

Key Stage 4: Science Curriculum Map 2023-24 (Single Sciences)

Prior Learning:

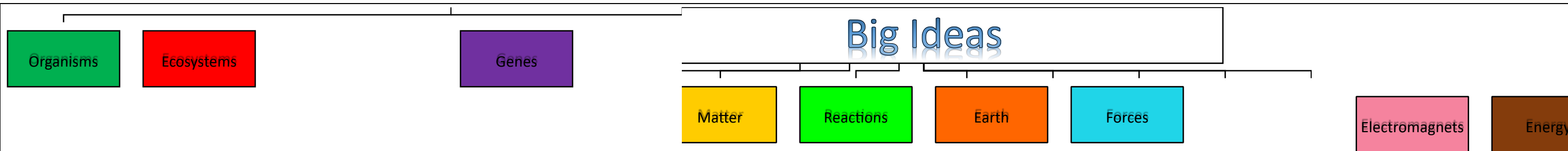
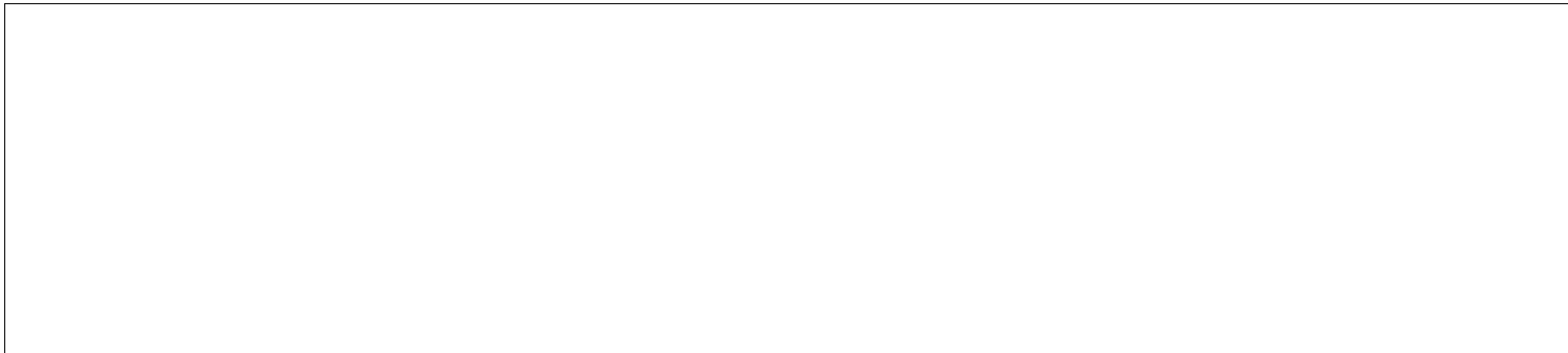
At KS3 the aim was for students to:

