

Curriculum Map

Subject: Science

		Autumn		Spring		Summer	
		Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 7	Content	Introduction to science Cells and Organisation	Forces and Motion Atoms, Elements and Compounds	Space	Chemical reactions Diet and Health	Reproduction States and separation	Interdependence Investigative work
	Knowledge & Skills	How a lab works Scientific equipment and how it is used Lab safety. Cells, tissues and organs as well as organ systems in animals. How bones and muscles allow movement and how substances move into and out of cells by diffusion.	How objects interact and explore how speed, distance and time are linked. Introduction to atoms and the periodic table and explore how compounds may form between different elements. Practical skills develop as they carry out different chemical reactions	Gravity and space and our place in the universe. Seasons, the phases of the moon and the Big Bang.	Carry out different chemical reactions such as combustion, oxidation and rusting and use knowledge of elements to explain what is happening in these reactions. What makes a balanced diet, why we need different food groups and factors that affect our health such as smoking and alcohol	Students build on their knowledge of specialised cells to explain how reproduction occurs in plants and animals. Develop knowledge of the reproductive systems and learn how humans undergo physical and emotional changes during puberty. Practical skills are developed when students learn how to separate mixtures and how substances behave in different states	Building on photosynthesis, students look at how plants and animals are connected in food chains and that these show the flow of energy in an ecosystem. They explore pollinators and why they are important to human life and discuss how humans are negatively affecting their environment by their actions. Students will draw on their experiences over the year and carry

						of matter.	<p>out a series on investigations where they will plan, carry our and evaluate their results.</p> <p>They will look at variables as well as risks, hazards and managing these within a lab.</p>
<p>Prior Knowledge (we assume no prior knowledge in year 7 even if it is on KS2 curriculum due to the variation in KS2 science experience)</p>	<p>KS2: functions of plant organs Skeletons and muscles for support and movement</p>	<p>KS2: Gravity and its effect Air resistance, water resistance and friction Pulleys and gears Contact forces</p>	<p>KS2: Movement of Earth and planets relative to sun Movement of moon relative to Earth Day and Night</p>	<p>KS2: Impact of diet, exercise drugs and lifestyle of the way the body functions Transportation of nutrients and water Functions of digestive system</p>	<p>KS2: Life cycles of mammals Reproduction as a life process</p> <p>Properties of materials Dissolving Separation techniques Reversible changes Irreversible reactions Changes of state</p>	<p>KS2: Planning Measuring Control variables Accuracy Precision Repeats Scientific diagrams Graphs</p> <p>KS2 – classification of living things Adaptation of animals and plants Food chains Year 8 spring term - photosynthesis</p>	
<p>Assessment</p>	<p>Assessment for all topics is as follows: Seneca set for HW to build retrieval practice Whole class feedback provided for HW Variety of retrieval strategies used in class weekly End of topic tests (these are comprised of 10 multiple choice questions, key words and definitions and a set of application questions which where possible incorporate scientific skills as well as assessing knowledge)</p>						



	One end of year exam						
	Key Vocabulary/ reading materials	Guided reading: Muscles and how they work	Guided reading: Air resistance Science in the news – shortage of helium gas IoP Forces and motion stories	Guided reading: Mars article Why does matter matter?	Guided reading: Metals and none metals	Guided reading: Healthy eating Reproduction	Key words: Variables – independent, dependant, control Hazard Risk Reading: IoP 'Weird units and wonderful measures' stories
	Enrichment/ Co-Curricular offer	Scientist of the week Co-curricular link with PE (muscles, bones, joints)	Scientist of the week Isaac Newton and gravity	Scientist of the week Tim Peake videos from ISS	Scientist of the week	Scientist of the week Co-curricular link with PE- diet and exercised linked to health	Scientist of the week Co-curricular – maths links for graph drawing, calculating means
Year 8	Content,	Genetics and evolution Electricity and magnetism	Acids and alkalis	Photosynthesis Pressure	Rocks	Respiration	Light and sound Energy
	Knowledge & Skills	Introduced to the idea that these are differences between individuals and species and these are caused by genes. How natural selection occurs and how features	Students explore a range of substances as being either acid or alkali. Develop a basic understanding of what this means and that neutralisation occurs when one is added to the other.	Learn how plants make their own food and how they are adapted for this. Test leaves for starch. Lear what pressure is, the equation for pressure and	Study the structure of the earth and how rocks have formed overtime and are linked in the rock cycle. Students begin to think about the atmosphere and how the balance of carbon is important	How animals and plants respire – they build on their knowledge of organ systems to look in more detail at the respiratory system and how this is adapted.	Wave types discussed and investigate sound as a longitudinal wave. Comparisons of this to light as a transverse wave. Investigation include looking at



