



FRAMEWORK FOR LEARNING



CREATIVE

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

HAPPY

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

SUCCESSFUL

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

SUBJECT

SCIENCE

INTENT

"Every brilliant experiment, like every great work of art, starts with an act of imagination." - **Jonah Lehrer**

The Scientific area of learning is concerned with increasing pupils' knowledge and understanding of our world, and with developing skills associated with Science as a process of enquiry. It will develop the natural curiosity of the child, encourage respect for living organisms and the physical environment and provide opportunities for critical evaluation of evidence.

At CHS south we aim to create Scientists that are curious about the natural world and understand the importance of scientific process. We are passionate about developing a curriculum that is accessible to all and one that enriches through cultural capital and extra-curricular opportunities which are provided throughout the 5-year course.

We encourage students to be inquisitive throughout their time at the school and beyond. The curriculum is designed to ensure that students can acquire key scientific knowledge through practical experiences, using equipment, conducting experiments, building arguments and explaining concepts confidently. The school's approach to science takes account of the school's own context, ensuring access to people with specialist expertise and places of scientific interest as part of the school's commitment to learning outside the classroom.



YEAR GROUP

YEAR 9

RATIONAL / 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.

TERM KNOWLEDGE

AUTUMN 1

Energy
 Energy stores
 Energy transfers
 Energy efficiency
 Energy dissipation
 Power
 Energy costs
 Power stations
 Non-renewable energy
 Renewable energy
 Evaluating energy sources.

AUTUMN 2

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

SPRING 1

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

SPRING 2

Energy efficiency work and power
 Power work
 Conservation and dissipation of energy
 Energy transfers in a system
 Efficiency
 Specific heat capacity

SUMMER 1

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

SUMMER 2

Electricity and magnetism
 Circuit Component
 Series and parallel circuits
 Conductors and insulators
 Measuring current and Voltage
 Magnetism

SKILLS

Evaluation of energy resources using data sources.
 Analyse advantages and disadvantages of renewable energy.
 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.
 Recall and apply the following equations:
 $KE = \frac{1}{2}mv^2$
 $GPE = mgh$

Practical skills- Osmosis practical: measuring the change in mass of potato pieces.
 Exercise practical: measuring change in pulse rate and breathing rate.
 Interpret/analyse data from tables and graphs.
 Draw conclusion from experimental data

Interpret graphs showing climate change data.

Students will use models to explain enzyme action. A large focus on Maths in Science
 Students will learn how to calculate energy changes
 Recall and apply the following equations:
 $KE = \frac{1}{2}mv^2$
 $GPE = mgh$
 $P = E/t$
 $P = W/t$
 Use of equations to calculate efficiency

Students will learn how to investigate the effect of different factors on enzyme activity.

Make predictions on whether materials are conductive or not, then testing their predictions
 Correctly building series and parallel circuits
 Investigate current in series and parallel circuits
 Investigate voltage in series and parallel circuits



<h2>ASSESSMENT</h2>	Use of prefixes-kilo, mega, giga.					
	Students will be assessed on: EOT low stakes testing Plan an investigation to measure the energy content in food EOT low stakes testing Evaluating energy generation from renewables and non-renewables	Students will be assessed on: EOT low stakes testing Comparison of aerobic and anaerobic respiration. EOT low stakes testing Describing diffusion in animal and plant cells	Students will be assessed on: EOT low stakes testing Discussing the possible consequences of a future increase in carbon dioxide emissions. EOT low stakes testing Progress test – Energy and cellular processes. This will cover autumn year 9 and year 8 (forces and genetics).	Students will be assessed on: EOT with teacher assessment – writing a description the impact of humans on the earth. Comparing thermal insulation investigation – focus point of drawing a graph, writing a conclusion and explanation.	Students will be assessed on: EOT with teacher assessment – correcting a method for food tests. EOT with teacher assessment – effects of non-communicable disease.	Students will be assessed on: EOT with teacher assessment – writing a description the impact of humans on the earth. Progress test – Cellular processes, energy, digestion and non-communicable diseases. This covers Autumn and spring year 9.
	Weekly quizzes set on Educake covering the terms topics, Energy.	Weekly quizzes set on Educake covering the terms topics, Cellular Processes.	Weekly quizzes set on Educake covering the terms topics, Climate, the earth and sustainability. Revision booklet relevant to the END OF TOPIC TEST.	Weekly quizzes set on Educake covering the terms topics, Energy efficiency, Work and Power.	Weekly quizzes set on Educake covering the terms topics, Organisation and Disease.	Weekly quizzes set on Educake covering the terms topics, Electricity and Magnetism. Revision booklet relevant to the END OF TOPIC TEST.
<h2>HOME LEARNING</h2>	<p>Talk: Students learn about the structure and function of a gas/coal power station through talk and discuss the issues surrounding their use.</p> <p>Writing: Students write an evaluation of renewable and non-renewable power Students will learn about how electricity is generated from a variety of sources, both renewable and non-renewable and how demand is met to keep a stable supply for the country.</p> <p>Think pair share:</p>	<p>Reading, Writing and Talk: Students learn about plant organisation through talk. They will quiz each other, ask and answer questions and offer instructions to a partner drawing plant structures.</p> <p>Writing: Students will continue to write scientifically in their write up of required practical- Investigating photosynthesis. This will include forming a hypothesis, identifying variables and interpretation of data.</p> <p>Think pair share:</p>	<p>Reading: Students will read various articles on fossil fuels and a crematorium to evaluate the use of fossil fuels. Students will read information slides relating to global warming and use these to answer comprehension questions.</p> <p>Writing: Students will write a letter to the government detailing steps they can take to minimise global warming and the impacts of using non-renewable energy. They will also</p>	<p>Talk: Students talk about how energy is transferred from one store to another.</p> <p>Writing: They will write up the investigation on how different types of insulation affect heat transfer.</p> <p>Reading: They will read about different types of insulation.</p> <p>Think pair share: Students will discuss the following key words and topics in class: Students will discuss the importance of appliance efficiency and how</p>	<p>Talk: Students talk about how lifestyle choice can affect their physical and mental health using the science faculty LAUNCH, BOOST AND REROUT oracy strategies.</p> <p>Writing: Students will write up the investigation on the conditions which affect enzyme activity Students will produce a leaflet about the harmful effects of smoking and alcohol abuse.</p> <p>Think pair share: Students will discuss the following key words and topics in class:</p>	<p>Talk: Students talk about which techniques are used to separate different mixtures.</p> <p>Writing: They will be applying their knowledge of KS3 to answer extend written answers from the KS3 curriculum.</p> <p>Reading: Using the CHS south reading strategies to analyse and deconstruct KS3 assessment questions.</p> <p>Think pair share: Students will discuss the following key words and topics in class:</p>
<h2>READING, WRITING, TALK, NUMERACY</h2>						



