

SCIENCE – YEAR 11 CURRICULUM OVERVIEW 2020 / 2021

TOPIC TITLE	TOPIC OVERVIEW	KNOWLEDGE & SKILLS	ASSESSMENT	WIDER LINKS
<p>Year 11 - Term 1</p> <p>P9 Motion</p>	<p>Motion</p> <p>This short physics topic looks at how speed and acceleration can be graphically represented</p> <ul style="list-style-type: none"> • What is the difference between speed and velocity? • How can we represent motion data graphically? <p>What values can be determined from these graphs?</p>	<p>Motion</p> <ul style="list-style-type: none"> • If you know the distance an object has travelled in a certain time you can calculate speed. • Slopes on distance – time and velocity – time graphs have different meanings. • The area under a velocity – time graph represents the distance travelled. <p>Key skills</p> <ul style="list-style-type: none"> • Investigate acceleration of an object when the forces applied is varied • Apply the equation for speed and acceleration. • Identify changes in motion from graphical evidence. 	<p>Motion</p> <p>Homework is set weekly and is based around exam papers for biology, chemistry or physics.</p> <p>End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.</p>	<p>Motion</p> <p>Extended answer practise.</p> <p><u>Numeracy:</u> Graphical interpretation of velocity and acceleration. Calculate area. Calculation of speed and acceleration</p> <p><u>Key links to other units:</u> Year 7 – Forces. Year 8 – Motion and pressure.</p>
<p>P10 Forces and Motion</p>	<p>Force and Motion</p> <p>This physics topic looks at how velocity is affected by forces and applies the science to stopping a vehicle.</p> <ul style="list-style-type: none"> • How does mass affect the acceleration of an object? • What is inertia? • What is terminal velocity? • How are stopping distances calculated? 	<p>Forces and Motion</p> <ul style="list-style-type: none"> • Investigate acceleration of an object when the forces applied is varied. • Inertia is the tendency of an object to stay at rest or remain in uniform motion. • Terminal velocity occurs when a falling object's weight equals the opposing frictional forces. • Stopping distance in a vehicle is affected by thinking and braking distance. • Understand that total momentum before a collision = total momentum . 	<p>Forces and Motion</p> <p>Homework is set weekly and is based around exam papers for biology, chemistry or physics.</p> <p>End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.</p>	<p><u>Forces and Motion</u></p> <p><u>Literacy:</u> Extended answer practise.</p> <p><u>Numeracy:</u> Calculate stopping distance. Calculate momentum. Apply the equation for spring constant.</p> <p><u>Key links to other units:</u> Year 7 – Forces. Year 8 – Motion and Pressure. Year 9 – Forces in Balance. Year 10 – Motion.</p>

		<p>after a collision.</p> <ul style="list-style-type: none"> Elastic object can extend proportionally when a force is applied and until it reaches the limit of proportionality. <p>Key skills</p> <ul style="list-style-type: none"> Apply Newton's second law. Calculate stopping distances. Calculate momentum for colliding objects. Use springs to apply Hooke's law. 		
P11 Force and Pressure (Triple Science only)	<p>Force and Pressure This physics topic looks at how pressure impacts properties of solids liquids and gases.</p> <ul style="list-style-type: none"> How does surface area affect pressure? What is water pressure and how does this link with floating? <p>How does pressure change with altitude?</p>	<p>Force and Pressure</p> <ul style="list-style-type: none"> Pressure in water and in the atmosphere changes with distance from the surface. Floating and sinking are determined by weight and upthrust. <p>Key skills</p> <ul style="list-style-type: none"> Apply the equation for pressure <p>Investigate the effects of pressure in a column of water.</p>	<p>Forces and Pressure Homework is set weekly and is based around exam papers for biology, chemistry or physics.</p> <p>End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.</p>	<p>Forces and Pressure <u>Literacy:</u> Extended answer practise.</p> <p><u>Numeracy:</u> Calculate pressure.</p> <p><u>Key links to other units:</u> Year 7 – Forces. Year 8 – Motion and pressure. Year 9 – Forces in balance. Year 11 – Forces and motion.</p>
P12 Wave Properties	<p>Wave Properties This physics topic looks at different wave forms.</p> <ul style="list-style-type: none"> How do sound, light and other waves travel through materials? What are seismic waves? 	<p>Wave Properties</p> <ul style="list-style-type: none"> Waves may be transverse or longitudinal. Waves if water can be reflected and refracted. <p>Key Skills</p> <ul style="list-style-type: none"> Investigate properties of transverse and longitudinal waves. Investigate water waves and sound waves. 		<p>Wave Properties <u>Literacy:</u> Extended answer practise.</p> <p><u>Numeracy:</u> Calculating wave speed. Calculating wavelength.</p> <p><u>Key links to other units:</u> Year 7 – Sound. Year 7 – Light. Year 9 – Electromagnetic waves.</p>

