

Science GSA KS4 Curriculum Map 2023-24

We aim to develop all students into scientists who:

- have opportunities to indulge their natural curiosity for science leading to a lifelong passion;
- are scientifically confident and skilled learners with potential for embarking upon STEM-based careers;
- have a broad and deep knowledge of the sciences through immersion in our five-year spiral curriculum.

	Autumn 1 (HT1)	Autumn 2 (HT2)	Spring 1 (HT3)	Spring 2 (HT4)	Summer 1 (HT5)	Summer 2 (HT6)
Year 10 Combined Science / Trilogy (Shared between two teachers)						
Biology						
Topic Covered	Organ Systems B3 Organisation B4	Infection and Response B5 B6	Infection and Response B7 Bioenergetics B8 B9	Bioenergetics B9 Homeostasis and Response B10 B11	Homeostasis and Response B11	REVISION / PPE
Knowledge Deepened	Cell biology Principles of organisation Human digestive system Transport systems The heart and blood vessels Blood Plant tissues Plant organ systems	Health, disease The role of white blood cells Drug trials and development of medicines	Cell biology, Process of Respiration and Photosynthesis	Coordination and control Nervous system Controlling blood sugar levels Menstrual cycle and contraception	Coordination and control Nervous system Controlling blood sugar levels Menstrual cycle and contraception	
Skills developed	Making observations Drawing conclusions Dissection skills	Aseptic technique Calculating bacterial populations Evaluating scientific theories	Calculating rate-straight line equations Calculating percentage change Investigate the effect of exercise on heart rate	Testing reflex actions Measuring reaction times Investigating newly germinated shoots Interpretation of	Testing reflex actions Measuring reaction times Investigating newly germinated shoots Interpretation of graphical data	

		Interpretation of data History of drug development	Investigating limiting factors rate of photosynthesis	graphical data		
Specification Link	AQA TRILOGY 4.2	AQA TRILOGY 4.3	AQA TRILOGY 4.4	AQA TRILOGY 4.5	AQA TRILOGY 4.5	
Flagship Link	GCSE PE and Biology - Applied anatomy/cardiovascular and respiratory system	History and Biology - Development of the smallpox vaccination.				
Cross Curriculum Connections	Technology - Term 1 Y10 Food and Nutrition Personal Development - HT4 -Y10 Healthy Lifestyle	Psychology - HT1 Y10 -Introduction to psychology - placebo/blind trials Technology - FPN Term 1 Y9 - Reasons for food choices Maths - HT6 Y10 Scatter Diagrams	Personal Development - HT5 Y10 - Intimate Relationships Personal Development - HT4 - Y11 - Communication in relationship Personal Development - HT5 Y11 - Families	Maths - Graphs Y10 (HT4) Maths - Correlation Y10 HT6 Psychology - HT3/4 Y10 -criminal psychology Personal Development - HT5 Y10 - Intimate Relationships Personal Development - HT4 - Y11 - Communication in relationship Personal Development - HT5 Y11 - Families	Maths - Graphs Y10 (HT4) Maths - Correlation Y10 HT6 Psychology - HT3/4 Y10 -criminal psychology Personal Development - HT5 Y10 - Intimate Relationships Personal Development - HT4 - Y11 - Communication in relationship Personal Development - HT5 Y11 - Families	
Resources to support learning	Resources available at: BBC Bitesize / Seneca Learning / Google Classroom					
Chemistry						

