



Intent



Science Intent

To provide the foundations for understanding the world around us, while developing a sense of natural curiosity and wonder.



Intent



Science

Aims of the Science Curriculum

The national curriculum for science aims to ensure that all pupils:

Biology:

- To encourage independent learners, listeners and thinkers
- To provide enjoyable courses, that will stimulate interest and enthusiasm in the subjects
- To develop scientific knowledge and conceptual understanding
- To develop and learn to apply observational, practical, modelling, enquiry and problem-solving skills in the laboratory and in the field a
- To develop students' ability to evaluate claims based on science through critical analysis of the methodology, evidence and conclusions, both qualitatively and quantitatively.



Science

Aims of the Science Curriculum

The national curriculum for science aims to ensure that all pupils:

Chemistry:

- To encourage independent learners, listeners and thinkers
- To provide enjoyable courses, that will stimulate interest and enthusiasm in the subjects
- To develop scientific knowledge and understanding
- To use models and theories to make sense of observed natural phenomena
- To understand that science progresses through a cycle of hypothesis, observation, analysis and evaluation
- To understand how physical and chemical properties of substances can be explained by their structure at the level of atoms, ions or molecules



Science

Aims of the Science Curriculum

The national curriculum for science aims to ensure that all pupils:

Physics:

- To encourage independent learners, listeners and thinkers
- To provide enjoyable courses, that will stimulate interest and enthusiasm in the subjects
- To develop scientific knowledge and understanding
- To use models and theories to make sense of observed natural phenomena
- To understand that science progresses through a cycle of hypothesis, observation, analysis and evaluation
- To understand that physical laws are expressed in mathematical form and to develop problem solving skills



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What is science?

Science is the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence.



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Why is studying science important?

Perhaps now, more than ever, is a time when science's importance in our everyday lives is unquestionable. With the onslaught on humankind brought about by the Coronavirus, Covid-19; science has become part of our day to day lives, be this through the concept of a vaccine, antibodies, the structure of a virus, or just the abundance of people in white coats on our TV screens! Science is everywhere, everything, and everybody.

Through studying science, students are able to develop enquiring minds, asking questions, making predictions, and planning ways to find out, being just some of the skills honed through the study of science.

Science allows us to find answers to the 'big questions', as well as the small ones. It recognises that mistakes may be made, but this can be part of the learning process towards making a discovery.

A scientific mind is also a creative one, as ideas are 'hatched', sometimes from nothing, and the seemingly impossible is made possible. Where would the human race be now without science and scientific thinkers?



Intent



Science

KS3 National Curriculum

- Students will build on skills that they have learnt in Years 8 and 9
- Students will be encouraged to be inspired, motivated and challenged by the key ideas in science such as the concept of cause and effect, the phenomena of action at a distance and the drivers of change
- Students and teachers will use models to develop understanding of the key ideas
- Students will perform regular practical activities to develop their experimental skills to include using a prediction to plan an experiment, manipulate apparatus, make and record observations, present data appropriately with guidance and evaluate



Intent



Science

KS3 National Curriculum

Subject content

Biology

Cells and microscopy

Enzymes

Movement through membranes

Cell division and growth

The nervous system



Intent



Science

KS3 National Curriculum

Subject content

Chemistry

States of Matter

Separation techniques

Atomic Structure

Periodic Table



Intent



Science

KS3 National Curriculum

Subject content

Physics

Waves and the Electromagnetic Spectrum

Space



Intent



Science

Literacy and Numeracy

Scientific keywords are introduced as part of a 'checklist' for each topic. Keyword lists and definitions have been created, and key words are often highlighted or picked up within learning objectives and marking of work. Activities involving various writing styles, such as poetry, newspaper articles, instructional writing and non-chronological reports, are included in topics.

Numeracy skills, including calculating mean/ averages, rounding, graphing, scale reading, using formulae and measuring using S.I. units, are included throughout scientific investigation work in all topics.



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British Values

Students will explore different attitudes towards topical issues such as climate change, genetics, energy sources etc. and the positive and negative impact of the British Empire, including relationships with other nations. Students will be given opportunities to discuss and form opinions on contentious topical issues and relate these to scientific ideas.



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Retrieval Practice

- Topic checklists used to consolidate learning throughout topics.
- Questioning of pupils based around previous work covered.
- Quizzes.
- Class discussion of ideas.
- Homework tasks linked to pupils' learning in topics.
- End of unit tests to assess knowledge and understanding of each topic.



Science

Progress

- In Y10 each student has 2 lessons per subject and the majority of classes are taught by subject specialists.
- Each subject has a routeplanner providing the sequence of lessons to be taught before end of year exams.
- Each topic has a revision lesson, test and self-evaluation lesson. Students then have an opportunity to revise all Y9 and Y10 content for the mocks.
- Interleaving of content is achieved through some starter activities testing knowledge from a previous unit.
- Some staff use online resources to set homework and for revision such as Seneca, Isaac Physics, ChemSheets and GCSEPod.
- At the end of each unit the students sit an end of unit test worth 25 marks which contains exam style questions which are marked by the teacher. Students then complete a self-evaluation and set themselves targets for the next unit.
- For each of the core practicals that will appear in their GCSEs, the students are set homework with exam style questions.
- Students have a mock exam at the end of Y10 and in January of Y11.

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Support

- Careful planning to ensure maximum inclusivity to meet all individual needs.
- Flexible-paced learning to accommodate slower learners who can complete their tasks at a more comfortable speed.
- Extension tasks available to challenge, stretch and accommodate quicker-paced learners.
- Group work and pair work tasks to enable peer-support.
- Digital support via audio and visual input.
- Progressive tasks, cloze-sheet activities and keywords.
- Verbal support, one-on-one and scaffolded tasks.
- Targeted questioning.
- Tasks with variable outcomes to enable students flexibility and freedom of individuality.
- Science groups are usually set from Y9 to 11.
- Some tasks/ activities differentiated to suit sets.
- TAs deployed in most needy groups to work with individuals.
- Seating plans to allow improved learning of pupils.
- Courses in each subject finish at different stages over the year and allow time for revision. Extra revision sessions are offered to selected students who have underperformed in their mock. Revision sessions are also offered in each subject at lunch time starting from March. During the exam season, students have revision classes before each of their papers.



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Cross Curricular Links

Year 7: Cells	Maths History	Scale - microscope magnification. Cell discovery (Robert Hooke) - homework?
Reproduction	PSHE DT/ Maths	Puberty, menstrual cycle. Design a seed carrying vehicle investigation, measure distances, averages, graphing.
Forces & Motion	Maths	Calculating speed (distance, time), rearranging the equation. Plotting distance, time graphs. Measuring extension of a spring (Hooke's Law), plotting a graph. Calculating pressure, moments.
Space	Maths	Calculating weight on planets. Using the light year.
Acids & Alkalis.	Maths	Calculating volumes of antacid to neutralise an acid, averages, graphing.
Energy	History Art Music Maths Geography	James Prescott Joule. Design a 'leaf factory' (photosynthesis). Photosynthesis song! Measuring temperature differences, graphing results. Calculating electricity bills. Fossil fuels and global warming.
Electricity	Maths	Reading scales on ammeters/ voltmeters. Calculating resistance?
Chemical Reactions	Maths	Balancing equations. Weighing chemicals (conservation of mass).



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Cross Curricular Links

Topic	Subject	Cross-curricular link
Year 8: Food & Digestion	PE Maths Art, English, Drama.	Balanced diet, healthy eating (exercise), consequences of unbalanced diet. Calculation of energy requirement in daily diet. Cartoon of journey through digestive system, storyboarding. Act out the journey using props.
Respiration	PE DT PSHE, English Maths	Aerobic/ anaerobic respiration related to sports. Cardiovascular system, heart and lungs. Investigation lung capacity/ breathing/ pulse rate. Making a working lung in a bottle. Look at impact of smoking, exercise, asthma on respiratory system (homework). Write up as report. Measuring, graphing lung capacity of class. Lines of best fit, averages.
Magnets & Electromagnets	Geography DT Maths	Comparing magnetic with geographic poles. Make a compass. Recording mass held by electromagnets, averages, plotting line graphs, lines of best fit.
Light & Sound	Maths DT Music Drama	Speed of sound v light comparison. Measuring angles of reflected rays. Making pinhole cameras (homework). Measuring frequency, amplitude. Colour of objects under different stage lighting.
Elements & Compounds	Maths Art/ DT History	Recording temperatures, graphing. Balancing equations. Drawing compounds etc, modelling with molymods. Dalton's atomic model.
Rocks	Geography Art/ DT History FoodTech	Earth's structure, types of weathering, acid rain, transportation of weathered rock material. Making plaster fossils, molecules in air. Evolution of Earth's atmosphere - timeline. Using chocolate to represent the rock cycle.



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Cross Curricular Links

Topic	Subject	Cross-Curricular Link
Year 9 science: States of matter, separating mixtures	Maths, art, english	Calculating retention factor, methodology of chromatography, modelling atoms, graph skills of melting/boiling points
Atomic and electronic structure, bonding	Maths, art, IT, history	Modelling atoms, ions, presentation video in bonding types, development of atomic models
Specialised cells, enzymes, food tests, cells in the human body, osmosis, diffusion	PE, art, maths, english	Keeping healthy, modelling cells, calculating cell size, conversion of units, Percentage mass change in osmotic cells, labelling cells
Mitosis, growth, nervous system, the brain	PE, child development	Human growth, development
Waves, wave speed, reflection and refraction, transmission and absorption	Maths, english	Calculations, written descriptions of key words
Electromagnetic spectrum	Maths	Calculating and conversion of units, standard form
Space	Maths, art, IT	Calculating g, weight, modelling life cycle of a star, research history/future of the Universe



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Cross Curricular Links

Topic	Subject	Cross-Curricular Link
Y10 Biology: Photosynthesis, root hair cells transpiration, rate	Maths	Inverse square law
Monohybrid inheritance, sex determination, DNA	Maths, Art, B&V	Probability, modelling double helix structure, Gender
Genetic engineering, natural selection	Geography, History, B&V	Ethics of gene manipulation, evolution theory of Galapagos
Health and correlations, cholera, smoking and alcohol, STIs, cardiovascular disease	PE, Food Tech, B&V	Keeping healthy, consequences of poor diet



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Cross Curricular Links

Topic	Subject	Cross-Curricular Link
Y10 Chemistry: Reactivity of metals with acids, bases, carbonates, solubility, pH and indicators	Maths, English	Conversion of concentration to pH using standard form, identifying trends in words for chemical reactions
Moles, empirical formulae, conservation of mass	Maths	Calculations involving mass changes, ratios, use of formulae
Transition metals, electrolysis, extraction of metals from ores, equilibria	English, IT, Physics	Explanations of methodology of electrolysis and equilibria, research into different methods of metal extraction
Group 1, 7 and 8, rates of reaction, energy changes in reactions	Maths	Calculating rates of reaction



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Cross Curricular Links

Topic	Subject	Cross-Curricular Link
Y10 Physics: Conservation of Energy, Energy Resources	Maths, Geography	Rearranging equations, Renewable and Non-Renewable energy resources
Radioactivity, Background radiation, Medical Uses, Dangers, Nuclear Power	Maths, Geography, Biology	Probability, Advantages and disadvantages of nuclear energy, Radiotherapy
Forces and motion, distance time graphs, velocity time graphs, Newton's Laws	Maths, Life Skills	Rearranging equations, Graphs of motion, Driving theory test and stopping distance
Work, power, vectors, forces, moments and gears	Maths, PE	Rearranging equations, human power, Levers

Intent





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Cross Curricular Links

Topic	Subject	Cross-Curricular Link
Y11 Biology: Food chains, ecosystems, water and carbon cycles	Geography, maths	Sampling, hydrological changes, rock cycle
Adrenaline, diabetes	PE, food tech	Keeping healthy
Blood, the heart, cardiac output	PE	Keeping healthy



Science

Cross Curricular Links

Topic	Subject	Cross-Curricular Link
Y11 Chemistry: Hydrocarbons, combustion, pollution, the atmosphere climate change	Geography, maths, RS, IT	Percentages of atmospheric composition, ethics/cause and effect of climate change, research mitigation of climate change
Percentage yield, atom economy, concentration, titrations, gas volumes	Maths	Calculations involving formulae use
Fuel and chemical cells	English	Explaining methodology, advantages/disadvantages of fuels
Testing for positive and negative ions, nanoparticles, materials	English, maths	Standard form use, written explanations of observations

Intent





Science

Cross Curricular Links

Topic	Subject	Cross-Curricular Link
Y11 Physics: Electricity, circuits, electrical resistance, electrical power, mains electricity	Maths, Geography, Chemistry, Life Skills	Rearranging equations, converting units, electric current, wiring a plug
Electrostatic electricity, uses and dangers	Biology, First Aid	Defibrillators and heart attacks
Magnetism, electromagnetism, motor effect, dynamo effect, transformers	Maths, Geography	Rearranging equations, converting units, National Grid
Particles, density, kinetic theory, specific heat capacity, latent heat, gas laws	Maths, Chemistry, Resistant Materials	Rearranging equations, converting units, states of matter, particle theory, properties of materials
Hooke's law, pressure, upthrust	Maths, History	Rearranging equations, converting units, Archimedes



Science

National Curriculum Coverage Map: KS3 (Year 7)

Intent



<p>Science</p>	<p><u>Cells</u></p> <ul style="list-style-type: none">- MRS GREN (The 7 life processes).- Plant & Animal Structure and Function.- Plant/animal cells: What's the difference?- Specialised cells- Using a microscope- Cells, tissues, organs (The order of things).- Onion/ cheek cell preparation- Unicellular organisms, bacteria, viruses, fungi.- How do things get in and out of a cell? (Diffusion). <p><u>Acids and Alkalis</u></p> <ul style="list-style-type: none">- Common acids.- Hazards and hazard symbols.- Indicators.- pH scale.- Neutralisation.- Investigating indigestion remedies. <p><u>Energy</u></p> <ul style="list-style-type: none">-Forms of energy-Plant energy and energy in living things-Fuels and energy resources.-Investigating energy in food.-Climate change and fossil fuels.-Comparing power ratings of appliances.	<p><u>Reproduction</u></p> <ul style="list-style-type: none">- Male and female reproductive systems- Reproductive stages (including fertilisation).- Comparing sperm and egg.- How do we get twins?- The menstrual cycle.- Pregnancy.- Birth.- The effect of maternal lifestyle on the foetus.- Puberty- Reproduction in plants. <p><u>Electricity</u></p> <ul style="list-style-type: none">- Circuit diagrams and electrical symbols.- Electrical current in series and parallel circuits.- Voltage.- Resistance: how a fuse works.- Static electricity. <p><u>Forces and Motion</u> (start)</p> <ul style="list-style-type: none">- What is a force? Force diagrams, balanced/unbalanced forces.- Using the Newtonmeter.	<p><u>Forces and Motion</u></p> <ul style="list-style-type: none">- Weight in water (upthrust.)- Upthrust in different liquids- Density- Stretching and squashing (Hooke's Law).- Mass and weight. What's the difference?- Friction.- Speed (distance, time graphs).- Pressure.- Moments (turning forces). <p><u>Chemical reactions</u></p> <ul style="list-style-type: none">- Comparing physical and chemical changes.-Chemical reactions in terms of atoms rearranging.-Diffusion).-The reaction of acids + metals/ carbonates.-Testing for gases (Hydrogen, Carbon dioxide, Oxygen)-Oxidation of metals.-Displacement reactions.-Represent chemical reactions using formulae and equations.-Products of burning (combustion). <p><u>Space – Solar System and beyond</u></p> <ul style="list-style-type: none">- Day, month, year (KS2 revision).- Phases of the moon- Gravity: Earth's compared to other planets.- Why do we get seasons?- Stars: Our Sun and others- Galaxies- The light year
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Science

