Science department curriculum intent

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Link governor: Simon Peach

Department curriculum intent – Introduction

To have a broad and balanced curriculum that provides students with ample opportunity to understand the world around them.

In KS3, students study the Science Works curriculum, with additional content delivered to ensure that more than just the national curriculum is covered, and relevance is highlighted to needs and applications of science in the local area. In year 7, students begin by looking at big ideas in science, such as particles or cells, which provide a strong foundation for the development of knowledge across scientific disciplines in future years. It also builds on KS2 topics, such as 'Living things', in which students first discuss cell theory, but not in as much detail as at KS3. The national curriculum is covered into year 9, with ample opportunity for the development of skills in planning, carrying out and analysing practical experiments and their results.

In KS4, students study either combined or separate sciences, which build on the strong foundations gained at KS3, and develop students understanding of science to help them explain the world around them. Combined science provides a strong basis by which to move onto further study in a related area, such as going to college to study equine management or science based A-levels, whereas separate science is tailored to provide a more challenging curriculum that prepares students more thoroughly for post 16 study in the sciences. Students study topics which cover all statutory aspects. Topics are taught in line with what we believe to be most accessible for students during their cognitive development- for example we teach P3- Electricity, last, as this benefits from prior teaching in Physics in energy and generation of electricity before we look at the more complex concepts found in P3. See curriculum mapping and GCSE intent below for more information. Students are able to access all recommended practicals and through this comprehensive approach examining theory, application of this theory in the modern world, and the working scientifically strands embedded through the key stage, students build both their scientific and cultural capital.

At post-16, students study one or more Science A-levels, each of which have a different specification. In Physics, AQA is taught as this has the option to deliver elective modules which students can choose based on their preference. This provides the students not only with a breadth of understanding across disciplines within physics, but also enables them to develop understanding of new areas not previously seen before at GCSE. Biology uses Salters-Nuffield (Advanced Biology) which is structured as themed topics, each topic area having a story/concept connected to them. This enables students to really identify with the subject matter more closely and understand the application and relevance of developing their knowledge. Chemistry runs the OCR A Specification, which takes concepts first developed at GCSE and delves into them in much greater depth. The initial part of the specification focuses on core ideas in chemistry, which enables students to bring their understanding and skills up to speed very quickly, providing a strong bridge between GCSE and A level chemistry.

Rationale

In order to develop an outstanding curriculum, several key aspects were first considered.

1) What is the ultimate goal for our curriculum to achieve?
2) How can we formulate a curriculum that meets this need?
3) What evidence can we base our curriculum on?
4) How can we put our curriculum into place successfully? (implement)
5) How will we know if the curriculum is successful (impact)?

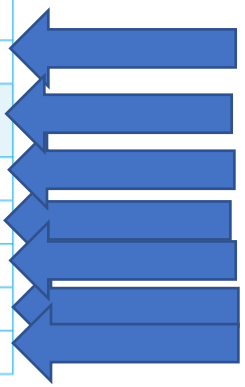
1) Ultimately, the curriculum should be structured in a way that all children, regardless of colour, creed, gender, disability or socio-economic status are able to move onto the next steps that are appropriate and successful for them. We aim to ensure all young people are scientifically literate and able to understand the world around them.

2) Our curriculum should meet a range of success criteria:
   a. It should meet all statutory requirements- the national curriculum should be covered at all key stages, and all specification points covered at GCSE and A-level.
   b. It should include a broad range of learning opportunities: classroom based, written tasks, practical activities, opportunities to learn from others and activities outside of the classroom, to include field studies, trips and extra-curricular opportunities.
   c. It should have appropriate provision in terms of content, literacy and numeracy to stretch the highest ability learners and support those students who may be lower prior attaining students, those with SEND, or those that find appropriate classroom conduct challenging.
   d. It should promote students emotional, physical and social development where possible through effective personal development provision within the curriculum.
   e. It should have, at all stages, the opportunity for students to engage with their learning, and not be passengers.
   f. It should use assessment, both formative and summative, to inform planning and support for students' next steps.

3) A wide range of evidence was considered when designing the curriculum at KS3. A need was highlighted from our exam analysis of combined and separate science that suggested the scientific skills base of our GCSE students was lacking. We, as teachers of science, always have a strong focus on content, and the majority of what we teach is content based. Research by Mannion & Mercer (2018) identifies a real need in education to have a strong focus on skills as well as content. This conclusion is supported by a raft of evidence (Ergul *et al,* 2011, Saido *et al* 2018). A course attended in May 2020 supported the idea of having a strong basis of practical and skills-based education in science, which supports learners in both achieving strong outcomes and supporting their next steps.

However, research is not the only motivator for increasing the focus on scientific skills. Examining the Assessment objectives (AOs) for combined science below (separate science's AOs are identical), those marked by arrows indicate a skill-based AO, or one that depends on having a strong scientific skill set, rather than knowledge recall. However, what we are not suggesting is a removal of any content, rather an improvement in the training of skills. Research supports the idea that teaching scientific skills result in longer term retention of both skills and content, than a heavy content-based approach alone (Spektor-levy *et al,* 2009).

Assessment Objective elements	
AO1	**Demonstrate knowledge and understanding of scientific ideas and scientific techniques and procedures.**
AO1.1	Demonstrate knowledge and understanding of scientific ideas.
AO1.2	Demonstrate knowledge and understanding of scientific techniques and procedures.
AO2	**Apply knowledge and understanding of scientific ideas and scientific enquiry, techniques and procedures.**
AO2.1	Apply knowledge and understanding of scientific ideas.
AO2.2	Apply knowledge and understanding of scientific enquiry, techniques and procedures.
AO3	**Analyse information and ideas to interpret and evaluate, make judgements and draw conclusions and develop and improve experimental procedures.**
AO3.1	Analyse information and ideas to interpret and evaluate.
AO3.1a	Analyse information and ideas to interpret.
AO3.1b	Analyse information and ideas to evaluate.
AO3.2	Analyse information and ideas to make judgements and draw conclusions.
AO3.2a	Analyse information and ideas to make judgements.



In setting the context for the curriculum, feeder primary schools' KS2 science curricula were examined and checked to see how well our curriculum supports student transition. It became clear that although content was covered, there was a large gap present in students practical experience and skills knowledge, as often primary schools did not have the facilities or the equipment to support good practical work. This was further supported when speaking to students as part of a student voice activity at a local feeder primary school, where they were eager to develop their practical skills through the more complex experiments that are completed at secondary school. The impact of covid closure as well cannot be underestimated- students across all key stages have had far less time spent in science lessons, and at secondary, less time spent in the lab. It is therefore crucial we ensure adequate scientific skills are developed and honed alongside knowledge.

At KS4 and being a small school in a rural area, we must consider that a large proportion of our students progress into vocational subjects and training (42% in 2019), so we must ensure our curriculum supports these students in being able to access practical, skills based training (they will need to know how to read a manual telling them how to assemble a component, or understand the range and limit of tensile strength on baler twine). It is with these students, as well as those that stay on to post-16 science study (who are required to demonstrate a core competence in practical skills) who we must always be mindful. Student voice with year 12s supported this conclusion, with student remembering practicals and activities from over 5 years ago, and believing the skills they developed at both KS3 and KS4 were crucial for their success at GCSE. This begs the question: if we can support the wider development of key scientific skills, could we support more students to achieve their desired outcomes than we currently already do?

At GCSE, why do we deliver this the way we do? In most cases, we use the recommended approach set by the exam boards, comprised of experts who suggest the order of teaching. However, to meet the needs of our students, we deliver content occasionally differently to this. An example being we deliver C2 (atomic structure) before C1 (air and atmosphere), as we believe understanding the structure of atoms supports the understanding of how the atmosphere is comprised more successfully. Where changes to delivery are made, they are discussed by all staff, trialled and then decided upon. The delivery of content in this fashion has been in place for several years and has been well regarded by our students and staff alike. With a 2-year KS4, we must also be mindful of time, and utilise smaller assessments so as to maximise time spent learning, and then use mock assessment points to take more detailed summative assessment. I am also keen to begin to embed spaced retrieval practice, in line with Hopkins *et al*, 2016, who found that using spaced retrieval practice significantly boosted student retention- as a dept we have a range of retrieval practical starters in place, and a retrieval lesson per topic will be planned and implemented for academic year 21-22.

