

Medium Term Planning Document: Combined science Year 10

Curriculum Intent:

The Northampton Academy science curriculum is designed to let all students thrive and develop a love for science. When students reach KS4 they will have a strong foundation of understanding and appreciation of the scientific world and will continually work on their competence in all aspects of science, building a better understanding of how the world around us works and our place within it.

In Science at KS4 pupils should be able to develop the independence, resilience and character traits required to prepare them to be able to critically analyse information and apply these traits to their everyday lives. In Science the skill of processing information and data can be used in problem solving, planning, and strategising when required. Students will also be exposed to careers and learn about the types of careers that would use the knowledge they will learn about in each of their topics.

'Why This, Why Now?'

In our planning, we have asked ourselves 'why this, why now?' Here we provide some examples of the curriculum choices we have made, and why the units have been placed in the order we have chosen:

- Cell Biology is taught before organisation so that the basic structures in cells are understood before learning about their interconnectivity.
- Atomic structure and the periodic table is taught first so that the basic fundamental principles of all chemical interactions have a grounding in the structure of the atom.

Curriculum Intent Science



We aim to stoke your curiosity and better your understanding about the world around you.

You will have the opportunity to:

- **Gain investigative skills**, allowing you to question and inquire.
- **Expand your scientific knowledge** about the world you live in.
- Improve and develop existing numeracy, literacy and problem solving skills



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The Medium Term Planning document below is designed to show the journey that every student takes through our curriculum. Some elements of the curriculum may be taught over several lessons, others in a single lesson.

Science				
Topic	Content		Formative Assessments?	Link(s) to an example lesson
B1 - Cell Biology	Cells		Prior knowledge checks Bell work- retrieval quizzes/retrieval roulette Exam question plenaries (low stakes application) End of topic 'Pause Point' assessment.	https://continuityoak.org.uk/lessons Click 'KS4 Science' Under Biology Click 'Cell biology'
	Microscopes			
	Specialised cells			
	Genes, DNA and cell cycle (mitosis)			
	Stem cells			
	Cell transport mechanisms			
Key words	Prokaryotic, Eukaryotic, Chloroplast, Nucleus, Mitochondria, Ribosome, Cytoplasm, Cell membrane, Cell wall, Osmosis, Active Transport, Diffusion, Stem cell, Mitosis, Microscope, Root hair cell, Sperm cell			
C1 - Atomic structure and periodic table	Atoms & elements		Prior knowledge checks Bell work- retrieval quizzes/retrieval roulette Exam question plenaries (low stakes application) End of topic 'Pause Point' assessment.	https://continuityoak.org.uk/lessons Click 'KS4 Science' Under Chemistry Click 'Atomic structure and periodic table'
	Compounds and chemical equations			
	Separating mixtures			
	History of the atom			
	Isotopes, electronic structure			
	Development of the periodic table			
	Metals and non-metals			
	Groups 1, 7, 0			
Key words	Atom, Proton, Neutron, Electron, Isotope, Distillation, Filtration, Crystallisation, Group, Period, Halogens, Alkali metals, Noble Gas, Reactivity			

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Science	Year 10 – Half Term 2			
Topic	Content	Key Words	Formative Assessments	Link(s) to an example lesson
P1 - Energy	Energy stores and transfers		Prior knowledge checks Bell work- retrieval quizzes/retrieval roulette Exam question plenaries (low stakes application) End of topic 'Pause Point' assessment.	https://continuityoak.org.uk/lessons Click 'KS4 Science' Under Physics Click 'Energy'
	Specific heat capacity			
	Losses and dissipating energy			
	Energy resources			
Kinetic energy, Gravitational potential, Elastic potential, Chemical energy, Efficiency, Renewable resource, Non-renewable resource, Finite, Dissipation, Thermal energy, Nuclear energy, Magnetic energy, Electrostatic energy, Fossil fuels, Specific heat capacity				
B2 - Organisation	Cells, tissues, organs		Prior knowledge checks Bell work- retrieval quizzes/retrieval roulette Exam question plenaries (low stakes application) End of topic 'Pause Point' assessment.	https://continuityoak.org.uk/lessons Click 'KS4 Science' Under Biology Click 'Organisation'
	Digestive system			
	Food tests			
	Enzymes			
	Lungs			
	Cardiovascular system			
	Heart disease			
	Health issues/ lifestyle factors			
	Non-communicable diseases			
Plant tissues and functions				
Cardiovascular, Artery, Vein, Capillary, Coronary Heart Disease, Non-communicable, Biuret solution, Benedict's solution, Iodine, Emulsion, Cancer, Benign, Malignant, Xylem, Phloem				

