

SCIENCE

Intent

Science provides students with knowledge about, and a secure understanding of, life and the world around them. Through the separate disciplines of Biology, Chemistry and Physics, they discover how science has, and continues to, shape the world in which we live. Students are taught to predict, analyse, explain and evaluate, as well as key mathematical and practical techniques, enabling them to take responsibility for the world of tomorrow.

Careers

Studying D&T develops creativity, problem solving, planning, communication and evaluation skills. Skills which are vital in many careers. However, popular career paths for D&T students include fashion, engineering, architecture, information technology, careers in hospitality and catering and construction.

Strands

There are two strands that spiral throughout the Science curriculum:

Knowledge: Throughout the Science curriculum, students are required to demonstrate an understanding of key scientific concepts. This knowledge is spiralled throughout each year group to ensure that it is consistently recapped and consolidated. Our key knowledge strands for each specialism are below:

Biology	Chemistry	Physics
Cells and Microscopes Genes and DNA Health Body Systems Bioenergetics Ecology Transport	Chemical Changes Energy and Reactions Periodic Table Analysis Earth as a Resource Rates and Equilibrium Nature of Matter	Energy Electricity Particle Model Atomic Structure Forces Waves Magnetism Space

Skill: Throughout the Science curriculum, students will be required to demonstrate that they are proficient in both scientific and mathematical skills. These skills are interleaved through the teaching of knowledge and our key scientific concepts. Our skills strands are essential in the development of competent scientists.

Scientific Skills	Mathematical Skills
<ul style="list-style-type: none">• Development of Scientific Thinking• Experimental Skills and Strategies• Analysis and Evaluation• Scientific Vocabulary, Quantities, Symbols and Nomenclature	<ul style="list-style-type: none">• Arithmetic and Numerical Computation• Handling Data• Algebra• Graphs• Geometry and Trigonometry

Assessment in Science and Feedback in Science

Every 6-8 lessons all year groups are assessed formatively. At KS3 and KS4 students complete 'progress checks' that assess the 2 strands of our curriculum. All students also complete summative assessments throughout the year, timetabled near to whole school data collections in order to provide a most up-to-date picture of student attainment.

Following formative and summative assessments, students complete a Feedback and Response lesson which focuses on the errors made by students in each strand. The format of these feedback lessons leads students through the following metacognitive cycle:

- Students review their assessed piece of work, identifying their own personal areas of strength and development
- Create a personal goal to improve their ability to demonstrate the strand being assessed
- Demonstrate progress with respect to a reflection question that assesses the same strand

5 Year Curriculum Overview

Year	Biology	Chemistry	Physics
7	<ol style="list-style-type: none"> 1. Fundamentals of Biology 2. Passing on Genes 	<ol style="list-style-type: none"> 1. Fundamentals of Chemistry 2. Introduction to Chemical Reactions Reactivity 	<ol style="list-style-type: none"> 1. Fundamentals of Physics 2. Forces Electricity and Magnetism
8	<ol style="list-style-type: none"> 1. Health and Diet 2. Body Systems 3. Bioenergetics 	<ol style="list-style-type: none"> 1. Acids and Alkalis 2. Energetics Earth and Its Resources 	<ol style="list-style-type: none"> 1. Space Waves
9	<ol style="list-style-type: none"> 1. Ecology and Evolution (current Y9 studied inheritance, chromosomes, and genes) 2. Cell Structure and Function 3. Transport in Cells 4. Human Systems 	<ol style="list-style-type: none"> 1. Reactions 2. Atomic Structure and the Periodic Table Bonding and Structure 	<ol style="list-style-type: none"> 1. Matter (current Y9 studied light waves) 2. Maths in Physics (current Y9 studied space physics) 3. Energy and Electrical Energy Transferring Energy Through Waves
10	<ol style="list-style-type: none"> 1. Respiration and Metabolism 2. Plant Systems 3. Disease 4. Defence Against Disease 5. Coordination and Control 	<ol style="list-style-type: none"> 1. Chemical Changes 2. Energy Changes 3. Extraction of Metals and Electrolysis 4. Quantitative Chemistry Rates of Reaction 	<ol style="list-style-type: none"> 1. Forces and Energy 2. Forces and Elasticity 3. Particles and Energy 4. Energy in Changes of State and Changes of Temperature 5. Resistors and Components in Electrical Circuits Behaviour of EM Waves
11	<ol style="list-style-type: none"> 1. Inheritance 2. Evolution 3. Ecology 	<ol style="list-style-type: none"> 1. The Earth as a Resource Equilibrium and Le Chatelier's Principle 	<ol style="list-style-type: none"> 1. Radioactive Decay 2. Forces and Motion 3. Describing Motion 4. Forces, Stopping and Momentum 5. Electromagnetism and Motor Effect Space Physics (Separates Only)

In The Library

The Horizon Library holds a wide range of fiction and non-fiction books that support our Science curriculum. Students can ask either Mrs Wakefield or Miss Dickinson to help them find any of these books.