National Curriculum Coverage Map: KS3 (Year 8)

Intent



<p>Science</p>	<p><u>Food and Digestion</u></p> <ul style="list-style-type: none"> - Food groups and their functions in the body. - Food tests: testing for sugars, starch, fat and protein. - Balanced diet: consequences of imbalances in the diet. - Energy requirements in a healthy diet. - Digestion: what happens to food when we eat it? - The importance of bacteria in the digestive system. - Enzymes: what do they do? Investigate the action of amylase on starch. <p><u>Elements and Compounds</u></p> <ul style="list-style-type: none"> - Properties of solids, liquids and gases using the particle model. - Changes of state in terms of the particle model. - How do materials change when heated or cooled? Heat transfer, conduction etc. - Periodic Table. - Atoms/ Elements/ Compounds define with examples.(Chemical reactions of compounds). - Chemical symbols, formulae and equations. - Is it a pure substance? How can we tell? (Investigate the melting/ boiling point of compound and mixture). - Separating mixtures: what is a mixture? - Investigate diffusion of a chemical (if time) 	<p><u>Light and Sound</u></p> <ul style="list-style-type: none"> - The speed of light v speed of sound. - Properties of light. - The law of reflection. - The human eye. - Focusing using convex/concave mirrors and lenses - Refraction. - The light spectrum and colour. - The ear: how we hear. - Amplitude and frequency of sound. - Speed of sound in different mediums. <p><u>Respiration</u></p> <ul style="list-style-type: none"> - What is respiration? - burning sugar/ tin can bomb. - Respiratory system/ lung model. - Investigate lung capacity. - Breathing and gas exchange. - The impact of exercise, asthma and smoking on gas exchange. - The skeletal and muscular systems. - The heart. - Heart and lung dissection. 	<p><u>Magnets and Electromagnets</u></p> <ul style="list-style-type: none"> - Magnetism basics. - What does magnetism work though? - Earth's magnetic field, compasses and navigation. Making a magnet/ compass. - Magnetic fields: plotting them using a compass. - Investigate electromagnets by making and testing one. <p><u>Rocks</u></p> <ul style="list-style-type: none"> - The composition and structure of the Earth. - Rock classification. - Types of weathering of rocks. - The Rock Cycle. - Igneous rocks: growing crystals and investigating the size of crystals. - Sedimentary rocks: Fossils and making one using plaster. - The Earth's atmosphere/the Carbon Cycle
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Intent



Science Route Plans

Y9 Science

Week	Subject		
	Chemistry	Physics	Biology
1	Introduction to Science Topic 2 States of Matter (2)	P1 Key Concepts in Physics Units (2)	B1 Key concepts in biology Cells (2)
2	Separating and Purifying (4)	P4 Waves Introduction to waves (1) Wave speed (3) Including core practical	Microscopes (4) [inc. core practical]
3	Separating and Purifying (4)	Wave speed (2) Including core practical Ultrasound (2)	Specialised Cells (2) Enzymes (2)
4	Topic 1 Atomic Structure (4)	Reflection and Refraction (2) Core Practical on refraction (2)	Enzymes (4) [incl. core practical]
5	Atomic Structure (2) Periodic Table (2)	Transmission, Absorption and TIR (2) Revision and quick test (2)	Food tests (4) [incl. core practical]
6	Periodic Table (2) Ionic Bonding (2)	P5 EM Waves Introduction, uses and dangers (3) Absorption, reflection and transmission (1)	Transport in/ out of cells (2) Osmosis (2) [core practical]
7	Ionic Bonding (2) Covalent Bonding (2)	Absorption, reflection and transmission (3) Including core practical Generating EM Waves (1)	Topic 2 Cell division (2) Growth in Animals (2)



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Science Route Plans

Y9 Science

8	Types of Substance (4)	P7 Astronomy Origins of the Universe (1) Lifecycle of a Star (1) The Solar System (1) Orbits and how the moon was formed (1/2)	Growth in Plants (3) Stem Cells (1)
9	Types of Substance (4)	Observing the Universe (1) Black Holes (1) Weight and the value of g (1)	Stem Cells (1) The Brain (2) Brain and Spinal Cord Problems (1)
10	Catch up and Revision (4)	Asteroid Impacts (1) Project - Assessing the Damage from Asteroid Impacts (2/3)	The nervous system (4)
11	Revision (2) Assessment (2)	Revision and assessment (4)	The eye (2) Revision and assessment (2)



Science Route Plans

Y10 Biology

Intent



Week	Week beg.	Important Dates	Y10 Combined Science			Y10 Separate BIOLOGY		
			Unit	Lesson	Specification Item	Unit	Lesson	Specification Item
1	31.08.20	PD Days 01.09.20 and 02.09.20	CB6 Plant Structures and functions	Introduction lesson Establishing class routines		SB6 Plant Structures and functions	Introduction lesson Establishing class routines	
2	07.09.20			Photosynthesis intro	6.1		Photosynthesis and leaf structure	6.1 6.2
				Photosynthesis and leaf structure	6.2		Limiting factors	6.3 6.4
3	14.09.20			Limiting factors	6.3 6.4		Core practical - Light intensity	6.5 6.6
				Core practical - Light intensity	6.5 6.6		Root hair cells	6.7
4	21.09.20			Root hair cells	6.7		Xylem and Phloem	6.8 6.10
				Xylem and Phloem	6.8 6.10		Transpiration and Stomata (Practical looking at stomata under the microscope)	6.9
5	28.09.20	Open Evening 01.10.20		Stomata (Practical looking at stomata under the microscope)	6.9		Factors affecting transpiration + rate calcs (potometer practical/demo)	6.12 6.13
				Factors affecting transpiration	6.12		<i>Plant adaptations</i>	<i>6.11B 6.14B</i>
6	05.10.20			Rate calculations (potometer practical)	6.13		<i>Plant hormones</i>	<i>6.15B</i>
				CB6 Revision			<i>Uses of plant hormones</i>	<i>6.16B</i>
7	12.10.20	PD Day 23.10.20		CB6 Revision			SB6 Revision	
				Test			Test	



Intent



Science Route Plans

Y10 Biology

8	26.10.20	2nd Half of Autumn Term	CB3 Genetics	Recap of gametes, fertilisation and chromosomes from SB2		SB3 Genetics	<i>Sexual and asexual reproduction</i>	<i>3.1B 3.2B</i>
				Recap of mitosis from SB2			<i>Sexual and asexual reproduction 2</i>	<i>3.1B 3.2B</i>
9	02.11.20			Meiosis	3.3		Recap of chromosomes and mitosis from SB2	
				DNA structure	3.4 3.5		Meiosis	3.3
10	09.11.20			DNA extraction practical	3.6		DNA structure	3.4 3.5
				DNA and genomes	3.5		DNA extraction practical	3.6
11	16.11.20			Alleles	3.12 3.13		<i>Genetic Code and intro to protein synthesis</i>	<i>3.7B 3.8B</i>
				Monohybrid inheritance	3.14 3.16		<i>Protein synthesis</i>	<i>3.8B 3.9B 3.10B</i>
12	23.11.20			Sex determination	3.15		<i>Mendel and alleles</i>	<i>3.11B 3.12</i>
				Variation	3.19 3.20		Monohybrid inheritance	3.13 3.14 3.16
13	30.11.20			Mutations	3.22 3.23		Sex determination <i>and sex-linkage</i>	3.15 <i>3.18B</i>
				Human genome project	3.21		<i>ABO blood groups</i>	<i>3.17B</i>
14	07.12.20			CB3 Revision			Variation	3.19 3.20
				CB3 Revision			Human Genome project	3.21
15	14.12.20	Term ends 18.12.20	CB3 Test		Mutations	3.22 3.33		



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Science Route Plans

Y10 Biology

17	11.01.21		CB4 Natural selection and genetic modification	Darwin and Natural selection	4.2	Natural selection and genetic modification	SB3 Test	
				Natural selection and antibiotic resistance	4.2 4.3		Darwin, Wallace and Natural selection	4.1 4.2
18	18.01.21			Fossil evidence for human evolution	4.4		Natural selection and antibiotic resistance	4.2 4.3
				Stone tools and human evolution	4.5		Evidence for human evolution + <i>pentadactyl limb</i>	4.4 4.5 4.6
19	25.01.21			Classification	4.7		Fossil evidence for human evolution	4.4
				Selective breeding	4.8		Classification	4.7
20	01.02.21			Selective breeding	4.8		<i>Tissue culture</i>	4.9B
				Genetic engineering	4.10		Selective breeding	4.8
21	08.02.21	PD Day 12.02.21		Genetic engineering	4.11		Genetic engineering	4.10
				Evaluating risks of GE and SB	4.14		Genetic engineering	4.11 4.12B
22	22.02.21	2nd Half of Spring Term	CB4 Revision		<i>Fertilisers and biological control</i>	4.13B		
			CB4 Revision		Evaluating risks of GE and SB	4.14		



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Science Route Plans

Y10 Biology

24	08.03.21		CB5 Health and disease	Intro to health and correlations	5.1 5.2 5.3		Intro to health and correlations	5.1 5.2 5.3
				Pathogens - cholera and TB	5.4 5.5 5.6		Pathogens	5.4 5.5 5.6 5.8
25	15.03.21			Pathogens- chalaria ash dieback and malaria	5.4 5.5 5.6		Pathogens	5.4 5.5 5.6 5.8
				Pathogens - stomach ulcers and ebola	5.4 5.5 5.6		<i>Lifecycle of a virus</i>	<i>5.7B</i>
26	22.03.21	Term ends 26.03.21		STIs - HIV and chlamydia	5.8		<i>Plant defences</i>	<i>5.9B 5.10B 5.11B</i>
				Physical and chemical barriers	5.12		Physical and chemical barriers	5.12
27	12.04.21	PD Day 12.04.21 Term Starts 13.04.21		Specific immune response	5.13		Specific immune response	5.13
				Immunisation	5.14		Immunisation	5.14 <i>5.15B</i>
28	19.04.21			Antibiotics	5.16		<i>Aseptic techniques and core practical</i>	<i>5.17B 5.18B 5.19B</i>
				Development of new medicines	5.20		<i>Aseptic techniques and core practical</i>	<i>5.17B 5.18B 5.19B</i>
29	26.04.21			Obesity, malnutrition and BMI	5.23 5.24		Antibiotics and development of new medicines	5.16 5.20
				Alcohol and liver disease	5.23 5.24		<i>Monoclonal antibodies</i>	<i>5.21B</i>
30	03.05.21	Bank Holiday 03.05.21		Cardiovascular disease and smoking	5.23 5.24		Obesity, malnutrition and BMI	5.23 5.24
				Treatments for CVD	5.25		Alcohol and liver disease	5.23 5.24
31	10.05.21		Cb5 Revision			Cardiovascular disease and smoking	5.23 5.24 5.25	



Intent



Science Route Plans

Y10 Biology

36	21.06.21		7 – Animal coordination, control and homeostasis	Intro to hormones	7.1	7 – Animal coordination, control and homeostasis	Intro to hormones	7.1
37	28.06.21			Insulin and blood glucose concentration	7.13 7.14		Insulin and blood glucose concentration	7.13 7.14
38	05.07.21			Type 1 diabetes	7.15		Type 1 diabetes	7.15
				Type 2 diabetes	7.16 7.17		Type 2 diabetes	7.16 7.17
39	12.07.21			Adrenaline	7.2		Adrenaline	7.2
				Thyroxine	7.3		Thyroxine	7.3



Science Route Plans

Y11 Biology

Intent



Week	Week beg.	Important Dates	Y11 Combined Science			Y11 Biology		
			Unit	Lesson	Specification Item	Unit	Lesson	Specification Item
1	31.08.20	PD Days 01.09.20 and 02.09.20	CB9 Ecosystems and material cycles	Intro to ecosystems: Key terms	9.1		Intro to ecosystems, food chains and food webs	9,1
2	07.09.20			Food chains and food webs	9.3		<i>Energy transfer in food chains</i>	<i>9.7B 9.8B</i>
				Abiotic factors	9,2		Abiotic factors	9,2
3	14.09.20			Core practical - Quadrats and transects	9.5 9.6		Core practical - Quadrats and transects	9.5 9.6
				Core practical - Quadrats and transects	9.5 9.6		Core practical - Quadrats and transects	9.5 9.6
4	21.09.20			Biotic factors - competition and predation	9.2		Biotic factors - competition and predation	9.2
				Interdependence Parasitism and mutualism	9.4		Interdependence Parasitism and mutualism	9.4
5	28.09.20	Open Evening 01.10.20		Biodiversity and humans - fish farming and non-indigenous species	9.9		Biodiversity and humans - fish farming and non-indigenous species	9.9
				Biodiversity and humans - eutrophication	9.9		Preserving biodiversity	9.10
6	05.10.20			Preserving biodiversity	9.10		<i>Food security</i>	<i>9.11B</i>
				Carbon cycle	9.12 9.13		Carbon cycle	9.12 9.13
7	12.10.20	PD Day 23.10.20		Water cycle	9.12 9.14		Water cycle	9.12 9.14
				Nitrogen cycle	9.12 9.15		Nitrogen cycle	9.12 9.15
8	26.10.20	2nd Half of Autumn Term		CB9 Revision			<i>Indicator species</i>	<i>9.16B</i>
				CB9 Revision			<i>Decomposition</i>	<i>9.17B 9.18B 9.19B</i>
9	02.11.20			CB9 Test			SB9 Revision	



Intent



Science Route Plans

Y11 Biology

19	25.01.21		CB8 Exchange and transport in animals	Efficient transport and exchange surfaces	8.1 8.2	SB8 Exchange and transport in animals	Efficient transport and exchange surfaces	8.1 8.2
				Alveoli	8.3		Alveoli	8.3
20	01.02.21			Blood	8.6		<i>Ficks law</i>	<i>8.4B 8.5B</i>
				Blood vessels	8.7		Blood	8.6
21	08.02.21	PD Day 12.02.21		The heart	8.8		Blood vessels	8.7
				The heart (dissection demo)	8.8		The heart	8.8
22	22.02.21	2nd Half of Spring Term		Cellular respiration	8.9 8.10		The heart (dissection demo)	8.8
				Core practical (Respiration rates)	8.11		Cellular respiration	8.9 8.10
23	01.03.21			Core practical (Respiration rates)	8.11		Core practical (Respiration rates)	8.11
				Summary and cardiac output	8.12		Core practical (Respiration rates)	8.11
24	08.03.21		CB8 Revision		Summary and cardiac output	8.12		



