

# Moor House School & College Curriculum Map

SUBJECT: Science							
YEAR GROUP/PATHWAY: Year 11 GCSE							
Autumn 1	Biology – Homeostasis Response			Biology – Inheritance, Variation and Evolution		Biology – Ecology	
Knowledge	Core: Homeostasis, The Nervous System and Hormonal Coordination			Core: Reproduction, Variation and Evolution and Classification of Living Organisms		Core: Adaptations, Interdependence and Competition/Ecosystems/Humans Effect on Biodiversity	
Knowledge & Skills	Core – students to demonstrate understanding of: <ul style="list-style-type: none"> <li>- Importance of homeostasis</li> <li>- Controls Systems</li> <li>- Structure and function</li> <li>- The reflex arc (required practical)</li> <li>- Human endocrine system</li> <li>- Control of blood glucose concentration</li> <li>- Hormones in human reproduction</li> <li>- Female reproductive hormones</li> <li>- Contraception</li> </ul>			Core – students to demonstrate understanding of: <ul style="list-style-type: none"> <li>- Sexual reproduction</li> <li>- Asexual reproduction</li> <li>- Meiosis</li> <li>- Genome</li> <li>- Genetic Inheritance</li> <li>- Inherited Disorders</li> <li>- Sex determination</li> <li>- Variations</li> <li>- Mutations</li> <li>- Evolution</li> <li>- Selective breeding</li> <li>- Genetic engineering</li> <li>- GM crops</li> <li>- Fossils</li> <li>- Evidence for evolution</li> <li>- Extinction</li> <li>- Resistant bacteria</li> <li>- Classification</li> </ul>		Core – students to demonstrate understanding of: <ul style="list-style-type: none"> <li>- Communities</li> <li>- Abiotic factors</li> <li>- Biotic factors</li> <li>- Adaptations</li> <li>- Levels of organisation</li> <li>- How materials are recycled</li> <li>- Waste management</li> <li>- Land use</li> <li>- Deforestation</li> <li>- Global warming</li> <li>- Biodiversity maintenance</li> </ul>	
Vocabulary	Homeostasis	Stimulus	Type 1 & 2	Sexual Reproduction	Variation	Ecology	Carbon Cycle
	Automatic	MRI	Diabetes	Asexual Reproduction	Mutation	Abiotic Factors	Pollution
	Control	Neurotransmitters	Reproduction	Mitosis	Evolution	Biotic Factors	Deforestation
	System	Synapse	Menstrual	Meiosis	Selective Breeding	Adaptation	Global Warming
	Receptors	Impulse	Cycle	Chromosome	Genetic Engineering		Biodiversity
	Effectors	Endocrine System	Oestrogen	Gamete	Fossils		
	Co-	Hormone	FSH	DNA	Genetic Resistance		
	ordinators	Pituitary Gland	LH	Inheritance	Classification		