4) The implementation of the curriculum is an intensely complex exercise, and one that depends on a multitude of factors; however, I believe it can be summarised into the following three aspects:
    a. Leadership: how leadership throughout the school supports the implementation of the curriculum, from the senior leadership team implementing a strategic and supportive role, to departmental leadership who are responsible for identifying issues and solutions, giving the department focus and direction and ensuring compliance with systems and initiatives.
    b. Teaching: The quality of teaching, broken down into the planning for specific classes, each containing a unique learner profile, in some cases those containing students needing additional support, or those that would benefit from additional challenge. The delivery of engaging, interesting and functional lessons, the quality of feedback given to students and how they act on it to improve their understanding, and the ability to steer learners and engage those that may find consistent good conduct a challenge.
    c. Students: We must also consider the students we teach as crucial in the delivery of a curriculum, and by extension, the situation and home life the students find themselves in. In order to maximise the impact the curriculum can have, students should be motivated and not passengers in their learning. As teachers, we can support and promote this, but we must also look to parental engagement as key in promoting engagement with learning in general. Parents should be aware of what their child is learning and how it fits into their educational journey, so that they feel involved and able to support their child appropriately.

5) In short, the curriculum will be successful if our intent is met. All students, regardless of ability, SEND etc. will make the progress they need, achieve the outcomes they deserve, and progress onto further study, apprenticeships or work as functional, healthy and productive members of society. The big question, is how do we measure this? Again, this can be broken down into key metrics that can be measured:
    a. Outcomes: How do our students perform in examinations? Are there any gaps between key student populations? If there are, then what strategies are in place to close them? Do student outcomes allow for students to make the progress to post-16 education and training that supports them in their personal growth?
    b. Progress review points: How are our students progressing through their time with us? Are there gaps forming that can be closed before examinations? Are there students underperforming and what support can be put in place for them? Are there issues in a particular subject or teachers' class and are there reasons for this?
    c. Student progression data: Do students go on to study at their first-choice institution or course?
    d. Student voice: What do students say about their learning? What do they enjoy or find hard? Where do they find stumbling blocks, and how can we address these? Are key student populations saying the same thing about subjects, or are there differences in perception; how do we change these?
    e. Staff voice: How do staff find the curriculum- does it support all students? Are there students falling behind in the opinion of, and if so, how can we support them? Does the curriculum ensure high quality learning experiences for all, and is it interesting to deliver?
    f. Parental voice: How do parents find our curriculum supports their children- do they know what is taught and where it is taught? Do they know how to support their children with home learning, and places to locate resources when they are unsure. Is the website a good source of information?

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Year 7

Overall curriculum intent for year 7: Students will be introduced to the basic key ideas in science across all three sciences, to build a broad and basic understanding of science at KS3.						
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**	**Half term 6**
Intent for the half term	**Introduction** to science: use of scientific equipment, safety precautions and presenting data. **Cells**: describe similarities and differences between animal, plant and microbial cells and use microscopes to view different cells.	**Particles:** understand how solids, liquids and gases behave, using ideas from the particle model **Energy**: understand the way that energy can be stored and transferred, and different energy sources.	**Reproduction**: understand the process of plant and animal reproduction, including puberty and birth in humans. **Elements and compounds**: understand the differences between elements, compounds and mixtures, in terms of their particles and properties.	**Electricity and magnetism**: understand how electricity flows through different types of circuits and components, and how this can be used in electromagnets.	**Differences**: understand the causes of differences within a species as a result of genetic and environmental factors. **Chemical Reactions**: Understand how chemical reactions occur	
Content mapping	Introduction, Cells and Particles topics	Cells, Particles, Energy topics	Reproduction, Elements and compounds, electricity	Electricity, reproduction, investigation	Differences, Chemical reactions	
Assessment mapping	Summative: End of topic tests Formative: marking tasks within topic					End of year assessment
Personal development mapping			Developing pupils' age-appropriate understanding of healthy relationships through appropriate relationship and sex education		Understanding and appreciation of the range of different cultures in the school during differences topic	
Literacy focus for the half term	Reading- Students develop ability to read scientific methods and comprehend their meaning	Grammar & Vocab- Students using glossaries to understand meaning of key scientific terms. Use of bullet	Writing- Students considering the effect of puberty/pregnancy on young people and carrying out extended writing tasks in response.	Spoken English- Students give presentations on aspects of current science that interest them. Using the	Reading- Students read primary source materials on lesson topics.	Grammar and Vocab- Using subject specific vocab during differences topic. Tabular recording of information in chemical reactions

		pointing to summarise information during method writing		correct vocabulary when delivering.		
Numeracy links	Measurement of mass, volumes, times, temperature	Measuring melting points/ comparing MP/BP, simple mathematic process	Determining basic mathematical relationships between current and voltage in different circuit types	Recording key measurements, understanding age specific changes, dates and events during pregnancy	Measuring quantities, stoichiometry, conservation of mass theory	Discussing qualitative/quantitative and continuous/discontinuous data
Cross-curricular links to other subjects	Link to PE/ PSHCE- disease causing organisms (cells). Catering- temperature and chemical changes (particles)	DT & Geography- types of energy, methods of generation- power stations (Energy)	PSHCE- Sex and relationships (Reproduction),	DT- Electrical circuits, current, voltage, resistance. Maths- relationships between physical concepts (electricity)	PE- Physical traits, function of anatomical features (differences) DT- Biometrics (differences)	Maths-variables and data types
Careers	Discussion of professional scientific method- how scientists work!	Role power stations have in society	Role of doctors and HC professionals in gestation, IVF and parturition	Role of electricians and electrical engineers	How chemists create useful chemicals	Role of population scientists and public health (on pop. Height for example)
Support for all	All tasks have lower ability support sheets, that encompass a range of activities, but allow for a strong and comprehensive understanding to be established. Lower ability PowerPoints are also used. Teachers scaffold in lessons using a variety of techniques and training.					
Examples of differentiation for lower prior attaining	Drawing and labelling equipment, scavenger hunts to locate equipment	Moving diagram of particle arrangements, students representing particles	Video introduction to reproduction, gentle approach, linking to prior content at KS2	Lots of demonstrations, explanations at a range of levels, translating circuits to diagrams, moving diagrams/ modelling of what happens in a circuit	Discussing differences of creatures/animals in their lives, drawing images of a 'new creature' using creative approaches	Demonstrations of interesting reactions, engaging, use of prefilled sheets/cloze activities for naming chemicals
Challenge ideas	When does a cell become a particle? What about a particle becoming a cell?	What does $E=mc^2$ mean? What does this tell us?	How does an ultrasound probe work?	How can we make our homes use less electricity?	Can you beat your phones biometric security?	Why can we only see so far when we look into space?

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Year 8

Overall curriculum intent for year 8: To build upon content from year 7 and develop, deepen and broaden understanding of scientific principles and ideas						
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**	**Half term 6**
Intent for the half term	**Space**: To understand the scale, movement and conditions found in space	**Acid reactions**: understand how to determine the acidity of a liquid, and the different reactions of acids and alkalis.	**Sound**: understand the process of sound transmission, including pitch, volume and human hearing.	**Photosynthesis and respiration**: understand the importance of photosynthesis and respiration for maintaining life on Earth.	**Life support:** understand the processes and systems that make up the healthy human body, including breathing, circulation, digestion and skeletons. **Periodic Table:** understand the development and arrangement of the Periodic Table, highlighting key groups present.	
	Forces: understand the different forces acting on an object and how this affects the motion of the object		**Light**: understand the interaction of light with surfaces and objects, and that white light is a mixture of different colours.			
Content mapping	Space, Forces & Acids		Sound, Light, Photosynthesis and respiration		Life support, Periodic table	
Assessment mapping	Summative: End of topic tests Formative: marking tasks within topic					End of year assessment
Personal development mapping	Sense of enjoyment and fascination in learning about themselves, others and the world around them			Developing pupils' understanding of how to keep physically healthy, eat healthily and maintain an active lifestyle	Enabling pupils to recognise online and offline risks to their well-being – for example…substance misuse	Sense of enjoyment and fascination in learning about themselves, others and the world around them;
Literacy focus for the half term	Reading Student following written instruction during practical, reading task forces	Grammar and Vocab Use of glossaries to understand specific terminology. Linking ideas across paragraphs during experiment write ups	Writing Writing scientific reports/using scientific writing style- 3rd person passive tense (this was done)	Spoken English Students utilise subject specific terminology, using glossaries to support.	Reading Students read case studies of health, disease and illness.	Grammar and Vocab Use of bullet points to summarise information on dietary nutrients in foodstuffs.
Numeracy links	Calculating resultant forces, use of units, concentrations, volumes, ratios,	Calculating resultant forces etc, measuring volumes, numerical pH scale	Measuring angles incidence/reflection, using IUPAC units (dB)	Measurements of rates-respiration/photosynthesis	Calculating energy content of foods	