Science Route Plans

Y10 Chemistry

Intent



Week	Week beg.	Important Dates	Y10 Chemistry Foundation (Combined)			Y10 Chemistry Higher and Separate Science		
			Unit	Lesson	Specification Item	Unit	Lesson	Specification Item
1	31.08.20	PD Days 01.09.20 and 02.09.20	C8 Acids and Alkalis	Introduction and Lab Safety		C8 Acids and Alkalis	Introduction and Lab Safety	
				C8a Acids, alkalis and indicators	C0.5, C3.1, C3.2, C3.3		C8a Acids, alkalis and indicators	C0.5, C3.1, C3.2, C3.3, C3.4
2	07.09.20			C8c Bases and Salts	C3.9, C3.11, C3.13, C3.15		C8b looking at acids; concentration	C3.4, C3.5, C3.7,
				C8c Core Prac, Preparing copper sulfate	C3.17		C8b looking at acids; strong and weak	C3.8
3	14.09.20			C8c Core Prac, Preparing copper sulfate	C3.17		C8c Bases and Salts	C3.9, C3.11, C3.13, C3.15
				C8d Alkalis and equations	C0.1, C0.2, C0.3, C3.10, C3.11		C8c Core Prac, Preparing copper sulfate	C3.17
4	21.09.20			C8d Balancing Equations	C0.1, C0.2, C0.3, C3.11		C8d Alkalis and equations	C0.1, C0.2, C0.3, C3.10, C3.11
				C8d Core Prac, Investigating Neutralisation	C3.6		C8d Core Prac, Investigating Neutralisation	C3.6
5	28.09.20	Open Evening 01.10.20		C8d Core Prac, Investigating Neutralisation	C3.6		C8d Core Prac, Investigating Neutralisation	C3.6
				C8e Alkalis and Neutralisation	C3.11, C3.14, C3.16, C3.18		C8e Alkalis and Neutralisation	C3.11, C3.14, C3.16, C3.18
			C8f Reactions of acids with metals and carbonates	C3.11, C3.12	C8f Reactions of acids with metals and carbonates	C0.4, C3.11, C3.12		
6	05.10.20		C8g Solubility	C3.19, C3.20, C3.21	C8g Solubility	C0.4, C3.19, C3.20, C3.21		



Science Route Plans

Y10 Chemistry

Intent



8	26.10.20	2nd Half of Autumn Term	C9 Calculations	C9a Relative Formula Mass	C1.43, C1.44, C1	C9 Calculations	C9a Relative Formula Mass	C1.43, C1.44, C1
				C9a Empirical Formula	C1.45, C1.46		C9c Moles	C1.50, C1.51, C1.52, C1.53
9	02.11.20			C9b Conservation of Mass	C1.47, C1.48, C1.49		C9a Empirical Formula	C1.45, C1.46
			C10 Electrolysis	C10a Electrolysis	C3.22, C3.23, C3.24	C9 Calculations Practice	C9b Conservation of Mass	C1.47, C1.48, C1.49
10	09.11.20			C10a Electrolysis consolidation and keywords	C3.22, C3.23, C3.24			
				C10b Products from solution electrolysis	C3.25, C3.26, C3.20		C10a Electrolysis	C3.22, C3.23, C3.24, C3.27, C3.28, C3.29
				C10b Products from molten electrolysis	C3.25, C3.26, C3.20		C10b Products from solution electrolysis	C3.25, C3.26, C3.20
11	16.11.20			C10a Core Prac, Using copper electrodes	C3.31		C10b Products from molten electrolysis	C3.25, C3.26, C3.20
				C10a Core Prac, Using copper electrodes	C3.31	C10a Core Prac, Using copper electrodes	C3.31	
12	23.11.20			C10a Core Prac, Using graphite electrodes	C3.31	C10a Core Prac, Using copper electrodes	C3.31	
				C10a Core Prac, Using graphite electrodes	C3.31	C10a Core Prac, Using graphite electrodes	C3.31	
13	30.11.20							



Intent



Science Route Plans

Y10 Chemistry

13	30.11.20			Graphite Electrodes		Graphite Electrodes		
14	07.12.20		C11 Obtaining and using metals	C11a Reactivity	C4.1, C4.3	C11 Obtaining and using metals	C10 Electrolysis Consolidation	
				C11a Displacement reactions	C4.1, C4.3		C11a Reactivity	C4.1, C4.3, C4.2
				C11b Ores	C4.4, C4.7		C11b Ores	C4.4, C4.7, C4.8
				C11c Oxidation and Reduction	C4.5, C4.6, C4.9		C11c Oxidation and Reduction	C4.5, C4.6, C4.9, C4.2
15	14.12.20	Term ends 18.12.20		C11d Life cycle and recycling	C4.10, C4.11, C4.12		C11d Life cycle and recycling	C4.10, C4.11, C4.12
16	04.01.21	PD Day 04.01.21 Term Starts 05.01.21						
17	11.01.21		C12 Equilibria	C12a Dynamic Equilibrium	C4.13, C4.14	C12 Equilibria	C12a Dynamic Equilibrium	C4.13, C4.14, C4.17
				C12a The Haber Process	C4.15, C4.16		C12a The Haber Process	C4.15, C4.16, C4.17
18	18.01.21		C9-12	C9-12 Revision		Alloys and Corrosion	C13a Transition metals	C5.1C
				C9-12 Test			C13b Corrosion	C5.2C, C5.3C



Intent



Science Route Plans

Y10 Chemistry

19	25.01.21		C17 Groups	C17a Group 1	C6.1, C6.2, C6.3, C6.4	C13 Metals, A Corrosi	C13c Electroplating	C5.4C	
				C17a Explaining Reactivity	C6.4, C6.5			C13d Alloying	C5.5C, C5.6C
20	01.02.21				C17b Group 7	C6.6, C6.7, C6.8,	C9-13	C9-13 Revision	
					C17b Halogen reactions	C6.9, C6.10			C9-13 Test
21	08.02.21	PD Day 12.02.21			C17c Halogen reactivity	C6.11, C6.13	C17 Groups	C17a Group 1	C6.1, C6.2, C6.3, C6.4, C6.5
					C17c Halogen reactivity - consolidation	C6.11, C6.13			C17a Explaining Reactivity
22	22.02.21	2nd Half of Spring Term		C17d Group 0	C6.14, C6.15, C6.16			C17b Group 7	C6.6, C6.7, C6.8, C6.9, C6.10
				C18a Rates of Reaction	C7.2, C7.5			C17c Halogen reactivity	C6.11, C6.13, C0.4, C6.12
23	01.03.21			C18b Collision Theory	C7.3, C7.4		C17d Group 0	C6.14, C6.15, C6.16	



Intent



Science Route Plans

Y10 Chemistry

23	01.03.21		C18 Rates	C18b Core prac, gas volume	C7.1	C18 Rates	C18a Rates of Reaction	C7.2, C7.5
24	08.03.21			C18b Core prac, gas volume	C7.1		C18b Collision Theory	C7.3, C7.4
25	15.03.21			C18b Core prac, colour change	C7.1		C18b Core prac, gas volume	C7.1
				C18b Core prac, colour change	C7.1		C18b Core prac, colour change	C7.1
				C18c Catalysts	C7.6, C7.7, C7.8		C18b Core Prac Consolidation	C7.1
26	22.03.21	Term ends 26.03.21	C19 Energy Changes	C19a Endothermic and Exothermic Reactions	C7.9, C7.10, C7.11	C19 Energy Changes	C18c Catalysts	C7.6, C7.7, C7.8
				C19b Energy and Bonds	C7.12, C7.13		C19a Endothermic and Exothermic Reactions	C7.9, C7.10, C7.11
27	12.04.21	PD Day 12.04.21 Term Starts 13.04.21		C19b Reaction Profiles	C7.15, C7.16		C19b Energy and Bonds	C7.12, C7.13, C7.15, C7.16, C7.14



Science Route Plans

Y11 Chemistry

Intent



Week	Week beg.	Important Dates	Y11 Combined			Y11 Separate Chemistry		
			Unit	Lesson	Specification Item	Unit	Lesson	Specification Item
1	31.08.20	PD Days 01.09.20 and 02.09.20	C20 Fuels	C20a Recap Crude oil	C8.1, C8.2, C8.15	C20 Fuels	C20e Pollution	C8.11, C8.12, C8.13
				C20b Recap Fractional Distillation	C8.3, C8.4, c8.5		C20f Cracking and alkenes	C8.16
2	07.09.20			C20c Recap Alkanes	C8.5, C8.6		C20f Fuels for cars	C8.14, C8.17
				C20d Complete Combustion	C8.7, C8.8	C21 Earth and Atmosphere	C21a The early atmosphere	C8.18, C8.19, C8.20
3	14.09.20			C20d Incomplete Combustion	C8.9, C8.10		C21b The changing atmosphere	C8.21, C8.22, C8.23
				C20e Pollution	C8.11, C8.12, C8.13		C21c The atmosphere today	C8.24, C8.25
4	21.09.20			C20f Cracking and alkenes	C8.16		C21d Climate change	C8.26
			C20f Fuels for cars	C8.14, C8.17	C20-21	C20-21 Test		
5	28.09.20	Open Evening 01.10.20	C21 Earth and Atmosphere	C21a The early atmosphere	C8.18, C8.19, C8.20	C22a alkanes and alkene	C22a alkanes and alkene	C9.10, C9.11, C9.12, C9.13
				C21b The changing atmosphere	C8.21, C8.22, C8.23		C22b Reactions of alkanes and alkenes	C9.14, C9.15, C9.16
6	05.10.20			C21c The atmosphere today	C8.24, C8.25		C23a ethanol production	C9.33, C9.34
				C21d Climate change	C8.26		C23b The alcohols	C9.26, C9.27, C9.32
7	12.10.20	PD Day 23.10.20		C21 Consolidation Activity			C23b Core Prac, Combustion of alcohols	C9.28



Intent



Science Route Plans

Y11 Chemistry

9	02.11.20		C20-Z1	C20-21 Revision		C22-4 Organic Chemistry	C23c Carboxylic acids	C9.29, C9.30, C9.31, C9.32
10	09.11.20			C20-21 Test			C24a Addition polymers	C9.17, C9.18, C9.25
11	16.11.20		Revision for Mocks (Paper 2)	Revision of C3/4			C24b Polymer uses	C9.19, C9.20, C9.21
				Revision of C5/6/7			C24c Condensation polymers	C9.22
Revision of C9		C24d Problems with polymers		C9.23, C9.24				
Revision of C17		C22-24 Test						
12	23.11.20			Revision of C18		C25-26 Qualitative and Materials	C25a Flame tests and photometry	C9.2, C9.7, C9.8, C9.9, C9.6
13	30.11.20			Revision of C19			C25b Tests for positive ions, inc. core prac	C9.1, C9.3, C9.4, C9.7, C9.6
			Revision of C20		C25c Tests for negative ions, inc core prac		C9.5, C9.7, C9.6	
14	07.12.20		Revision of C21		C26a/b choosing materials and composites		C9.38, C9.39	
			General revision		C26c nanoparticles		C9.35, C9.36, C9.37	
15	14.12.20	Term ends 18.12.20	General revision		C25-26 Test			
16	04.01.21	PD Day 04.01.21 Term Starts 05.01.21	General revision					



Intent



Science Route Plans

Y11 Chemistry

18	18.01.21		Revision for Mock - Paper 1	Revision of C1/2		C14-16 Quantitative, Equilibrium and Cells	C14a Yields	C5.11, C5.12
				Revision of C8			C14b Atom economy	C5.13, C5.14, C5.15
19	25.01.21			Revision of C8			C14c Concentration	C5.8
				Revision of C10			C14d Titration	C5.9, C5.10
20	01.02.21			Revision of C10			C14d Titration calculations	C5.10
				Revision of C11			C14d Core prac, titration	C5.9
21	08.02.21	PD Day 12.02.21		Revision of C12			C14e Molar volume of gases	C5.16, C5.17, C5.18
				Revision of C3/4			C15a Fertilisers and the Haber Process	C5.19, C5.22, C5.23, C5.24
22	22.02.21	2nd Half of Spring Term		Revision of C5/6/7			C15b Factors affecting equilibrium	C5.15, C5.20, C5.21
				Revision of C9			C16a Chemical cells	C5.25, C5.26, C5.27
23	01.03.21			Paper 1 Mock			C16a Fuel cells	C5.25, C5.26, C5.27
				Review of Paper 1 Mock			C14-16 Revision	
24	08.03.21		Revision		C14-16 Test			



Science Route Plans

Y10 Physics

Intent



Week	Week beg.	Important Dates	Y10 Combined Science			Y10 Separate Physics		
			Unit	Lesson	Specification Item	Unit	Lesson	Specification Item
1	02.09.19	PD Days 02.09.19 and 03.09.19	P1	P1 Key Concepts	P1.1, P1.2, P1.3	P1	P1 Key Concepts	P1.1, P1.2, P1.3
2	09.09.19			P1 Key Concepts	P1.4		P1 Key Concepts	P1.4
3	16.09.19		P3 Conservation of Energy	Stores of Energy	P3.5	P3 Conservation of Energy	Conservation of Energy	P3.3, P3.4, P3.5, P3.6
4	23.09.19			Energy Transfer	P3.3, P3.5		Kinetic Energy	P3.2
5	30.09.19	Open Evening 03.10.19		Conservation of Energy	P3.4, P3.6		GPE	P3.1
6	07.10.19			Kinetic Energy	P3.2		Dissipation of Energy	P3.7, P3.9
7	14.10.19	PD Day 18.10.19		GPE	P3.1		Efficiency	P3.11, P3.12
				Dissipation of Energy	P3.7, P3.9		Home insulation	P3.10
				Efficiency	P3.11, P3.12		Thermal Conductivity	P3.10
				Home insulation	P3.10		Renewable Resources	P3.13, P3.14
				Thermal Conductivity	P3.10		Non-renewable Resources	P3.13, P3.14
				Renewable Resources	P3.13, P3.14		P3 Revision	Revision
			Non-renewable Resources	P3.13, P3.14	P3 Test	Test		



Science Route Plans

Y10 Physics

Intent



8	28.10.19	2nd Half of Autumn Term		P3 Revision	Revision		Structure of the Atom	P6.1, P6.2, P6.3, P6.4, P6.5, P6.6
				P3 Test	Test		Development of the Atomic Model	P6.17
9	04.11.19			Structure of the Atom	P6.1, P6.2, P6.3, P6.4, P6.5, P6.6		Energy Levels	P6.7, P6.8
				Development of the Atomic Model	P6.17		Background Radiation	P6.12, P6.13, P6.14
10	11.11.19			Energy Levels	P6.7, P6.8		Radioactivity	P6.10, P6.11, P6.15, P6.16
				Background Radiation	P6.12, P6.13, P6.14		Ionisation	P6.9
11	18.11.19			Radioactivity	P6.10, P6.11, P6.15, P6.16		Nuclear Equations	P6.18, P6.19, P6.20, P6.21, P6.22
				Ionisation	P6.9		Half life Lesson 1	P6.23, P6.24
12	25.11.19			Nuclear Equations	P6.18, P6.19, P6.20, P6.21, P6.22		Half life Lesson 2	P6.25, P6.26, P6.27
				Half life Lesson 1	P6.23, P6.24		Uses of Radioactivity	P6.28P
13	02.12.19			Half life Lesson 2	P6.25, P6.26, P6.27		Dangers of Radioactivity	P6.29, P6.31, P6.32
				Uses of Radioactivity	P6.28P (Separate science content only but it is useful to know)		Medical Uses of Radioactivity	P6.33P, P6.34P, P6.35P
14	09.12.19			Dangers of Radioactivity	P6.29, P6.31, P6.32		Nuclear Fission and Fusion	P6.37P, P6.43P, P6.44P, P6.45P, P6.46P
				Revision	Revise P6 Radioactivity		Nuclear Power	P6.36P, P6.38P, P6.39P, P6.40P, P6.41P, P6.42P