- To develop a strong understanding of the 10 big ideas: Organisms, Ecosystem, Genes, Matter, Reactions, Earth, Forces, Electromagnets, Energy and Waves.
- To develop an understanding of how to work scientifically, formulating a line of enquiry based on prior knowledge and being able to start making prediction and creating a hypothesis.
- Pupils should have developed an understanding surrounding associated processes in common language, they should also be familiar with, and able to use a wide range of scientific and technical terminology accurately and precisely.
- Students should be able to apply their mathematical knowledge cross curriculum to their understanding of science, this should involve collecting, presenting, and analysing data.
- Students should have begun to develop an understanding of social and economic implications science can have on their everyday life including an insight into potential careers.
- Through a spiral of constant reviewing and deepening of knowledge throughout Year 7-9 a solid foundation of learning should have been built, cementing knowledge surrounding these big ideas as well as building concepts of more abstract ideas.
- Across KS3, each discipline is split up into primarily 3-4 big ideas, with some content spanning across multiple disciplines that are studied. A strong foundation across these ideas should have been built. These include: □
 - Biology primarily focusing on the 3 big ideas and builds upon:
 - Organisms which looks to cement and build upon knowledge surrounding; movement, cells, breathing and digestion.
 - Ecosystems which look to cement and build upon knowledge surrounding; interdependence, plant reproduction, respiration and photosynthesis.
 - Genes which looks to cement and build upon knowledge surrounding; variation and human reproduction evolution and inheritance.
 - Chemistry primarily focusing on the 3 big ideas and builds upon:
 - Matter which looks to cement and build upon knowledge surrounding; particle model and separating mixtures, elements, and periodic table
 - Reactions which looks to cement and build upon knowledge surrounding; acids and alkali, metals and non-metals, types of reactions and chemical energy.
 - Earth which looks to cement and build upon knowledge surrounding; earth structure, the universe, climate and earth resources.
 - Physics primarily focusing on the 4 big ideas and builds upon:
 - Forces which looks to cement and build upon knowledge surrounding; speed, gravity, contact forces, and pressure.
 - Electromagnets which looks to cement and build upon knowledge surrounding; potential difference and resistance, gravity, magnetism and electromagnets.
 - Energy which looks to cement and build upon knowledge surrounding; energy costs, energy transfers, work, heating and cooling.
 - Waves which looks to cement and build upon knowledge surrounding; sound, light, wave effects and wave properties.

Curriculum Intent:

The curriculum will provide opportunities within the classroom and beyond, for students to build upon their prior experiences within science. It is the intention to develop resilience, independence, numeracy, oracy and literacy skills, that can be transferred to lifelong learning. Whilst nurturing these critical skills, we aim to enhance each student's understanding of science in the real world, incorporating SMSC and Cross-curricular links, paving the way for improved life experiences. Furthermore, there will be a continued development of the understanding as to how science can be used as a conduit to a plethora of careers and professions.

Our curriculum is based on the ten 'Big Ideas' in science. From Year 7 through to Year 11, students will study modules that continually link into these Big Ideas and build their understanding year upon year. The sequencing of the curriculum, transitions from simpler, concrete modules to more abstract topics.



			Year 10			
	Autumn Term 1 7 weeks	Autumn Term 2 7weeks	Spring Term 1 6 weeks	Spring Term 2 6 weeks	Summer Term 1 6 weeks	Summer Term 2 6 weeks
Module Title	Cells Homeostasis & Response Atomic Structure Chemical Analysis Astrophysics	Ecology Quantitative Chemistry Energy	Infection and Response Bonding, structure and properties of matter Electricity	Homeostasis and Response Chemical Changes Atomic Structure	Homeostasis and Response Energy Changes Forces	Cells Homeostasis & Response Ecology Atomic Structure Chemical Analysis Quantitative Chemistry Bonding, structure and properties of matter Chemical Changes Energy Changes Astrophysics Energy Electricity Forces

Learning Focus	<ul style="list-style-type: none"> • Culturing microorganisms • RP Culturing microorganisms • Effect of antibiotics • RP Effects of antibiotics • The Brain • The Eye • Comparison of Group 1 with Transition elements • Properties Transitional • Flame tests • Metal Hydroxides • Solar System 	<ul style="list-style-type: none"> • RP Decay • Impact of Environmental Change • Trophic levels • Biomass • Factors affecting food security • Farming techniques • Sustainable fisheries • Biotechnology • Percentage yield • Atom economy • Using concentrations of solutions in Moles. • Use of amount of substance 	<ul style="list-style-type: none"> • Producing monoclonal antibodies • Use of monoclonal antibodies • Plant diseases • Preventing Plant diseases • Sizes of particles and their properties • Use of nanoparticles • Static charge • Electric fields 	<ul style="list-style-type: none"> • Plant hormones, control and coordination • Germination • RP Germination • Use of plant hormones • Acids and alkalis • Neutralisation • RP Neutralisation • Radioactivity • Background radiation • Half-lives of radioactive isotopes • Use of Nuclear radiation • Nuclear Fission 	<ul style="list-style-type: none"> • Control of body temperature • Maintaining water balance • Maintaining nitrogen balance • Electrolysis • Cells and batteries • Fuel cells • Pressure fluids • Increasing the pressure of fluids • Atmospheric pressure 	<p>In addition to the continued review of students will commence a revision pro covered thus far.</p>
	<ul style="list-style-type: none"> • Life cycle of a star • Orbital motion • Natural and artificial satellites • Red Shift • Big Bang Theory 	<p>in relation to volume of gases</p> <ul style="list-style-type: none"> • Thermal Insulation • RP Thermal Insulation 		<ul style="list-style-type: none"> • Nuclear Fusion 		
Careers Focus	Links to careers are continually made across all modules.		Links to careers are continually made across all modules. British Science week		Links to careers are continually made across all modules.	
Assessment	<p style="text-align: center;">1</p> Checkpoint quiz Close the gap tasks Progress quiz Seneca assignments		<p style="text-align: center;">2</p> Checkpoint quiz Close the gap tasks Progress quiz Seneca assignments		<p style="text-align: center;">3</p> Checkpoint quiz Close the gap tasks Progress quiz Seneca assignments	

