

Subject: Science

Year group: Year 9

Department Curriculum Vision:

The KS3 Science Curriculum is designed to provide students with a solid foundation in scientific knowledge and skills. It covers a wide range of topics across Biology, Chemistry, and Physics. Here are the main themes for each Year:

- Year 7 - Building Blocks
- Year 8 - Advance and deepen
- Year 9 - Apply

	Autumn Term 1	Autumn Term 2
Content: (Know what...)	<u>Biology: Environment, Evolution and Inheritance</u> - Life on Earth is dependent on photosynthesis to fix carbon dioxide and produce the organic molecules used as the fuels for respiration and life processes. - Living organisms interact with one another and their environment in many different ways. Human behaviours may have beneficial or detrimental effects on natural populations and the environment. The chemicals in the environment are continually cycling through the natural world. - Life on Earth has evolved over time by natural selection, which accounts for biodiversity and how organisms are related. The characteristics of living things depend on both their environment and their genome. - Humans can now use genetic engineering to modify organisms.	<u>Chemistry: Chemistry in Our World</u> - Acids react with metals, alkalis and bases to produce compounds known as salts. - Many chemical reactions produce a change in temperature. - Chemical reactions can be made to go faster or slower by changing the conditions. - The Earth's atmosphere has changed over billions of years. Human activities increase the amounts of some substances in the atmosphere. - Water that is safe to drink is essential for human health.

Skills: (know how...)	<u>Practical Skills</u> - Investigate the rate of photosynthesis in plants with different light intensities. - Testing leaves from different conditions for Starch <u>Additional Skills</u> - Applying previous KS3 practical skills to design, carry out and analyse results from Year 9 practicals	<u>Practical Skills</u> - Collecting a Soluble Salt from an Insoluble Base - Analysing and Testing Water Samples <u>Additional Skills</u> - Applying previous KS3 practical skills to design, carry out and analyse results from Year 9 practicals
Key vocabulary	- Abiotic - Acid Rain - Adapted - Algae - Asexula Reproduction - Biotic - Carbon Cycle - Carbon Dioxide - Characteristic - Chlorophyll - Clone - Competition - Consumer - Cutting - Decay - Deforestation - DNA - Ecosystem - Environment - Evolution - Extinct - Food Chain	- Acid - Alkali - Atmosphere - Base - Burning - Carbonate - Carbon Dioxide - Carbon Monoxide - Catalyst - Combustion - Compound - Crude Oil - Crystallised - Distillation - Explosion - Filtering - Fossil Fuels - Fractional Distillation - Fuel - Global Warming - Greenhouse Gases - Hydrochloric Acid

	- Food Web - Fossil - Gene - Genetic Engineering - Habitat - Herbicide - Landfill Site - Microorganism - Nutrient - Offspring - Organism - Pesticide - Photosynthesis - Plants - Plasmid - Pollution - Producer - Radiation - Selective Breeding - Sexual reproduction - Survival - Territory - Theory - Toxic - Variety	- Hydrogen - Limewater - Mixture - Neutralise - Neutralisation - Oxidation - Photosynthesis - Reaction - Rusting - Salts - Soot - Sterilising - Sulfuric Acid
Mid Term Assessment	2 MUAs to be completed every 2 weeks of the unit.	1 MUA to be completed half way through the topic.
End Term Assessment	EUA - Environment, Evolution and Inheritance	EUA - Chemistry in Our World
	Spring 1	Spring 2

Content: (Know what...)	<u>Physics: Energy, Forces and the Structure of Matter</u> - Forces are pushes or pulls, and if a force causes an object to move then work is done and energy is transferred. - Energy can be transferred usefully, stored or dissipated, but cannot be created or destroyed. - A braking force will cause an energy transfer that makes a vehicle slow down and heats the brakes. The braking distance of a vehicle depends on many different things, such as the speed of the vehicle. - The energy resources available to use may be divided into renewable and non-renewable. - Energy can also be released from atoms, which contain smaller particles such as neutrons and protons in the nucleus, because atoms can break down to emit particles or gamma rays.	<u>Northwood School Science Fair Project</u> At Northwood School the Science department believes it is important to find ways to get all students excited about science. We strive for our students to be able to apply their science knowledge taught in the classroom to the wider world around them. We understand science does not always come naturally to all our students but know that all students have their favourite subject. Therefore, our Year 9's take on a science project where they can apply their science knowledge but also bring in their creativity and knowledge from all other subjects. Therefore, all Year 9 students take part in a Science Project to connect their learning to the world outside of the classroom. All students will receive a Northwood Certificate of Participation. Students can choose any topic covered in the first 3 half terms and design a project exploring these topics to the outside world.
Skills: (Know how...)	<u>Practical Skills</u> - Investigate the thermal conductivity of different materials. - Investigate how different surfaces affect the amount of friction on a moving block. <u>Additional Skills</u> - Applying previous KS3 practical skills to design, carry out and analyse results from Year 9 practicals	<u>Research and Inquiry Skills</u> 1) Research Skills: Learning how to find and use scientific literature and other reliable sources of information. 2) Hypothesis Formation: Understanding how to formulate testable and meaningful hypotheses. 3) Experimental Design: Gaining knowledge in designing experiments to test hypotheses effectively. <u>Critical Thinking and Problem-Solving</u> 1) Analytical Thinking: Developing the ability to analyse data and draw logical conclusions. 2) Problem-Solving: Enhancing the capacity to identify problems and devise effective solutions. 3) Creativity: Encouraging innovative thinking in designing experiments and solving problems. <u>Communication Skills</u> 1) Oral Communication: Practising how to present findings clearly and confidently to judges and peers.