Cross-curricular links to other subjects	Link to DT- forces & measurements of. Maths- mechanics topics	Links to catering- uses/properties of acids in foods etc	Music- instruments, note, tone and timbre	PSHCE- Diet/drugs (LS) PE- Aerobic respiration (P&R)	Geography- habitats and food chains/webs	
Careers	Engineering- concept of resultant forces/structural engineering	Role of chemists in industry and uses of acids	Musicians and sound engineers.		Medical careers- clear links to role of good biological knowledge	Ecologist/conservationist careers
Support for all	All tasks have lower ability support sheets, that encompass a range of activities, but allow for a strong and comprehensive understanding to be established. Lower ability PowerPoints are also used. Teachers scaffold in lessons using a variety of techniques and training.					
Examples of differentiation for lower prior attaining	Chunked task in forces, 1:1 support, instructions given visually	Acid reactions- use of storyboards/cartoon strips to support uses of acids	Investigation into sounds- learning by doing, creative approach	Visual instructions, moving diagrams, modelling a plant absorbing photosynthesis	Human sized diagram of digestive system, modelling- sticking exercise!	Colouring activity to identify groups in periodic table, demonstrations to engage with concept of reactivity
Challenge ideas	Explain why a small fragment of paint in orbit can cause catastrophic damage when it hits a space station	How can you tell which acid is stronger when they both turn UI deep red?	Explain why your teeth and clothes glow in a disco/laser quest etc.	What limits how fast an athlete can run?	Why were some elements on the periodic table not properly named until recently?	Are humans predators or prey? Can you be both?

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Year 9

Overall curriculum intent for year 9: To begin the transition from KS3 and the KS3 national curriculum to preparing students for their move to GCSE content by consolidating the key threshold concepts covered at KS3.						
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**	**Half term 6**
Intent for the half term	**Inside Materials**: Students develop an understanding of how materials behave and why this is. **Ecology**: Understand the interrelationships that exist between biotic and abiotic factors	**Rocks:** Understand the types and variety of rocks and how they are formed and used. **Metals Investigation:** Understand how metals undergo reactions and how we can make use of these properties	**Moving Around:** Students understand how forces cause a range of motions, and how these can be utilised. **Skills in Science:** Students undertake a variety of investigations that support the development of the essential skills needed at KS4	Students have the opportunity to review and revise key KS3 content in preparation for GCSE as part of the **Pre-GCSE** Topic.	Students begin the first GCSE topics- **P1 Waves** (Understand how types of wave result in energy transfer and how this can be quantified), **B1 Genetics** (understand how genes control living organisms and result in descent with variation)	Students continue GCSE topics and begin **P2- Energy** (Understand how energy can be generated, and the advantages and disadvantages of methods of generation), **C2 Atomic structure** (first as it looks at atomic structure and the periodic table)
Content mapping	Inside Materials, Ecology	Rocks, Metals Investigation	Moving around, Skills in science topic	KS3 topic review and GCSE Preparation	GCSE Topics P1, B1	GCSE Topics P2, C2
Assessment mapping	Summative: End of topic tests Formative: marking tasks within topic			End of KS3 test	2 assessments per topic- 15 marks mid unit and end of unit	2 assessments per topic- 15 marks mid unit and end of unit
Personal development mapping	Sense of enjoyment and fascination in learning about themselves, others and the world around them;		Use of imagination and creativity in their learning- planning novel approaches to practical problems		B1-Promoting an inclusive environment, discussing genetic differences etc.	Understanding of the consequences of their behaviour and actions- P2 discussion around energy crisis
Literacy focus for the half term	**Reading** Students become more familiar with specialist terms, reading case studies of endangered animals	**Grammar and Vocab**- correct use of homophones, e.g. when discussing metals, Steal, Steel, Iron/ion	**Writing**-adapting writing for a range of purposes; students create written reports on their investigations	**Spoken English:** Group discussion Students produce a mini plenary/similar activity on an aspect of KS3 science and teach one another	**Reading:** Summarising key points from a text- used to support revision	**Grammar and Vocab:** Linking ideas across paragraphs- formulating opinion pieces on energy generation

Numeracy links	Using, interpreting and measuring key metrics of materials- strength, extension etc, using apparatus to measure temp, surveying habitats	Understanding time scales for Geological processes, MYA etc.	Use of various types of force diagrams and calculations. Collecting, analysing and expressing data.	Revising key equations from KS3 topics	P1 wave equation, B1 probability/percentage outcome from genetic crosses	P2- energy equations, C2 timeline of models of atom development
Cross-curricular links to other subjects	Geography- habitats and food chains/webs	Geography- rock cycle	Maths- use of numerical processing			Links to history/historical perspectives
Careers	Ecologist/conservationist careers	Role of geologists locally, links to YDNP	How science works- linked to all STEM careers		Genetic counsellors/medical careers. Engineers and renewable energy scientists	Engineers/electricians,
Support for all	All tasks have lower ability support sheets and lower ability PowerPoints.				Foundation and Higher tiers delivery of content. Scheme of Work has lower ability support activities.	
Examples of differentiation for lower prior attaining	Sampling habitats, finding examples of invetebrates, drawing images of habitats, hands on approach	Chocolate model of rock cycle, modelling, hands on experience of rock types, practical watching igneous rock formation	Support sheets/ scaffolded planning sheet, 1:1 call-backs, different practical instructions given	Review of key topics relevant for GCSE foundation- cells, particles etc	Lower ability content looked at initially- Foundation tier on GCSE- waves and light- links to KS3	Modelling waves using Slinkys, building models of atoms with plasticine.
Challenge ideas	Which material would be best for a bulletproof jacket? Are humans predators or prey? Can you be both?	Why do we have lots of limestone pavements in the Dales?	Students to be given a question- plan, carry out and analyse to improve experiment	Use of GCSE questions to support revision	Rearrange wave equation to give each component, work out units. Carry out genetic crosses for unknown conditions/discuss why haemophilia affects mostly men.	Explain why many people support nuclear power but may not want one built nearby. Explain why you may or may not want a Tesla vehicle.

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Year 10 Biology

Overall curriculum intent for year 10: To both broaden and deepen understanding of key biological principles from students' KS3 starting points.						
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**	**Half term 6**
Intent for the half term	To understand the role of the immune system, vaccines and the impact of communicable and noncommunicable diseases on health		Understand the role photosynthesis plays in the global interdependence of organisms.		Understand the role respiration plays in the maintenance of life, and cells use the energy provided to grow and develop.	
Content mapping	**B2** Causes of disease, function of immune system, vaccines, plant defences	**B2** Non communicable disease, heart and lung disease and treatments	**B3** Photosynthesis products and reactants, measuring rate	**B3** Enzymes, food chains and interdependence	**B4** Types of Respiration, equations, measuring rate, fermentation, microscopy	**B4** Cell division- mitosis, meiosis, stem cells
Assessment mapping	2 topic assessments-1 mid unit and 1 end of topic, end of term assessment during mock periods **Winter mock exams**.		2 topic assessments-1 mid unit and 1 end of topic		2 topic assessments-1 mid unit and 1 end of topic.	
Personal development mapping	Enabling pupils to recognise online and offline risks to their well-being. Developing pupils' understanding of how to keep physically healthy, eat healthily and maintain an active lifestyle.		Sense of enjoyment and fascination in learning about themselves, others and the world around them.		Sense of enjoyment and fascination in learning about themselves, others and the world around them.	
Literacy focus for the half term	Reading- use of non-fiction texts from a range of sources Students read case studies of people with both communicable and non-communicable diseases. Summarise information	Grammar and Vocab Use of tables to represent mortality data from a range of diseases and illnesses.	Writing- Different forms of writing- for example producing newspaper articles on the impact of non-sustainable hunting/ fishing/farming	Spoken English- Use of subject specific terminology in verbal answers- using keywords and staff to model new terms to support usage	Reading- Reading examples of how the lesson topic links to real world applications- for example- brewing beer industrially.	Grammar and Vocab Linking ideas across paragraphs- writing responses to ethical dilemmas posed by using ethically questionable therapies.
Numeracy links	Analysing patterns of mortality in non-communicable data sets. Recognising the effect of risk factors on this		Analysing energy flow withing food chains, calculating food chain efficiency		Links to rate of breathing and respiration, understanding cell growth curves (cell division)	
Cross-curricular links to other subjects	Links to PSHCE through the promotion of healthy lifestyle choices		Links to catering- production of food		RE- Ethical dilemmas over the use of stem cells	

Careers	Health and allied professions Fitness coaches	Farming and agriculture, food production	Ethicist, sports science linked careers
Support for all	Foundation & Higher tiers delivery of content. Scheme of work has middle and lower ability support activities.		
Challenge ideas	Giving more complex data to analyse. Why does immunity to some diseases last a long time (chickenpox/shingles) whilst others do not? Can there ever be a cure for the common cold?	Explain how plants developed/gained chloroplasts. Explain the role of a keystone species, find some examples etc.	Is there a limit on how fast you can run? Could Usain Bolt be beaten in his 100m record? If not, why not?