Science Route Plans

Y10 Physics

Intent



Week	Date	Notes	Topic	Resources	Assessment
16	06.01.20	PD Day 06.01.20 Term Starts 07.01.20	Scalars and Vectors	P2.1, P2.2, P2.3, P2.4, P2.5	Test
17	13.01.20		Measuring Speed	P2.6, P2.11, P2.12	Scalars and Vectors
			Distance Time Graphs	P2.7	Measuring Speed
18	20.01.20		Acceleration	P2.8, P2.13	Distance Time Graphs
			Speed Time Graphs	P2.10	Acceleration
19	27.01.20		Equations of Motion	P2.9	Speed Time Graphs
			Representing Forces	P2.14	Equations of Motion
20	03.02.20		Newton's First Law	P2.14	Representing Forces
			Mass and Weight	P2.16, P2.17, P2.18, P2.22	Newton's First Law
21	10.02.20		Circular Motion (Higher)	P2.20, P2.21	Mass and Weight
			Newton's Second Law	P2.15	Circular Motion (Higher)
22	24.02.20	2nd Half of Spring Term	F=ma core practical	P2.19	Newton's Second Law
			F=ma core practical	P2.19	F=ma core practical
23	02.03.20		Newton's Third Law	P2.23	F=ma core practical



Intent



Science Route Plans

Y10 Physics

23	02.03.20			Momentum (Higher)	P2.23, P2.24, P2.25, P2.26		Newton's Third Law	P2.23
24	09.03.20			Collisions (Higher)	P2.23, P2.24		Momentum (Higher)	P2.23, P2.24, P2.25, P2.26
				Stopping Distance	P2.27, P2.28, P2.29, P2.30		Collisions (Higher)	P2.23, P2.24
				Crash Hazards	P2.23, P2.31		Stopping Distance	P2.27, P2.28, P2.29, P2.30
25	16.03.20			Revision	Revision of P2 Motion and Forces		Crash Hazards	P2.23, P2.31
				Revision	Revision of P2 Motion and Forces		Revision	Revision of P2 Motion and Forces
26	23.03.20							
28	20.04.20	PD Day 20.04.20		P8 Energy – Forces doing Work	Energy Stores	P8 Energy – Forces doing Work	Energy Stores	P3.3, P3.5, P8.1, P8.2, P8.3
		Term Starts 21.04.20			Energy Stores		P8.8, P8.9, P8.10, P8.11, P8.15	
29	27.04.20		Work		P8.4, P8.5, P8.6			
			Power		P8.12, P8.13, P8.15, P8.14			
30	04.05.20		Work and Power		P8.13, P8.15, P9.10			
			P9	Newton's Third Law	P9.1, P9.2			
31	11.05.20	Bank Holiday 04.05.20		Vector Diagrams	P9.3, P9.4, P9.5			
		P8&9	Test	P8 and 9 Test				
							Newton's Third Law	P9.1, P9.2
							Vector Diagrams	P9.3, P9.4, P9.5
							Moments	9.6P, 9.7P, 9.8P
							Gears	9.9P, 9.10P



Intent



Science Route Plans

Y10 Physics

36	22.06.20		P10 and P11	Static Electricity	P11.1P, P11.2P, P11.3P, P11.4P	P10 and P11	Static Electricity	P11.1P, P11.2P, P11.3P, P11.4P
37	29.06.20			Curriculum Enrichment Week			Curriculum Enrichment Week	
38	06.07.20			Uses of Static Electricity	P11.4P, P11.5P, P11.6P		Uses of Static Electricity	P11.4P, P11.5P, P11.6P
				Dangers of Static Electricity	P11.4P, P11.7P		Dangers of Static Electricity	P11.4P, P11.7P
39	13.07.20			What is a circuit	P10.2, P10.3		Electric Fields	P11.8P, P11.9P, P11.10P
				Series and Parallel	P10.3		What is a circuit	P10.2, P10.3
40	20.07.20	Term Ends 22.07.20		Electric Current	P10.7, P10.8, P10.9, P10.11		Series and Parallel	P10.3



Science Route Plans

Y11 Physics

Intent



Week	Week beg.	Important Dates	Y10 Combined Science			Y10 Combined Science		
			Unit	Lesson	Specification Item	Unit	Lesson	Specification Item
1	02.09.19	PD Days 02.09.19 and 03.09.19	P10 Electricity and Circuits	Current, Charge and Energy	P10.6	P10 Electricity and Circuits	Potential Difference	P10.4, P10.5
2	09.09.19			Resistance	P10.12, P10.13, P10.22, P10.23, P10.24, P10.25H		Current, Charge and Energy	P10.6
				Resistance in Series and Parallel	P10.14, P10.15, P10.16		Resistance	P10.12, P10.13, P10.22, P10.23, P10.24, P10.25H
3	16.09.19			Core Practical - Investigating Resistance	P10.17		Resistance in Series and Parallel	P10.14, P10.15, P10.16
				Core Practical - Investigating Resistance	P10.17		Core Practical - Investigating Resistance	P10.17
4	23.09.19			Resistance of a Filament Bulb	P10.18a, P10.21a		Core Practical - Investigating Resistance	P10.17
				Resistance of a Thermistor and LDR	P10.18c, P10.18d, P10.19, P10.20, P10.21c, P10.21d		Resistance of a Filament Bulb	P10.18a, P10.21a
5	30.09.19	Open Evening 03.10.19		Electrical Power	P10.28, P10.29, P10.30, P10.31		Resistance of a Thermistor and LDR	P10.18c, P10.18d, P10.19, P10.20, P10.21c, P10.21d
				Transferring Energy by Electricity	P10.32, P10.33, P10.42, P10.34, P10.35, P10.36		Electrical Power	P10.28, P10.29, P10.30, P10.31
6	07.10.19			Wiring a Plug	P10.37, P10.40, P10.41		Transferring Energy by Electricity	P10.32, P10.33, P10.42, P10.34, P10.35, P10.36
			Fuses	P10.38, P10.39	Wiring a Plug	P10.37, P10.40, P10.41		
7	14.10.19	PD Day 18.10.19	P10 Revision		Fuses	P10.38, P10.39		



Science Route Plans

Y11 Physics

Intent



10	11.11.19		P12 Magnets and Motor Effect	Magnets	P12.1, P12.2, P12.3, P12.4, P12.5, P12.6	P12 Magnets and the Motor Effect	Magnets and the Earth's Magnetic Field	P12.1, P12.2, P12.3, P12.4, P12.5, P12.6
				Electromagnetism	P12.7, P12.8, P12.9		Electromagnetism	P12.7, P12.8, P12.9
				Magnetic Forces	P12.10, P12.11, P12.12, P12.13		Motor Effect (Higher only)	P12.10, P12.11, P12.12, P12.13
11	18.11.19		P13 Electromagnetic Induction	Electromagnetic induction (Higher)	P13.2	P12 Magnets and the Motor Effect	Electric Motor	P12.14
				Transformers (Higher)	P13.5, P13.6, P13.9		Electromagnetic induction (Higher)	P13.1P, P13.2, P13.3P, P13.4P
12	25.11.19		P13 Electromagnetic Induction	National Grid	P13.8	P13 Electromagnetic Induction	Transformers (Higher)	P13.5, P13.6, P13.7P, P13.9
				Transformers and Energy	P13.10		National Grid	P13.8, P13.11P
13	02.12.19		P13 Electromagnetic Induction	P12 and P13 Revision		P13 Electromagnetic Induction	Transformers and Energy	P13.10



Intent



Science Route Plans

Y11 Physics

19	27.01.20		P14 Particle Model	Density	P14.2	P14 Particle Model	Density	P14.2
				Core Practical - Investigating Density	P14.3		Core Practical - Investigating Density	P14.3
20	03.02.20			Core Practical - Investigating Density	P14.3		Core Practical - Investigating Density	P14.3
				Kinetic Theory	P14.1		Kinetic Model	P14.1, P14.4, P14.5, P14.6
21	10.02.20			Changes of State	P14.4, P14.5, P14.6		Specific Heat Capacity	P14. 7, P14.8
				Specific Heat Capacity	P14. 7, P14.8		Latent Heat	P14.7, P14.9, P14.10
22	24.02.20	2nd Half of Spring Term		Latent Heat	P14.7, P14.9, P14.10		Core Practical - Properties of water and ice	P14.11
				Core Practical - Properties of water and ice	P14.11		Core Practical - Properties of water and ice	P14.11
23	02.03.20			Core Practical - Properties of water and ice	P14.11		Temperature	P14.12, P14.13, P14.14, P14.15
				Temperature	P14.12, P14.13, P14.14, P14.15		Temperature and Pressure	P14.16P, P14.17P, P14.18P
24	09.03.20		P14 Revision		Pressure and Volume	P14.19P, P14.20P		



Intent



Science Route Plans

Y11 Physics

25	16.03.20		P15 Forces and Matter	Hooke's Law	P15.1, P15.2, P15.3, P15.5	P14 Test		
				Energy Stored in a Spring	P15.4			Bending and Stretching
26	23.03.20			Core Practical - Investigating Springs	P15.6	P15 Forces and Matter	Extension and Energy Transfers	P15.4
				Core Practical - Investigating Springs	P15.6		Core Practical - Investigating Springs	P15.6
27	30.03.20	Term ends 02.04.20		Revision			Core Practical - Investigating Springs	P15.6
			Test		Pressure in Fluids		P15.7P, P15.8P, P15.9P, P15.10P, P15.11P, P15.12P, P15.13P, P15.4P	
28	20.04.20	PD Day 20.04.20		Revision		Upthrust	P15.15P, P15.16P, P15.17P	



Intent



Science Recovery curriculum

Year 9

Work set during lockdown	Issues arising from lockdown	How we are addressing these issues	Intervention
Respiration Magnets and Electromagnets	<p>Magnets and Electromagnetism was only partially completed and will need to be consolidated.</p> <p>Students missed whole topics such as Rocks, the Structure of the Earth and the Composition of the Atmosphere.</p> <p>Students have missed opportunities to develop their practical skills.</p>	<p>The cyclical nature of the Science curriculum means that we will be teaching these topics again:</p> <ul style="list-style-type: none">- Respiration in Biology in Year11- Earth Structure in Physics in Y9- Magnetism and Electromagnetism in Physics in Y11- Composition of the Atmosphere in Chemistry in Y11- Carbon cycle in Biology in Y11 <p>At the end of Year 9, students will have 4 weeks of practical investigations which will be used to develop these skills.</p>	<p>Students are sitting End of Y8 GL assessments which will provide data on individual student progress as well as an overview of which topics in science are poorly understood.</p> <p>Students will be set 3 tests throughout the year and these will be used to determine which students are not on track. These students will be provided with opportunities to attend extra revision classes in May half term before their practise exams.</p>



Intent



Science Recovery curriculum

Year 10

Work set during lockdown	Issues arising from lockdown	How we are addressing these issues	Intervention
<p>Students were set assignments on Google Classroom in different topics in Biology, Physics and Chemistry depending on their class. Most students had completed $\frac{5}{8}$ of the course prior to lockdown. Most of May would usually have been spent revising for their practice exams so this time was used to complete the course at a slower pace than if they had been in school.</p>	<p>Students will have gaps in their knowledge from the Y9 course if they have not engaged with remote learning. These gaps might be different for students in the same class depending on which class they were in last year.</p>	<p>We have kept a record of which students missed online assignments from the summer term. We will monitor these students throughout the year to check their progress in tests. We will revise topics from Y9 before the practice exams in June.</p>	<p>Students who are underperforming in tests and end of Y10 practice exams will be offered early intervention in autumn of Y11.</p>
<p>For the second half of summer term, students were given practical assignments to complete at home to develop some of the investigative skills such as planning, observing and recording and writing conclusions.</p>	<p>Students have missed the opportunity to develop their practical skills at the end of Y9 and complete a core practical in each subject.</p>	<p>The science route planner allows for at least a half term of revision in Y11 before the GCSE examinations start. During this revision, students can perform the core practicals in each subject as part of their preparation.</p>	



Intent



Science

Intended areas of Science development

Our curriculum focuses on areas which are based on the National Curriculum.

These criteria are mapped across the units that are taught during the academic year and, although skills and knowledge are constantly being repeated and built on in different contexts, only certain criteria are focused on for assessment during each unit.



Intent



Science Assessment Objectives

Assessment Objectives

Students must:		% in GCSE
A01	Demonstrate knowledge and understanding of: <ul style="list-style-type: none">• scientific ideas• scientific techniques and procedures.	40
A02	Apply knowledge and understanding of: <ul style="list-style-type: none">• scientific ideas• scientific enquiry, techniques and procedures.	40
A03	Analyse information and ideas to: <ul style="list-style-type: none">• interpret and evaluate• make judgements and draw conclusions• develop and improve experimental procedures.	20
Total		100%



Intent



Intended areas of Science development (continued)

- the use of conceptual models and theories to make sense of the observed diversity of natural phenomena
- the assumption that every effect has one or more cause
- that change is driven by differences between different objects and systems when they interact
- that many such interactions occur over a distance and over time without direct contact
- that science progresses through a cycle of hypothesis, practical experimentation, observation, theory development and review
- that quantitative analysis is a central element both of many theories and of scientific methods of inquiry.
- develop scientific knowledge and conceptual understanding through the specific disciplines of Biology, Chemistry and Physics
- develop understanding of the nature, processes and methods of science, through different types of scientific enquiries that help them to answer scientific questions about the world around them
- develop and learn to apply observational, practical, modelling, enquiry and problem-solving skills in the laboratory, in the field and in other learning environments
- develop their ability to evaluate claims based on science through critical analysis of the methodology, evidence and conclusions, both qualitatively and quantitatively.



Intent



Intended areas of Science development (continued)

BIOLOGY

- life processes depend on molecules whose structure is related to their function
- the fundamental units of living organisms are cells, which may be part of highly adapted structures including tissues, organs and organ systems, enabling living processes to be performed effectively
- living organisms may form populations of single species, communities of many species and ecosystems, interacting with each other, with the environment and with humans in many different ways
- living organisms are interdependent and show adaptations to their environment
- life on Earth is dependent on photosynthesis in which green plants and algae trap light from the Sun to fix carbon dioxide and combine it with hydrogen from water to make organic compounds and oxygen
- organic compounds are used as fuels in cellular respiration to allow the other chemical reactions necessary for life
- the chemicals in ecosystems are continually cycling through the natural world
- the characteristics of a living organism are influenced by its genome and its interaction with the environment
- evolution occurs by a process of natural selection and accounts both for biodiversity and how organisms are all related to varying degrees.



