

Science Curriculum Overview

Subject Curriculum Intent Statement

We believe that Science is all about asking questions; questions about our past, present and future. Our curriculum vision aims to build on this belief and the curriculum intent of the whole school, enabling our students to make informed decisions about the contribution that science offers to society and prepare them for a modern world that is underpinned by scientific processes.

The curriculum intent will be achieved through:

- Delivering a broad, balanced and ambitious science curriculum focused around the four main concepts of particles, forces, energy and living organisms.
- Ensuring high levels of challenge and expectation, through high quality teaching that inspires students and is pitched to allow all students to reach their full potential.
- Enabling confidence and fluency in literacy, numeracy and oracy by encouraging students to communicate like a scientist.
- Preparing and equipping students for life in modern Britain by emphasising the importance of critical thinking, logical reasoning and methodical investigation, through the skills of observation, comparison, experimentation and data analysis.

Science Curriculum Offer @ SNA

- **Year 7 – Science** – three periods per week – all students
- **Year 8 – Science** – three periods per week – all students
- **Year 9 – Science** – three period per week – all students
- **Year 10-11 – Combined Science** – five periods per week – all students

In addition, we offer the following optional courses:

Key Stage 4 – Years 10-11

- **GCSE Triple Science** – two/three **extra** periods per week

Key Stage 5 - Years 12-13

- A Level Biology
- A Level Chemistry
- A Level Physics

Science Pathways

	Biology		Chemistry		Physics	
Year 7	<ul style="list-style-type: none"> ▪ Cells ▪ Structure and function of body systems ▪ Reproduction 		<ul style="list-style-type: none"> ▪ Separation techniques ▪ Particles ▪ Elements, atoms and compounds ▪ Chemical reactions 		<ul style="list-style-type: none"> ▪ Forces ▪ Space ▪ Sound 	
Year 8	<ul style="list-style-type: none"> ▪ Health and lifestyles ▪ Reproduction 		<ul style="list-style-type: none"> ▪ Metals and other materials ▪ Chemical reactions ▪ Periodic table 		<ul style="list-style-type: none"> ▪ Earth ▪ Motion and pressure ▪ Sound ▪ Light 	
Year 9	<ul style="list-style-type: none"> ▪ Ecosystems and adaptations ▪ Cell structure and transport ▪ Cell division ▪ The human digestive system 		<ul style="list-style-type: none"> ▪ Metals and other materials ▪ Atomic structure ▪ Periodic table 		<ul style="list-style-type: none"> ▪ Electricity and magnetism ▪ Conservation and dissipation of energy ▪ Energy transfer by heating and energy resources 	
Pathways	Combined Biology	Triple Biology	Combined Chemistry	Triple Chemistry	Combined Physics	Triple Physics
Year 10	<ul style="list-style-type: none"> ▪ Cell Division ▪ Organisation ▪ Infection and response ▪ Bioenergetics ▪ Ecology 	<ul style="list-style-type: none"> ▪ Cell Division ▪ Organisation ▪ Infection and response ▪ Bioenergetics ▪ Ecology 	<ul style="list-style-type: none"> ▪ Periodic table ▪ Bonding, structure and the properties of matter ▪ Quantitative chemistry ▪ Chemical changes ▪ Energy changes 	<ul style="list-style-type: none"> ▪ Periodic table ▪ Bonding, structure and the properties of matter ▪ Quantitative chemistry ▪ Chemical changes ▪ Energy changes ▪ Rate and extent of chemical change ▪ Organic chemistry 	<ul style="list-style-type: none"> ▪ Energy transfer by heating and energy resources ▪ Electricity ▪ Particle model of matter ▪ Atomic structure 	<ul style="list-style-type: none"> ▪ Energy transfer by heating and energy resources ▪ Electricity ▪ Particle model of matter ▪ Atomic structure ▪ Forces
Year 11	<ul style="list-style-type: none"> ▪ Homeostasis ▪ Inheritance, variation and evolution 	<ul style="list-style-type: none"> ▪ Ecology ▪ Inheritance, variation and evolution 	<ul style="list-style-type: none"> ▪ The rate and extent of chemical change ▪ Organic chemistry ▪ Chemistry of the atmosphere ▪ Chemical analysis ▪ Using resources 	<ul style="list-style-type: none"> ▪ Organic chemistry ▪ Chemical analysis ▪ Chemistry of the atmosphere ▪ Using resources 	<ul style="list-style-type: none"> ▪ Forces ▪ Waves ▪ Magnetism and electromagnetism 	<ul style="list-style-type: none"> ▪ Forces ▪ Waves ▪ Magnetism and electromagnetism ▪ Space
Pathways	A Level Biology		A Level Chemistry		A Level Physics	
Year 12	<ul style="list-style-type: none"> ▪ Foundations in biology ▪ Exchange and transport ▪ Biodiversity, evolution and disease ▪ Communication, homeostasis and energy ▪ Genetics, evolution and ecosystems 		<ul style="list-style-type: none"> ▪ Foundations in chemistry ▪ Periodic table and energy ▪ Core organic chemistry ▪ Physical chemistry and transition elements ▪ Organic chemistry and analysis 		<ul style="list-style-type: none"> ▪ Measurements and their errors ▪ Particles and radiation ▪ Waves ▪ Mechanics and materials ▪ Electricity ▪ Further mechanics and thermal physics 	
Year 13	<ul style="list-style-type: none"> ▪ Communication, homeostasis and energy ▪ Genetics, evolution and ecosystems 		<ul style="list-style-type: none"> ▪ Physical chemistry and transition elements ▪ Organic chemistry and analysis 		<ul style="list-style-type: none"> ▪ Further mechanics and thermal physics ▪ Fields and their consequences ▪ Nuclear physics ▪ Engineering physics 	