Reading Suggestions for Science

- Science Tales, Lies, Hoaxes and Scams (Daryl Cunningham)
- Spilling the Beans on Charles Darwin (Dennis Hamley)
- Why is Snot Green? And Other Extremely Important Questions (and Answers) from the Science Museum (Glenn Murphy)
- Spilling the Beans on Albert Einstein (Dennis Hamley)
- Stuff that Scares your Pants Off (Glenn Murphy)

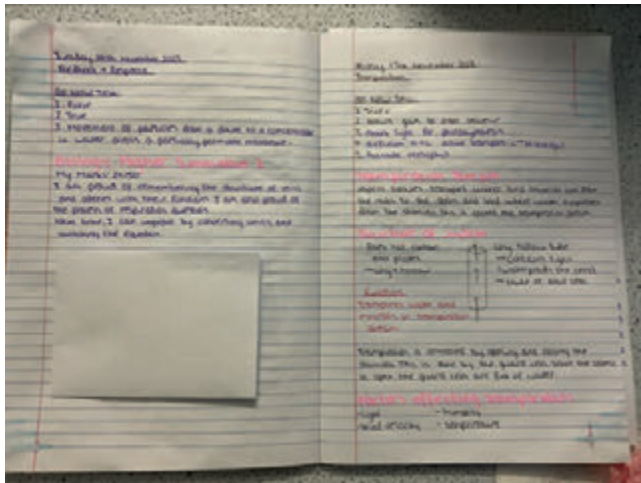
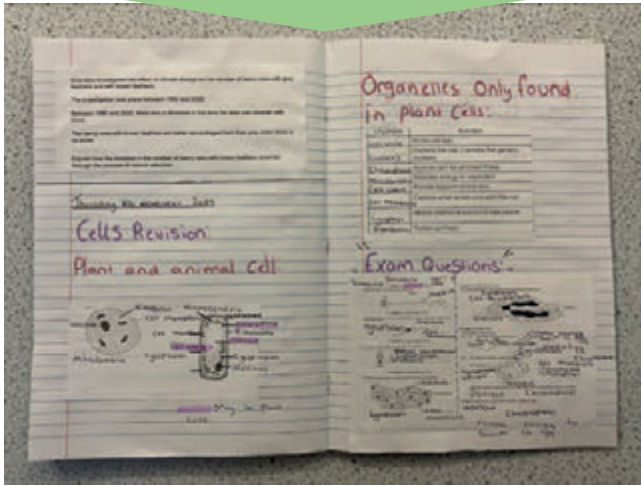
Home Learning - Seneca

In Science, we use the online learning platform Seneca for all our home learning quizzes. In KS3 (Y7-Y9), students are set one Seneca quiz per week, and in KS4 (Y10-Y11) students are set 3 quizzes per week (one Biology, one Chemistry and one Physics). All quizzes open at 8.30am on Monday and then close at 8.30am the following Monday. Students are expected to complete at least 20 minutes of their Seneca online learning per quiz.

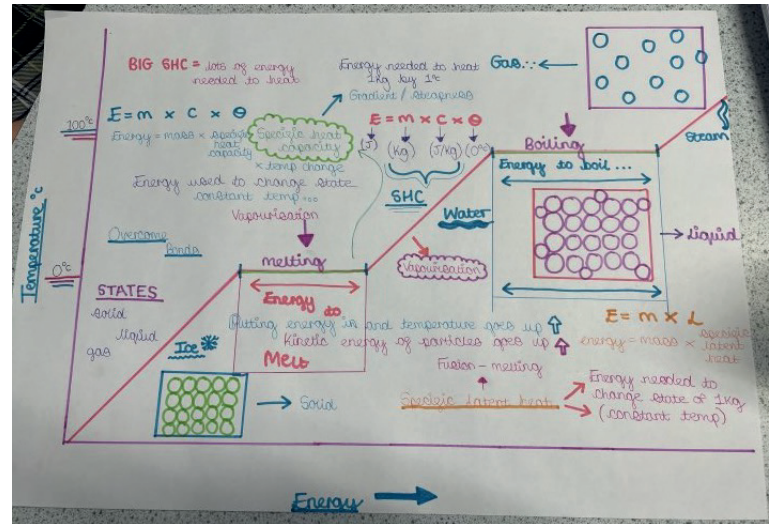
To access Seneca, students simply navigate to the Seneca website and then log in using their normal school Microsoft log on. If they have any problems accessing their quizzes, they should speak to their class teacher in the first instance.

Student Work

Y11 Biology Revision



Y11 Chemistry Intervention Revision Work



Y11 Physics Intervention Revision Work

bonding

group 7

	Charge	relative mass
proton	+1	1
electron	-1	very small
neutron	0	1

7e on outer shell
needs 1e, shares 1e.

IONIC BONDING
metal + non metal.
lose electrons and become + charged.
gain electrons and become - charged.
electrons = transferred.
opposite charges are attracted by strong electrostatic forces.

METALS *

NON *

HIGH MELTING POINT → lots of energy needed to break strong electrostatic forces.

ONLY CONDUCTS ELECTRICITY WHEN LIQUID OR SOLUTION!

METALLIC BONDING
METALS ONLY.
+ metal ions surrounded by delocalised electrons.
held together by strong electrostatic forces.
ions tightly packed, in rows.
CONDUCT ELECTRICITY = delocalised electrons.

HIGH MP.

= layers are disordered. **ALLOYS**
= prevented from sliding over each other.
= harder to shape.
mixture of 2 metals or more different sized atoms.