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Year 10 Chemistry

Overall curriculum intent for year 10: To both broaden and deepen understanding of key chemical principles from students' KS3 starting points.						
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**	**Half term 6**
Intent for the half term	To understand how the Earth's atmosphere has changed historically and in response to human activity, as well as how we can improve the quality of both air and water.		Understand how metallic bonding results in metal properties and the range of ways we can extract metals from their ores.		Understand how bonding and structure of materials relates to their properties, how we can make use of these properties, and when we have used the materials, how their impact on the environment can be lessened.	
Content mapping	**C1**- development of atmosphere, pollutants	**C1** Endothermic and exothermic reactions, clean water	**C3-** Metallic bonding, properties, methods of extraction, half equations	**C3-**Crude oil, cracking, fractional distillation, polymerisation	**C4**- properties of materials, testing, covalent bonding- simple and giant	**C4**- Carbon allotropes, nanoparticles,
Assessment mapping	2 topic assessments-1 mid unit and 1 end of topic, end of term assessment during mock periods. **Winter mock exams**		2 topic assessments-1 mid unit and 1 end of topic		2 topic assessments-1 mid unit and 1 end of topic	
Personal development mapping	Developing responsible, respectful and active citizens who are able to play their part and become actively involved in public life as adults.		Sense of enjoyment and fascination in learning about themselves, others and the world around them.		Sense of enjoyment and fascination in learning about themselves, others and the world around them.	
Literacy focus for the half term	Reading Reading key texts/ information on the lesson topic- i.e. how the atmosphere evolved, how different pollutants impact differently.	Grammar and Vocab Using the passive voice during writing practical instructions.	Writing Writing practical instructions using correct tense and format.	Spoken English Discussing how bonding of substances can affect structure- use of correct terms and vocabulary.	Reading Case study of different materials: information hunt task and making notes.	Grammar and Vocab Using cohesive devices (adverbials) when explaining key concepts around bonding and structure.
Numeracy links	Analysis of air quality data, identification of correlation vs causation		Awareness of the role electricity and effect of current on the rate of electrolysis. % fractions of crude oil useful, linked to cracking to maximise yield of useful hydrocarbons.		Data analysis on material properties, choosing the right material for the need, drawing on data to support conclusions.	
Cross-curricular links to other subjects	Geography-pollution and impacts of human activity. Water use & sustainability.		DT- use of crude oil for plastics		DT- the use of materials with the correct properties for the role, using a range of materials.	

Careers	Transport and haulage sector roles, air quality and ecological monitoring scientists,	Energy supply professions, mining and metallurgical jobs	Engineers, materials scientist, automotive and manufacturing sectors.
Support for all	Foundation & Higher tiers delivery of content. Scheme of work has middle and lower ability support activities.		
Challenge ideas	Explain in more detail how a catalytic converter works in terms of adsorption and desorption. Additional separate content.	Why is mercury a liquid when all other metals are solid? Are any of mercury's other properties different? Why? Additional separate content.	What is a smart material? Discuss some advantages and disadvantages of their uses. Additional separate content.

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Year 10 Physics

Overall curriculum intent for year 10: To both broaden and deepen understanding of key physical principles from students' KS3 starting points.						
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**	**Half term 6**
Intent for the half term	Complete P2 (Understand how energy can be generated, and the advantages and disadvantages of generation methods)	To understand the nature and hazards of radioactive materials, and how we can ensure these are safely handled.		Understand how energy transforms matter and how these changes can be explained using examples such as heating and placing matter under physical stress		Understand how forces result in motion, and how this motion can be expressed in terms of energy transfer
Content mapping	**P2**- national grid, use of energy nationally	**P5**- structure of atom, isotopes, types and nature of radiation	**P5**-Half lives, activity net decline. P6 may begin early.	**P6-** density, mass, volume, energy transfers, heat capacity, latent heat	**P6**-Particle model, elastic and plastic deformation, F=kx relationships, Hooke's law. May push into HT6	**P4**- Newtons laws, forces, vectors, weight, speed/ distance/time, acceleration
Assessment mapping	2 topic assessments-1 mid unit and 1 end of topic.	2 topic assessments-1 mid unit and 1 end of topic. **Winter mock exams**		2 topic assessments-1 mid unit and 1 end of topic		2 topic assessments-1 mid unit and 1 end of topic
Personal development mapping	Understanding of the consequences of their behaviour and actions- P2 discussion around energy crisis	Sense of enjoyment and fascination in learning about themselves, others and the world around them.		Sense of enjoyment and fascination in learning about themselves, others and the world around them.		Sense of enjoyment and fascination in learning about themselves, others and the world around them.
Literacy focus for the half term	Reading Linking ideas across paragraphs when discussing	Grammar and Vocab Recognition of formal/informal language- understanding the type of language you would use to word warning/hazard information	Writing Students writing about radioactivity using key terms and language- supported by staff modelling.	Spoken English Students utilise human models/dramatic pieces/acting to demonstrate chemical concepts such as density.	Reading Students read information and translate to another medium/dual code e.g. comic strips on plastic deformation	Grammar and Vocab Writing for a purpose- creating written methods for force and motion experiments.
Numeracy links	Energy calculations	Interpretation of activity/time graphs, calculating half-lives, calculating isotopic mass		Use and rearrangement of Hooke's law equations and q=mcΔT, use of correct units, conversion between units		Motion calculations, rearranging formulae, using

				correct units and scales, scalars and vectors.
Cross-curricular links to other subjects	DT- electrical engineering	Geography/history- radiocarbon dating. Manufacturing/DT- quality control of certain materials (e.g. tin foil)	DT- strength of materials/tensile strength	Sport science- forces and motion
Careers	Electrical/renewable energy engineers	Nuclear power generation careers, medical physics careers, medical and allied health professions. Geologists, Fire services (smoke alarms)	Engineering, architect, civil engineer,	Physiologist, kinesiologist, biomechanic scientist, prosthetist, automotive engineer
Support for all	Foundation & Higher tiers delivery of content. Scheme of work has middle and lower ability support activities.			
Challenge ideas	Explain why many people support nuclear power but may not want one built nearby. Explain why you may or may not want a Tesla vehicle. Additional separate content.	Why are some radionucleotides more suited to medical applications? How can you make the risk of radiation exposure zero for an exposed health worker? Additional separate content.	Use of 6th form style questions, more complex calculations practice. Determine plastic and elastic limits of an unknown material. Additional separate content.	Complex SUVAT equations, utilising 6th form style questions to really probe understanding. Additional separate content.