Core Science Curriculum Map

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7	<ul style="list-style-type: none"> ▪ Separation techniques ▪ Cells ▪ Forces 	<ul style="list-style-type: none"> ▪ Forces ▪ Particles 	<ul style="list-style-type: none"> ▪ Particles ▪ Structure and function of body systems ▪ Space 	<ul style="list-style-type: none"> ▪ Space ▪ Elements, atoms and compounds 	<ul style="list-style-type: none"> ▪ Elements, atoms and compounds ▪ Reproduction ▪ Chemical reactions 	<ul style="list-style-type: none"> ▪ Chemical reactions ▪ Sound
Year 8	<ul style="list-style-type: none"> ▪ Earth ▪ Metal and other materials 	<ul style="list-style-type: none"> ▪ Health and lifestyles ▪ Chemical reactions 	<ul style="list-style-type: none"> ▪ Chemical reactions ▪ Motion and pressure 	<ul style="list-style-type: none"> ▪ Motion and pressure ▪ Reproduction 	<ul style="list-style-type: none"> ▪ Reproduction ▪ Sound 	<ul style="list-style-type: none"> ▪ Light
Year 9	<ul style="list-style-type: none"> ▪ Ecosystems and adaptations ▪ Electricity and magnetism 	<ul style="list-style-type: none"> ▪ Electricity and magnetism ▪ Biological processes ▪ Metals and other materials 	<ul style="list-style-type: none"> ▪ Cell structure and transport ▪ Atomic structure 	<ul style="list-style-type: none"> ▪ Atomic structure ▪ Conservation of energy and dissipation 	<ul style="list-style-type: none"> ▪ Conservation of energy and dissipation ▪ Cell division ▪ The periodic table ▪ Energy transfer and energy resources 	<ul style="list-style-type: none"> ▪ The human digestive system

GCSE Combined Science

Year 10	<ul style="list-style-type: none"> ▪ Cell division ▪ The periodic table ▪ Energy transfer and energy resources ▪ Organisation 	<ul style="list-style-type: none"> ▪ Bonding structure and the properties of matter ▪ Electricity 	<ul style="list-style-type: none"> ▪ Electricity ▪ Infection and response ▪ Quantitative chemistry ▪ Particle model of matter 	<ul style="list-style-type: none"> ▪ Particle model of matter ▪ Chemical changes 	<ul style="list-style-type: none"> ▪ Chemical changes ▪ Atomic structure 	<ul style="list-style-type: none"> ▪ Atomic structure ▪ Ecology ▪ Energy changes 	
Year 11	<ul style="list-style-type: none"> ▪ Rate and extent of chemical change ▪ Forces ▪ Homeostasis and response 	<ul style="list-style-type: none"> ▪ Homeostasis and response ▪ Organic chemistry 	<ul style="list-style-type: none"> ▪ Chemistry of the atmosphere ▪ Waves ▪ Inheritance, variation and evolution 	<ul style="list-style-type: none"> ▪ Inheritance, variation and evolution ▪ Chemical analysis ▪ Using resources ▪ Magnetism and electromagnetism 	<ul style="list-style-type: none"> ▪ Revision ▪ Exams 	<ul style="list-style-type: none"> ▪ Exams 	