TIER 2 VOCABULARY

TIER 3 VOCABULARY

<p>Students will discuss the following key words and topics in class: Students will discuss the positives and negatives associated with renewable and non-renewable energy generation. Students will discuss how power is distributed around the country and the reasons for a national grid.</p>	<p>Students will discuss the following key words and topics in class: Students will discuss the ethics involving stem cells and the future technologies that will arise from stem cell research. Students will discuss particle theory and how this enables scientists to make predictions about the transport of molecules in cells.</p>	<p>analyse letter structure in this task. Think pair share: Students will discuss the following key words and topics in class: Students will watch a documentary about global warming from David Attenborough and debate the impacts humans are having on climate. Students will discuss changes in the atmosphere and why these changes have occurred.</p>	<p>modern technologies like LED light bulbs have helped to reduce waste and global emissions. Students will discuss dissipation in class and how energy dissipation can be reduced by insulation.</p>	<p>Students will discuss the impacts of cancer on families and how scientific interventions has helped to raise the life expectancy associated with many different types of cancer. Students will discuss the health implications of non-communicable diseases and how factors like diet, exercise, drugs, and alcohol can increase the risks of diabetes, obesity, and heart related illnesses.</p>	<p>Students will discuss the flow of charge (current) and conduction. Students will learn how electrons are able to carry electrical energy throughout a conductor.</p>
<p>Available Benefit Calculate Compare Discuss Similar suggest environment evaluate source economy interpret</p>	<p>Annotate Function Give Identify Illustrate Process Role section</p>	<p>Analyse Benefit Calculate Data Identify research determine environment evaluate factor source economy establish income, indicate interpret major significant</p>	<p>Calculate Context Data Formula Identify Occur Percent principle</p>	<p>Discuss Function Specific structure suggest individual Respond</p>	<p>Compare Complete design function issue draw source</p>
<p>Renewable Non-Renewable Finite Replenished</p>	<p>DNA Genome Variation Organisation Osmosis Diffusion Enzyme Benign Malignant</p>	<p>Sedimentary Igneous Metamorphic Erosion Compaction</p>	<p>Cells Tissues Organs Organ systems Enzymes Biological catalysts Lipase Amylase Protease</p>	<p>Watts Joules Power Kinetic Gravitational Thermal Energy stores Radiation Forces</p>	<p>Voltage Current Conductor Insulator Attract Repel</p>



PSPSMC, BRITISH VALUES AND DIVERSITY

	Tumour / cancer		Carbohydrase Stomach Small intestine Diffusion Absorption Obesity Anorexia Depression Statins White blood cells Red blood cell Platelets Plaques Cholesterol	Electricity Efficiency Specific heat capacity	
<p>Social, Moral and Spiritual: Exploring issues around renewable and non-renewable energy resources. Students will learn discuss and present work about the importance or renewable technologies. They will also evaluate the issues surrounding fossil fuels and global warming.</p> <p>Social and Moral: Students will learn about their carbon footprint, and how this impacts globally on climate change. Students will learn simple changes that they can make to reduce their carbon footprint. Students will also learn about the Earth's atmosphere and how this is damaged by human activity.</p> <p>Social and Moral: Students will explore the issues around health and what they can do to lead a healthier lifestyle and ways to avoid / reduce the risk of CHD and cancer. Students will also discuss the arguments over STEM cell use and treatments.</p> <p>Social, Moral and Spiritual: Exploring issues around stem cell research.</p> <p>Social and Moral: Students will explore the issues around health and what they can do to lead a healthier lifestyle and ways to avoid / reduce the risks of obesity and health related conductions.</p> <p>Social and Moral: Students will evaluate the use of gene therapy and embryo screening.</p> <p>Social and Moral: Students will explore the issues around how we generate electricity and the impacts on the environment. Are we living in a sustainable way?</p> <p>Social and Moral: Students will learn about how water can be separated from salt water to create clean drinking water in countries who don't have a safe supply.</p>					