Topics covered	Bonding, Structure and Properties of Matter C3 Quantitative Chemistry C4		Chemical Changes C5	Chemical Changes C6 C7	Chemical Analysis C12	REVISION / PPE
Knowledge Deepened	<p>The 3 types of bonding - ionic, covalent and metallic</p> <p>Properties of ionic, covalent and metallic bonding</p> <p>Quantitative Chemistry: calculating formula mass, % of an element in a compound</p>		<p>Reactions of Acids</p> <p>The reactivity series and extracting metals</p> <p>Reactions of metals</p>	<p>The reactivity series and extracting metals</p> <p>Reactions of metals</p> <p>Electrolysis</p> <p>Electrolysis of Aqueous solutions</p> <p>Exothermic and endothermic reactions</p> <p>Reaction profiles</p> <p>Measuring energy changes</p>	<p>Chemical Analysis - Purity and formulation, process of chromatography and analysis of chromatograms</p> <p>Gas tests for Oxygen, Hydrogen, Chlorine and Carbon Dioxide</p> <p>Evolution of the Earth's atmosphere, Greenhouse gases and climate change</p> <p>Carbon footprint</p>	
Skills developed	<p>The theories, properties, and technology about structures and materials.</p> <p>Mathematical skills in Chemistry.</p>		<p>Required Practical skills - carrying out a practical safely.</p> <p>Variables</p> <p>Data analysis - graphs/tables</p>	<p>Practically separating ions using electricity.</p> <p>How energy is gained and lost in reactions.</p> <p>Required Practical skills - variables, data analysis</p>	<p>Practical analysis of metals and gases in Chemistry.</p> <p>Using evidence to form conclusions</p> <p>Extraction and use of the Earth's natural resources - evaluating impact</p>	
Specification Link	AQA TRILOGY 5.2 AQA TRILOGY 5.3		AQA TRILOGY 5.4.	AQA TRILOGY 5.4 AQA TRILOGY 5.5	AQA TRILOGY 5.8 AQA TRILOGY 5.9 AQA TRILOGY 5.10	
Flagship Link						
Cross Curriculum	Computer Science - HT1 Y10 Computer Hardware		Maths - HT2 Y10 Solving Equation		Geography - Y10 Term 1 Hot deserts	

Connections	Maths - HT3 Y10 Perimeter Area and Volume				Geography - Y 11 Term 1 Natural Hazards	
Resources to support learning	Resources available at: BBC Bitesize / Seneca Learning / Google Classroom					
Physics						
Topics covered		Electricity P4 P5			Particle Model of Matter P6 Atomic Structure P7	REVISION / PPE
Knowledge Deepened		What is Resistance? Calculating resistance Circuits: series and parallel, symbols. National Grid Electricity in the home Power - what is it and how do we calculate it?			The Particle model and motion in gases Density of materials Internal Energy and Changes of state Specific latent heat The current model of an atom Isotopes and nuclear radiation Nuclear equations Half Life Irradiation and contamination	
Skills developed		Development of scientific ideas Extended writing Building simple circuits Recall and use of equations Required practicals resistance and I-V characteristics, Density Complete electric circuits			Describing particle model and atomic structure Graph analysis and interpretation Application of knowledge	

		Using equations				
Specification Link		AQA TRILOGY 6.4			AQA TRILOGY 6.3 AQA TRILOGY 6.4	
Flagship Link						
Cross Curriculum Connections		Technology (simple circuits) Year 10 HT3			Maths - HT5 Y10 Probability	

Resources to support learning	Resources available at: BBC Bitesize / Seneca Learning / Google Classroom					
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Year 10 Separate Science

Biology

Topics covered	Nutrition and Digestion B3 Organisation B4	Infection and Response B5	Infection and Response B6 B7 Bioenergetics B8	Bioenergetics B9 Homeostasis and Response B10	Homeostasis and Response B11	Homeostasis and response B12 REVISION / PPE
Knowledge Deepened	The heart and blood vessels and cardiovascular disease Digestive System and Enzymes Respiratory System Plant tissues and plant organ systems	Health and disease The role of White blood cells Drug trials and development of medicines Monoclonal antibodies Plant disease	Cell biology Photosynthesis Respiration Health and Fitness		Coordination and control Nervous system Controlling blood sugar levels, water levels. The Brain - how we analyse the structure and function The Eye Menstrual cycle and contraception Control of water levels Control of Nitrogen	