Year 11					
	Autumn Term 1 7 weeks	Autumn Term 2 7weeks	Spring Term 1 6 weeks	Spring Term 2 6 weeks	Summer Term 1 6 weeks
Module Title	Inheritance, Variation and Evolution Chemical Analysis Forces	Inheritance, Variation and Evolution Organic Chemistry Forces Waves	Inheritance, Variation and Evolution Using resources Waves Magnetism and Electromagnetism	Cells Organisation Bioenergetics Infection & Response Homeostasis & Response Inheritance, Variation and Evolution Ecology Atomic Structure & Periodic Table Bonding Chemical Change Quantitative Chemistry Energy Changes Rate and Extent of Chemical Change Organic Chemistry Energy Forces Particle Model of Matter Atomic Structure Electricity Waves Magnetism and Electromagnetism	Cells Organisation Bioenergetics Infection & Response Homeostasis & Response Inheritance, Variation and Evolution Ecology Atomic Structure & Periodic Table Bonding Chemical Change Quantitative Chemistry Energy Changes Rate and Extent of Chemical Change Organic Chemistry Energy Forces Particle Model of Matter Atomic Structure Electricity Waves Magnetism and Electromagnetism

Learning Focus	<ul style="list-style-type: none"> Advantages and disadvantages of sexual reproduction Advantages and disadvantages of asexual reproduction DNA structure Carbonates Halides Sulfates Instrumental methods Flame emissions spectroscopy RP identifying ions 	<ul style="list-style-type: none"> Cloning Theory of evolution Structure and formula of alkenes Reaction of alkenes Alcohols Carboxylic acids Additional polymerisation Condensation polymerisation Amino acids DNA and other naturally occurring polymers Reflection of Waves Sound waves 	<ul style="list-style-type: none"> Speciation Understanding of genetics Corrosion and its prevention Alloys as useful materials Ceramics, polymers and composites The Haber process Production and uses of NPK fertilisers Emission and absorption of IR RP Radiation and absorption Perfect Black Bodies Loudspeakers 	<p>In addition to the continued review of content, along with the range of tasks, students will commence a revision programme spanning all of the GCSE modules.</p>	<p>In addition to the continued review of content, along with the range of tasks, students will commence a revision programme spanning all of the GCSE modules.</p>
	<ul style="list-style-type: none"> Moments, levers and gears Momentum Changes in momentum 	<ul style="list-style-type: none"> Waves for detection and exploration Lenses Visible light RP Light 	<ul style="list-style-type: none"> Induced potential Uses of the Generator effect Microphones Transformers 		
Careers Focus	Links to careers are continually made across all modules.		Links to careers are continually made across all modules. British Science week		Links to careers are continually made across all modules.
Assessment	PPE1 Checkpoint quiz Close the gap tasks Progress quiz Seneca assignments		PPE2 Checkpoint quiz Close the gap tasks Progress quiz Seneca assignments		

