forces to make movement possible. Using Resources Industries use the Earth's natural resources to manufacture useful products. In order to operate sustainably, chemists seek to minimise the use of limited resources, use of energy, waste and environmental impact in the manufacture of these products. Chemists also aim to develop ways of 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 human activity has affected the Earth's natural cycles, and how to minimise damaging effects.	Wave behaviour is common in both natural and man-made systems. Waves carry energy from one place to another and can also carry information. Designing comfortable and safe structures such as bridges, houses and music performance halls requires an understanding of mechanical waves. Modern technologies such as imaging and communication systems show how we can make the most of electromagnetic waves.
Skills across the year	Analyse Analyse Patterns Discuss Limitations Draw Conclusions Present data	<i>Communicate</i> Communicate ideas Construct explanations Critique claims Justify Opinions	<i>Enquire</i> Collect data Devise questions Plan variables Test hypotheses	Solve Estimate risks Examine consequences Review theories Interrogate sources

### **Curriculum Assessment Map: Year 10 Chemistry**



This course runs alongside Physics and Biology. The Chemistry components have been highlighted on this document in bold.

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• Classify organisms using the Linnaean system       • Usatify organisms using and cycling       • Usatify organisms       • Usatify organify organify organisms       • Usatify organism		<ul> <li>Know the stages of selective breeding and genetic engineering</li> </ul>	<ul> <li>Explain the differences between scalar and vector quantities</li> </ul>	
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• 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 • Describe an experiment to investigate Newton's second law • State factors that effect a person's reaction time • Calculate stopping distance • Identify key parts of the nervous system • Describe an experiment to compare the hazards of the three types of ionising radiation • Describe an experiment to compare human 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• State Newton's three laws of motion • Describe the role of hormones in controlling blood glucose concentration and the menstrual • Cycle • State the roles of different contraceptives• State Newton's three laws of motion • Describe the probable water • Describe the roles of different contraceptives• State Newton's three laws of motion • Describe an experiment to investigate Newton's second law • State sustainable methods of product disposal • Describe produces to product • State the roles of different contraceptivesInformal (formative) AssessmentGRIT and Uve Marking DIRT for mock exams Think Pink sheetsGRIT and Uve Marking DIRT for mock exams Think Pink sheetsGRIT and Uve Marking DIRT for mock exams Think Pink sheetsGRIT and Uve Marking DIRT for mock exams Think Pink sheetsTwo 45 minute tests on: Using Resources Waves Part 2 Mock ExamsFormal (summative) to mostasisTwo 45 minute tests on: Using Resources of Matter HomeostasisTwo 45 minute tests on: Using Resour			<ul> <li>Interpret distance-time and velocity-time graphs</li> </ul>	
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# Year 11 Curriculum Assessment Map





#### **Curriculum Assessment Map: Year 11 Chemistry.**

	Autumn Term	Spring Term	Summer Term
	Ecology	Cell Biology	Revision for Summer
Торіс	Electromagnetism	Organisation	2023 GCSE exams
	Organic Chemistry	Infection and Response	
	Chemical Analysis	Chemistry of the atmosphere	
	Space (triple only)	Electricity	
	Ecology The Sun is a source of energy that passes through ecosystems. Materials including carbon and	<b>Cell Biology</b> Cells are the basic unit of all forms of life. In this section we explore	
	water are continually recycled by the living world, being released through respiration of animals,	how structural differences between types of cells enables them to	
	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	perform specific functions within the organism. These differences in cells are controlled by genes in the nucleus. For an organism to	
	and that are adapted to particular conditions, both abiotic and biotic. These ecosystems provide	grow, cells must divide by mitosis producing two new identical cells.	
	essential services that support human life and continued development. In order to continue to	If cells are isolated at an early stage of growth before they have	
	benefit from these services humans need to engage with the environment in a sustainable way. In	become too specialised, they can retain their ability to grow into a	
	this section we will explore how humans are threatening biodiversity as well as the natural systems	range of different types of cells. This phenomenon has led to the	
	that support it. We will also consider some actions we need to take to ensure our future health,	development of stem cell technology. This is a new branch of	
	prosperity and well-being.	medicine that allows doctors to repair damaged organs by growing	
	Electromagnetism	new tissue from stem cells	
	Electromagnetic effects are used in a wide variety of devices. Engineers make use of the fact that a	Organisation	
	magnet moving in a coil can produce electric current and also that when current flows around a	In this section we will learn about the human digestive system which	
	magnet it can produce movement. It means that systems that involve control or communications	provides the body with nutrients and the respiratory system that	
	can take full advantage of this.	provides it with oxygen and removes carbon dioxide. In each case	
	Organic Chemistry	they provide dissolved materials that need to be moved quickly	
	The chemistry of carbon compounds is so important that it forms a separate branch of chemistry.	around the body in the blood by the circulatory system.	
Кеу	A great variety of carbon compounds is possible because carbon atoms can form chains and rings	We will also learn how the plant's transport system is dependent on	
Learning	linked by C-C bonds. This branch of chemistry gets its name from the fact that the main sources	environmental conditions to ensure that leaf cells are provided with	
Learning	of organic compounds are living, or once-living materials from plants and animals. These sources	the water and carbon dioxide that they need for photosynthesis	
	include fossil fuels which are a major source of feedstock for the petrochemical industry.	Infection and Response	
	Chemists are able to take organic molecules and modify them in many ways to make new and	Pathogens are microorganisms such as viruses and bacteria that	
	useful materials such as polymers, pharmaceuticals, perfumes and flavourings, dyes and	cause infectious diseases in animals and plants. They depend on	
	detergents.	their host to provide the conditions and nutrients that they need to	
	Chemical Analysis Analysts have developed a range of qualitative tests to detect specific chemicals. The tests are	grow and reproduce. They frequently produce toxins that damage tissues and make us feel ill.	
	based on reactions that produce a gas with distinctive properties, or a colour change or an	Chemistry of the Atmosphere	
	insoluble solid that appears as a precipitate. Instrumental methods provide fast, sensitive and	The Earth's atmosphere is dynamic and forever changing. The	
	accurate means of analysing chemicals, and are	causes of these changes are sometimes man-made and sometimes	
	particularly useful when the amount of chemical being analysed is small. Forensic scientists and	part of many natural cycles. The problems caused by increased	
	drug control scientists rely on such instrumental methods in their work.	levels of air pollutants require scientists and engineers to develop	
	Space (Triple Only)	solutions that help to reduce the impact of human activity.	
	Questions about where we are, and where we came from, have been asked for thousands of years.	Electricity	
	In the past century, astronomers and astrophysicists have made remarkable progress in	Electric charge is a fundamental property of matter. Many circuits	
	understanding the scale and structure of the universe, its evolution and ours. New questions have	are powered with mains electricity, but portable electrical devices	
	emerged recently. 'Dark matter', which bends light and holds galaxies together but does not emit	must use batteries of some kind. The fundamentals of	
	electromagnetic radiation, is everywhere - what is it? And what is causing the universe to expand	electromagnetism were worked out by scientists of the 19th	
	ever faster?	century. Power stations have a limited lifetime. If we all continue to	