	can be manipulated in genetic engineering and selective breeding.	Practical skills are developed. Investigative skills are used to carry out a practical to find the best indigestion remedy.	moments – uses and applications.	and effects of changing this balance – e.g. climate change.		splitting light, colour and refraction. Students look at how the eye works and our ears as a sense organ that receives sound. Energy stores and pathways and simple energy transfers as well as renewable and non-renewable energy resources and the cost of electricity
Prior Knowledge	<p>KS2 – fossils evidence provides information about things that inhabited Earth millions of years ago Living things produce offspring that show variation</p> <p>KS2 – conductors and insulators Use symbols to draw simple circuits Construct simple circuits, series circuits Magnets as having 2 poles, Repulsion and attraction</p>			<p>KS2: rock types Fossils Soils</p>	<p>KS2 – parts of human circulatory system, functions of heart and blood vessels</p> <p>Year 7 – organ systems</p>	<p>KS2 – light travels in straight lines Objects are seen because they reflect light. How sounds are made – vibrations Pitch and volume</p>



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Key Vocabulary/ reading materials	<p>Guided reading: DNA explained History of electricity</p> <p>IoP Electricity and magnetism stories</p>	<p>Guided reading: Neutralisation in everyday life</p>	<p>Guided reading: Aerobic and anaerobic respiration</p>	<p>Guided reading: Weathering and erosion Non-renewable / renewable resources</p>	<p>Guided reading: Food chains Evidence of climate change</p>	<p>IoP 'Waves' stories</p>
Enrichment/ Co-Curricular offer	<p>Scientist of the week Watson and Crick Rosalind Franklin and Maurice Wilkins story Elect: Franklin, Volta, Faraday, Edison, Latimer</p>	<p>Scientist of the week</p>	<p>Scientist of the week Co-curricular link with PE - Respiration</p>	<p>Scientist of the week</p>	<p>Scientist of the week Rachel Carson – 'Silent spring'</p>	<p>Scientist of the week</p>

Year 9	Content,	Cells mastery Atomic structure and the history of the atom	Energy in systems	Biological organisation Chemical bonding	Forces	Infection and Response Calculations in Chemistry	Particle model of matter
	Knowledge & Skills	Develop their knowledge of cellular structures, stem cells and a more in depth look at how systems work and interact. They look in greater depth at how the periodic table was developed and start to link ideas about how elements behave and their properties according to their atom	Develop the depth of their knowledge of energy stores and pathways and begin to look at the mathematics behind some energy store – e.g. kinetic, GPE. They will attempt simple calculations based on a given formula and be able to compare different energy resources. Practical skills include planning an experiment to investigate a solar panel.	Students look the digestive system in more detail and investigate enzymes and factors that affect them. Study in more depth the heart and circulatory system as well as how this can be affected by ill health, e.g. coronary heart disease and lifestyle factors. Make links between their work on the periodic table in year 7 and develop an understanding of how elements combine in ionic and covalent bonding, based on their electron	Forces – resultant forces, scalar and vectors, Gravity and Hooke’s Law Distance time, acceleration, $F=ma$, velocity time graphs, terminal velocity and stopping distances	Students build on year 7 work on health to look at how pathogens infect, the different type pf pathogens and how the body defends itself against disease. In chemical change they will look at the reactivity series, extraction of metals and electrolysis as well as the reactions of metals with acid	Following on from looking at states of matter in year 7, students now look at how atoms are arranged in solids, liquids and gases in more detail. They will explore how energy is transferred in conduction, convection and radiation and how a gas behaves when it is heated.



			structure.			
Prior Knowledge	Year 7 autumn term 1– Cells and Organisation Year 7 autumn term 2 - Atoms, Elements and Compounds	Year 8 – spring term 2 Energy	Year 7 autumn term 1– Cells and Organisation Year 8 – Autumn term 1 Atomic structure and the history of the atom	Year 8 Autumn term 1 - Electricity and magnetism	Year 7 summer term - Diet and Health Year 8 Atomic structure and bonding	Year 7 – states and separation
Assessment	<p>Assessment for all topics is as follows: Seneca set for HW to build retrieval practice Whole class feedback provided for HW Variety of retrieval strategies used in class weekly End of topic tests (these are comprised of 10 multiple choice questions, key words and definitions and a set of application questions which where possible incorporate scientific skills as well as assessing knowledge) One end of year exam</p>					
Key Vocabulary/ reading materials	Guided reading: Cells story Desalination article	Guided reading: Comparing renewable and non-renewable power stations		Guided reading: History of electricity IoP Electricity and magnetism stories	Book: Vaxxers (Prof Sarah Gilbert, Dr Catherine Green)	Guided reading: Water – the weirdest liquid o the planet IoP stories ‘Matter’
Enrichment/ Co-Curricular offer	Scientist of the week Mendeleev Story History of the atom (Democritus, Rutherford, Thompson, Bohr, Chadwick)	Scientist of the week Co-curricular – maths links for rearranging equations	Scientist of the week Co-curricular link with PE – heart and circulatory system	Scientist of the week Volta, Faraday	Scientist of the week Covid link (Sarah Gilbert) Edward Jenner story	Scientist of the week