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Year 10 Combined science

Overall curriculum intent for year 10: To broaden understanding of a range of scientific principles from KS3 content and examine certain aspects in greater depth.						
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**	**Half term 6**
Intent for the half term	Physics: P2 Understand how energy can be generated, and the advantages and disadvantages of methods of generation. P5: Understand the types, risks and uses of radioactive materials. Chemistry: C1 To understand how the Earth's atmosphere has changed historically and in response to human activity, as well as how we can improve the quality of both air and water. Biology: B2 To understand the role of the immune system, vaccines and the impact of communicable and noncommunicable diseases on health		P6 Understand how energy transforms matter and how these changes can be explained using examples such as heating and placing matter under physical stress C3 Understand how metallic bonding results in metal properties and the range of ways we can extract metals from their ores. B3 Understand the role photosynthesis plays in the global interdependence of organisms		P4 Understand how forces result in motion, and how this motion can be expressed in terms of energy transfer C4 Understand how bonding and structure of materials relates to their properties, how we can make use of these properties, and when we have used the materials, how their impact on the environment can be lessened. B4 Understand the role respiration plays in the maintenance of life, and cells use the energy provided to grow and develop.	
Content mapping	Students will cover: final parts of P2 national grid, use of energy nationally Beginning of P5 structure of atom, isotopes, types and nature of radiation C1 evolution of atmosphere, pollution B2 causes of disease, immune system, vaccines.	P5, C1 and B2 continue: P5 half-lives, activity net decline. (P6 may begin early). C1 Endothermic and exothermic, clean water B2 Non-communicable diseases and data analysis	Students will begin P6, C3 and B3 P6 density, volume, mass, energy transfers, heat capacity, latent heat C3 Metallic bonding, properties, methods of extraction, half equations B3 Photosynthesis products and	P6 Particle model, elastic and plastic deformation, F=kx, relationships, Hooke's law, C3 Crude oil, cracking, fractional distillation, polymerisation B3 Enzymes, food chains and interdependence	Students will begin P4, C4 and B4 P4 Newtons laws, forces, vectors, weight, speed/distance/time, acceleration C4 properties of materials, testing, covalent bonding- simple and giant B4 Types of Respiration, equations, measuring	C4 Carbon allotropes, nanoparticles P4 Acceleration, SUVAT, dist.-time/vel-time graph, force diagrams. B4 Cell division- mitosis, meiosis, stem cells

			reactants, measuring rate		rate, fermentation, microscopy	
Assessment mapping	2 topic assessments-1 mid unit and 1 end of topic. **Winter mock exams**		2 topic assessments-1 mid unit and 1 end of topic		2 topic assessments-1 mid unit and 1 end of topic	
Personal development mapping	Understanding of the consequences of their behaviour and actions- P2 discussion around energy crisis Sense of enjoyment and fascination in learning about themselves, others and the world around them.		Sense of enjoyment and fascination in learning about themselves, others and the world around them.		Sense of enjoyment and fascination in learning about themselves, others and the world around them.	
Literacy focus for the half term	Reading	Grammar and Vocab	Writing	Spoken English	Reading	Grammar and Vocab
	All literacy focuses will be the same as the separate sciences					
Numeracy links	Numeracy links are identical to separate science for each topic					
Cross-curricular links to other subjects	Cross curricular links are identical to separate sciences for each topic					
Careers	Career links are identical to separate sciences for each topic					
Support for all	Tiers of entry (Higher and Foundation: foundation tier has reduced content and exams have a different format, with a greater focus on shorter response questions). Scheme of work has a range of differentiation activities for lower ability students, from resources that have lower reading ages, to tasks that focus on core and key ideas, with opportunities for extension when they are required.					
Examples of differentiation for lower prior attaining	Cartoon strip of atmosphere evolution, practical activities to support theory- range of learning styles	Match up activities for types of radiation, demos of radioactive sources, diagrams to support.	Modelling metallic bonding with modelling materials, moly mods etc. Linking properties to structure	Practical activities to support engagement- spring extension, repetition of key concepts- particle model	Fermentation- yeast rising practical, linking to bread and beer production, instructions given verbally & visually	Building carbon allotropes from moly mods, peer teaching activity
Challenge ideas	Key challenge questions are the same as separate sciences for each topic.					

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Year 11 Biology

Overall curriculum intent for year 11: Deepen understanding of GCSE Biology, sufficient to ensure post-16 study and job opportunities are able to be progressed onto.					
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**
Intent for the half term	To understand the role of the circulatory and endocrine system in the maintenance of a constant internal environment.		To understand the role natural selection plays in the vast variety of life on Earth, and how this has arisen through natural selection and selective breeding.		Revision
Content mapping	B5 Structure and function of the circulatory system, hormones and nervous system	B5 Homeostasis, diabetes, menstrual cycle	B6 Variation and causes, selective breeding and natural selection, evidence for evolution	B6 DNA evidence for evolution, ecosystems and interdependence	B1-6
Assessment mapping	2 topic assessments-1 mid unit and 1 end of topic. **Winter mock exams**		2 topic assessments-1 mid unit and 1 end of topic. **Spring mini mock exam**		-
Personal development mapping	Developing pupils' understanding of how to keep physically healthy etc		The ability to be reflective about their own beliefs (religious or otherwise) and perspective on life. Build knowledge of, and respect for, different people's faiths and feelings.		Supporting readiness for the next phase of education, training or employment so that pupils are equipped to make the transition successfully.
Literacy focus for the half term	Reading- reading information in a variety of formats- e.g. marketplaces, newspapers/journals. Familiarising with technical language	Grammar and Vocab Use of layout devices to structure written responses- bullet points etc.	Writing- students write pieces on the evidence for scientific theories and the + and – of using this evidence.	Spoken English Students discuss the opposition to evolution and the factors that influence it. Use of key terms, modelled by staff member.	All literacy strands will be covered as part of revision
Numeracy links	Calculating SA:V ratio, calculating lumen size in vein/artery using pi,		Understanding the scale of time involved in the evolution of animals. Understanding the role genetics can play in confirming evolutionary relationships with DNA sequence homology		Revision of key maths skills required for spec
Cross-curricular links to other subjects	PE- structure and function of living systems and organs		RE- perceptions and ideas around the origins of life		-
Careers	Medical and allied health professions Sports sciences		Evolutionary biologists, ecologists, wildlife and zoological professions		-

Support for all	Foundation & Higher tiers delivery of content. Scheme of work has middle and lower ability support activities.		Revision sessions, 1:1 sessions, use of revision guides, Seneca, textbooks
Challenge ideas	Explain how gestational diabetes can arise and whether it is more like T1 or T2 in profile. Additional separate content.	Scientists almost universally agree that evolution has occurred but disagree on how it has occurred. Outline these differences and state which theory you think is more reliable and why. Additional separate content.	Exam question practice, sitting full mock papers

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Year 11 Chemistry

Overall curriculum intent for year 11: Deepen understanding of GCSE Chemistry, sufficient to ensure post-16 study and job opportunities are able to be progressed onto.					
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**
Intent for the half term	Understand how chemicals are separated, purified and quantified in solids, liquids and gases		Understand the reactions of acids, and how reactions can be manipulated in terms of rate to optimise yield		Revision
Content mapping	C5 Separation and purification methods, conservation of mass, the mole	C5 Acids, Avogadro constant, mole calculations (solids, liquids, gases & solutions), stoichiometry	C6 Acid reactions, neutralisation, strong and weak acids, factors affecting rate of reaction, catalysts	C6 Determining and expressing rate graphically, enzymes, reversible reactions & equilibrium	C1-6
Assessment mapping	2 topic assessments-1 mid unit and 1 end of topic. **Winter mock exams**		2 topic assessments-1 mid unit and 1 end of topic **Spring mini mock exam**		-
Personal development mapping	Sense of enjoyment and fascination in learning about themselves, others and the world around them		Developing responsible, respectful and active citizens who are able to play their part and become actively involved in public life as adults; (awareness of green chemistry and impact on environment)		Supporting readiness for the next phase of education, training or employment so that pupils are equipped to make the transition successfully
Literacy focus for the half term	Reading Reading practical instructions, summarising and taking notes where appropriate and condensing written instructions.	Grammar and Vocab Use of layout devices- ensuring practical instructions for titrations are laid out correctly, recalling and using layout devices when considering practical tasks.	Writing Writing to describe/ instruct; practicing exam questions/long response answers	Spoken English Students examine examination terminology and practice their exam technique in chemistry.	All literacy strands will be covered as part of revision
Numeracy links	Calculations to calculate amounts of substance in chemistry, conservation of mass laws.		Interpreting rate graphs, understanding time/product graphs, balancing equations of acid reactions.		Revision of key maths skills required for spec
Cross-curricular links to other subjects	DT- purifying products/separation techniques.		Mathematics- using a tangent to calculate line gradient		-
Careers	Chemical engineers, pharmaceutical chemists/pharmacists/medical and allied health professions		Chemical engineers, green chemists, environmental scientists		-

Support for all	Foundation and higher tiers delivery of content. Scheme of Work has middle and low ability support activities. 1:1 support where required, with scaffolding and differentiation taking place in lessons as part of quality teaching. Extra sessions laid on to support students finding aspects challenging.		Revision sessions, 1:1 sessions, use of revision guides, Seneca, textbooks
Challenge ideas	Mole calculations- using a-level questions as challenge tasks. Calculating moles from titration measurements. Additional separate content.	Complex graphs to analyse, understanding effect of changing conditions on complex equilibria, 6th form questions to challenge. Additional separate content.	Exam question practice, sitting full mock papers