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	Motor Neurons Sensory Neurons	Thyroid Adrenal Gland	Contraception		
<b>Autumn 2</b>	<b>Biology – Revision</b>				
Knowledge	Core: Summary of Biology module				
Knowledge & Skills	Core – students to demonstrate understanding of: <ul style="list-style-type: none"> <li>- Biology curriculum in preparation for mock exams and formal exams</li> </ul>				
Vocabulary	See summary of Year 9-11				
<b>Spring 1</b>	<b>Chemistry – Organic Chemistry</b>		<b>Chemistry – Chemical Analysis</b>	<b>Chemistry – Chemistry in our Atmosphere</b>	
Knowledge	Core: Carbon Compounds as Fuel and Feedstock		Core: Purity, Formulations and Chromatography / Identification of Common Gases	Core: The Composition and Evolution of Earth’s Atmosphere / Greenhouse Gases / Atmospheric Pollutants	
Knowledge & Skills	Core – students will demonstrate understanding of: <ul style="list-style-type: none"> <li>- Crude oil is a finite resource found in rocks. Crude oil is the remains of an ancient biomass consisting mainly of plankton that was buried in mud</li> <li>- Crude oil is a mixture of a very large number of compounds. Most of the compounds in crude oil are hydrocarbons, which are molecules made up of hydrogen and carbon atoms only</li> <li>- Most of the hydrocarbons in crude oil are hydrocarbons called alkanes. The general formula for the homologous series of alkanes is <math>C_nH_{2n+2}</math></li> </ul>		Core – students will demonstrate understanding of: <ul style="list-style-type: none"> <li>- In chemistry, a pure substance is a single element or compound, not mixed with any other substance</li> <li>- Pure elements and compounds melt and boil at specific temperatures. Melting point and boiling point data can be used to distinguish pure substances from mixtures</li> <li>- In everyday language, a pure substance can mean a substance that has had nothing added to it, so it is unadulterated and in its natural state, e.g. pure milk</li> <li>- A formulation is a mixture that has been designed as a useful product. Many</li> </ul>	Core – students will demonstrate understanding of: <ul style="list-style-type: none"> <li>- For 200 million years, the proportions of different gases in the atmosphere have been much the same as they are today</li> <li>- One theory suggests that during the first billion years of the Earth’s existence there was intense volcanic activity that released gases that formed the early atmosphere and water vapour that condensed to form the oceans</li> <li>- Volcanoes also produced nitrogen which gradually built up in the atmosphere and there may have been small proportions of methane and ammonia</li> </ul>	