Year 10 Trilogy	Content,	Bioenergetics Calculations in Chemistry	Atomic Structure (physics) Homeostasis and response Energy changes Rate and extent of chemical change	Inheritance, Variation and Evolution Electricity	Organic Chemistry Waves	Chemical analysis	Chemistry of the atmosphere Using resources
	Knowledge & Skills	Building on year 8 work to look at factors that can limit photosynthesis and the effect of light on the rate. Make new links between respiration and the response to exercise. Building on prior work done on the periodic table and atoms, students will be introduced to the idea that matter is conserved in chemical reactions. They will learn that when talking about atoms, the numbers are so big that a number called a mole is used.	The history of the atom and ionisation radiation and its properties and uses. They will use nuclear equations and explain the effect of radioactive contamination. Nervous system, blood glucose control. Reproduction and menstrual cycle. Contraception, infertility. In the rates topic, practical skills will develop as experiment investigating the rates of reaction are carried out. This will include reversible reactions and catalysts.	Asexual and sexual reproduction, mitosis and meiosis. The structure of DNA is studied in more detail – e.g. sugar phosphate backbone and base pairs. Inheritance of characteristics and probability of features being inherited. Genetic engineering, selective breeding and Evolution are covered in greater depth. Students have already covered basic circuits in year 8. As they master this topic further they will look at what charge	Alkanes, alkenes, crude oil, combustion, cracking. Types and features of a wave with examples of both types. Practical – ripple tank and waves on a string. EM spectrum – uses and dangers of different waves.	Pure substances and mixtures. Chromatography. Testing for gases.	Re-visit the atmosphere, look at greenhouse gases, the effect of these on global temperatures. The combustion of fuels and the impact of this on the atmosphere. Basic resources from the earth. The water cycle. The carbon cycle (linking back to global warming) Waste water treatment Life cycle assessments Extraction of metals Recycling



				<p>is, how potential difference is calculated and the links between current, resistance and PD. They will explore resistance in circuits and look at how a range of different resistors are used in everyday life. They explain how the national grid supports all of the country and uses both renewable and non-renewable resources</p>			
	<p>Prior Knowledge</p>	<p>Year 8: Intro to photosynthesis and respiration</p> <p>Year 7: Chemical changes Year 8: Acids and alkalis,</p>	<p>Year 9: Atomic structure and the history of the atom</p> <p>Year 7: Reproduction</p> <p>Year 7: Chemical reactions</p> <p>Year 8: Neutralisation (in acids and alkalis)</p> <p>Year 9: Chemical change</p>	<p>Year 7: Cells and reproduction Year 8: Genetics</p> <p>Year 7: Forces and motion</p>	<p>Year 7: Combustion in Chemical Reactions</p> <p>Year 8: Light and Sound</p>	<p>Year 7: States and separation</p>	<p>Year 8: Ecology</p>



Assessment	Assessment for all topics is as follows: Seneca set for HW to build retrieval practice Whole class feedback provided for HW Variety of retrieval strategies used in class weekly End of topic tests (these are comprised of 10 multiple choice questions, key words and definitions and a set of application questions which where possible incorporate scientific skills as well as assessing knowledge) One end of year exam					
Key Vocabulary/ reading materials	Guided reading: Photosynthesis literacy article	Guided reading: Diabetes IVF article Fertility rates Nuclear energy	Guided reading: Forces article IoP Forces and motion stories	IoP 'Waves' stories		Guided reading: The atmosphere article Evidence of climate change The bottled water story
Enrichment/ Co-Curricular offer	Scientist of the week Co-Curricular links with PE for Bioenergetics topic Co-curricular – maths links for	Scientist of the week Co-curricular link with Life - contraception	Scientist of the week	Scientist of the week	Scientist of the week	Scientist of the week Co-Curricular links with Geography for Chemistry of atmosphere topic



