

## Subject Applied Science Single

Adjustments due to covid. Due to the varied experience of students from multiple schools and long gap between learning and re-using, time has been built in to cover all KS4 linked learning to whatever depth is required. The teacher assesses prior knowledge through questioning and either completely re-teaches, interleaves key pieces of knowledge into successive lessons or provides differentiated independent learning tasks should some students be further behind than others.

### SMSC AND BRITISH VALUES

#### Spiritual

1. Developing personal values and beliefs
2. Experiencing fascination, awe and wonder
3. Exploring the values and beliefs of others
4. Understanding human feelings and emotions
5. Using imagination and creativity in learning

#### Moral

1. Developing and expressing personal views or values
2. Investigating moral values and ethical issues
3. Recognising right and wrong and applying it
4. Understanding the consequences of actions

#### Social

1. Developing personal qualities and using social skills
2. Participating, cooperating and resolving conflicts
3. Understanding how communities and societies function

#### Cultural

Exploring, understanding  
and respecting diversity

Participating and  
responding to cultural  
activities

Preparing for life in modern  
Britain

Understanding and  
appreciating personal  
influences

#### British values

Democracy

Rule of law

Individual liberty

Mutual respect

Tolerance

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Year 12						
When	WHAT & WHY WILL THEY LEARN?		New Skill = NS Revisit = R Revision = RV	Stretch and Challenge (Differentiation – how will you stretch the most able to achieve top grades?)	CIEAG/Extension  Enrichment Trips, workshops, speakers, local environment and experiences	KS4 PRIOR LEARNING
Term Plan	<u>KNOWLEDGE &amp; SKILLS</u>	Assessment Objective		Band 5 = Informed Band 6 = Mature		
	<u>Transition Task</u> <u>Preparation for unit 2 practical methods</u>	Unit 2 A,B,C	Re-visit from GCSE content	Informed Methods for pass standard Mature Risk assessments for merit standard		
<b>Term 1 2 contents running at the same time by 2 teachers</b> <b>Unit 1 exam content:</b> Biology Chemistry Physics Coursework	B1: Cell structure and function	<ul style="list-style-type: none"> <li>Know that cell theory is a unifying concept stating that cells are a fundamental unit of structure, function and organisation in all living organisms.</li> <li>Understand the ultrastructure and function of organelles in the following cells</li> <li>Recognise cell organelles from electron micrographs and the use of light microscopes.</li> </ul>	NS: New content based on basics learnt at GCSE level	<b>Unit 1 content Informed:</b> Learners will be able to recall, select and apply scientific knowledge and understanding to vocational and realistic situations. They will be able to use scientific terminology and concepts in given situations, and to use given information and	Sp 2 Mo3,4 So1,3 Cu3-4 BV 2	Previous knowledge on cell structure is common content across all three schools exam boards at GCSE. Magnification calculations have also been completed at GCSE so this is

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		<ul style="list-style-type: none"> <li>• Understand the similarities and differences between plant and animal cell structure and function.</li> <li>• Understand how to distinguish between gram-positive and gram-negative bacterial cell walls and why each type reacts differently to some antibiotics.</li> <li>• Calculate magnification and size of cells and organelles from drawings or images.</li> </ul>		<p>apply appropriate mathematical and technical skills in context. Learners will be able to interpret and analyse information in order to make valid judgements.</p> <p><b>Mature:</b> Learners will be able to integrate relevant scientific knowledge and understanding from</p>		revisiting that knowledge
	A1: Structure and bonding in applications in science	<ul style="list-style-type: none"> <li>• Understand the electronic structure of atoms</li> <li>• Understand ionic bonding</li> <li>• Understand covalent bonding</li> <li>• Understand metallic bonding</li> <li>• Understand the following intermolecular forces</li> <li>• Understand the quantities used in chemical reactions</li> </ul>	NS: All new content, building on GCSE knowledge	<p>different areas to demonstrate a deeper understanding of how these apply to vocational and realistic situations. They will be able to use scientific terminology and concepts, communicating consistently and effectively in given situations. They will be able to select relevant information and apply appropriate mathematical and technical skills to</p>	Sp 2 Mo3,4 So1,3 Cu3-4 BV 2	GCSE knowledge of bonding and quantities in reactions will be known across all three schools however will differ from pupil to pupil, depending on the needs of the students different re-teaching will be completed
	C1: Working with waves	<ul style="list-style-type: none"> <li>• Understand the features common to all waves</li> </ul>	NS: New content building	<p>justify decisions or solve problems in context.</p>	Sp 2 Mo3,4 So1,3	GCSE knowledge of the different types of waves