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	<ul style="list-style-type: none"> <li>- The first four members of the alkanes are methane, ethane, propane and butane</li> <li>- The many hydrocarbons in crude oil may be separated into fractions, each of which contains molecules with a similar number of carbon atoms, by fractional distillation</li> <li>- The fractions can be processed to produce fuels and feedstock for the petrochemical industry</li> <li>- Many of the fuels on which we depend for our modern lifestyle such as petrol, diesel oil, kerosene, heavy fuel oil and liquefied petroleum gases, are produced from crude oil</li> <li>- Many useful materials on which modern life depends are produced by the petrochemical industry, such as solvents, lubricants, polymers, detergents</li> <li>- The vast array of natural and synthetic carbon compounds occur due to the ability of carbon atoms to form families of similar compounds</li> <li>- Some properties of hydrocarbons depend on the size of their molecules, including boiling point, viscosity and flammability. These properties influence how hydrocarbons are used as fuels</li> <li>- The combustion of hydrocarbon fuels releases energy. During combustion, the carbon and hydrogen in the fuels are oxidised. The complete combustion of a hydrocarbon produces carbon dioxide and water</li> <li>- Hydrocarbons can be broken down (cracked) to produce smaller, more useful molecules</li> </ul>	<p>products are complex mixtures in which each chemical has a particular purpose</p> <ul style="list-style-type: none"> <li>- Formulations are made by mixing the components in carefully measured quantities to ensure that the product has the required properties. Formulations include fuels, cleaning agents, paints, medicines, alloys, fertilisers and foods</li> <li>- Chromatography can be used to separate mixtures and can give information to help identify substances</li> <li>- Chromatography involves a stationary phase and a mobile phase. Separation depends on the distribution of substances between the phases</li> <li>- Different compounds have different <math>R_f</math> values in different solvents, which can be used to help identify the compounds. The compounds in a mixture may separate into different spots depending on the solvent but a pure compound will produce a single spot in all solvents</li> <li>- The test for hydrogen uses a burning splint held at the open end of a test tube of the gas. Hydrogen burns rapidly with a pop sound</li> <li>- The test for oxygen uses a glowing splint inserted into a test tube of the gas. The splint relights in oxygen</li> <li>- The test for carbon dioxide uses an aqueous solution of calcium hydroxide (lime water). When carbon dioxide is shaken with or bubbled through limewater the limewater turns milky (cloudy)</li> <li>- The test for chlorine uses litmus paper. When damp litmus paper is put into</li> </ul>	<ul style="list-style-type: none"> <li>- When the oceans formed, carbon dioxide dissolved in the water and carbonates were precipitated producing sediments, reducing the amount of carbon dioxide in the atmosphere</li> <li>- Algae and plants produced the oxygen that is now in the atmosphere by photosynthesis</li> <li>- Algae first produced oxygen about 2.7 billion years ago and soon after this oxygen appeared in the atmosphere. Over the next billion years plants evolved and the percentage of oxygen gradually increased to a level that enabled animals to evolve</li> <li>- Algae and plants decreased the percentage of carbon dioxide in the atmosphere by photosynthesis</li> <li>- Carbon dioxide was also decreased by the formation of sedimentary rocks and fossil fuels that contain carbon</li> <li>- Greenhouse gases in the atmosphere maintain temperatures on Earth high enough to support life</li> <li>- Water vapour, carbon dioxide and methane are greenhouse gases</li> <li>- Some human activities increase the amounts of greenhouse gases in the atmosphere. These include:             <ul style="list-style-type: none"> <li>• carbon dioxide</li> <li>• methane                 <ul style="list-style-type: none"> <li>- Based on peer-reviewed evidence, many scientists believe that human activities will cause the temperature of the Earth's atmosphere to increase at the surface and that this will result in global climate change</li> </ul> </li> </ul> </li> </ul>
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	<ul style="list-style-type: none"> <li>- Cracking can be done by various methods including catalytic cracking and steam cracking</li> <li>- The products of cracking include alkanes and another type of hydrocarbon called alkenes</li> <li>- Alkenes are more reactive than alkanes and react with bromine water, which is used as a test for alkenes</li> <li>- There is a high demand for fuels with small molecules and so some of the products of cracking are useful as fuels</li> <li>- Alkenes are used to produce polymers and as starting materials for the production of many other chemicals</li> </ul>	chlorine gas the litmus paper is bleached and turns white	<ul style="list-style-type: none"> <li>- An increase in average global temperature is a major cause of climate change.</li> <li>- There are several potential effects of global climate change</li> <li>- The carbon footprint is the total amount of carbon dioxide and other greenhouse gases emitted over the full life cycle of a product, service or event</li> <li>- The carbon footprint can be reduced by reducing emissions of carbon dioxide and methane</li> <li>- The combustion of fuels is a major source of atmospheric pollutants</li> <li>- Most fuels, including coal, contain carbon and/or hydrogen and may also contain some sulfur</li> <li>- The gases released into the atmosphere when a fuel is burned may include carbon dioxide, water vapour, carbon monoxide, sulfur dioxide and oxides of nitrogen. Solid particles and unburned hydrocarbons may also be released that form particulates in the atmosphere</li> <li>- Carbon monoxide is a toxic gas. It is colourless and odourless and so is not easily detected</li> <li>- Sulfur dioxide and oxides of nitrogen cause respiratory problems in humans and cause acid rain.</li> <li>- Particulates cause global dimming and health problems for humanS</li> </ul>			
Vocabulary	Crude Oil Carbon Cycle Hydrocarbons	Cracking Alkanes Alkenes	Pure Substance Compounds Mixture Formulation	Hydrogen Test Oxygen Test Carbon Dioxide Test	Atmosphere Fossil Fuels Greenhouse Gases	Complete Combustion Incomplete Combustion