		rearranging equations					
Year 10 Triple	Content,	Inheritance, Variation and Evolution Energy changes Electricity	Ecology Rates of Reaction	Cells and Organisation mastery Organic Chemistry Waves	Inheritance mastery Chemical analysis Space	Bioenergetics Mastery Chem of the atmosphere Energy mastery	Homeostasis mastery Using resources Particle model mastery
	Knowledge & Skills	Asexual and sexual reproduction, mitosis and meiosis. The structure of DNA is studied in more detail – e.g. sugar phosphate backbone and base pairs. Students have already covered	Abiotic and biotic factors, adaptations of animals and plants. Levels of organisation. The water cycle. Quadrats and transects. The carbon cycle. Decay practical. Biodiversity.	Consolidate knowledge of cellular structures, stem cells and systems. Embed understanding of digestive system and enzymes. Revisit heart and circulatory system as well as how this can be affected by	Consolidation of: Asexual and sexual reproduction, mitosis and meiosis. The structure of DNA. Inheritance of Genetic engineering, selective breeding and Evolution	Consolidation of: Factors that can limit photosynthesis and the effect of light on the rate. Respiration and the response to exercise. Re-visit the atmosphere, look	Consolidation of: Nervous system, blood glucose control. Reproduction and menstrual cycle. Contraception, infertility. The brain, the eye, plant hormones. Basic resources

	<p>basic circuits in year 8. As they master this topic further they will look at what charge is, how potential difference is calculated and the links between current, resistance and PD. They will explore resistance in circuits and look at how a range of different resistors are used in everyday life. They explain how the national grid supports all of the country and uses both renewable and non-renewable resources.</p>	<p>Global warming. Measuring rates, collision theory and activation energy. Factors affecting rates. Catalysts. Reversible reactions. The Haber process.</p>	<p>ill health, e.g. coronary heart disease and lifestyle factors. Alkanes, alkenes, crude oil, combustion, cracking. Reactions of alkanes, functional groups, alcohols, esterification and polymers. Types and features of a wave Practical – ripple tank and waves on a string. EM spectrum – uses and dangers of different waves. Reflection, ear and sound, ultrasound, lenses and colour.</p>	<p>Pure substances and mixtures. Chromatography. Testing for gases. Test for positive and negative ions, instrumental analysis. Objects in space, orbits. The sun. Life cycle of a star. Red shift. Big bang.</p>	<p>at greenhouse gases, the effect of these on global temperatures. The combustion of fuels and the impact of this on the atmosphere. Consolidation of: Energy stores and pathways Equation – KE, GPE, EPE, Power Manipulation of equations to find any term within them.</p>	<p>from the earth. The water cycle. The carbon cycle (linking back to global warming) Waste water treatment Life cycle assessments Extraction of metals Recycling. Alloys, ceramics and revisit Haber process and NPK fertilisers. Consolidation of: Changes of state, density, Specific heat capacity, specific latent heat. Internal energy, gas pressure, Boyles law.</p>
Prior Knowledge	<p>Year 7: Cells and reproduction Year 8: Genetics Year 7: Forces and motion</p>	<p>Year 8: Ecology Year 10: Chemistry of the atmosphere Year 7: Chemical reactions</p>	<p>Year 7: Cells and organisation Year 9: Cells Year 7: Chemical reactions Year 8: Sound and light (waves)</p>	<p>Year 7: Reproduction Year 9: Cells Year 7: States and separation Year 7: Space</p>	<p>Year 8: Photosynthesis and respiration Year 9: Bioenergetics Year 9: Chem of atmosphere</p>	<p>Year 9: Homeostasis Year 7: states and separation Year 9: Particle model</p>



						Year 8 & 9: Energy stores	
Assessment	<p>Assessment for all topics is as follows: Seneca set for HW to build retrieval practice Whole class feedback provided for HW Variety of retrieval strategies used in class weekly End of topic tests (these are comprised of 10 multiple choice questions, key words and definitions and a set of application questions which where possible incorporate scientific skills as well as assessing knowledge) One end of year exam</p>						
Key Vocabulary/ reading materials	<p>Guided reading: Forces article</p> <p>IoP Forces and motion stories</p>	<p>Guided reading: The atmosphere article</p> <p>IoP Electricity and magnetism stories</p>	<p>Guided reading: Cells story</p> <p>IoP 'Waves' stories</p>			<p>Guided reading: Photosynthesis literacy article</p>	<p>Guided reading: Diabetes</p> <p>IVF article Fertility rates</p> <p>Nuclear energy The atmosphere article</p> <p>Evidence of climate change The bottled water story</p>
Enrichment/ Co-Curricular offer	<p>Scientist of the week</p>	<p>Scientist of the week Co-curricular – maths links for rearranging</p>	<p>Scientist of the week Co-curricular link with PE –</p>	<p>Scientist of the week</p>	<p>Scientist of the week</p> <p>Co-curricular – maths links for</p>	<p>Scientist of the week</p>	<p>Scientist of the week</p>