Skills developed	Making observations Drawing conclusions Dissection skills	Aseptic technique Calculating bacterial populations Evaluating scientific theories Interpretation of data History of drug development	Calculating rate-straight line equations Calculating percentage change Investigate the effect of exercise on heart rate Investigating limiting factors rate of photosynthesis	Calculating rate-straight line equations Calculating percentage change Investigate the effect of exercise on heart rate Investigating limiting factors rate of photosynthesis	Investigating newly germinated shoots Interpretation of graphical data Testing reflex actions Measuring reaction times Comparing and contrasting nervous to hormonal control
Specification Link	AQA BIOLOGY 4.3	AQA BIOLOGY 4.3	AQA BIOLOGY 4.4	AQA BIOLOGY 4.5	AQA BIOLOGY 4.5
Flagship Link	GCSE PE and Biology - Applied anatomy/cardiovascular and respiratory system	History and Biology - Development of the smallpox vaccination.			
Cross Curriculum Connections	Technology - Term 1 Y10 Food and Nutrition Personal Development - HT4 -Y10 Healthy Lifestyle	Psychology - HT1 Y10 -Introduction to psychology - placebo/blind trials Technology - FPN Term 1 Y9 - Reasons for food choices Maths - HT6 Y10 Scatter Diagrams		Psychology - HT3/4 Y10 -criminal psychology Maths - Graphs Y10 (HT4) Maths - Correlation Y10 HT6 Personal Development - HT5 Y10 - Intimate Relationships Personal Development - HT4 - Y11 - Communication in relationship Personal Development - HT5 Y11 - Families	Personal Development - HT5 Y10 - Intimate Relationships Personal Development - HT4 - Y11 - Communication in relationship Personal Development - HT5 Y11 - Families
Resources to support learning	Resources available at: BBC Bitesize / Seneca Learning / Google Classroom				

Chemistry

Topics covered	C3 Bonding, structure and properties of matter C4 Quantitative chemistry	C4 Quantitative chemistry C5 Chemical Changes	C6 Chemical Changes C7 Energy changes	C7 Energy changes C8 The rate and extent of chemical change	C9 Crude oil and fuels	REVISION / PPE
Knowledge Deepened	The 3 types of bonding - ionic, covalent and metallic Properties of ionic, covalent and metallic bonding Quantitative Chemistry: calculating formula mass, % of an element in a compound Limiting reactants Reacting Masses The Mole	Reactions of Acids The reactivity series and extracting metals Reactions of metals	Reactions of Acids The reactivity series and extracting metals Reactions of metals Electrolysis Electrolysis of Aqueous solutions Exothermic and endothermic reactions Reaction profiles Measuring energy changes Bond energy calculations Chemical cells and Fuel Cells	Factors that affect the rate of reaction e.g. concentration, surface areas, temperature and a catalyst Reversible reactions What is meant by a dynamic equilibrium and factors that can affect the equilibrium.	Carbon compounds as fuels and feedstock Reactions of Alkenes, Alcohols and other organic compounds. Synthetic and naturally occurring polymers Organic Chemistry	Reactions of Alkenes, Alcohols and other organic compounds. Synthetic and naturally occurring polymers Organic Chemistry Retrieval of prior knowledge
Skills developed	Using and evaluating models for bonding in substances Evaluating how structure relates to properties Recalling and applying equations Rearranging equations Converting units	Recalling and applying equations Rearranging equations Converting units Making observations Writing a scientific method	Making observations Constructing electrical circuits Recording data Plotting points on a line graph Drawing lines of best fit Calculating a mean	Making accurate observations Identify hazards in a practical Calculating rate of reaction Comparing data	Drawing the displayed formula of compounds Identifying features of organic molecules	Evaluating the use of polymers Exam technique Revision study skills
Specification Link	AQA CHEMISTRY 4.2 AQA CHEMISTRY 4.3	AQA CHEMISTRY 4.4	AQA CHEMISTRY 4.4 AQA CHEMISTRY 4.5	AQA CHEMISTRY 4.6	AQA CHEMISTRY 4.7	AQA CHEMISTRY 4.7