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		<ul style="list-style-type: none"> <li>• Graphical representation of wave features</li> <li>• Understand the difference between the two main types of wave: Transverse and longitudinal</li> <li>• Understand concepts of displacement, coherence, path difference, phase difference, superposition as applied to diffraction gratings.</li> <li>• Understand the industrial application of diffraction gratings</li> <li>• Be able to use the wave equation</li> <li>• Understand the concept and applications of stationary waves resonance.</li> <li>• Musical instruments.</li> </ul>	on GCSE knowledge	Learners will be able to interpret and analyse information in order to make valid judgements that are supported by evidence, with awareness of limitations.	Cu3-4 BV 2	and their uses however not in the detail needed for the exam so needs based teaching will take place
	Unit 2 A: Undertake titration and colorimetry to determine the concentration of solutions	Pro formas of results for checking the calibration of a pipette and balance(s) and calibration of a pH meter. A report on the use of $\text{Na}_2\text{CO}_3$ to standardise HCl, used in turn to standardise NaOH. pH curve from the titration plus a differential plot. Results, calculations and calibration	NS: If students took combined science they will not have completed titrations before  NS: Colorimetry	<b>Unit 2 content:</b> <b>Informed:</b> P1. Correctly prepare and standardise solutions for titration and colorimetry. P2. Investigate the concentration of unknown solutions, using procedures and techniques in titration and colorimetry	Practical work Sp1-5 Mo 1-4 So 1-3 Cu 1,3,4 BV 3-5	Students who did triple at GCSE will be more aware of titrations and concentration calculations however the students may not be able to

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		graph for the determination of the concentration of a coloured solution using colorimetry. Explanations of how the accuracy, precision and safety of the quantitative techniques may be optimised. Observation checklist, completed by the teacher, including safety.	R: Concentration calculations from GCSE  R: Evaluation of accuracy	<b>Mature:</b> M1.Demonstrate skilful application of procedures and techniques in titration and colorimetry to accurately determine the concentration of solutions D1. Evaluate the accuracy of procedures and techniques used in titration and colorimetry in relation to outcomes and suggest improvements.		complete these independently
	Unit 2 B: Undertake calorimetry to study cooling curves	Results from checking the calibration of at least two types of thermometer. A table of time/temperature data and a graph of temperature against time for a substance cooling. Calculations of the rate of cooling at points on the graph. An analysis of how the rate of cooling is related to intermolecular forces and the state of the substance. A report	R: revising knowledge from GCSE on latent heat from physics, and the particle model  NS: Tangents and rate of	<b>Informed:</b> B.P3 Correctly obtain data using different equipment to construct cooling curves. B.P4 Correctly determine the rate of cooling of substances using cooling curves. <b>Mature:</b> B.M2 Analyse the rate of cooling of substances from your data using		Students will be aware of state changes, the particle model and plotting graphs however will not be aware of the detail needed, therefore teaching will be based on prior knowledge

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		evaluating the accuracy of the cooling curve experiment. An observation report with a checklist, completed by the teacher, including safety.	cooling calculations  NS: Evaluation accuracy	cooling curves to draw valid conclusions. B.D2 Evaluate the accuracy of practical work in calorimetry in relation to the analysis of the cooling curve.		of the students (for example teaching tangents will be covered as it is a merit skill that only higher maths students will have covered)
<b>Term 2 2 contents running at the same time by 2 teachers</b> <b>Biology</b> <b>Chemistry</b> <b>Physics</b> <b>Coursework</b>	B2: Cell specialisation  B3 Tissue structure and function	<ul style="list-style-type: none"> <li>Understand cell specialisation in terms of structure and function</li> <li>Understand the structure and function of epithelial tissue</li> <li>Understand the structure and function of endothelial tissue, as illustrated by blood vessels in the cardiovascular system, including the risk factors that damage endothelial cells and affect the development of atherosclerosis.</li> </ul>	NS: new content building on the previous terms teaching	<b>Unit 1 content Informed:</b> Learners will be able to recall, select and apply scientific knowledge and understanding to vocational and realistic situations. They will be able to use scientific terminology and concepts in given situations, and to use given information and apply appropriate mathematical and	Sp 2 Mo3,4 So1,3 Cu3-4 BV 2	Very basic knowledge of cell specialisation will be from GCSE knowledge but will vary from student to student so different teaching will take place dependant on students prior knowledge.