			equations	circulatory system		rearranging equations PE - respiration	
Year 11 Trilogy	Content,	Ecology Chemical analysis Waves	Magnetism and electromagnetism	Cells revisited (linked to organisation, inheritance, infection) Atomic structure and bonding revision	Exam preparation Classes will have a lesson by lesson plan in place to cover key areas and consolidate practical skills leading up to the exams.	Exam preparation Classes will have a lesson by lesson plan in place to cover key areas and consolidate practical skills leading up to the exams.	
	Knowledge & Skills	Abiotic and biotic factors, adaptations of animals and plants. Levels of organisation. The water cycle Quadrats and transects. The carbon cycle. Biodiversity. Global warming. Pure substances and mixtures. Chromatography. Testing for gases.	Magnetism and electromagnets. The motor effect, making a motor.	Students re-visit the work on cells to apply knowledge to unfamiliar situations and carry out calculations e.g. magnification equation Consolidation of: Atomic structure, covalent, ionic and metallic bonding			



	Types and features of a wave Ripple tank and waves on a string. EM spectrum – uses and dangers of different waves.					
Prior Knowledge	Year 8: Ecology Year 10: Chemistry of the atmosphere Year 8: States and separation Year 8: light and sound	Year 8: Electricity and magnetism	This has been covered in years 7, 8 and 9.			
Assessment	Assessment in year 11 continues with regular retrieval practice via Seneca as well as targeted past paper questions during revision of each topic. Variety of retrieval strategies used in class weekly Mock exams take place in October and March in year 11.					
Key Vocabulary/ reading materials	Guided reading: Weather hazards Human causes of climate change The carbon story IoP 'Waves' stories	IoP elect and magnetism				
Enrichment/ Co-Curricular offer	Scientist of the week Co-curricular links		Co-curricular link with PE- circulatory system			



		with Geography for carbon cycle and climate change					
Year 11 Triple	Content	Inheritance, variation and evolution Using resources Waves	Ecology Organic chemistry Electricity Space	Exam preparation Classes will have a lesson by lesson plan in place to cover key areas and consolidate practical skills leading up to the exams.	Exam preparation Classes will have a lesson by lesson plan in place to cover key areas and consolidate practical skills leading up to the exams.		
	Knowledge & Skills	Asexual and sexual reproduction, mitosis and meiosis. The structure of DNA. Inheritance of characteristics and probability of features being inherited. Genetic engineering, selective breeding and Evolution are covered in greater depth. Cloning, work of Mendel, Speciation.	Abiotic and biotic factors, adaptations of animals and plants. Levels of organisation. The water cycle Quadrats and transects. The carbon cycle. Decay practical. Biodiversity. Global warming. Alkanes, alkenes, crude oil, combustion, cracking. Reactions of				



		<p>Basic resources from the earth. The water cycle. The carbon cycle (linking back to global warming) Waste water treatment Life cycle assessments Extraction of metals Recycling. Alloys, ceramics and revisit Haber process and NPK fertilisers.</p> <p>Types and features of a wave Practical – ripple tank and waves on a string. EM spectrum – uses and dangers of different waves. Reflection, ear and sound, ultrasound, lenses and colour</p>	<p>alkanes, functional groups, alcohols, esterification and polymers.</p> <p>Static electricity. Charge, potential difference is calculated, links between current, resistance and PD. Investigate resistance in circuits and look at how a range of different resistors are used in everyday life.</p> <p>Objects in space, orbits. The sun. Life cycle of a star. Red shift. Big bang.</p>				
	Prior Knowledge	<p>Year 7: Cells and reproduction Year 8: Genetics</p> <p>Year 8: Light and sound</p>	<p>Year 8: Ecology Year 10: Chemistry of the atmosphere</p> <p>Year 7 and 9: Chemical reactions</p>				



		Year 7: Electricity and magnetism Year 7: Space				
Assessment	Assessment in year 11 continues with regular retrieval practice via Seneca as well as targeted past paper questions during revision of each topic. Mock exams take place in October and March in year					
Key Vocabulary/ reading materials	Guided reading: Weather hazards Human causes of climate change The carbon story	IoP Electricity and magnetism stories				
Enrichment/ Co-Curricular offer	Scientist of the week Co-curricular links with Geography for Using resources topic	Scientist of the week Co-curricular links with Geography for Ecology topic				