Flagship Link						
Cross Curriculum Connections	Computer Science - HT1 Y10 Computer Hardware Maths - HT3 Y10 Perimeter Area and Volume	Maths - HT2 Y10 Solving Equation		Psychology - HT2 Y10 Graphs and charts Maths - HT3 Y11 Gradients and Rates of change	Technology - Term 1 Y10 Structures and forces (Polymers)	
Resources to support learning	Resources available at: BBC Bitesize / Seneca Learning / Google Classroom					
Physics						
Topics covered	Electricity P4	Electricity P5 Particle Model of Matter P6 Atomic Structure P7	Atomic Structure P7 Forces P8	Forces P8 P9 P10	Forces P10 Pressure P11	REVISION / PPE
Knowledge Deepened	What is Resistance? Calculating resistance Circuits: series and parallel, symbols. National Grid Electricity in the home	Power - what is it and how do we calculate it? Density of materials Internal Energy and changes of state Specific Latent Heat Particle motion in gases The current model of an atom Isotopes and nuclear radiation Nuclear equations Half Life Background radiation and contamination Fission & Fusion	The current model of an atom Isotopes and nuclear radiation Nuclear equations Half Life Background radiation and contamination Fission & Fusion Contact and noncontact forces Weight, Mass and Gravity Calculating force Force and Elasticity Moments Fluid Pressure Upthrust and atmospheric pressure Acceleration DT and VT Graphs	Contact and noncontact forces Weight, Mass and Gravity Calculating force Force and Elasticity Moments Acceleration DT and VT Graphs Terminal Velocity Newton's Laws of Motion Momentum and Change in momentum	Contact and noncontact forces Weight, Mass and Gravity Calculating force Force and Elasticity Moments Acceleration DT and VT Graphs Terminal Velocity Newton's Laws of Motion Momentum and Change in momentum Fluid Pressure Upthrust and atmospheric pressure Retrieval of prior knowledge	

			Terminal Velocity Newton's Laws of Motion Momentum and Change in momentum			
Skills developed	Describing particle model and atomic structure Construct electric circuits Problem solving Recalling and applying equations Rearranging equations	Planning a practical Obtaining data Plotting line graphs + determining the gradient of the line of best fit Development of scientific ideas Extended writing Building simple circuits Recall and use of equations Required practicals resistance and I-V characteristics, Density	Using and evaluating models Recalling and applying equations Rearranging equations	Recalling and applying equations Rearranging equations Describing the gradient of a line graph Calculating the area underneath a motion graph Evaluating factors affecting braking distance	Recalling and applying equations Rearranging equations Describe the shape of a curve on a graph	Making observations Collecting data Recalling and applying equations Rearranging equations Exam technique Revision study skills
Specific Link	AQA PHYSICS 4.2	AQA PHYSICS 4.2 AQA PHYSICS 4.3 AQA PHYSICS 4.4	AQA PHYSICS 4.4 AQA PHYSICS 4.5	AQA PHYSICS 4.5	AQA PHYSICS 4.5	AQA PHYSICS 4.5
Flagship Link						
Cross Curriculum Connections	Technology - Term 2 Y10 Mini NEA	Maths - HT5 Y10 Probability	Maths / graph interpretation and calculation of speed Year 9 HT2 / Yr 10 HT3 Maths / Vectors, forces and motion Year 12 HT2	Maths / graph interpretation and calculation of speed Year 9 HT2 / Yr 10 HT3 Maths / Vectors, forces and motion Year 12 HT2 Technology - Term 2 Y10 Mini NEA	Maths / graph interpretation and calculation of speed Year 9 HT2 / Yr 10 HT3 Maths / Vectors, forces and motion Year 12 HT2 Technology - Term 2 Y10 Mini NEA	
Resources to support learning	Resources available at: BBC Bitesize / Seneca Learning / Google Classroom					

Year 11 Combined Science / Trilogy (Shared between two teachers)

Biology

Topics covered	Ecology B16 B17 Inheritance variation and evolution B13 B14	Inheritance, variation and evolution B15		Revision & Exam Preparation	EXAMS
Knowledge Deepened	Ecosystems Competition Adaptations Food chains How to use a Quadrat/Transect The water and carbon cycle Decomposition DNA - structure Reproduction - sexual and asexual Meiosis X & Y chromosomes Genetic diagrams Embryo screening	Variation and Evolution Selective Breeding Genetic Engineering Fossils and Classification		Retrieval of prior knowledge	
Skills developed	Discussing viewpoints Weighing evidence Investigation- Field work Modelling natural selection Use of qualitative data	Discussing viewpoints Weighing evidence Evaluating use of GM Ethics of cloning		Exam technique Revision study skills Application of mathematical, practical and analysis skills to different contexts.	
Specification link	AQA TRILOGY 4.6 AQA TRILOGY 4.7	AQA TRILOGY 4.7			
Flagship Link	Geography, Chemistry, Biology - Climate Change				
Cross Curriculum	Geography - Y10 Term 1 Ecosystem	Personal Development - HT5 Y11 - Families			