<p>P12 Crude Oil and Fuels</p>	<p>Crude Oil and Fuels This chemistry topic looks at how we can use Earth's natural resource of crude oil to make useful materials.</p> <ul style="list-style-type: none"> Which alkanes are produced at the highest and lowest temperatures during fractional distillation? What are the products of complete and incomplete combustion? What does it mean to 'crack' hydrocarbons? 	<p>Crude Oil and Fuels</p> <ul style="list-style-type: none"> Crude oil can be separated into fractions using fractional distillation. These are alkanes and alkenes. The size of a hydrocarbon will determine its properties. Carbon monoxide is a product of incomplete combustion in addition to the usual carbon dioxide and water. <p>Key skills</p> <ul style="list-style-type: none"> Draw display formulae for the fractions formed by distilling crude oil. Write balanced equations and carry out molar calculations. 	<p>Crude Oil and Fuels Homework is set weekly and is based around exam papers for biology, chemistry or physics.</p> <p>End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.</p>	<p>Crude Oil and Fuels <u>Literacy:</u> Extended answer practise.</p> <p><u>Numeracy:</u> Apply molar calculations.</p> <p><u>Key links to other units:</u> Year 7 – Atoms, elements, compounds. Year 8 – Earth. Year 8 – Separation techniques. Year 9 – Atomic structure. Year 10 – Molecules and matter.</p>
<p>C10 & 11 Organic Reactions and Polymers (triple science only)</p>	<p>Organic Reactions and Polymers These chemistry topics are for triple scientists only. They explore reactions of certain chemical groups.</p> <ul style="list-style-type: none"> How do alkenes react with different types of chemical group? How do other organic compounds react? What is polymerisation? 	<p>Organic Reactions and Polymers These chemistry topics are for triple scientists only. They explore reactions of certain chemical groups.</p> <ul style="list-style-type: none"> Alkenes react with different types of chemical to form products. Alcohols, and carboxylic acids can take part in reactions that produce useful materials. Monomers can bond together to produce polymers such as polyester and DNA. <p>Key skills</p> <ul style="list-style-type: none"> Complete balanced chemical equations. Write display formulae for a range of chemicals. Describe the bonding between bases in DNA. 	<p>Organic Reactions and Polymers Homework is set weekly and is based around exam papers for biology, chemistry or physics.</p> <p>End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.</p>	<p>Organic Reactions and Polymers (triple science only) <u>Literacy:</u> Extended answer practise.</p> <p><u>Numeracy:</u> Apply molar calculations.</p> <p><u>Key links to other units:</u> Year 7 – Atoms, elements, compounds. Year 8 – Separation techniques Year 9 – Atomic structure. Year 10 – Molecules and matter.</p>

<p>B10 The Human Nervous System</p>	<p>The Human Nervous System This biology topics looks at how the body processes stimuli.</p> <ul style="list-style-type: none"> • What are reflex actions? 	<p>The Human Nervous System Students learn about specialised cells</p> <ul style="list-style-type: none"> • Alkenes. <p>Key skills</p> <ul style="list-style-type: none"> • Complete a reaction time practical. 	<p>The Human Nervous System Homework is set weekly and is based around exam papers for biology, chemistry or physics.</p> <p>End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.</p>	<p>The Human Nervous System <u>Literacy:</u> Extended answer practise.</p> <p><u>Numeracy:</u> Apply molar calculations.</p> <p><u>Key links to other units:</u> Year 7 – Body systems. Year 7 – Cells. Year 9 – Cell structure and transport.</p>
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At the end of Term 1, students will sit an 'end of term' mock exam spanning all topics covered so far.