Assessment Approach

Within our curriculum, we look at a variety of methods to assess our students. Below is the assessment plan which gives an overview of our assessment approaches with each year group.

Assessment Approach	Description	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Extended response style questions	Structure and support is provided in lower years and gradually removed over the science course as students become more accomplished in this style question. Students reflect and improve upon their answer.							
Graphical questions	Students could be asked to plot/draw or read information from a graph. Students reflect and improve incorrect questions.							
Individual exam questions	Specific exam questions used in class to assess exam technique - students reflect and improve incorrect questions.							
Investigation Write Up	A complete plan and analysis of an investigation. Different levels of structure and support are provided to help students show success in this form of assessment. Students reflect and improve weaker areas of the plan/analysis.							
Kerboodle	Online assessment tool providing students and staff with instant feedback of areas of weakness which is then fed into future teaching/planning							
Lesson Review	Reflection on graded lesson outcomes (based on objective slide)							
Low Stakes Quizzing	Short answer questions from current or previous topics which is peer marked							
Maths questions	Students could be asked to correctly identify equations from an equation sheet or complete maths calculations across all 3 science disciplines. Students reflect and improve incorrect questions.							
Past Paper Question Booklet	In house built test papers using GCE and GCSE past exam questions (using exampro or equivalent). Style and level of demand of the questions to mirror a real exam paper. All papers are between 45-50 minutes/marks in length. Students reflect and improve incorrect questions.							
Past Papers	Exam Board papers used in previous years GCE and GCSE exams - students reflect and improve incorrect questions							
Practical Skills Assessment	Individual skills such as, risk assessments, drawing tables, choosing suitable equipment, identifying variables, writing a method, etc. Students reflect and improve incorrect questions.							

Cross Curricular links

Within our Science curriculum, we offer a variety of opportunities for cross curricular links, that benefits students at all levels. Our cross curricular links are as follows;

- Literacy - Students write extended answers around all three science disciplines with emphasis on the quality of their explanations using key scientific terminology.
- Numeracy – Students use their numeracy skills constantly throughout all three science disciplines from producing and interpreting graphs to displaying answers in standard form or to a specific number of significant figures to choosing, rearranging and applying scientific equations.
- SMSC – Throughout all key stages, students are exposed to many social, moral, spiritual and cultural scenarios within Science, from debates around the use of renewable energy sources versus non-renewable to evaluating the use of stem cell technology in modern society.

Preparing for Life

At SNA, our Science curriculum supports and further develops the following skills within students to prepare them for life beyond school and the world of work. These include:

- **Team work** – Collaboration is key within Science and is something that is frequently used within lessons from class activities involving group work to completion of practical investigations in pairs. These group tasks allow students to effectively build their communication skills as well as discover their main strengths and weaknesses when working in a group.
- **Staying positive** – The three separate science disciplines and the investigative approach used by the department to teach the subject, challenges students and means that they will get frustrated as they go on their science journey. However, we emphasise being positive and resilient, modelling ways for the students to persevere, succeed and achieve.

Extra-Curricular

At KS3, KS4, and KS5, we offer students the chance to take part in STEM club. These opportunities allow students to expand their investigative skills whilst also having fun with their peers.

As a department we take opportunities, when they are available, for groups of students to take part in external enrichment activities. For example, we have previously accessed the following activities/opportunities:

- Salter's Festival of Chemistry
- Ada Lovelace girls in STEM day
- A Level Science Live day
- A Level Chemistry students go and experience a university lab
- Local businesses come into school to look at how the science curriculum fits into their career pathway