Connections	Philosophy - Y8 HT6 Science and Religion	Philosophy - Y8 HT6 Science and Religion				
Resources to support learning	Resources available at: BBC Bitesize / Seneca Learning / Google Classroom					
Chemistry						
Topics covered		Chemistry of the atmosphere C13	Using Resources C14 Organic Chemistry C9	Revision & Exam Preparation	EXAMS	
Knowledge Deepened		Evolution of the Earth's atmosphere, Greenhouse gases and climate change Carbon footprint Combustion and pollution Biodiversity and waste management Global Warming Deforestation and Land Use Impact of environmental change	Using Resources - Finite and renewable resources, Reuse and recycling, Life Cycle Assessments, Potable water and desalination, wastewater treatment Hydrocarbon families: alkanes and alkenes Crude oil and Fractional Distillation The process of cracking	Retrieval of prior knowledge		
Skills developed		Data analysis: Graphs and tables Evaluation of theories Mathematical skills e.g. calculating mean	Analytical skills - data interpretation Evaluation of resources	Exam technique Revision study skills Application of mathematical, practical and analysis skills to different contexts.		
Specification Link		AQA TRILOGY 5.9 AQA TRILOGY 5.10	AQA TRILOGY 5.7			

Flagship Link		Geography, Chemistry, Biology - Climate Change			
Cross Curriculum Connections		Geography - Y10 Term 1 Hot deserts	Biology (environment / global warming) Year 11 HT1 Technology - Y11 NEA		
Resources to support learning	Resources available at: BBC Bitesize / Seneca Learning / Google Classroom				
Physics					
Topics covered	Forces P8 P9 P10	Waves P12	E.M Spectrum P13 Electricity and Magnetism P15	Revision & Exam Preparation	EXAMS
Knowledge Deepened	Weight, mass gravity Resultant forces and work done Distance and velocity time graphs Forces, acceleration and Newton's Laws of Motion Forces and elasticity	Transverse and Longitudinal waves Frequency, Period and Wave speed Refraction	EM Spectrum - properties, uses and dangers Investigating Infrared radiation Permanent and Induced Magnets Electromagnetism	Retrieval of Prior Knowledge	
Skills developed	Mathematical reasoning Use of scalars and vectors Required Practical skills: graphs, data collection and interpretation	Extended writing linkage of ideas and concepts Application and manipulation of mathematical equations Required practicals radiation and absorption, [thermal insulation and	Extended writing linkage of ideas and concepts Application and manipulation of mathematical equations	Exam technique Revision study skills Application of mathematical, practical and analysis skills to different contexts. .	

		light (Physics only)]				
Specification Link	AQA TRILOGY 6.5	AQA TRILOGY 6.6	AQA TRILOGY 6.6 AQA TRILOGY 6.7			
Flagship Link						
Cross Curriculum Connections	Maths / graph interpretation and calculation of speed Year 9 HT2 / Yr 10 HT3 Maths / Vectors, forces and motion Year 12 HT2		Computer Science:: Electromagnetics with focus on WiFi (data)			
Resources to support learning	Resources available at: BBC Bitesize / Seneca Learning / Google Classroom					

Year 11 Separate Science

Biology

Topics covered	Ecology B16 B17	Ecology B18 Inheritance, variation and evolution B13	Inheritance, variation and evolution B14	Inheritance, variation and evolution B15	Revision / EXAM PREPARATION	EXAMS
Knowledge Deepened	Ecosystems Competition Adaptations Food chains How to use a Quadrat/Transect The water and carbon cycle Trophic Levels Food security and Biotechnology	DNA - structure Reproduction - sexual and asexual Meiosis X & Y chromosomes Genetic diagrams Embryo screening	Embryo screening Variation and Evolution Selective Breeding Genetic Engineering Fossils and Classification and Extinction Speciation	Retrieval of Prior Knowledge		

