

Curriculum Knowledge Map - Science

CHS Curriculum Intent



SUCCESSFUL: An education where imagination, curiosity and resilience enable us to ignite our learning.

CREATIVE: A shared belief that optimism, empathy and responsibility are the foundations for a respectful, safe and inclusive community.

HAPPY: Individuals who are ready to learn, practise being reflective, and are motivated to become champions.

CHS Curriculum Area Framework for Learning – Year 9

SUBJECT	Science
INTENT	<p>The intent of the science department is to teach students that Science underpins everything.</p> <p>At Chorlton High School we study</p> <ul style="list-style-type: none"> • Physics to be able to understand the principles that govern all Energy and Matter in the Universe. <p>Physics gives us tools to understand nature from the scale of sub-atomic particles up to the inter-galactic scale of the universe.</p> <ul style="list-style-type: none"> • Chemistry to be able to understand the nature of substances: how they are composed, their behaviour, and their physical and chemical properties. <p>Chemistry allows us to identify unknown substances, monitor concentrations and make new chemicals. Above all, Chemistry is about finding solutions to the problems that concern us and our surroundings.</p> <ul style="list-style-type: none"> • Biology to be able to understand life and thereby understand ourselves. <p>Biology allows us an understanding of the amazing complexity of many life processes and mechanisms. Biology encourages us to seek out reasons for strange, surprising and sometimes unusual observations.</p>

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Year Group	9					
Rationale/ Narrative	In year 9 pupils will continue to follow the KS3 national curriculum and develop their understanding of topical issues that currently polarise national and international opinions: like global warming, power generation, stem cells and lifestyle choices. Pupils will link what they learn in year 9 to the fundamental concepts they have developed in years 8 and 9 and build upon their evaluating and data handling skills, so that they can become the analytical scientific minds of the future.					
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Declarative <i>What should they know?</i>	Energy Energy stores Energy transfers Energy efficiency Energy dissipation Power Energy costs Power stations Non renewable energy Renewable energy Evaluating energy sources.	Climate, the atmosphere and sustainability The Earth's early atmosphere The modern atmosphere Human effects on the atmosphere Global warming Using the Earth's resources sustainably Clean water	Cellular Processes Cells Types of cells Cell differentiation and growth Stem cells Diffusion and active transport in cells Osmosis in cells Investigating osmosis in cells Aerobic and anaerobic respiration in cells systems	Energy efficiency work and power Power work Conservation and dissipation of energy Energy transfers in a system Efficiency Specific heat capacity	Principles of organization and disease Cells to tissues Digestive enzymes and digestion Investigating enzymes in digestion Health issues Lifestyle choices Cancer The heart and blood vessels Components of the blood Coronary heart disease	Atomic structure and the periodic table Atoms, elements and compounds Mixtures The development of the model of the atom Relative electrical charges of subatomic particles Size and mass of atoms Relative atomic mass Electronic structure