Science					
Topic	Content	Key words	Formative Assessments		SEND Adaptations
C2 – Bonding structure and the properties of matter		Ion Electrostatic Force of attraction Electron Transfer Polymer Monomer	Prior knowledge checks Bell work- retrieval quizzes/retrieval roulette Exam question plenaries (low stakes application) End of topic 'Pause Point' assessment.	https://continuityoak.org.uk/lessons Click 'KS4 Science' Under Chemistry Click 'Bonding structure and the properties of matter'	<ul style="list-style-type: none"> • Instructions kept short and clear • Planning lessons with a common predictable structure (Do now, I, We You, etc) • Use clear timings for task completion where appropriate • Using scaffolds for calculations (VESRAU) • Lots of key term repetition to aid with retention • Model answers/scaffolding for written work • Coloured resources for students with visual stress
	Ionic bonding and structures				
	Covalent bonding				
	Allotropes of carbon				
	Metallic bonding				
	Polymers				
	Nano particles				
P2 - Electricity	Circuits and circuit symbols	Component Current Charge Resistance Power Circuit Coulombs Joules Transformer Potential difference Voltage Amperes	Prior knowledge checks Bell work- retrieval quizzes/retrieval roulette Exam question plenaries (low stakes application) End of topic 'Pause Point' assessment.	https://continuityoak.org.uk/lessons Click 'KS4 Science' Under Physics Click 'Electricity'	<ul style="list-style-type: none"> • Instructions kept short and clear • Use of a 'slow practical' approach • Use of visual practical sheets • Planning lessons with a common predictable structure (Do now, I, We You, etc) • Use clear timings for task completion where appropriate
	Charge and current				
	Energy transfer in circuits				
	Resistance				
	Series and parallel circuits				
	Electrical power				
	Mains electricity				
	National grid				

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	Transformers				<ul style="list-style-type: none"> • Using scaffolds for calculations (VESRAU) • Lots of key term repetition to aid with retention • Model answers/scaffolding for written work • Coloured resources for students with visual stress
B3 – Infection and response	Infectious diseases Immunity Vaccines Antibiotics Drug testing	Pathogen Microorganism Vaccine Lymphocytes Memory cell Antigen Antibody Neutralise Bacteria Virus Protists Antibiotic Clinical trial	Prior knowledge checks Bell work-retrieval quizzes/retrieval roulette Exam question plenaries (low stakes application) End of topic 'Pause Point' assessment.	https://continuityoak.org.uk/lessons Click 'KS4 Science' Under Biology click 'Infection and response'	<ul style="list-style-type: none"> • Instructions kept short and clear • Planning lessons with a common predictable structure (Do now, I, We You, etc) • Use clear timings for task completion where appropriate • Lots of key term repetition to aid with retention • Model answers/scaffolding for written work • Coloured resources for students with visual stress

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Science					
Topic		Keyword	Formative Assessments?	Link(s) to an example lesson	SEND Adaptations
C3 – Quantitative chemistry					
		Atomic mass Atomic number Moles Avogadro's constant Reactant Product Concentration Conservation of mass	Prior knowledge checks Bell work- retrieval quizzes/retrieval roulette Exam question plenaries (low stakes application) End of topic 'Pause Point' assessment.	https://continuityoak.org.uk/lessons Click 'KS4 Science' Under Chemistry Click 'Quantitative chemistry'	<ul style="list-style-type: none"> • Instructions kept short and clear • Planning lessons with a common predictable structure (Do now, I, We You, etc) • Use clear timings for task completion where appropriate • Using scaffolds for calculations (VESRAU) • Lots of key term repetition to aid with retention • Model answers/scaffolding for written work • Coloured resources for students with visual stress •
		Solid Liquid	Prior knowledge checks	https://continuityoak.org.uk/lessons	<ul style="list-style-type: none"> • Instructions kept short and clear



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P3 – Particle model			Gas	Bell work- retrieval quizzes/retrieval roulette	Click 'KS4 Science' Under Physics Click 'Particle model'	<ul style="list-style-type: none"> • Use of a 'slow practical' approach • Use of visual practical sheets • Planning lessons with a common predictable structure (Do now, I, We You, etc) • Use clear timings for task completion where appropriate • Using scaffolds for calculations (VESRAU) • Lots of key term repetition to aid with retention • Model answers/scaffolding for written work • Coloured resources for students with visual stress
			Density			
			Mass			
			Volume	Exam question plenaries (low stakes application)		
		Melting	End of topic 'Pause Point' assessment.			
		Freezing				
		Sublimation				
		Condensation				
		Evaporation				
		Pressure				
	Photosynthesis	Photosynthesis				



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B4 - Bioenergeti cs	Limiting factors of photosynthesis	Limiting factor Endothermic Exothermic Respiration Mitochondria			<ul style="list-style-type: none"> • Instructions kept short and clear • Use of a 'slow practical' approach • Use of visual practical sheets • Planning lessons with a common predictable structure (Do now, I, We You, etc) • Use clear timings for task completion where appropriate • Using scaffolds for calculations (VESRAU) • Lots of key term repetition to aid with retention • Model answers/scaffolding for written work • Coloured resources for students with visual stress
	Respiration				
	Anaerobic respiration				
	Metabolism				

<https://continuityoak.org.uk/lessons>

Click 'KS4 Science'
Under Biology click 'Bioenergetics'