Intent



Intended areas of Science development (continued)

CHEMISTRY

- matter is composed of tiny particles called atoms and there are about 100 different naturally occurring types of atoms called elements
- elements show periodic relationships in their chemical and physical properties
- these periodic properties can be explained in terms of the atomic structure of the elements
- atoms bond by either transferring electrons from one atom to another or by sharing electrons
- the shapes of molecules (groups of atoms bonded together) and the way giant structures are arranged is of great importance in terms of the way they behave
- there are barriers to reaction so reactions occur at different rates
- chemical reactions take place in only three different ways:
 - proton transfer
 - electron transfer
 - electron sharing
- energy is conserved in chemical reactions so can therefore be neither created nor destroyed.



Intent



Intended areas of Science development (continued)

PHYSICS

- the use of models, as in the particle model of matter or the wave models of light and of sound
- the concept of cause and effect in explaining such links as those between force and acceleration, or between changes in atomic nuclei and radioactive emissions
- the phenomena of 'action at a distance' and the related concept of the field as the key to analysing electrical, magnetic and gravitational effects
- that differences, for example between pressures or temperatures or electrical potentials, are the drivers of change
- that proportionality, for example between weight and mass of an object or between force and extension in a spring, is an important aspect of many models in science
- that physical laws and models are expressed in mathematical form.



Intent



Intended areas of Science development (continued)

1 Development of scientific thinking

- a Understand how scientific methods and theories develop over time.
- b Use a variety of models, such as representational, spatial, descriptive, computational and mathematical, to solve problems, make predictions and to develop scientific explanations and an understanding of familiar and unfamiliar facts.
- c Appreciate the power and limitations of science, and consider any ethical issues that may arise.
- d Explain everyday and technological applications of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and arguments.
- e Evaluate risks both in practical science and the wider societal context, including perception of risk in relation to data and consequences.
- f Recognise the importance of peer review of results and of communicating results to a range of audiences.

2 Experimental skills and strategies

- a Use scientific theories and explanations to develop hypotheses.
- b Plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena.
- c Apply a knowledge of a range of techniques, instruments, apparatus and materials to select those appropriate to the experiment.
- d Carry out experiments appropriately, having due regard to the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations.
- e Recognise when to apply a knowledge of sampling techniques to ensure any samples collected are representative.
- f Make and record observations and measurements using a range of apparatus and methods.
- g Evaluate methods and suggest possible improvements and further investigations.



Intent



Intended areas of Science development (continued)

3 Analysis and evaluation

Apply the cycle of collecting, presenting and analysing data, including:

- a presenting observations and other data using appropriate methods
- b translating data from one form to another
- c carrying out and representing mathematical and statistical analysis
- d representing distributions of results and making estimations of uncertainty
- e interpreting observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions
- f presenting reasoned explanations including relating data to hypotheses
- g being objective, evaluating data in terms of accuracy, precision, repeatability and reproducibility and identifying potential sources of random and systematic error
- h communicating the scientific rationale for investigations, methods used, findings and reasoned conclusions through paper-based and electronic reports and presentations using verbal, diagrammatic, graphical, numerical and symbolic forms.

4 Scientific vocabulary, quantities, units, symbols and nomenclature

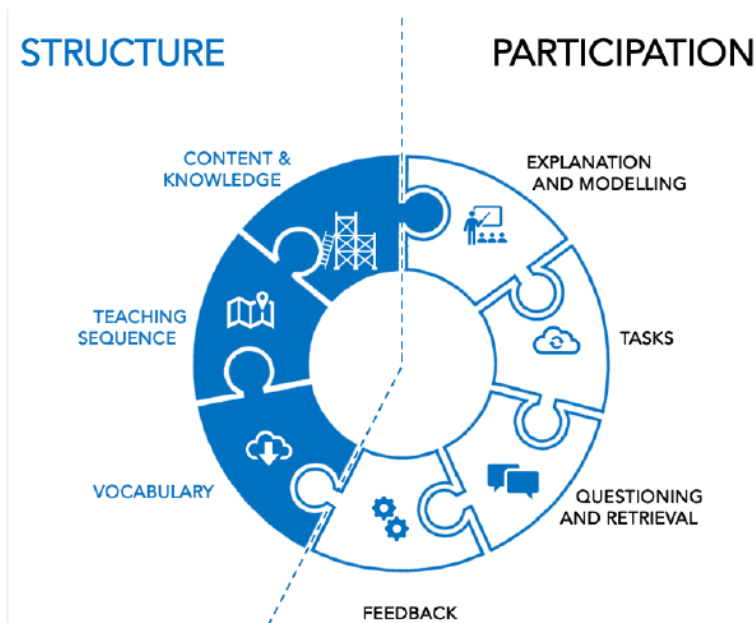
- a Use scientific vocabulary, terminology and definitions.
- b Recognise the importance of scientific quantities and understand how they are determined.
- c Use SI units (e.g. kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate.
- d Use prefixes and powers of ten for orders of magnitude (e.g. tera, giga, mega, kilo, centi, milli, micro and nano).
- e Interconvert units.
- f Use an appropriate number of significant figures in calculation.



Implementation



Science Implementation





Implementation



Teaching

- **Science** is taught to whole classes and is fully inclusive. Classes are set from Year 9-11.
- The Science department has the advantage of specialist facilities in the form of nine laboratories, fitted with sinks, mains and gas supplies, along with ample storage for some scientific apparatus. The department also benefits from science specialists delivering lessons, which means we are able to teach high quality lessons that focus on subject specific skills and vocabulary, using specialist equipment, distillation apparatus, vacuum filtration, burettes, light gates with dataloggers, ripple tank etc
- Each year is divided up into a number of units/ topics, covering the disciplines of biology, chemistry and physics. Topics are often revisited in later years to build upon the foundational skills and knowledge, and progress into further detail within the topic area. This includes science enquiry skills, that are developed through investigative practical work.



Examples of Plans

Assessment

- Individual Skills within lessons
- End of module test to be completed at the end of the module

Bury St Edmunds County Upper School



Edexcel GCSE 9-1 Sciences
Year 9 Chemistry 2016-

OBJECTIVES

Bold denotes higher only

Cross Curricular and Skill Opportunities

Numeracy

Literacy

Skills

Lesson no & Title	Learning Objectives	Possible Activities <input type="text"/>
1. Lab Safety	State the meanings of some hazard symbols (flammable, irritant, corrosive) Describe the risks involved with Bunsen burners Explain how you can prevent risk of injuries in the lab	S: Spot the hazards picture. M: Hazard symbol card sort, identification of risks/prevention methods for a Bunsen burner to make a lab safety leaflet. P: Lab safety bingo

Implementation





Examples of Plans

2. CC1a.1: States of Matter – Identifying States	<p>Describe the arrangement, movement and the relative energy of particles in each of the three states of matter: solid, liquid and gas.</p> <p>Recall the names used for the interconversions between the three states of matter, recognising that these are physical changes.</p> <p>Explain the changes in arrangement, movement and energy of particles during these interconversions.</p>	<p>S: Naming changes of state M: Predicting the state of a substance, given b.p. and m.p. data Practical activity; cooling of stearic acid; measuring, recording data in a table P: Solid, liquid or gas? Particle diagrams</p>
3. CC1a.2: States of Matter – Cooling Curves	<p>Predict the physical state of a substance under specified conditions, given suitable data.</p>	<p>S: Solid, liquid or gas from data M: Processing data from stearic acid experiment; plotting graph Analysing graphs, and using them to form a conclusion P: Exam style question on changes of state</p>
4. CC2a.1: Mixtures – Investigating Ice-Salt Mixtures	<p>Explain the differences between a pure substance and a mixture.</p> <p>Interpret melting point data to distinguish between pure substances, which have a sharp melting point, and mixtures, which melt over a range of temperatures.</p>	<p>S: Mixtures quiz. M: Ice melting practical – 2 sets of data to be collected with pure ice and ice-salt mixture (1 set to be collected and collaborate results). Construct graph of both sets of data combined. Conclude and evaluate results. P: Use data from table to identify which substances are pure and which are mixtures.</p>



Examples of Plans

<p>5. CC2b.1: Filtration and Crystallisation – Purifying Rock Salt (Practical)</p>	<p>Explain the experimental techniques for separation of mixtures by: (a) filtration (b) crystallisation. Describe an appropriate experimental technique to separate a mixture, knowing the properties of the components of the mixture. Evaluate the risks in a practical procedure and suggest suitable precautions for a range of practicals, including those mentioned in the specification.</p>	<p>S: Quick quiz. M: Demo filtration and crystallisation process. Discuss equipment, variables, risk, and method and complete up to collection of results (filtration). P: Name the equipment!</p>
<p>6. CC2b.2: Filtration and Crystallisation – Purifying Rock Salt (Analysis)</p>		<p>S: Calculate percentages of salt in solutions. M: Complete second half of practical (crystallisation) – analyse results by producing a table of percentage of salt in solution. Conclude and evaluate results. P: Why are some crystals bigger than others?</p>



Implementation



Literacy:

Reading:

We are looking to develop reading further in lessons through the potential use of booklets. At present most reading will be related to question answering and information gathering, whether it be from a paper or electronic format. Teachers will often model reading of questions or comprehension texts.

Vocabulary:

Scientific vocabulary across all three sciences is currently being implemented to be given in the form of checklists for each topic. These list 'criteria' or objectives covered throughout the topic, along with a list of keywords, that is adapted and altered as necessary.

Oracy:

Class discussion is encouraged, as is the use of correct scientific terminology. Enquiry skills are developed through discussion, often via pupils working as a partnership to bounce ideas off one another.

Writing:

Pupils are taught to write formally, including extended writing, report writing when carrying out investigations, in the form of a method, conclusion or evaluation. Notes may be recorded from a number of sources in the form of simple bullet points to extensive mind maps.



Implementation



How are lessons tailored for different learners, including pupils with SEND?

The Science department caters for a number of different learning styles, from practical activities for the kinaesthetic learners, through to using visual stimuli, such as animation and film footage for the more visual learner; we try to cater for all.

Many tasks are differentiated by outcome with the help of a teaching assistant to guide pupils through each task.

SEND pupils are often assisted with the use of 'adapted' worksheets, along with some scaffolding given via vocabulary supplied or an alternative task or layout. Interactive display work also helps some of these pupils to access transferable skills, such as drawing a graph. Those with needs involving literacy can be aided with a laptop and/or exercise books with coloured paper or overlays.

Opportunities for more able pupils

More able students, as well as those wishing to take their scientific learning to the next level, are given opportunities throughout lessons with various extension tasks to dig deeper into the topic covered.

Historically, we have offered extra curricular activities such as GCSE Astronomy, Science fair, Astronomy evening, Youth STEM Award, Gifted and Talented day, IOP ambassadors scheme, medical mavericks, women in engineering and also careers talks.



Implementation



Resources

Pearson Active learn worksheets, online book

Scisheets - chemistry content

Seneca

GCSEPod

EZYEducation

IsaacPhysics

Edexcel and CGP revision guides and exam practice

Phet physics simulations

iMovie

Nearpod

Socrative

Quizlet

Jamboard

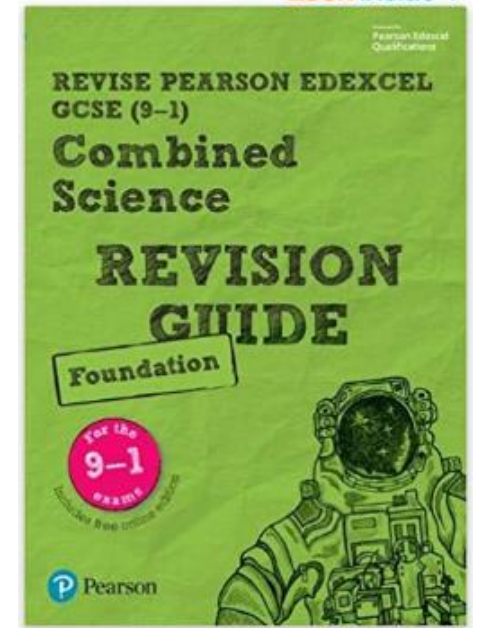
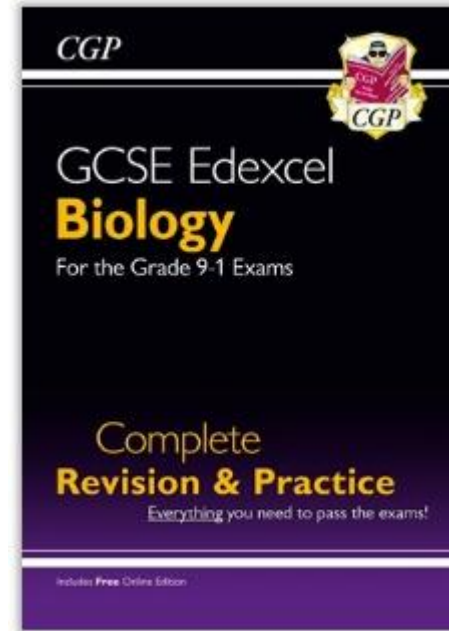
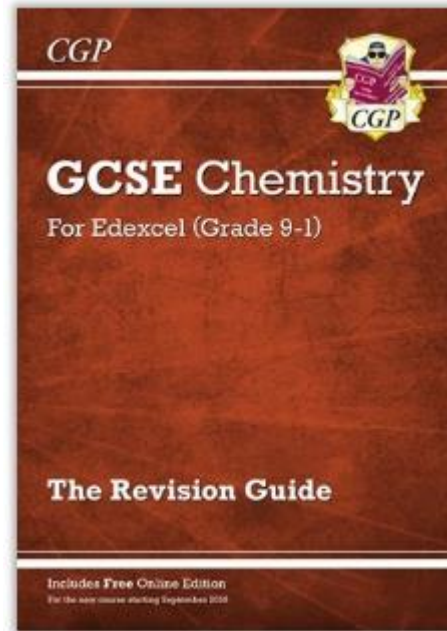
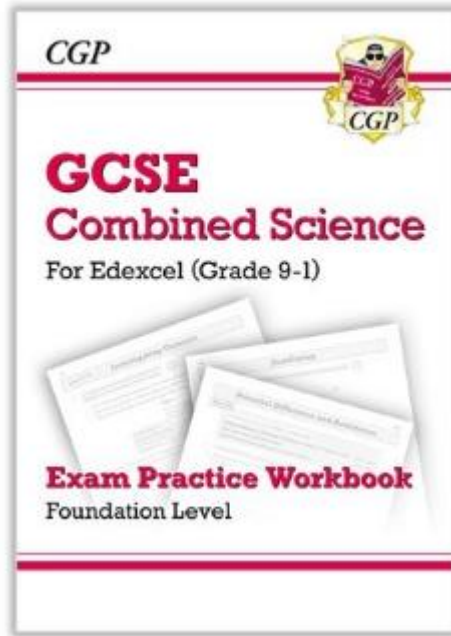
Visualisers




Implementation



Resources (continued)




Edexcel GCSE (9-1) Combined Science

 [Open front-of-class book](#)




Edexcel GCSE (9-1) Combined Science Support Edition

 [Open front-of-class book](#)



Edexcel GCSE (9-1) Sciences

 [Open front-of-class book](#) ▾



Impact



Science Impact



Impact



How do you monitor progress and achievement?