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Year 11 Physics

Overall curriculum intent for year 11: Deepen understanding of GCSE Physics, sufficient to ensure post-16 study and job opportunities are able to be progressed onto.					
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**
Intent for the half term	Understand how forces result in motion, and how this motion can be expressed in terms of energy transfer		Understand how electrical circuits behave, and how we can quantify energy, current, voltage and resistance in a variety of circuit arrangements. Understand how magnetic fields work and induce electric fields.		Revision
Content mapping	P4 Acceleration, SUVAT, dist.-time/vel-time graph, force diagrams,	P4 Momentum, vector diagrams, Newtons 2nd law, circular motion, reaction times.	P3 Current, Ohm's law, charge, circuit building, V=W/Q,	P3 Series, parallel, resistors, thermistors, W=J/S, circuit relationships, transformers	P1-6
Assessment mapping	2 topic assessments-1 mid unit and 1 end of topic **Winter mock exams**		2 topic assessments-1 mid unit and 1 end of topic **Spring mini mock exam**		-
Personal development mapping	Sense of enjoyment and fascination in learning about themselves, others and the world around them.		Sense of enjoyment and fascination in learning about themselves, others and the world around them.		Supporting readiness for the next phase of education, training or employment so that pupils are equipped to make the transition successfully;
Literacy focus for the half term.	Reading Students read a range of sources relevant to subject, such as information about braking distance, and apply their knowledge to questions- comprehension.	Grammar and Vocab Writing for a purpose- creating written methods for force and motion experiments. Use of correct vocabulary, tense and format.	Writing Writing instructions for building circuits and measuring key metrics such as current, voltage and resistance.	Spoken English Discuss the role of components in the national grid, and how their use impacts upon supplier, customer and network.	All literacy strands will be covered as part of revision
Numeracy links	Motion calculations, rearranging formulae, using correct units and scales, scalars and vectors.		Methods to calculate current, voltage, energy and resistance. Rearrangement of these equations.		Revision of key maths skills required for spec
Cross-curricular links to other subjects	Sport science- forces and motion		DT- electrical circuitry		-
Careers	Physiologist, kinesiologist, biomechanic scientist, prosthetist, automotive engineer		Electrician/electrical engineering,		-

Support for all	Foundation and higher tiers delivery of content. Scheme of Work has middle and low ability support activities. 1:1 support where required, with scaffolding and differentiation taking place in lessons as part of quality teaching. Extra sessions laid on to support students finding aspects challenging.		Revision sessions, 1:1 sessions, use of revision guides, Seneca, textbooks
Challenge ideas	Complex SUVAT equations, utilising 6th form style questions to really probe understanding. Additional separate content.	Investigations into current, voltage, resistance, complex circuits in both series and parallel and link this into equations to calculate I, P, V,E. Additional separate content.	Exam question practice, sitting full mock papers

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Year 11 Combined science

Overall curriculum intent for year 11: Deepen understanding of GCSE content, but maintain sufficient broadness to ensure a good understanding of key scientific principles.					
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**
Intent for the half term	P4 Understand how forces result in motion, and how this motion can be expressed in terms of energy transfer C5 Understand how chemicals are separated, purified and quantified in solids, liquids and gases B5 To understand the role of the circulatory and endocrine system in the maintenance of a constant internal environment.	P3 To understand the role and function of a variety of electrical components and circuits, and how current, voltage and resistance vary in response to components and circuit type. C5 and B5 as to the left	P3 as to the left C6 Understand the reactions of acids, and how reactions can be manipulated in terms of rate to optimise yield- including equilibrium. B6 To understand the role natural selection plays in the vast variety of life on Earth, and how this has arisen through natural selection and selective breeding.		Revision
Content mapping	Students continue working on P4 to completion, and begin B5 & C5. B5 Structure and function of the circulatory system, hormones and nervous system C5 Separation and purification methods, conservation of mass, introduce the mole	B5 ongoing Homeostasis, diabetes, menstrual cycle C5 ongoing Acids, Avogadro constant, Mole calculations (S, L.G,AQ), stoichiometry, P4 ongoing; vector diagrams, Newtons 2nd law, reaction times. P3 begun Current, ohms law, charge, circuit building, V=W/Q	Students begin B6 and C6, and continue working on P3 B6 Variation and causes, selective breeding and natural selection, evidence for evolution C6 Acid reactions, neutralisation, Strong and weak acids, factors affecting rate of reaction, catalysts	B6 DNA evidence for evolution, ecosystems and interdependence C6 Determining and expressing rate graphically, enzymes, reversible reactions & equilibrium P3 nearing completion.	BCP topics 1-6, covering 7 and 8 WS and numeracy strands in addition

	P4 cont. from year 10 Acceleration, SUVAT, dist.-time/vel-time graph, force diagrams, Momentum, vector diagrams, Newtons 2nd law, reaction times.		P3 Series, parallel, resistors, thermistors, W=J/S, circuit relationships, transformers		
Assessment mapping	2 topic assessments-1 mid unit and 1 end of topic. **Winter mock exams**		2 topic assessments-1 mid unit and 1 end of topic **Spring mini mock exam**		-
Personal development mapping	Developing pupils' age-appropriate understanding of healthy relationships through appropriate relationship and sex education	Sense of enjoyment and fascination in learning about themselves, others and the world around them.	Sense of enjoyment and fascination in learning about themselves, others and the world around them.		Supporting readiness for the next phase of education, training or employment so that pupils are equipped to make the transition successfully;
Literacy focus for the half term-	All literacy focuses will be the same as the separate sciences				
Numeracy links	Numeracy links are identical to separate science for each topic				
Cross-curricular links to other subjects	Cross curricular links are identical to separate sciences for each topic				
Careers	Career links are identical to separate sciences for each topic				
Support for all	Tiers of entry (Higher and Foundation: foundation tier has reduced content and exams have a different format, with a greater focus on shorter response questions). Scheme of work has a range of differentiation activities for lower ability students, from resources that have lower reading ages, to tasks that focus on core and key ideas, with opportunities for extension when they are required.				
Examples of differentiation for lower prior attaining	Force diagrams, taking everyday objects and adding labels to them- visualising forces	Menstrual cycle cartoon strip/Claymation animation- good for sequential learning	Selective breeding- links to agriculture- activity on breeding best cow	Use of analogies/models to explain reversible reactions- subliming iodine etc	Use of SENECA, GCSEpod to support, revision guides available, extra revision sessions laid on.
Challenge ideas	Key challenge questions are the same as separate sciences for each topic.				

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Year 12 Biology

Overall curriculum intent for year 12: Develop knowledge on from GCSE content to prepare for the second year of A-level and post-18 study.						
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**	**Half term 6**
Intent for the half term	Topic 1) Understand the effect of heart disease on the body, thereby understanding the structure and function of the circulatory system and the dependent organs and systems. Topic 2) Understand the structure and function of the cell membrane, and delve deeper into the role of DNA, to include DNA transcription, translation and replication, and how errors in this system can result in diseases such as cystic fibrosis		Topic 3) Understand the ultrastructure of cells, and how this is replicated through cell division (mitosis and meiosis). Understand how DNA is replicated in these processes and how genetic variation can arise. Topic 4) Understand the importance and how to measure biodiversity, and link this to plant cell structure and function, as well as some of the uses of a variety of plants.		Topic 5) Understand how species diversity and succession occurs, and carry out sampling to determine species richness Topic 6) Understand the range of investigative procedures forensic scientists can use to establish time of death, identity (DNA analysis) and cause of death if via infections through understanding the role and function of the immune system.	
Content mapping	Topic 1 shared by 2 teachers Teacher A)1.7-1.18 Teacher B) 1.1-1.6	Topic 2, shared TA)2.1-1.9 TB)2.10-2.16	Topics 3 and 4- each taught by a teacher independently.		Completion of year 12 content, moving onto topics 5 and 6, again each taught independently Topic 5-5.1-5.4 & 5.10-5.11 Topic 6 6.1-6.4	Topics 5 and 6 5.6—5.9 6.5-6.8
Assessment mapping	Formative marking tasks throughout- exam questions etc. Summative end of topic assessments and mock exam periods.					
Personal development mapping	Sense of enjoyment and fascination in learning about themselves, others and the world around them.		Developing responsible, respectful and active citizens who are able to play their part and become actively involved in public life as adults;			
Literacy focus for the half term	Reading Students reading case studies of communicable and non-communicable disease, their causes,	Grammar and Vocab Students becoming familiar with more specialist terms, using layout devices to	Writing a scientific report that meets the need of CPAC standards in its complexity of language used and	Spoken English Students research and present back findings on endangered species and efforts to	Reading Reading case studies on climate change, impact of human activity and using these as a source for	Grammar and Vocab- Using purposeful language to create scientific reports/forensic reports.