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Science					
Topic	Content	Keywords	Formative Assessments?		SEND Adaptations
C4 – Chemical changes	Making salts	pH scale Concentration Acid Alkali Reaction Electrolysis Anode Cathode Cation Anion Electrolyte Cryolite Discharge Electrode	Prior knowledge checks Bell work-retrieval quizzes/retrieval roulette Exam question plenaries (low stakes application) End of topic 'Pause Point' assessment.	https://continuityoak.org.uk/lessons Click 'KS4 Science' Under Chemistry Click 'Chemical changes'	<ul style="list-style-type: none"> • Instructions kept short and clear • Use of a 'slow practical' approach • Use of visual practical sheets • Planning lessons with a common predictable structure (Do now, I, We You, etc) • Use clear timings for task completion where appropriate • Using scaffolds for calculations (VESRAU) • Lots of key term repetition to aid with retention • Model answers/scaffolding for written work • Coloured resources for students with visual stress
	Acids, alkalis and the pH scale				
	Strong and weak acids (HT only)				
	Electrolysis				
	Extraction of aluminium				
P4 – Atomic structure	History of the atom	Radioactive particle Isotope Ionisation Penetration Half-life Alpha Beta Gamma	Prior knowledge checks Bell work-retrieval quizzes/retrieval roulette Exam question plenaries (low stakes application)	https://continuityoak.org.uk/lessons Click 'KS4 Science' Under Physics click ' Atomic structure	<ul style="list-style-type: none"> • Instructions kept short and clear • Use of a 'slow practical' approach • Use of visual practical sheets • Planning lessons with a common predictable structure (Do now, I, We You, etc) • Use clear timings for task completion where appropriate • Using scaffolds for calculations (VESRAU)
	Isotopes and ionisation				
	Radioactivity and decay equations				
	Half-life				
	Uses and hazards of radioactivity				
	Limiting factors of photosynthesis				
	Respiration				

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			End of topic 'Pause Point' assessment.		<ul style="list-style-type: none"> • Lots of key term repetition to aid with retention • Model answers/scaffolding for written work • Coloured resources for students with visual stress
C5 – Energy changes	Exothermic and endothermic reactions	Endothermic Exothermic Activation energy enthalpy	Prior knowledge checks Bell work-retrieval quizzes/retrieval roulette Exam question plenaries (low stakes application) End of topic 'Pause Point' assessment.	https://continuityoak.org.uk/lessons Click 'KS4 Science' Under chemistry click ' Energy changes'	<ul style="list-style-type: none"> • Instructions kept short and clear • Use of a 'slow practical' approach • Use of visual practical sheets • Planning lessons with a common predictable structure (Do now, I, We You, etc) • Use clear timings for task completion where appropriate • Using scaffolds for calculations (VESRAU) • Lots of key term repetition to aid with retention • Model answers/scaffolding for written work • Coloured resources for students with visual stress
	Energy level diagrams				
	Bond energies				

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Science	Year 10 – Half Term 6				
Topic	Content	Key words	Formative Assessments?	Link(s) to an example lesson	SEND Adaptations
B7 - Ecology	Communities	Individual Habitat Population Community Ecosystem Biodiversity Precipitation Evaporation Surface run off Respiration Photosynthesis Transect	Prior knowledge checks Bell work- retrieval quizzes/retrieval roulette Exam question plenaries (low stakes application) End of topic 'Pause Point' assessment.	https://continuityoak.org.uk/lessons Click 'KS4 Science' Under Biology Click 'Ecology'	<ul style="list-style-type: none"> • Instructions kept short and clear • Use of a 'slow practical' approach • Use of visual practical sheets • Planning lessons with a common predictable structure (Do now, I, We You, etc) • Use clear timings for task completion where appropriate • Using scaffolds for calculations (VESRAU) • Lots of key term repetition to aid with retention • Model answers/scaffolding for written work • Coloured resources for students with visual stress
	Biotic and abiotic factors				
	Adaptations				
	Sampling				
	Cycles				
	Global warming				
	Biodiversity				
P5 - Forces	Distance-time graphs	Speed Velocity Acceleration Distance Displacement	Prior knowledge checks Bell work- retrieval quizzes/retrieval roulette Exam question plenaries (low stakes application) End of topic 'Pause Point' assessment.	https://continuityoak.org.uk/lessons Click 'KS4 Science' Under Physics clicks 'Forces'	<ul style="list-style-type: none"> • Instructions kept short and clear • Use of a 'slow practical' approach • Use of visual practical sheets • Planning lessons with a common predictable structure (Do now, I, We You, etc) • Use clear timings for task completion where appropriate • Using scaffolds for calculations (VESRAU) • Lots of key term repetition to aid with retention
	Velocity-time graphs				
	Equations of motion				

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					<ul style="list-style-type: none"> • Model answers/scaffolding for written work • Coloured resources for students with visual stress
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Summative Assessment:

Pupil End of Year Assessments will take place in HT6. These will cover all of the content in units B1-B4, C1-C5 and P1-P4. This assessment will inform Rank Order and will therefore inform group moves once this data is published to students and parents.