Skills developed	Weighing evidence Investigation- Field work	Modelling natural selection Use of qualitative data Evaluating use of GM Ethics of cloning	Modelling natural selection Use of qualitative data Evaluating use of GM Ethics of cloning Discussing viewpoints	Exam technique Revision study skills Application of mathematical, practical and analysis skills to different contexts.	
Specification Link	AQA BIOLOGY 4.7	AQA BIOLOGY 4.6	AQA BIOLOGY 4.6		
Flagship Link					
Cross Curriculum Connections	Geography - Y10 Term 1 Ecosystem	Personal Development - HT5 Y11 - Families Philosophy - Y8 HT6 Science and Religion	Personal Development - HT5 Y11 - Families Philosophy - Y8 HT6 Science and Religion		
Resources to support learning	Resources available at: BBC Bitesize / Seneca Learning / Google Classroom				
Chemistry					
Topics covered	C10 Organic reactions C11 Polymers	C12 Chemical Analysis C13 Chemistry of the atmosphere	C14 C15 Using Resources	Revision & Exam Preparation	EXAMS
Knowledge Deepened	Structure of organic molecules (alkanes / alkenes / alcohols / carboxylic acids / esters) Structure of alkenes and relating the structure to a polymer Natural polymers	Chemical Analysis - Purity and formulation, process of chromatography and analysis of chromatograms Testing for positive metal ion Testing for negative ion	Using Resources - Finite and renewable resources, Reuse and recycling, Life Cycle Assessments, Potable water and desalination, wastewater treatment	Retrieval of prior knowledge	

		<p>Gas tests for Oxygen, Hydrogen, Chlorine and Carbon Dioxide</p> <p>Instrumental Analysis</p> <p>Evolution of the Earth's atmosphere, Greenhouse gases and climate change Carbon footprint Combustion and pollution Biodiversity and waste management Global Warming Deforestation and Land Use</p> <p>Impact of environmental change</p>				
Skills developed	Modelling molecules	<p>Making observations Recording data Problem solving Evaluating evidence to support theories</p>	<p>Writing a scientific method Collecting data Making observations Writing conclusions</p>	<p>Exam technique Revision study skills Application of mathematical, practical and analysis skills to different contexts.</p>		
Specification Link	AQA CHEMISTRY 4.7	<p>AQA CHEMISTRY 4.8 AQA CHEMISTRY 4.9</p>	<p>AQA CHEMISTRY 4.9 AQA CHEMISTRY 4.10</p>			
Flagship Link		<p>Science & Geography - Y 11 Term 2 Natural Hazards</p>				
Cross Curriculum Connections		<p>Psychology - HT4 Y11 Research Methods</p> <p>Technology - Term 1 - Factors to consider when designing a menu - Global Warming</p>	<p>Technology - (Core theory) Year 11 HT1</p>			
Resources to support learning	Resources available at: BBC Bitesize / Seneca Learning / Google Classroom					

Physics

Topics covered	Waves P12	Electromagnetic spectrum P13 Light P14	Magnetism P15 Space P16	Revision & Exam Preparation	EXAMS
Knowledge Deepened	Fluid Pressure Upthrust and atmospheric pressure Transverse and Longitudinal waves Frequency, Period and Wave speed Reflection	EM Spectrum - properties, uses and dangers Infrared Radiation and Temperature Black Body Radiation Sound Waves and Ultrasound Lenses Images and Ray Diagrams Concave lenses and Magnification Visible Light	Permanent and Induces Magnets Electromagnetism The Motor Effect Electric Motors and Loudspeakers The Generator Effect Generators and Microphones Transformers The Life Cycle of a star The solar system and orbits Red-shift and The Big Bang	Retrieval of prior knowledge	
Skills developed	Extended writing linkage of ideas and concepts Application and manipulation of mathematical equations	Extended writing linkage of ideas and concepts Application and manipulation of mathematical equations	Development of models and ideas of our universe throughout history A sense of scale and use of significant figures The importance of peer review when analysing and interpreting data	Exam technique Revision study skills Application of mathematical, practical and analysis skills to different contexts.	
Specification Link	AQA PHYSICS 4.5 AQA PHYSICS 4.6	AQA PHYSICS 4.6	AQA PHYSICS 4.7 AQA PHYSICS 4.8		
Flagship Link					
Cross Curriculum Connections			Computer Science:: Electromagnetics with focus on WiFi (data)		
Resources to support learning	Resources available at: BBC Bitesize / Seneca Learning / Google Classroom				