<p>Year 11 - Term 2</p>				
<p>B11 Hormonal Coordination</p>	<p>Hormonal Coordination This biology topic focuses on how the body produces and uses hormones.</p> <ul style="list-style-type: none"> • How are processes controlled in the human body and in plants? • How can we control fertility? 	<p>Hormonal Coordination</p> <ul style="list-style-type: none"> • Hormones coordinate several important functions in the body such as blood sugar levels. • Hormones regulate reproduction in humans. • Plant hormones controls control the growth of shoots and roots and regulate fruit ripening. <p>Key skills</p> <ul style="list-style-type: none"> • Describe the range of hormones involved in regulating the menstrual cycle 	<p>Hormonal Coordination Homework is set weekly and is based around exam papers for biology, chemistry or physics.</p> <p>End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.</p>	<p>Hormonal Coordination <u>Literacy:</u> Extended answer practise.</p> <p><u>Numeracy:</u></p> <p><u>Key links to other units:</u> Year 7 – Body systems. Year 7 – Reproduction. Year 11 – Reproduction.</p>
<p>B12 Homeostasis in Action (triple science only)</p>	<p>Homeostasis This biology topics look how the body maintains internal conditions</p> <ul style="list-style-type: none"> • How do we regulate temperature and 	<p>Homeostasis Students learn that internal conditions are tightly regulated</p> <ul style="list-style-type: none"> • Blood sugar must be regulated • Body temperature must be regulated • Water levels are regulated 	<p>Homeostasis Homework is set weekly and is based around exam papers for biology, chemistry or physics.</p>	<p>Homeostasis <u>Literacy:</u> Extended answer practise</p> <p><u>Key links to other units:</u> Year 7 - Year 8 -</p>

	<ul style="list-style-type: none"> sugar and water levels? 	Key skills <ul style="list-style-type: none"> Complete 	End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	Year 9 - Year 10 -
P14 Light (triple science only)	Light This physics unit looks at how light behaves under different conditions <ul style="list-style-type: none"> What are the properties of light? 	Light These chemistry topics are for triple scientists only. They explore reactions of certain chemical groups. <ul style="list-style-type: none"> Light is bent when it passes through different materials. Light is reflected at the same angle as the incident ray. Light can be diffracted by a prism. Key skills <ul style="list-style-type: none"> Complete experiments with light rays. 	Light Homework is set weekly and is based around exam papers for biology, chemistry or physics. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	Light <u>Literacy:</u> Extended answer practise. <u>Numeracy:</u> Calculate angles of refraction and reflection. <u>Key links to other units:</u> Year 7 – Light. Year 10 – Electromagnetic waves. Year 11 – Wave properties.
P15 Electromagnetism	Electromagnetism This physics unit looks at how magnetic fields interact with electricity to create useful devices. <ul style="list-style-type: none"> How can we make a motors, generators and transformers? 	Electromagnetism <ul style="list-style-type: none"> Interactions between magnets and electricity can be exploited to make useful devices. Electromagnets, generators and motors can be made using simple equipment. Transformers can be used to increase or decrease the size of an alternating potential difference. Key skills <ul style="list-style-type: none"> Investigate magnetic fields around current carrying wires. Recall Fleming’s left-hand rule. 	Electromagnetism Homework is set weekly and is based around exam papers for biology, chemistry or physics. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	Electromagnetism <u>Literacy:</u> Extended answer practise. <u>Numeracy:</u> Apply transformer equations. <u>Key links to other units:</u> Year 8 – Electricity and magnetism. Year 9 – Electricity in the home. Year 10 – Electrical circuits.
P16 Space (triple science only)	Space This short physics topic looks at how the solar system was formed.	Space <ul style="list-style-type: none"> The solar system was formed due to the concentration of gas and dust clouds. 	Space Homework is set weekly and is based around exam papers for biology, chemistry or physics.	Space <u>Literacy:</u> Extended answer practise