Teachers are responsible for keeping a record of how individuals are progressing in the subject. Pupils are monitored and supported closely in their learning.

During each lesson, the teachers give verbal feedback to the learners and use questioning to develop further understanding, unravel misunderstanding and resolve any misconceptions, inline with the school's live marking policy. Regular marking of books followed up by individual written and verbal feedback allows for formative and ongoing assessment.

End of topic tests, mini quizzes, practical skills, writing and interpretation tasks all provide teachers with enough material to make a summative assessment at the end of each term. Where students are regularly underperforming, as highlighted by the teachers formative assessment, then lesson plans or resources may need to be adapted to address these issues. Where there is a need, intervention sessions are put into place for those who are behind expected attainment levels.



Impact



How do you document learning in science?

Throughout the year, year nine students are assessed against practical skill development and graded with 0-4 indicating either: (0) no progress, (1) emerging progress, (2) improving progress, (3) secure progress or (4) exceeding expectations and progress. Summative assessment at the end of each term provides a grade to track against each pupil: (B-) well below track and working well below the expected level, (B) below track and working below the expected level, (O) on track and working at the expected level, (A) above track and working above the expected level and (A+) well above track and working well above the expected level.

Objectives		
[blank]		This objective has not been assessed.
0	No Progress	Has not grasped the key concept/idea/skill within the objective.
1	Emerging	Beginning to grasp the key concept/idea/skill within the objective, but with limited development and work will show many errors. Students requires significant support.
2	Improving	Grasping key concept/idea/skill within the objective with increased confidence, yet work will show some errors. Students still require some support.
3	Secure	Understands key concept/idea/skill within the objective with confidence and consistency, and makes only occasional errors. Students are able to work independently.
4	Exceeding	Understands key concept/idea/skill within the objective with consistency and rarely makes errors. Beginning to apply security of understanding to new contexts. Students will be confident to work independently.

Attitude																			
Z1	Z2	Z4	S140	S141	S142	S143	S144	S145	S146	S147	S148	S149							
					2		3	2	2	2	2								
					2		3	2	2	2	2								
					2		3	2	2	2	2								
					2		3	2	2	2	2								
					2		2	2	2	2	2								
					3		3	2	3	2	3								
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					2		3	2	2	3	2								
					3		3	2	3	2	2								
					2		3	2	2	3	2								

Objectives included in this markbook

S140	Collects research and summarises in the form of a report. Links research to Bibliography.
S141	Plans a fair test based on a simple prediction made and linked to scientific understanding. Plans to collect a range of repeatable results to answer the question, using suitably accurate equipment.
S142	Assesses hazards & plans how to control risks. Considers likelihood of risk and plans for this.
S143	Makes detailed predictions and justifies them using scientific knowledge at or beyond expectations independently.
S144	Tables to include appropriate headings and units (in headings only). Independent and dependent variables in correct place. Data displayed to the same decimal places.
S145	Maths skills - Can use a formula to calculate unknown values/ can calculate percentages and Rf values/ can calculate magnification/ graph extrapolation, interpolation.
S146	Selects suitable ways to present evidence. Draws up line graph independently choosing the correct scales for the axes, labels/ headings (with units), and axes the correct way round. Can draw a line/curve of best and extrapolate from the graph.
S147	Describes patterns in data and identifies unexpected results independently, suggesting reasons for them.
S148	Compares results to prediction, then draws upon scientific knowledge to give a reason for findings at age expected level.
S149	Identifies errors and describes limitations in method that have led to them - identifying the main limitation. Offers some improvements based on these weaknesses (limitations), and may suggest further ideas for investigation.



Impact



How do you document learning in science?

All year groups are traced and documented by end of topic tests, end of year exams for years 9 and 10 and mock exams in year 11. Predicted grades are tracked and compared to target grades and residuals are formulated to help highlight those who are not on track.

F	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW
	Biology EOUT							Chemistry EOUT							Physics EOUT						
Y10 Class	B3 EOUT	B4 EOUT	B5 EOUT	B6 EOUT	Biology EOUT Average	Biology EOUT Average Grade	Biology EOUT Residual	C8 EOUT	C9-13 EOUT	C17-19 EOUT	C20-21 EOUT	Chemistry EOUT Average	Chemistry EOUT Average Grade	Chemistry EOUT Residual	P3 EOUT	P6 EOUT	P2 EOUT	P8 & 9 EOUT	Physics EOUT Average	Physics EOUT Average Grade	Physics EOUT Residual
									2		2	2	2.0								
7				4	6	1	-2.0	5	2	4		4	0	-3.0	2		11		7	1	-2.0
11				6	9	2	-2.0	5		2		4	0	-4.0	10		9		10	2	-2.0
3				2	3	0	-3.0	3				3	0	-3.0	2		3		3	0	-3.0
7					7	2	-2.0			2		2	0	-4.0	8		8		8	2	-2.0
9				4	7	1	-3.0	9	4	4		6	1	-3.0	10		14		12	3	-1.0
				2	2	0	-3.0	3	1	3		2	0	-3.0	5		7		6	1	-2.0
22	21			18	20	7	-0.5	19	19	18		19	6	-1.5	20	24	24		23	8	0.5
12	14			7	11	4	-2.5	13	8	12		11	4	-2.5	16	19	19		18	6	-0.5
24	24			18	22	8	0.0	21	23	18		21	7	-1.0	24	25	24		24	9	1.0
25	24			22	24	8	0.0	21	20	22		21	8	0.0	25	24	24		24	9	1.0
21	22			19	21	7	-0.5	21	13	17		17	6	-1.5	22	23	21		22	8	0.5
24	23			22	23	8	0.0	22		21		22	8	0.0	25	23	25		24	9	1.0
19	21			17	19	7	-0.5	20	21	16		19	7	-0.5	25	21	17		21	8	0.5
24	24			22	23	8	0.0	24	25	18		22	8	0.0	25	25	25		25	9	1.0
25	21			24	23	8	0.0	20	24	19		21	8	0.0	24	24	24		24	9	1.0
17	16			18	17	6	-1.0	22	18	14		18	6	-1.0	19	21	22		21	7	0.0
18	12			8	13	4	-2.0	17	20	14		17	6	0.0	23	10	21		18	6	0.0
14	21			18	18	6	-1.5		20	18		18	6	-1.5	21	23	17		20	7	-0.5
19	16			8	14	5	-1.5	19	10	10		13	5	-1.5	19	20	18		19	7	0.5
19	22			18	20	7	0.0	20	14	17		17	6	-1.0	19	22	22		21	8	1.0
23	21			19	21	8	0.5	23	15	19		19	7	-0.5	23	23	21		22	8	0.5
24	16			21	20	7	-1.0	20	18	15		18	6	-2.0	24	23	24		24	8	0.0
24	23			20	22	8	0.0		23	20		22	8	0.0	21	23	23		22	8	0.0
16	23			21	20	7	-0.5	22	13	18		18	6	-1.5	23	24	22		23	8	0.5
18	19			19	19	6	-2.0	22	20	15		19	7	-1.0	24	24	24		24	9	1.0
20	19			18	19	7	-0.5	20	21	20		20	7	-0.5	19	28	18		22	8	0.5
14	17			17	16	6	-1.0	19	21	18		19	7	0.0	21	17	22		20	7	0.0
	15			18	17	6	-1.5	21		16		19	6	-1.5	22	21	24		22	8	0.5
21	21			19	20	7	-0.5	18	22	15		18	6	-1.5	23	24	23		23	8	0.5
21	21			19	20	7	-0.5	17	18	15		17	6	-1.5	21	24	24		23	8	0.5
18	17			15	17	6	-1.0	24	17	15		19	6	-1.0	23	24	22		23	8	1.0
19	15			19	18	6	-1.5	25		20		23	8	0.5	23	23	22		23	8	0.5
20				20	7	-0.5	13		15			14	5	-2.5		25	22		24	8	0.5



Impact



How do you document learning in science?

All year groups are traced and documented by end of topic tests, end of year exams for years 9 and 10 and mock exams in year 11. Predicted grades are tracked and compared to target grades and residuals are formulated to help highlight those who are not on track.

Y11 Class	Exam Number	Pupil Premium Indicator	TMIG	Tri or Comb	Tier	Exam Entry				PG Y11 Autumn										TAG				
						Biology PG	Chemistry PG	Phys: PG	Science PG	Av. Biology Grade whole course	Total Score - Mini Assessments	Grade - Mini Assessments	Biology TAG	Biology Basket no.	Chemistry Grade whole course	Total Score - Mini Assessments	Grade - Mini Assessments	Chemistry TAG	Chemistry Basket no.	Av. Phys: PG whole course	Total Score - Mini Assessments	Grade - Mini Assessments	Phys: TAG	Phys: TAG Basket
Y	7	T	H	6.5	6	7.5		6.3	20	6	6	5	4.3	0	6	1	6.3	0	6	3				
	5	T	H	6	6.5	6		4.8	71	6	6	2	5.4	60	6	5	4.0	55	4	4	8			
	6	T	H	7	6	6		6.4	78	6	6	6	4.4	40	5	5	4	4.8	61	5	5	6		
	6	T	H	6	6	6.5		5.9	78	6	6	5	4.8	45	5	5	4	4.7	61	5	5	8		
	8	T	H	7	6	5		5.3	70	6	6	5	4.7	45	5	5	6	4.8	69	5	5	7		
	8	T	H	7	6.5	7.5		6.2	61	6	6	6	5.3	51	6	6	3	6.1	76	6	6	7		
	8	T	H	7	6.5	7		6.1	75	6	6	8	5.0	54	6	6	3	5.4	76	6	6	3		
	8	T	H	8	7	8		6.9	96	8	8	6	6.2	53	7	7	2	6.3	82	6	6	8		
	7	T	H	6.5	5	6		6.3	74	6	6	5	5.0	58	6	6	3	5.2	84	6	6	4		
Y	5	T	H	8	7	7		7.7	94	8	8	6	6.1	72	7	7	3	6.3	86	6	6	8		
	4	T	H	7	8	7.5		6.3	86	7	7	3	7.1	80	8	8	5	6.8	86	6	6	8		
	5	T	H	7	8	6.5		6.5	87	7	7	4	6.7	69	7	7	4	6.3	88	6	6	7		
	7	T	H	7	5.5	7		6.0	55	6	6	4	3.4	29	4	4	4	6.3	92	7	7	4		
	7	T	H	6	5.5	6		5.8	80	6	6	6	5.7	69	7	7	2	5.7	98	7	7	3		
	8	T	H	7	7	5.5		6.6	96	8	8	5	6.6	80	8	8	3	5.7	103	7	7	4		
	8	T	H	6	6.5	6		6.9	98	8	8	3	6.3	75	7	7	4	6.4	104	7	7	2		
	8	T	H	6.5	6.5	7		6.6	87	7	7	4	6.1	73	7	7	4	6.6	104	7	7	6		
	8	T	H	8.5	8	7		7.8	102	9	9	3	7.7	90	9	9	4	6.9	106	7	7	7		
	8	T	H	8	7	7		6.9	95	8	8	4	6.9	83	8	8	3	7.2	110	8	8	4		
Y	8	T	H	7	7	6.5		6.9	89	7	7	7	6.3	73	7	7	4	6.9	111	8	8	3		
	8	T	H	8	8	7.5		7.2	101	9	9	2	7.6	88	9	9	4	7.3	113	8	8	4		
	7	T	H	7	7	7.5		7.0	92	8	8	4	6.7	86	9	9	2	7.5	113	8	8	7		
	5	T	H	7.5	8	7.5		7.4	101	9	9	3	8.0	86	9	9	4	7.7	118	8	8	7		
Y	8	T	H	8.5	8	7.5		7.0	97	8	8	5	7.7	85	9	9	3	7.4	119	8	8	4		
	8	T	H	8	7.5	7.5		7.1	98	8	8	6	7.4	91	9	9	3	7.5	122	8	8	6		
	7	T	H	8	6	7		6.9	94	8	8	4	6.6	77	8	8	3	6.9	124	9	9	4		
	8	T	H	8.5	8	7		7.0	97	8	8	4	7.6	85	9	9	1	7.6	126	9	9	3		
	8	T	H	8.5	8	8		7.9	108	9	9	4	8.3	95	9	9	5	8.4	129	9	9	6		
	8	T	H	7	7	7		6.9	101	9	9	2	6.6	78	8	8	3	7.4	130	9	9	4		
	5	T	H	5	4.5	5.5		4.7	48	5	5	3	4.5	23	5	5	2	4.6	44	4	4	7		
Y	5	T	H	4.5	4.5	4.5		3.9	34	4	4	4	2.9	21	3	3	6	3.6	44	4	4	7		
Y	8	T	H	5	5	6.5		4.3	47	4	4	7	3.1	23	3	3	6	4.1	49	4	4	7		
	7	T	H	6	4.5	5		4.3	51	5	5	3	3.8	31	4	4	4	4.1	56	5	5	4		



Impact



How do you measure the impact of Science teaching?

Books are checked termly to check completion and quality of work, end of topic test checklists are filled out by students to highlight areas of strength and areas to development enabling students to set targets, QLA is also monitored to identify key areas.

Core practical skills are checked in the form of assessed questions



Impact



What do you consider to be the strengths of Science within the school?

Students enjoy practical work and ask searching questions

Teachers are passionate and knowledgeable

Specialist teachers and technicians

Very well resourced laboratories

Resources are developed with non-specialists in mind and widely accessible

How do you know?

- Faculty meetings and teacher feedback on curriculum content.
- Learning walks
- Care and consideration of work in student exercise books
- Verbal feedback from students
- Strong uptake of A Level courses

Subject	2020		2019	
	% grade 4+	% grade 7+	% grade 4+	% grade 7+
Biology	96	54	88	24
Chemistry	96	50	86	26
Physics	95	52	84	25
Double Science	71	6	55	2



Impact



Examples of progression in Science Y9 Chemistry

MAGNESIUM

Physical properties:

- Silvery white
- Very light
- Lowest boiling point of all the alkaline metals

Chemical properties:

- tarnishes when exposed to air
- Reacts with water at room temperature
- reacts exothermically with most acids - like HCl.

Configuration: 2, 8, 2
Group: 2
Period: 3

Uses of Magnesium

- Car seats
- Luggage
- Cameras
- tools
- Computers.

$^{24}_{12}\text{Mg}$

Climate Change

Climate Change is one of the greatest threats to the world at the moment. The mean temperature of the Earth has already increased by 0.9 degrees since the late 19th century and the rate of increase is increasing rapidly; as more and more greenhouse gases enter the atmosphere. It has been predicted that even with a rise of just 2C, most ecosystems in the world would struggle and 20-30% of all species would be put at risk of extinction. As well as these consequences there will be many other severe effects of climate change that if not prevented will change the way that we live.

Climate change has many causes but the main one is the rise in levels of greenhouse gases in the atmosphere. This means that due to the greenhouse effect where, heat is reflected back into the atmosphere, the global temperature rise. These greenhouse gases are created through many different means but the main causes of climate change are human activities.