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<p>Procedural <i>What should they be able to do?</i></p>	<p>Carry out practical's to look at changes in kinetic (Ek), Elastic (Ee) and gravitational (Ep) energy; Understand how we can convert the energy stores into different forms, especially electricity to be more useful to us; study the National Grid and explain how electrical energy is generated and distributed</p> <p>Evaluation of energy resources using data sources.</p> <p>Analyse advantages and disadvantages of renewable energy.</p> <p>Students will build a model power station in groups and produce a presentation about the different parts. They will also discuss the issues surrounding non renewable resources like coal and gas.</p> <p>Recall and apply the following equations: $KE = \frac{1}{2}mv^2$ $GPE = mgh$ Use of prefixes-kilo, mega, giga.</p>	<p>Explain the evolution of and what is responsible for the changes in the earth's early atmosphere to the present time; Recognise what gases are greenhouse gases and how they are currently affecting the average temperature of our atmosphere and ultimately changing our climate; Explain the effects of other gases that are also polluting our atmosphere; Be able to make decisions on how we access and use the earth's resources, including clean water, in a sustainable way for future generations; Know how to understand a LCA in terms of the cumulative effect of getting a product from manufacture to end of life and the effect this has on the planet.</p>	<p>Be able to draw and label Eukaryotic and prokaryotic cells; Know the common and differing organelles for eukaryotic and prokaryotic cells; Explain the need for stem cells and cell differentiation in plants and animals; Understand that substances need to move into and out of cells, being able to explain diffusion, osmosis and active transport, complete a practical on diffusion.</p>	<p>Be able to explain transfers of energy; calculate Work Done from the formula $W=Fs$; Calculate power using $P=E/t$; Calculate efficiency using $Eff = \frac{\text{Energy in}}{\text{Energy out}}$; Investigate the changing of thermal energy transfers using various insulators and emitters; Complete an investigation into thermal conductivity; Understand that the same quantities of different materials heat up by differing amounts when supplied with the same amount of energy – specific heat capacity.</p>	<p>Be able to test for starch using potassium iodide, protein using biurets reagent, glucose using benedict's reagent and fats using ethanol / paper; Explain the action of enzymes using the lock and key method; Know what foods contribute to a healthy diet; How to lead a healthy lifestyle considering diet and exercise; Know the structure of heart, arteries, veins and capillaries; How to reduce the risks of developing CHD and the effects of smoking and some diseases.</p>	<p>Know the details of all subatomic particles, their location, mass and charge; Be able to explain the difference between elements and compounds; Be able to name various compounds; Understand how elements are arranged on the current periodic table and know how it has developed over a number of years based on evidence; Explain how and why group 1 become more reactive down, and group 7 become more reactive up their respective groups; Know why group 0 is unreactive.</p>
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<p>Disciplinary Literacy (Tier 3 Vocab)</p>	<p>Renewable Non Renewable Finite Replenished</p>	<p>Sedimentary Igneous Metamorphic Erosion Compaction Atmosphere Climate change</p>	<p>DNA Genome Variation Organisation Osmosis Diffusion Enzyme</p>	<p>Watts Joules Power Kinetic Gravitational Thermal Energy stores Radiation Forces Electricity Efficiency Specific heat capacity</p>	<p>Lipase Amylase Protease Carbohydrase Stomach Small intestine Diffusion Absorption Statins Cholesterol Benign Malignant Tumour / cancer</p>	<p>Proton Neutron Electron Shells/energy levels Compound Ionic Covalent Evaporate Filtrate Solution Solvent Solute</p>
<p>ASSESSMENTS</p>	<p>Students will be assessed on:</p> <p>EOT with teacher assessment – focus point on recall and application of equations.</p> <p>EOT with teacher assessment - Writing an evaluation of energy generation.</p>	<p>Students will be assessed on:</p> <p>EOT with teacher assessment – Writing a description about the changing atmosphere.</p> <p>EOT with teacher assessment – writing a description the impact of humans on the earth.</p>	<p>Students will be assessed on:</p> <p>EOT with teacher assessment – comparison of aerobic and anaerobic respiration.</p> <p>Or</p> <p>EOT with teacher assessment – writing a description the impact of humans on the earth.</p> <p><u>Progress test – Energy and climate</u></p>	<p>Students will be assessed on:</p> <p>EOT with teacher assessment – energy transfers.</p> <p>Comparing thermal insulation investigation – focus point of drawing a graph, writing a conclusion and explanation.</p>	<p>Students will be assessed on:</p> <p>EOT with teacher assessment – correcting a method for food tests.</p> <p>EOT with teacher assessment – effects of non-communicable disease.</p>	<p>Students will be assessed on:</p> <p>EOT with teacher assessment – atomic structure</p> <p>Progress test – Cellular processes, energy, digestion and non-communicable diseases.</p> <p>Progress test –</p>

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HOME LEARNING	TEAMS homework's relevant to the topic being studied - one per week	TEAMS homework's relevant to the topic being studied. Revision booklet relevant to the END OF TOPIC TEST.	TEAMS homework's relevant to the topic being studied - one per week	TEAMS homework's relevant to the topic being studied. Revision booklet relevant to the END OF TOPIC TEST.	TEAMS homework's relevant to the topic being studied - one per week	TEAMS homework's relevant to the topic being studied. Revision booklet relevant to the END OF TOPIC TEST.