	<ul style="list-style-type: none"> • What is the life cycle of a star? • How does gravity cause planets and satellites to orbit? • Is the universe expanding? 	<ul style="list-style-type: none"> • Stars pass through a lifecycle before eventually collapsing. • Satellites orbit due to the force of gravity. • Red shift offers proof of our expanding universe. <p>Key skills</p> <ul style="list-style-type: none"> • Describe the stages of a star's lifecycle. 	End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	<p><u>Numeracy:</u></p> <p><u>Key links to other units:</u> Year 7 – Space Year 8 – Earth Year 11 – Forces and motion</p>
C14 The Earth's Resources	<p>The Earth's resources This chemistry topic looks at how certain resources on Earth are finite or renewable</p> <ul style="list-style-type: none"> • What constitutes a finite or renewable resource? • How do we ensure water is safe to drink and that waste water is recycled? • How do we extract metals? • How can we minimise our impact on Earth through looking at product lifecycles and minimising wastage? 	<p>The Earth's Resources</p> <ul style="list-style-type: none"> • Fossils fuels will eventually run out but renewable resources such as solar and wind power can be used to generate electricity • Potable water is safe to drink but contains chemical other than water • Sewage treatment constitutes a number of stages to make safe effluent for release into the environment <p>Key skills</p> <ul style="list-style-type: none"> • Complete balanced chemical equations to describe the use of electrolysis in extracting metals • Consider the stages of a life cycle assessment 	<p>The Earth's Resources Homework is set weekly and is based around exam papers for biology, chemistry or physics.</p> <p>End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.</p>	<p>The Earth's Resources</p> <p><u>Literacy:</u> Extended answer practise</p> <p><u>Numeracy:</u></p> <p><u>Key links to other units:</u> Year 8 – Earth Year 8 – Separation techniques Year 10 - Electrolysis</p>
C15 Using our Resources (triple science only)	<p>Using our Resources This chemistry topic looks at how useful materials can be made from simple constituents,</p> <ul style="list-style-type: none"> • What causes rusting? 	<p>Using our Resources</p> <ul style="list-style-type: none"> • Metals rust when exposed to air or water • Alloying metals can improve their properties for certain purposes 	<p>Using our Resources Homework is set weekly and is based around exam papers for biology, chemistry or physics</p>	<p>Using our Resources</p> <p><u>Literacy:</u> Extended answer practise</p> <p><u>Numeracy:</u></p>

	<ul style="list-style-type: none"> • Why are alloys useful? • What are the properties of polymers? • How do we make ammonia? 	<ul style="list-style-type: none"> • Thermosetting and thermosoftening polymers have different properties • Glass, ceramic and composites are made from simple starting materials • Ammonia can be made more efficiently by using catalysts and altering pressure and temperature • Ammonia can be used to make fertiliser <p>Key skills</p> <ul style="list-style-type: none"> • Recall the Haber process • Write balanced equations 	<p>End of topic Kerboodle Checkpoint Assessment quizzes or written assessment</p>	<p><u>Key links to other units:</u> Year8 – Metals and acids Year 9 – Atomic structure Year 9 – Chemical reactions</p>
<p>B13 Reproduction</p>	<p>Reproduction This biology topic explores the types of reproduction used in humans and other organisms</p> <ul style="list-style-type: none"> • How do sexual and asexual reproduction differ? • How are gametes produced? • What is the human genome and DNA? • How do we inherit characteristics? • How can we screen for genetic disorders? 	<p>Reproduction</p> <ul style="list-style-type: none"> • Cells can divide by mitosis or meiosis • Meiosis is the reason for variation in organisms • Some organisms can reproduce by meiosis and mitosis • Genes are found on chromosomes which are made from DNA • Punnett squares can be used to predict characteristics that will be passed on to offspring • Some inherited conditions are dominant and some are recessive • Describe methods of screening for genetic disorders <p>Key skills</p> <ul style="list-style-type: none"> • Recall the bonding rules of base pairs in DNA • Construct Punnett square diagrams from given information 	<p>Reproduction Homework is set weekly and is based around exam papers for biology, chemistry or physics.</p> <p>End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.</p>	<p>Reproduction <u>Literacy:</u> Extended answer practise</p> <p><u>Numeracy:</u> Calculate the probability of a characteristic being passed onto offspring</p> <p><u>Key links to other units:</u> Year 7 – Cells Year 7 – Body systems Year 10 – Genetics and evolution Year 11 - Hormones</p>

<p>B18 Biodiversity and ecosystems</p>	<p>Biodiversity and ecosystems This biology topic looks at human effects on our ecosystems</p> <ul style="list-style-type: none"> How has the population explosion contributed to land, water and air pollution? <p>Have can we ensure people have sufficient food?</p>	<p>Biodiversity and ecosystems</p> <ul style="list-style-type: none"> Pollution is an issue for land, water and the air and can lead to serious global problems Using Earth's resources destroys habitats Climate change is affecting biodiversity The way we produce food can ensure its availability for people living the world over <p>Key skills Interpret data to analyse global trends.</p>	<p>Reproduction Homework is set weekly and is based around exam papers for biology, chemistry or physics.</p> <p>End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.</p>	<p>Reproduction <u>Literacy:</u> Extended answer practise</p> <p><u>Numeracy:</u> Graphical interpretation</p> <p><u>Key links to other units:</u> Year 8 – Earth Year 10 – Photosynthesis Year 10 – Variation and evolution</p>
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At the end of Term 2, students will sit an 'end of term' mock exam spanning all topics covered so far.

<p>Year 11 - Term 3</p> <p>Revision</p>				
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At the end of Term 3 – Public Examination.