Greenhouse gasses are gasses that contribute to the greenhouse effect by absorbing infrared radiation. The largest greenhouse gas, by percentage of total greenhouse gas emissions, is carbon dioxide that makes up 74.4% of greenhouse gas emissions. There are a number of ways that carbon dioxide is emitted into the atmosphere. One of the large causes of greenhouse gas emissions are where fossil fuels are burnt to generate electricity. Large amounts of CO₂ and other harmful gasses are released when fossil fuels are burnt. Another large cause of carbon dioxide emissions is the production of cement that made in a way that consumes a lot of fossil fuels, and it creates carbon dioxide from breaking down the materials. A large contributor to carbon emissions is deforestation where Carbon trapped in the trees escapes when they are cut down and burnt. Deforestation also stops trees from taking in any carbon dioxide out of the atmosphere so it only increases the rate of global warming. A cause of greenhouse gas emissions is agriculture because livestock produce a lot of methane which is a greenhouse gas and pesticides release large amounts of nitrogen. Another well known cause of greenhouse gas emissions is Travel because carbon dioxide and many other gasses are created in car emissions.

5 things you can do to help stop climate change:

1. Use energy wisely. E.g. if you walk out of a room turn the light off.
2. Use renewable energy. Use energy that has come from a renewable source such as energy created through wind power.
3. Eat a stable diet. Try to eat organic and local food where possible and make sure you don't waste the food you buy.
4. Travel in a carbon efficient way. If you can ride a bike instead of using your car and if you can't share a lift with somebody that lives nearby.
5. Buy items such as clothes and electronics that have been sustainably sourced and have not travelled miles via a plane.



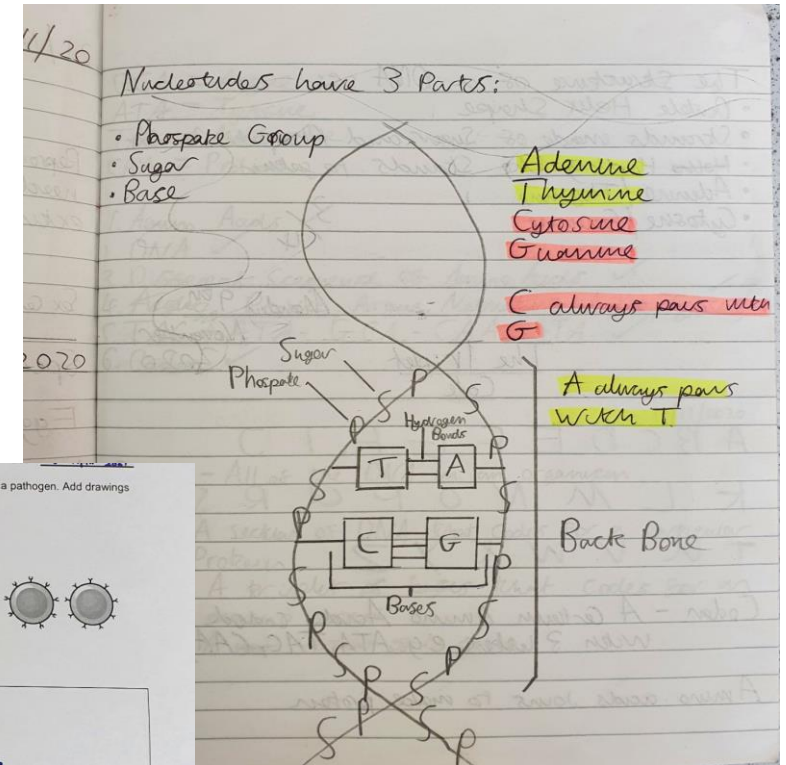
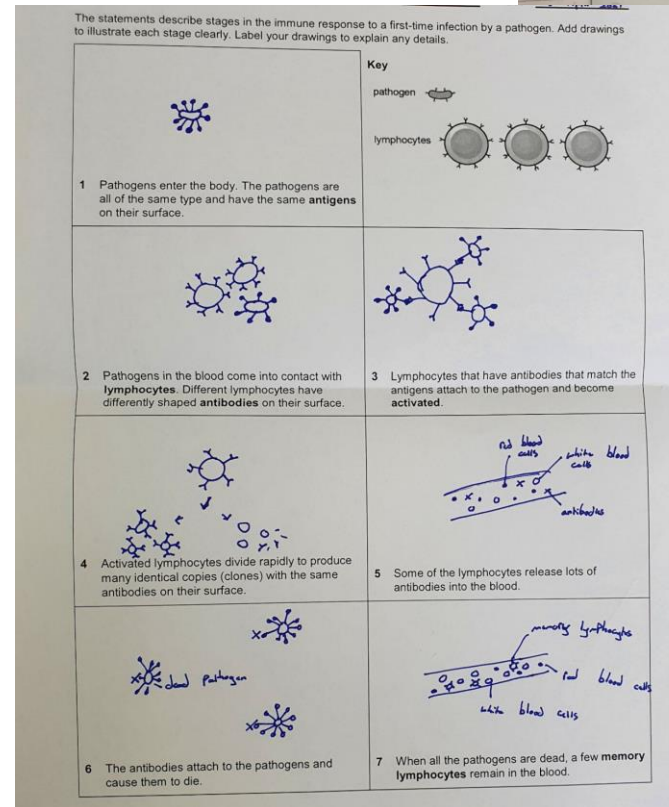
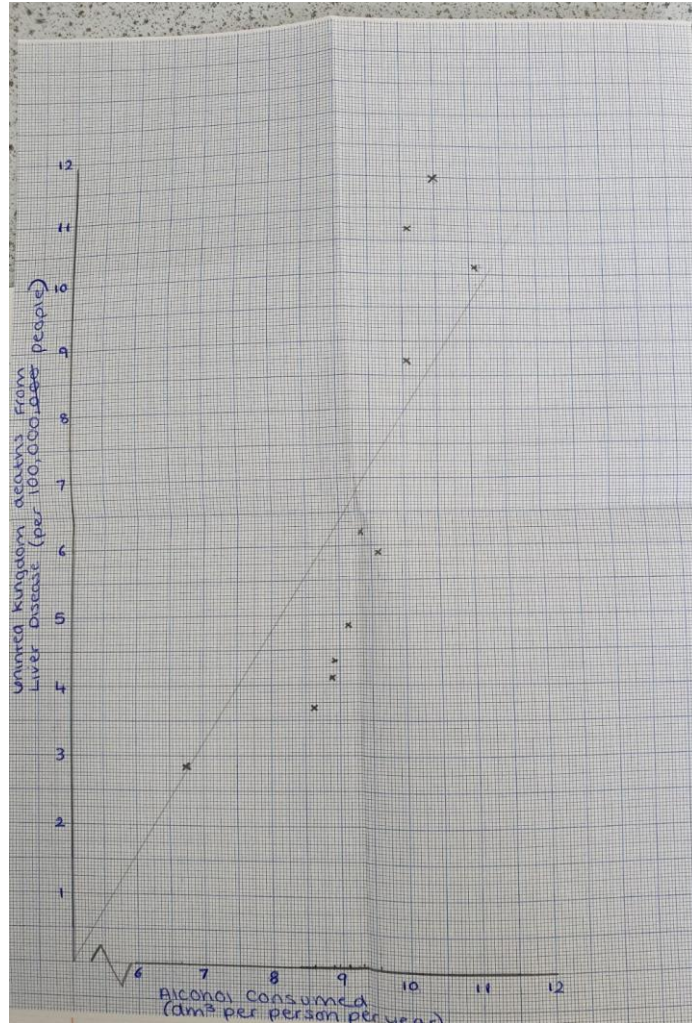
Climate change will have many incredibly severe and widespread impacts. One of the main and most apparent impacts of climate change is a rise in global temperatures. The rise in temperatures will have many impacts other than just being uncomfortable: harvests will fail leading to food shortages, extreme weather such as droughts and typhoons will become more common, the ice caps will begin to melt and lakes all over the world will shrink causing massive water shortages. Temperature rises have the potential to melt the permafrost, this contains huge amounts of methane gas and if the permafrost melted it would speed up climate change to rates that we could not recover from. Increased global temperatures also cause the expansion of the sea that is the main cause of sea level rise. Carbon in the atmosphere causes the acidity of the sea to rise that causes the bleaching of coral reefs.



Impact



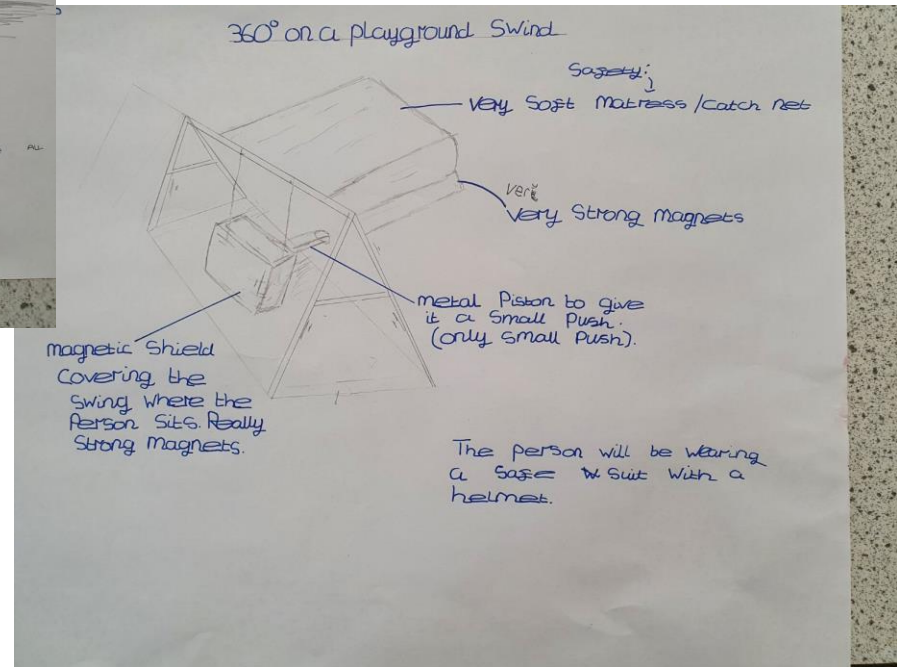
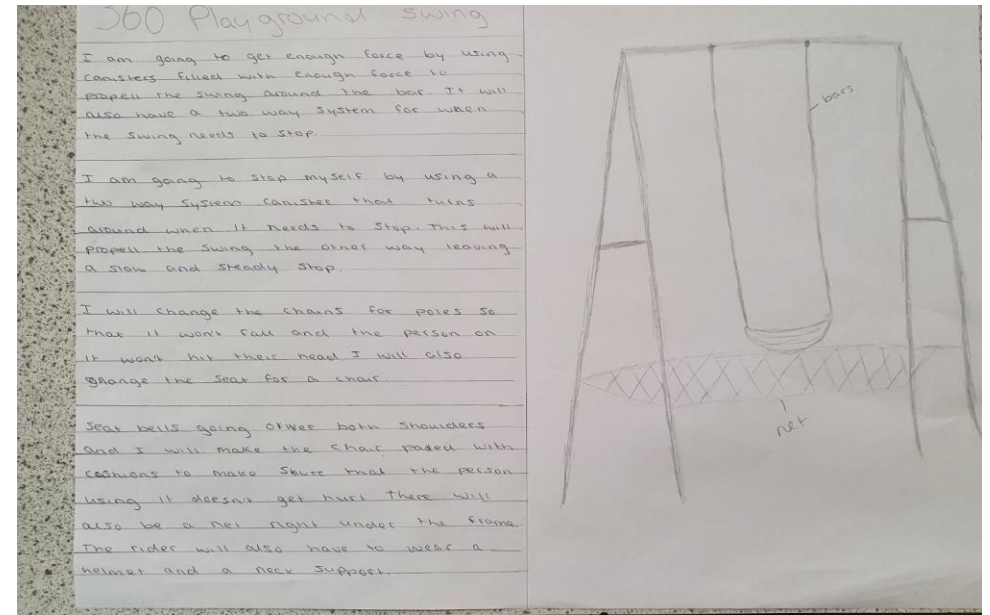
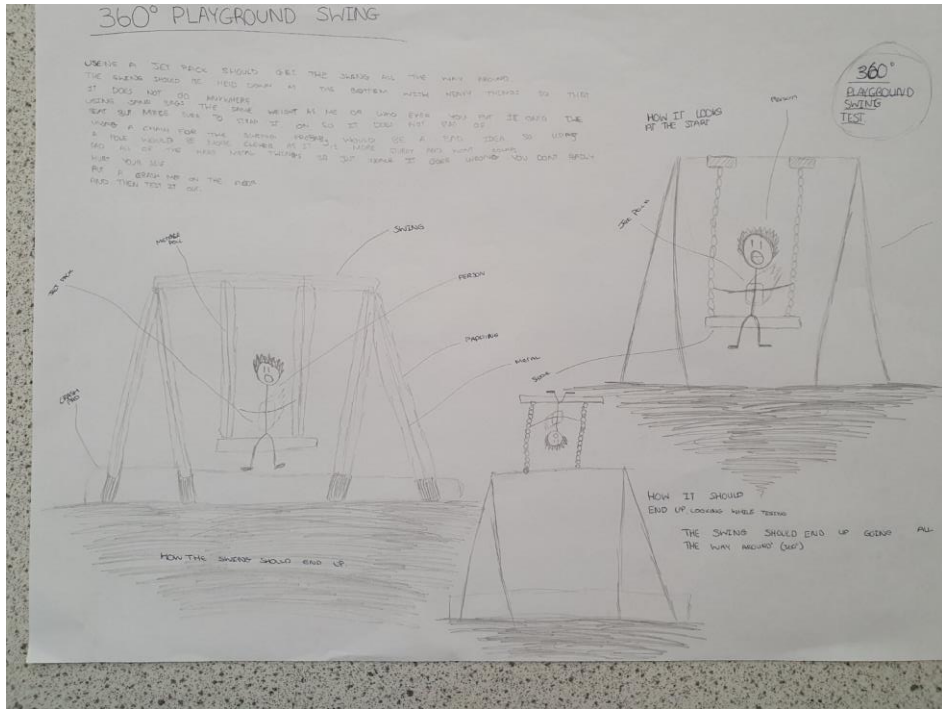
Examples of progression in Science Y10 Biology





Examples of progression in Science Y10 Physics

Impact





Impact



Examples of progression in Science Y10 Physics

A graph to show the number of remaining cells

Monday 13 November **Half life (pt)**

Half life is the time taken for half of the radioactive atoms to decay. The half life of a radioactive sample does not change with time, it is constant.