	effects and treatments. Understanding a higher grade of scientific language.	create instructions for practical activities	technicality of approach.	conserve them. Discussions each lesson around endangered species in light of new learning.	understanding wider context of climate change	
Numeracy links	Calculation of SA:V ratio, understanding absorbance/transmission in colorimetry.		Simpson's biodiversity index calculations, exponential growth of cells, growth rate		Tensile strength calculations of plant fibres, quantitative DNA analysis,	
Cross-curricular links to other subjects	Sport- structure and function of body systems		Geography- Biodiversity, role of plants in ecosystems		Geography- ecosystems and conservation	
Careers	Sport scientist, medical professions, research scientist		Ecologist, geneticist,		Ecologist, forensic scientist, police officer	
Support for all	Small class sizes, individual approach, extra support sessions laid on, repetition of key ideas throughout. Any SEND needs identified on whole school basis and support plan put into place.					
Challenge ideas	Use of exam questions, research tasks, wider reading tasks, presenting findings to class, per teaching tasks, quick fire questions/ quizlets, SENECA assignments					

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Year 12 Chemistry

Overall curriculum intent for year 12: Develop knowledge on from GCSE content to prepare for the second year of A-level and post-18 study.						
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**	**Half term 6**
Intent for the half term	Module 2- Foundations in chemistry- students explore a range of core concepts to bridge the gap between GCSE and A-Level, including atomic structure, moles, acids and their reactions, bonding and intermolecular forces. If shared between 2 teachers, dependent on hours content shared along topic lines.		Module 3- Periodic table and energy: Learners begin to learn about the periodic table and the nature of periodicity, how these link into energy changes and the ways in which we can determine energy changes. Rate of reaction and equilibria are studied, and a focus on optimising rates of reactions with a view to ensure chemistry is made more sustainable is present. Module 4- Core organic chemistry: Learners begin to understand the various nomenclature conventions for a range of organic substances, and how to express these using a range of different formulae. Understand the reactions, uses and safety precautions to be taken when handling is crucial, as is how to analyse products of reactions instrumentally.			Module 5- Physical chemistry and transition elements- understand how rates of reaction can be quantified. Module 6- Understand a greater range of organic chemicals than covered previously, to include aromatic compounds
Content mapping	2.1.1-2.2.2 Atomic structure, quantities of substance, acid reactions, redox, structure and bonding		Where teaching is split, teacher A covers module 3 and teacher B module 4. Module 3: the periodic table, enthalpy changes, rates of reaction, reversible reactions & equilibria and sustainability. Module 4: nomenclature of functional groups, isomerism, aliphatic hydrocarbons, alcohols and haloalkanes, organic synthesis and instrumental analytical techniques.			Topic 5- 5.1.1 How fast? Topic 6- 6.1.1 Aromatic compounds
	CPAC practicals are carried out as part of the delivery of the course.					
Assessment mapping	Formative assessments throughout the topic, with end of unit assessments and mock exam periods providing summative assessment.					
Personal development mapping	Sense of enjoyment and fascination in learning about themselves, others and the world around them.					
Literacy focus for the half term	Reading Students reading and repurposing practical instructions	Grammar and Vocab Using more specialist terminology, using layout devices to arrange notes in a readable format	Writing Examining the impact of green chemistry- case studies on how sustainability can be made a key feature of chemistry	Spoken English Students present findings from CPAC investigation as a research task presentation	Reading Students reading instructions on how to calculate rate order/ practical instructions and translating them into their practice.	Grammar and Vocab Use of A-level terminology and vocabulary, sufficient to prepare students for A-level examinations.

Numeracy links	Mole calculations, using ideal gas law, rearrangement, use of new scales- Kelvin etc.	Calculation of energy changes in reactions, use of Hess' law to determine energy change indirectly, understanding Boltzmann distributions graphs, and the effect of changing conditions	More calculations, manipulation of graphs.
Cross-curricular links to other subjects	Maths- rearrangement and use of 3- and 4-part equations	Physics- conservation of energy	-
Careers	Chemist, medical careers, environmental scientist	Chemical engineer, research chemist, petrochemical engineer, petrochemical industry worker,	Physical chemist, engineer, research chemist
Support for all	Small class sizes, individual approach, extra support sessions laid on, repetition of key ideas throughout, exam question practice and marking		
Challenge ideas	Use of exam questions, research tasks, wider reading tasks, presenting findings to class, per teaching tasks, quick fire questions/ quizlets, SENECA assignments		

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Year 12 Physics

Overall curriculum intent for year 12: Develop knowledge on from GCSE content to prepare for the second year of A-level and post-18 study.						
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**	**Half term 6**
Intent for the half term	Transition to Year 12 Physics- revisiting Key skills. Particles and radiation- Understand the fundamental properties of matter, electromagnetic radiation and quantum phenomena. Waves and optics- understand the properties of different wave types and their interactions, including standing waves, superposition and interference		Mechanics and materials- Understand scalars and vectors and their treatment, Newtonian laws of motion, as well as how materials behave under stress. Electricity- Understand the complex interrelationships that exist between current, voltage, power, charge and energy, and how these factors differ in different circuit types.		Completion of previous terms topics and revision of key AS topics and year 12 assessment.	Begin second year content: Further mechanics and thermal physics-Advance further study of motion by examining more complex motional systems Fields: Understand the unifying role field theory can have in the context to gravitational, electrostatic and magnetic fields.
Content mapping	Teacher A) Skills in Year 12 Physics, Begin Section 1- Particles and radiation. Teacher B) Begin waves and optics	TA) Quarks, leptons and quantum phenomena TB) Optics- refractions, reflection, interference	TA) mechanics- forces in equilibrium, kinetics, force and momentum TB) Electric current, equations, resistance of a wire	TA) periodic and circular motion, Work, energy and power, materials and tensile strength TB) DC circuits, supporting TA with mechanics work- thermal energy transfer	Completion of all AS topics	TA) Circular motion, Simple harmonic motion, TB) Fields- Gravitational fields and electric fields, capacitors.
Assessment mapping	Formative marking tasks- exam questions, questions from book. Formative end of topic assessments and assessments during mock exam periods					
Personal development mapping	Sense of enjoyment and fascination in learning about themselves, others and the world around them.					
Literacy focus for the half term	Reading- students reading key instructions required for the lesson, task, or practical activity.	Grammar and Vocab: Students becoming familiar with specialist terms, use	Writing Students write for a purpose- using supporting material to structure and	Spoken English Students present findings from lesson activities verbally, ensuring correct	Reading Students to consider, appraise and critique journal articles to	Grammar and Vocab A-level vocabulary, use of conjunctives when writing for a purpose- for example a lab report.

		of layout devices to structure notes.	complete exam questions/lesson questions.	vocabulary, grammar and syntax is used.	support the achievement of key CPAC standards	
Numeracy links	Calculation of key physical constants, wave equation, Units and conversions	Angles of incidence, refraction, photoelectric equation	Electric circuits equations for I,V,P,E and Q. SUVAT, the next parts of wave concepts superposition and nodes/antinodes equations	Motion equations, calculations using key formula	Key equations from AS topics.	SHM equations and integration.
Cross-curricular links to other subjects	Maths- key quantities	DT- fibre optics and reflection	Maths- mechanics topics	DT-tensile strength	-	Engineering/DT- SHM and the effect on structures.
Careers	Optometrist, fibreoptic engineer, civil engineering	Nuclear physicist, engineering and production careers	Electrician, electrical engineer, automotive engineer	Electrical engineering careers, design engineer	-	Civil engineer, architect.
Support for all	All classes have small numbers so good teacher: pupil ratio, tasks scaffolded appropriately, additional sessions laid on for students where struggling, exam paper and question practice regularly given and marked/feedback given. Use of SENECA to support independent working, revision guides to purchase.					
Challenge ideas	Use of exam questions, research tasks, wider reading tasks, presenting findings to class, per teaching tasks, quick fire questions/ quizlets, SENECA assignments. Rearrangement of key formula, integration of equations.					