		2) Visual Communication: Developing skills in creating posters, slides, and other visual aids to effectively communicate research. <u>Organisational and Time Management Skills</u> 1) Project Management: Learning to plan, execute, and manage a project from start to finish. 2) Time Management: Enhancing the ability to manage time effectively to meet deadlines. <u>Teamwork and Collaboration</u> 1) Collaboration: Gaining experience in working with others if the project involves team participation. 2) Networking: Building connections with peers, teachers, and professionals in the field. <u>Personal Development</u> 1) Self-Motivation: Encouraging self-directed learning and initiative. 2) Confidence: Building self-confidence through the successful completion and presentation of a project. 3) Resilience: Learning to deal with challenges and setbacks in a constructive manner.
Key vocabulary	- Absorb - Alpha Particle - Air Resistance - Beta Particle - Braking Distance - Braking Force - Chemical Energy - Conductivity - Dissipated - Elastic Potential Energy - Electrostatic Force - Efficiency - Emit - Energy	

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| | <ul style="list-style-type: none">- Energy Store- Energy Resource- Force- Fossil Fuel- Friction- Gamma Ray- Generator- Geothermal Energy- Gravitational Force- Gravitational Potential Energy- Hydroelectric- Ionising Radiation- Insulation- Kinetic Energy- Lubrication- Magnetic Force- Matt- Nuclear Reactor- Nucleus- Penetration Power- Power Station- Radioactive- Radioactivity- Radiation- Range- Reaction- Reaction Time- Renewable- Shiny- Solar Cell- Stopping Distance- Thermal Energy- Thermometer- Thinking Distance- Travel | |
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	- Turbine - Work	
Mid Term Assessment	1 MUA to be completed half way through the topic.	No MUAs are to be completed throughout the project however throughout the project students will be expected to be able to report back to their teachers on the progress of their project and be able to answer questions on their projects.
End Term Assessment	EUA - Energy, Forces and the Structure of Matter	Northwood Science Fair - Crest Award
	Summer 1	Summer 2
Content: (Know what...)	B1 Cell Biology - Eukaryotes and Prokaryotes - Animal and Plant Cells - Cell Specialisation - Cell Differentiation - Microscopes - Culturing microorganisms (biology only) - Chromosomes - Mitosis and the Cell Cycle - Stem Cells	C1 Atomic Structure and Periodic Table - Atoms, elements and compounds - Mixtures - The development of the model of the atom (common content with physics) - Relative electrical charges of subatomic particles - Size and mass of atoms - Relative atomic mass - Electronic structure - The periodic table

	- Diffusion - Osmosis - Active Transport	- Development of the periodic table - Metals and non-metals - Group 0 - Group 1 - Group 7 - Properties of transition metals (chemistry only) - Comparison with Group 1 elements - Typical properties
Skills: (Know how...)	<u>Practical Skills:</u> - Use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included. - Investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measuring zones of inhibition (Biology Only) - Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.	<u>Practical Skills:</u> - Filtration - Crystallisation - Simple Distillation - Chromatography - Group 1 Reaction with Water
Key vocabulary	- Active transport - Adult stem cell - Cell differentiation - Cell membrane - Cell wall - Chloroplast - Chromosomes - Concentration gradient - Diffusion - Embryonic stem cell - Eukaryotic cell - Magnification - Meristematic cells - Mitochondria - Mitosis - Nucleus	- Alkali metals - Atom - Atomic nucleus - Atomic number - Chromatography - Compound - Crystallisation - Displacement - Electron - Electron shell - Element - Filtration - Fractional distillation - Group (periodic table) - Halogens - Ion

	- Organelle - Osmosis - Prokaryotic cell - Resolution - Specialised cells - Stem cell - Surface area - Surface area to volume ratio (SA:V) - The cell cycle - Therapeutic cloning - Vacuole	- Isotope - Mass number - Metals - Mixture - Neutron - Noble gases - Non-metals - Nuclear model - Periodic table - Plum pudding model - Proton - Relative atomic mass - Simple distillation - Transition metals
Mid Term Assessment	MUA 1- Cells and Microscopes MUA 2 - Transport Across a Membrane	MUA 1 - Atomic Structure MUA 2 - Periodic Table
End Term Assessment	EUA - B1 Cell Biology	EUA - Atomic Structure and the Period Table
Additional information		
Homework	A range of homework tasks will be set including: - Research tasks - Revision tasks - Model making - Seneca - Application practice	

Extra curricular and enrichment opportunities	• Science club • Science week • Projects & competitions • Science Careers
Useful links that will support learning	Seneca - https://senecalearning.com/en-GB/ BBC Bitesize - https://www.bbc.co.uk/bitesize/subjects/zng4d2p Sparx science - https://sparxscience.com/
How parents can support learning	We encourage parents/carers to engage in conversation with their child/children about their science lessons and homework. We also encourage parents to