- Half life is the time taken for half of the radioactive atoms to decay.
- 30 minutes
- 2 hours down to 1 hour
- 21g
- 10 years

Carbon Dating

- carbon = C_{14}
- it decreases over time in dead organism
- organic dead organisms material
- there would be very little left they would have decayed

Thursday 14 November 2021

Using Conservation of Momentum in Collisions

$m_1 u_1 + m_2 u_2 = m_1 v_1 + m_2 v_2$

Example One

Before: $1000 \text{ kg} \times 10 \text{ m/s} = 10000 \text{ kg m/s}$

After: $1000 \text{ kg} \times 15 \text{ m/s} + 1000 \text{ kg} \times 5 \text{ m/s} = 15000 + 5000 = 20000 \text{ kg m/s}$

Example Two

Before: $1000 \text{ kg} \times 10 \text{ m/s} = 10000 \text{ kg m/s}$

After: $1000 \text{ kg} \times 15 \text{ m/s} + 1000 \text{ kg} \times 5 \text{ m/s} = 15000 + 5000 = 20000 \text{ kg m/s}$

1) [1kg] 3m/s + [1kg] 0 = [2kg] v

$(1 \times 3) + (1 \times 0) = 2v$

$3 = 2v$

$v = 1.5 \text{ m/s}$

2) [2kg] 5m/s + [1kg] 10m/s = [3kg] v

$(2 \times 5) + (1 \times 10) = 3v$

$10 + 10 = 3v$

$20 = 3v$

$v = 6.67 \text{ m/s}$

End of Unit Test Higher

Sciences CP2

5. A car is travelling at 10 m/s. It then accelerates at 5 m/s² until it reaches a velocity of 20 m/s. Calculate how far it travels while it is accelerating.

Use this equation $v^2 - u^2 = 2as$

$20^2 - 10^2 = 2 \times 5 \times s$

$300 = 10s$

$s = 30$

6. The graph shows how the velocity of a train on a model railway changes during part of a journey.

7. Between which times is the train travelling fastest? **15 and 30 seconds**

8. Use information from the graph to calculate the acceleration of the model train between 5 and 15 seconds after the beginning of its journey. Show your working.

$a = \frac{v - u}{t}$

$a = \frac{0.5 - 0}{10}$

$a = 0.05 \text{ m/s}^2$

acceleration = **0.04 m/s²**

(Total for Question 6 = 4 marks)

(TOTAL FOR TEST = 25 MARKS)

TASK THREE - Skills

Review your answers and find questions where you have not gained full marks. Using the table below to help you, identify why you lost the marks and record how many marks were lost in the tally chart.

Reason mark was lost	Tally	Total
Maths questions (calculations, decimal points, units etc...)		3
Application (using what you know to explain something in a unfamiliar context)		
Reading the question (correct use of command words such as describe, explain, suggest)		
Clarity of expression (correct keywords used, no repeated points)		
Knowledge (did you know the topic?)		
Statements per mark (written enough different points to gain the full marks available for the question)		

Use the totals to identify the key area you need to improve for the next test and set a target based on this in the space below.

Target:

I need to thoroughly learn the equations for collisions, forces in velocity and the way to obtain the answers

How I will achieve this:

improve maths abilities and practice questions like this

Use websites like science or Isaac Physics

Work done by a force = Force x distance

Work done by brakes = Frictional force x braking distance

The KE of the car before braking is transformed as thermal energy in the brake blocks.

hence: $KE = \text{Frictional force} \times \text{braking distance}$

$KE = \text{Frictional force} \times \text{braking distance}$

$1 \text{ kW} = 1000 \text{ W}$

$1 \text{ megawatt (MW)} = 1000000 \text{ W}$

20th April 2021

Power: 1000 W

To measure the power output of each student, each student has many times that student can lift the weight in 30 seconds. Measure the distance of their feet from the middle of the weight.

Then calculate the work done by the student. Then calculate the power by dividing the work done by 30 seconds as power = work done / time

$W = 65 \text{ kg} \times 5^2 = F \times d$

$1625 = 25$

$F = 406.25 \text{ N}$

$W = 130 \times 5^2 = 406.25 d$

$d = 4 \text{ m}$



Impact



Examples of progression in Science Y12 Physics

$V = k \cdot \frac{1}{m}$
 $k = 3.18 \times 10^3 \text{ N/m}$
 Calculated value for Hooke's constant = $3.18 \times 10^3 \text{ N/m}$
 Accepted value for Hooke's constant = $6.62 \times 10^3 \text{ N/m}$
 Percentage difference = $\frac{6.62 \times 10^3 - 3.18 \times 10^3}{6.62 \times 10^3} \times 100 = 52.0\%$

Reason for the actual level of accuracy could include random human errors in experimental technique such as reading and/or repeating light when observing the visible or electronic detector. However, these should have been removed in the repeated experiments which reduced the obvious anomalies in my results.

m / kg	t ₁ / s	t ₂ / s	t ₃ / s	T ₁ / s	T ₂ / s	T ² / s ²
0.100	4.23	4.35	4.32	3.34	0.334	0.112
0.200	4.35	4.32	4.26	4.26	0.426	0.181
0.300	4.94	4.94	4.94	4.94	0.494	0.244
0.400	5.75	5.75	5.41	5.59	0.559	0.312
0.500	6.22	6.19	6.00	6.14	0.614	0.377
0.600	6.97	6.72	6.66	6.78	0.678	0.460
0.700	7.15	7.50	7.31	7.32	0.732	0.536
0.800	7.97	7.75	7.66	7.79	0.779	0.607
0.900	8.50	7.86	8.13	8.16	0.816	0.666
1.000	8.31	8.43	8.60	8.45	0.845	0.714

$T = \frac{4\pi^2}{k} m$
 gradient = $\frac{4\pi^2}{k}$
 $k = \frac{4\pi^2}{\text{gradient}}$
 $k = 26.3 \text{ Nm}^{-1}$

In order to test the accuracy of my calculated value, I would need to repeat my experiment at least 3 times and compare the different values I obtain for the spring constant, calculating an average from these, since the spring used has an unknown spring constant value.

Uncertainties:
 Absolute uncertainty in mass = 0.00kg
 " " time = 0.01s + 1/visual reaction time
 Human reaction time to visual stimulus = 0.10 / 0.25s
 Total percentage uncertainty = $\frac{0.001}{0.05} \times 100 + \frac{0.01}{3.28} \times 100 + \frac{0.25}{3.28} \times 100$
 = 2% + 0.3% + 7.6%
 = 9.9%



Impact



Examples of progression in Science Y12 Biology

4th of November

REQUIRED PRACTICAL 4

The effect of temperature on the movement of pigment through the cell membranes.

Beetroot cells have red anthocyanin pigment in their vacuoles. The membranes are too weak to see but this investigation will be measuring the rate that anthocyanin leaves the cell at different temperatures.

Aim:
Compare beetroot cylinders using water not and work them 24 hours before starting step one. (Then six to ten long.)

1. Boil a bottle full distilled water and put around 200cm³ of the water in a beaker.
2. Wash the bottle if boiling place 10cm³ of distilled water into 10 test tubes labeled with 85, 80, 75, 70, 65, 60, 55 and 45.
3. Place one beetroot cylinder in the (temperature at 85°C) water for exactly one minute. After the minute place the beetroot into the test tube labeled 85 and stir a finger coating upwards.
4. As the water in the beaker cools to the next temperature place another beetroot cylinder in for another minute. Repeat for all temperatures.
5. Leave the cylinders to cool for exactly 30 mins so by recording when they went in on their original timer, their times can be calculated.
6. After the 30 mins shake the cooled cylinder 20 times, then remove the beetroot cylinder by pouring the entire contents into a beaker then pouring only the liquid back into the test tube.
7. Place a small amount of the liquid into a cuvette. Then use a colorimeter to measure the amount of pigment in the water. The colorimeter should be set to absorb at 470nm. (passing blue light)

Results:

Temperature (°C)	Absorbance (arbitrary units)
85	1.492
80	1.483
75	0.715
70	0.572
65	0.454
63	0.536
60	0.260
55	0.045
50	0.032
45	0.010

CPAC
4/21
4/6

Photo of results:

Temperature: 85°C, 80°C, 75°C, 70°C, 65°C, 63°C, 60°C, 55°C, 50°C, 45°C

Gradient of colours from red-pink to almost colourless.

Labels for the first heart: Lung, Diaphragm, Trachea, Larynx.

Labels for the second heart: Trachea, Aorta, Bronchiole, Bronchus.

Labels for the third heart: Lobe of lung, Trachea, Aorta, Bronchiole, Bronchus, Lobe of lung.

Labels for the fourth heart: Inflated lung lobe, Ring of cartilage 'C' shaped.

Caption: Opening of larynx made of cartilage.

REQUIRED PRACTICAL 7

Chromatography of chlorophyll and other leaf pigments

14th September

leaf as petroleum ether is very volatile (evaporates easily).

Filter paper held and secured with a drawing pin.

Pin at least 2cm from the bottom (origin).

Coloured spots of crushed leaf (normally three circles from the cork borer, then stained with a glass rod).

Solvent (petroleum ether)

When cutting slots from the leaf avoid the veins and midrib.

Labels for the heart dissection: Right ventricle, Left ventricle, Septum, Thick muscle wall, Left ventricle, Bicuspid valve, Tricuspid valve, Aorta, Semi-lunar valve, Pulmonary artery, Vessel valve.

Leaf	Chlorophyll a (Colour 1 (mm))	Chlorophyll b (Colour 2 (mm))	Xanthophylls (Colour 3 (mm))	Solvent front (mm)
A	20	34	43	93
B	19	30	44	94

Order:
 • Xanthophylls
 • Chlorophyll a
 • Chlorophyll b

Leaf	Colour 1	Colour 2	Colour 3	solvent front
A	0.215	0.366	1.000	0.99
B	0.142	0.303	1.000	0.92

Rf value:
 Chlorophyll a: 0.33
 Chlorophyll b: 0.38

Rf = distance moved by pigment from origin to centre of pigment spot / distance moved from origin to solvent front.



Impact



Examples of progression in Science Y12 Chemistry

BONDING

ACROSS -

1 = A type of diagram used to show electrons in a chemical bond. (3,3,5)

3 = A type of covalent compound that forms a giant lattice structure (1,4)

5 = An element located on the left or centre of the periodic table (6)

7 = An electron in a lattice which is free to move (11)

9 = A type of bond in which electrons are transferred from metals to non-metals. (5)

11 = A compound consisting of covalently bonded molecules, held together with weak van der Waal forces. (6,9)

DOWN

2 = A type of bond in which electrons are shared between two non-metals. (8)

4 = A type of covalent bond in which both electrons in the shared pair are supplied from a single atom. (6)

6 = A type of bond in which a lattice of positively charged ions are surrounded by a 'sea' of delocalised electrons. (8)

8 = A 3-dimensional structural arrangement of particles. (7)

10 = A particle which contains protons, neutrons, and electrons (4)

12 = An element located on the right of the periodic table. (3,6)



Impact



Examples of progression in Science Y12 Chemistry

12/3/21

Required Practical 5

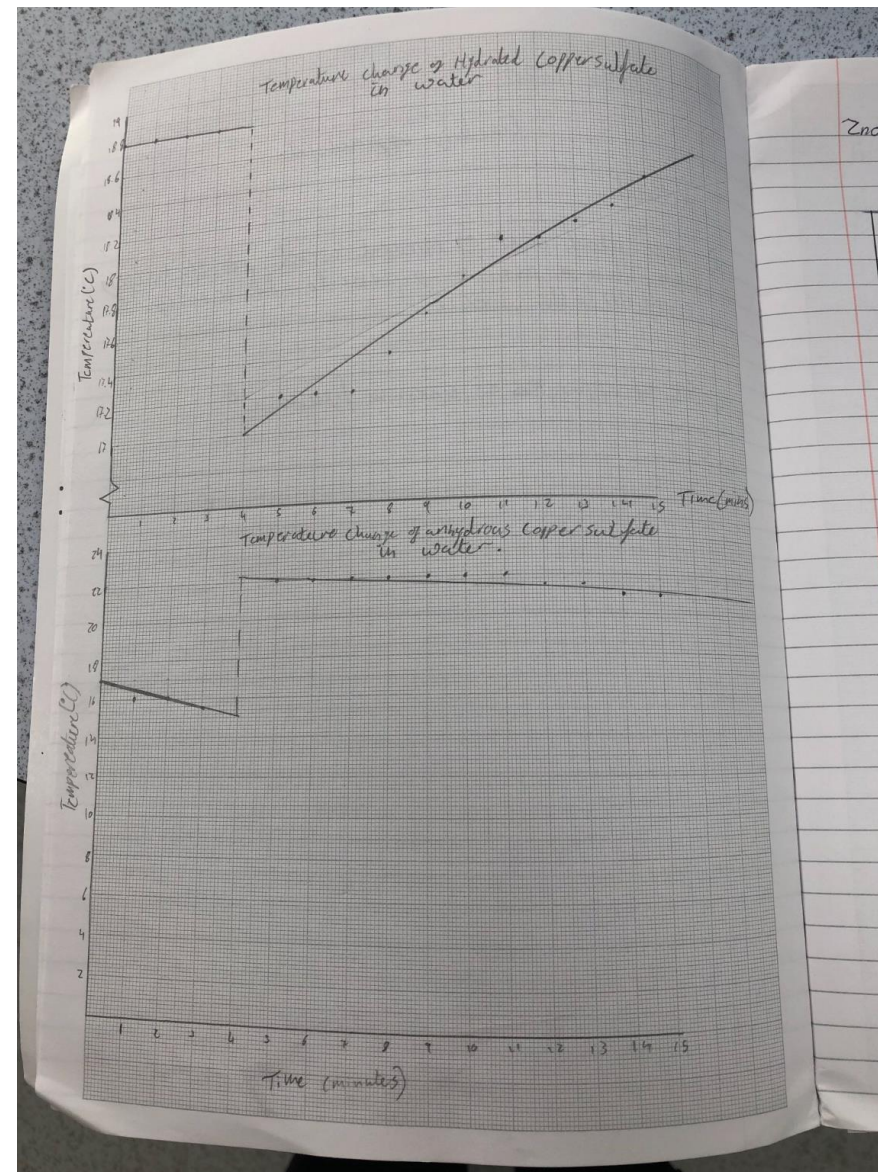
- Distillation of a product from a reaction
- Prepare ethanal (aldehyde) by the oxidation of ethanol and to distil the ethanal from the reaction.

Diagram

Observations

During oxidation there was a colour change inside the pear-shaped flask from orange to green. This was the acidified sodium dichromate (V) changing oxidation states from +6 to +3. The liquid also produced bubbles as it was heated.

When we added the aldehyde to the tollens' reagent we saw the formation of a grey precipitate and a small silvery patch on the boiling tube. The precipitate was the Ag^+ ions being reduced and silver forming.





Impact



Enrichment

In normal circumstances we have a wealth of extra-curricular activities taking place, including: Science club, Astronomy Club, Whitworm, STEMM Youth Award, G&T Competitions for all years, Problem Solving, Workshops with feeder schools, Astronomy evening, Science Fair.

We also run many school trips to the Cavendish Laboratory, UEA, Cambridge University, Babraham Institute, Science Centre, Lackford Lakes, CERN, Sanger centre, Big Bang fair. PP students are offered trips free of charge and many take advantage of all these activities.



Impact



Cultural capital

Teachers will regularly use local context to introduce new concepts and core practicals. For example, the research taking place at Treatts on esters in Y11 or the importance of the draft when the container ships enter Felixstowe Port when investigating the density of salt solutions.



Impact



Careers development

We invite local companies to give lunchtime talks to our students which include:

TREATTS

British Sugar

UEA

Rolls Royce

Medical Mavericks

RS Truck

More recently we have joined live career talks provided by the local businesses during British Science week.