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	Fractional Distillation	Chromatography	Climate Change Carbon Footprint Atmospheric Pollutants	Stabilising Agents
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Spring 2	Chemistry – Using Resources	Chemistry – Using Resources	Chemistry – Revision
Knowledge	Core: Using the Earth’s Resources and Obtaining Potable Water	Core: Life Cycle Assessment and Recycling	Core: Summary of Chemistry module
Knowledge & Skills	<p>Core – students will demonstrate understanding of:</p> <ul style="list-style-type: none"> <li>- Humans use the Earth’s resources to provide warmth, shelter, food and transport</li> <li>- Natural resources, supplemented by agriculture, provide food, timber, clothing and fuels</li> <li>- Finite resources from the Earth, oceans and atmosphere are processed to provide energy and materials</li> <li>- Water of appropriate quality is essential for life. For humans, drinking water should have sufficiently low levels of dissolved salts and microbes. Water that is safe to drink is called potable water. Potable water is not pure water in the chemical sense because it contains dissolved substances</li> <li>- The methods used to produce potable water depend on available supplies of water and local conditions</li> <li>- In the UK, rain provides water with low levels of dissolved substances (fresh water) that collects in the ground, in lakes and rivers</li> <li>- Sterilising agents used for potable water include chlorine, ozone or ultra-violet light.</li> </ul>	<p>Core – students will demonstrate understanding of:</p> <ul style="list-style-type: none"> <li>- Life Cycle Assessments (LCAs) are carried out to assess the environmental impact of products</li> <li>- Users reduces the use of limited resources, energy consumption, waste and environmental impacts</li> <li>- Metals, glass, building materials, clay ceramics and most plastics are produced from limited raw materials. Much of the energy used in the processes comes from limited resources. Obtaining raw materials from the Earth by quarrying and mining causes environmental impacts</li> <li>- Some products, such as glass bottles, can be reused. Glass bottles can be crushed and melted to make different glass products. Other products cannot be reused and so are recycled for a different use</li> </ul>	<p>Core – students will demonstrate understanding of:</p> <ul style="list-style-type: none"> <li>- Chemistry curriculum in preparation for mock exams and formal exams</li> </ul>

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	<ul style="list-style-type: none"> <li>- If supplies of fresh water are limited, desalination of salty water or sea water may be required. Desalination can be done by distillation or by processes that use membranes such as reverse osmosis. These processes require large amounts of energy</li> </ul>		
Vocabulary	<ul style="list-style-type: none"> <li>- Potable Water</li> <li>- Sewage Treatment</li> </ul>	<ul style="list-style-type: none"> <li>- Life Cycle Assessment</li> </ul>	
Summer 1	<b>Physics – Waves</b>	<b>Physics - Waves</b>	<b>Physics – Magnetism and Electromagnetism</b>
Knowledge	Core: Waves in Air, Fluids and Solids	Core: Electromagnetic Waves	Core: Permanent and Induced Magnetism, Magnetic Forces and Fields / The Motor Effect
Knowledge & Skills	Core – students to demonstrate understanding of: <ul style="list-style-type: none"> <li>- Features of transverse and longitudinal waves</li> <li>- Properties of waves</li> <li>- Equation linking the wave speed, frequency and wavelength should be known</li> </ul>	Core – students to demonstrate understanding of <ul style="list-style-type: none"> <li>- The electromagnetic spectrum</li> <li>- Properties of electromagnetic waves</li> <li>- Radio waves and electrical circuits</li> <li>- How electromagnetic waves are generated</li> <li>- The effects of gamma rays, X-rays and ultraviolet waves on the body</li> <li>- Uses of electromagnetic waves</li> </ul>	Core – students to demonstrate understanding of: <ul style="list-style-type: none"> <li>- The forces magnets exert on each other</li> <li>- The differences between permanent and induced magnets</li> <li>- Magnets exert forces on magnetic materials due to their magnetic fields</li> <li>- The difference between magnets and magnetic materials</li> <li>- The strength of a magnetic field depends on the distance from the magnet</li> <li>- Magnetic compasses point to the Earth’s poles due to the Earth’s magnetic field</li> <li>- A wire carrying an electric current has its own magnetic field</li> <li>- A coil of wire carrying an electric current has its own magnetic field</li> </ul>

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Vocabulary	Mechanical Waves Electromagnetic Waves Transverse Waves Perpendicular Longitudinal Waves	Compressions Refractions Amplitude Wavelength Frequency Speed	Electromagnetic Waves	Magnetism Induces Magnet Permanent Magnet
<b>Summer 2</b>	<b>Revision – all three modules</b>			
Knowledge	Core: Summary of Biology, Chemistry and Physics Modules			
Knowledge & Skills	Core – students to demonstrate understanding of: - Knowledge of modules in preparation for formal exams			
Vocabulary	All vocabulary between Year 9-11			