#### **Curriculum Assessment Map: Year 11 Chemistry.**

Skills across the year	<b>Analyse</b> Analyse Patterns Discuss Limitations Draw Conclusions Present data	<b>Communicate</b> Communicate ideas Construct explanations Critique claims Justify Opinions	demand more electricity this means building new power stations in every generation – but what mix of power stations can promise a sustainable future?	Solve Estimate risks Examine consequences Review theories Interrogate sources
End points	<ul> <li>Identify abiotic and biotic factor</li> <li>State adaptations and describe</li> <li>Draw food chains and webs</li> <li>Identify feeding relationships</li> <li>Explain how factors can affect p</li> <li>Explain how quadrats can be us</li> <li>Suggest why a transect might be</li> <li>Describe the main stages of the</li> <li>Describe human impacts on the</li> <li>Explain how sustainability can p</li> <li>Draw magnetic field lines aroun</li> <li>State the forces between poles</li> <li>Describe the behaviour of a cor</li> <li>Explain how to use the right-hai</li> <li>Define a solenoid and draw its r</li> <li>State the general formulas of h</li> <li>Draw the structure of common</li> <li>Compare complete and incomp</li> <li>Give the products that can be r</li> <li>Describe the process of fraction</li> <li>State the test for alkenes</li> <li>Define a pure substance and for</li> </ul>	cosystem, abiotic, biotic, adaptation and community rs their usefulness opulation sizes ed to investigate the distribution of plants in two areas e used water and carbon cycle planet orotect ecosystems d a magnet of a magnet of a magnet npass md thumb rule magnetic field lines gth of a solenoid's magnetic field carbons hydrocarbons hydrocarbons blete combustion of hydrocarbons made from crude oil mal distillation and its uses g and why it is needed rrmulation can be used to test the purity of a substance atography in separating soluble substances ut Rf values	<ul> <li>Identify cells and the use of microscopy</li> <li>Understand cells differentiate and divide</li> <li>State the uses of stem cells</li> <li>Describe the exchanging of substances</li> <li>Define the terms cell, tissue, organ, organ system and organism</li> <li>Describe common food tests</li> <li>Explain the role of enzymes in the digestive system</li> <li>Identify the role of the lungs and heart in the respiratory system and circulatory system</li> <li>State common non-communicable diseases and risk factors</li> <li>Describe how plants are organised</li> <li>Name the four types of pathogen</li> <li>Identify common communicable diseases</li> <li>Identify now the body prevents and fights diseases</li> <li>Describe preclinical drugs testing</li> <li>State the stages of the evolution of the atmosphere</li> <li>Identify the greenhouse gases</li> <li>Describe the effects of climate change</li> <li>Describe how you would investigate how the length of the wire affects resistance</li> <li>Interpret I-V graphs</li> <li>Use equations to calculate current, potential difference, power, charge and resistance</li> <li>Know the potential difference and frequency of UK mains supply</li> <li>Know the colours of each wire in a UK plug</li> <li>Explain how transformers are used in the national grid</li> </ul>	Revise key Science topics for summer exams



#### **Curriculum Assessment Map: Year 11 Chemistry.**

	<ul> <li>Triple Only:</li> <li>Define key cosmological bodies</li> <li>State the stages of the life cycle of a star</li> <li>Describe the orbits of the planets in our Solar System</li> <li>Describe the Big Bang theory and explain evidence for it</li> </ul>		
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 <b>Organic Chemistry</b> <b>Chemical Analysis</b> Space (triple only)	Mocks	Exams