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Year 13 Biology

Overall curriculum intent for year 13: Further develop a deep understanding of A-level Biology, sufficient to support the transition to University study.					
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**
Intent for the half term	Topic 5- understand the role of photosynthesis as a complex biochemical process, how plants fit into ecosystems as key species and the impact of climate change on these ecosystems. Topic 6- Understand the range of investigative procedures forensic scientists can use to establish time of death, identity (DNA analysis) and cause of death if via infections through understanding the role and function of the immune system.	Topic 7- To understand the role of respiration in enabling life to exist, and the role it has in enabling living processes, such as locomotion. Understand how locomotion occurs from the cellular to the macroscopic level, and the key structures involved.	Topic 8-Understand the structure and function of the nervous system in detecting and responding to stimuli, and how various substances can impact on these responses.	Pre-release article work	Revision
Content mapping	Completion of topics 5 and 6 Topic 5- Remaining spec points depending on spec completion pre-summer Topic 6- remaining spec points depending on spec completion pre-summer	Topic 7 – Running for your life- taught by teacher A Topic 8- Grey matter- taught by Teacher B		Completion of topics 7 & 8 and pre-release article	Topic 1-8
Assessment mapping	Formative marking tasks throughout- exam questions etc. Summative end of topic assessments and mock exam periods.				-
Personal development mapping	Developing responsible, respectful and active citizens who are able to play their part and become actively involved in public life as adults.	Sense of enjoyment and fascination in learning about themselves, others and the world around them.			Supporting readiness for the next phase of education, training or employment so that pupils are equipped to make the transition successfully.

Literacy focus for the half term	Reading Reading case studies on climate change, impact of human activity and using these as a source for understanding wider context of climate change	Grammar and Vocab Understanding new vocab, using it as part of verbal answers. Use of conjunctives when writing practical reports.	Writing Writing in the style of scientific reports for CPAC tasks.	Spoken English Discussion of key ideas and potential questions in pre-release article	Reading Reading of research papers/alternative sources of information to broaden understanding of topics
Numeracy links	Tensile strength calculations of plant fibres, quantitative DNA analysis,	Calculating respiratory rate, peak flow, stroke volume and cardiac output, Use of correct units.			All numeracy strands and equations covered as part of revision
Cross-curricular links to other subjects	Geography- ecosystems and conservation, carbon cycle	PE- Respiration and exercise, effect of exercise on fitness Psychology- structure and function of brain, processing centres			-
Careers	Ecologist, forensic scientist, police officer	Sports scientist, PE teacher, coaching and fitness careers Psychology and neuroscience careers, counselling			-
Support for all	Small class sizes, individual approach, extra support sessions laid on, repetition of key ideas throughout.				-
Challenge ideas	Use of exam questions, research tasks, wider reading tasks, presenting findings to class, per teaching tasks, quick fire questions/ quizlets, SENECA assignments				-

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Year 13 Chemistry

Overall curriculum intent for year 13: Further develop a deep understanding of A-level Chemistry, sufficient to support the transition to University study.					
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**
Intent for the half term *It is worth noting that this scheme of work is relying on a single teacher delivering in a simultaneous fashion. Topics taught simultaneously- dependent on staffing, splits and hours.*	Develop understanding of carbonyl compounds, with further investigation into carboxylic acids and esters. Quantify equilibria using experimental data and understand the reactivity and calculation of pH of acids and bases, as well the actions of buffers.	Calculate lattice enthalpy and use Born-Haber cycles. Understand and calculate entropy, enthalpy and free energy. Understand the reactions, uses and properties of nitrogen compounds- amines, amides and polymers, and the various synthetic routes than can be used to synthesise a range of compounds	Understand how redox reaction occur, test this experimentally, and understand the application of redox reactions in fuel cells. Understand how to carry out a range of chemical analyses- qualitative and quantitative, and those utilising spectroscopic approaches.	Develop a deeper understanding of the transition elements in terms of their properties, reactions and uses.	Revision- revise key aspects of the course- student led choices with teacher input on areas to cover
Content mapping	6.1.2-6.1.3 5.1.2-5.1.3	6.2.1-6.2.5 5.2.1, 5.2.2	5.2.3, 6.3.1 & 2	5.3.1 & 2 Revision towards end	Modules 1-6
Assessment mapping	Formative assessments throughout the topic, with end of unit assessments and mock exam periods providing summative assessment.				-
Personal development mapping	Sense of enjoyment and fascination in learning about themselves, others and the world around them.				Supporting readiness for the next phase of education, training or employment so that pupils are equipped to make the transition successfully;
Literacy focus for the half term	Reading Students reading practical instructions with greater complexity and scientific language- comprehension of these essential .	Grammar and Vocab Use of subject specific vocabulary- specialist organic terms to construct answers.	Writing Writing to instruct- written methods for CPAC/class practical's	Spoken English- using subject specific terminology in verbal answers	Reading Reading of research papers/alternative sources of information to broaden understanding of topics

Numeracy links	Calculation of $[H^+]$ and pH using logs.	Balancing equations- oxidations of alcohols Analysis of IR and Carbon-13, proton NMR data			All numeracy strands are covered as part of revision
Cross-curricular links to other subjects	Biology – proteins	Physics – energy changes	Physics - batteries		-
Careers	Physical chemist, engineer, research chemist	Pharmaceutical chemist, petrochemical worker, food standards officer, atmospheric scientist			-
Support for all	Small class sizes, individual approach, extra support sessions laid on, repetition of key ideas throughout, exam question practice and marking				-
Challenge ideas	Use of exam questions, research tasks, wider reading tasks, presenting findings to class, per teaching tasks, quick fire questions/ quizlets, SENECA assignments				-

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Year 13 Physics

Overall curriculum intent for year 13: Further develop a deep understanding of A-level Physics, sufficient to support the transition to University study.					
	Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**
Intent for the half term	Continue Topic 6 and 7	Begin topic 8- Nuclear physics-understand the properties and causes of nuclear radiation, and how this phenomenon can have both a positive and negative impact on society. Begin optional unit- one from Astrophysics, Medical physics, engineering physics, turning points and electronics		Ensure completion of all topics, begin A-level revision.	Revision of A-level content
Content mapping	TA) Thermal physics, gases, boyles law, SHM with spring practical investigation TB) Capacitors, Magnetic fields, EM induction, force on a wire practical.	TA) Nuclear energy, radiation types, unstable nuclei, decay TB) Optional unit first half	TA) Atomic radius, instability, induced fission and safety aspects TB) Second half of optional unit	Topics 1-4, student led	Topics 5-9, student led
Assessment mapping	Formative marking tasks- exam questions, questions from book. Formative end of topic assessments and assessments during mock exam periods				Exam question practice, exam paper, with review.
Personal development mapping	Sense of enjoyment and fascination in learning about themselves, others and the world around them.		Developing responsible, respectful and active citizens who are able to play their part and become actively involved in public life as adults;	Supporting readiness for the next phase of education, training or employment so that pupils are equipped to make the transition successfully;	
Literacy focus for the half term	Reading Reading key research papers on the topic to broaden knowledge base	Grammar and Vocab Use of specialist terms with fluency Developing use of formal language in written reports	Writing Writing articles for a purpose- for example, Promoting nuclear safety.	Spoken English Peer teaching during revision activities, use of specialised language, pupil as teacher etc.	Reading Exam question dissection, key words, prompt words
Numeracy links	Boyle's law equations, SHM equations, capacitance equations.	Decay equations Depending on optional unit- key equations from relevant topic.	Atomic radius equations, key equations from optional unit.	All key equations from year 12 content	All key equations from year 13 content.
Cross-curricular links to other subjects	Chemistry- ideal gas laws	-	-	-	-

Careers	Chemical engineering, electrical engineering/ electrician careers	Nuclear power linked professions, medical physicist, civil engineer.	-	-
Support for all	All classes have small numbers so good teacher:pupil ratio, tasks scaffolded appropriately, additional sessions laid on for students where struggling, exam paper and question practice regularly given, and marked/feedback given. Use of SENECA to support independent working, revision guides to purchase.			
Challenge ideas	Use of exam questions, research tasks, wider reading tasks, presenting findings to class, per teaching tasks, quick fire questions/ quizlets, SENECA assignments. Rearrangement of key formula, integration of equations.			

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