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		<ul style="list-style-type: none"> <li>• Understand the structure and function of muscular tissue</li> <li>• Understand the structure and function of nervous tissue</li> </ul>		technical skills in context. Learners will be able to interpret and analyse information in order to make valid judgements.		
	A2: Production and uses of substances in relation to properties	<ul style="list-style-type: none"> <li>• Understand the periodic table</li> <li>• Understand the physical properties of elements</li> <li>• Understand the chemical properties of elements</li> </ul>	NS: New content building on GCSE content	<p><b>Mature:</b></p> <p>Learners will be able to integrate relevant scientific knowledge and understanding from different areas to demonstrate a deeper understanding of how these apply to vocational and realistic situations. They will be able to use scientific terminology and concepts, communicating consistently and effectively in given situations. They will be able to select relevant information and apply appropriate mathematical and technical skills to justify decisions or solve problems in context. Learners will be able to interpret and analyse</p>	Sp 2 Mo3,4 So1,3 Cu3-4 BV 2	Basic knowledge of the periodic table will be known from both combined and triple GCSE content however the detail needed for the unit 1 exam will not be known.
	C2: Waves in communication  C3: Use of electromagnetic waves in communication	<ul style="list-style-type: none"> <li>• Understand the principles of fibre optics</li> <li>Understand the applications of fibre optics in medicine to include endoscopes.</li> <li>• Understand the applications of fibre optics in communication</li> <li>• Understand that all electromagnetic waves travel with the same speed in a vacuum.</li> <li>• Be able to use the inverse square law in relation to the intensity of a wave</li> </ul>	NS: New content building on GCSE content		Sp 2 Mo3,4 So1,3 Cu3-4 BV 2	Triple GCSE students will have covered total internal reflection so based on the cohort of students will depend on teaching however more detail and GCSE is needed.

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		<ul style="list-style-type: none"> <li>• Understand how the regions of the electromagnetic spectrum are grouped according to the frequency.</li> <li>• Understand how the applications of electromagnetic waves in communications are related to frequency</li> </ul>		information in order to make valid judgements that are supported by evidence, with awareness of limitations.		
	Unit 2 C: Undertake chromatographic techniques to identify components in mixtures	Results from the paper chromatography and TLC of extracted plant pigments from paper chromatography of amino acids. An explanation of the principles behind the chromatographic separations. Suggestions for improvements to the chromatographic procedures carried out and full justification of these suggestions. An observation report with a checklist, completed by the teacher, including safety	R: Paper chromatography from GCSE  NS: TLC  R: Evaluation of accuracy	<b>Informed:</b> C.P5 Correctly use chromatographic techniques to produce chromatograms. C.P6 Explain the use of chromatographic techniques to separate mixtures <b>Mature:</b> C.M3 Analyse own chromatograms and relate the factors that affect the separation of mixtures to the quality of results obtained. C.D3 Evaluate the chromatographic techniques used in	<b>Practical work</b> Sp1-5 Mo 1-4 So 1-3 Cu 1,3,4 BV 3-5	Students of all exam boards will have covered the basics of chromatography however different exam boards have different amounts of detail



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				relation to outcomes and suggest improvements.		
<b>Term 3</b>	Biology, Chemistry, Physics revision for JUNE exams will take place	Finishing off content not currently taught and then revising weak areas based on mock papers and end of unit tests (ZIGZAG tests)	RV: whole years content based on weak areas in mocks and teaching			
	Unit 2 D: Review personal development of scientific skills for laboratory work	A presentation or report that focuses on the evaluation of learners' performance and skill development across all scientific procedures and techniques carried out in learning aims A, B and C.	R: Evaluation	<b>Unit 2:</b> <b>Informed:</b> D.P7 Summarise key personal competencies developed in relation to scientific skills undertaken. <b>Mature:</b> D.M4 Analyse skills developed and suggest improvements to own practice. D.D4 Evaluate scientific skills developed in terms of potential for future progression.	Sp1-5 Mo 1-4 So 1-3 Cu 1,3,4 BV 3-5	Students may be able to evaluate their performance and skill development from PE in the three schools however this will be taught so students know how to analyse their skills

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Year 13						
When	WHAT & WHY WILL THEY LEARN? (SOW overview linked to assessment Objectives)		New Skill = NS Revisit = R Revision = RV	Stretch and Challenge (Differentiation – how will you stretch the most able to achieve top grades?)	CIEAG/Extension	KS4 PRIOR LEARNING
Term Plan	<u>KNOWLEDGE &amp; SKILLS</u>	Assessment Objective		Band 5 = Informed Band 6 = Mature	Trips, workshops, speakers, local environment and experiences	How will GCSE knowledge support new skills & knowledge
	<u>Transition Task</u> <u>Improve any year 12</u> <u>coursework grades up</u>	This will be dependent on students and assignments				
<b>Term 1 The teaching for this will be split between 2 teachers..</b>	Unit 3 teaching for JAN exam  Students will complete all common standards for all 5 practicals that could be examined i.e. A Planning a scientific investigation B Data collection, processing and analysis/interpretation	Common standards will be covered through the five different practicals  D Enzymes in action E Diffusion of molecules F Plants and their environment G Energy content of fuels H Electrical circuits	RV: All practicals are GCSE content and have been completed at GCSE level  NS: Standard deviation and other analytical techniques	<b>Unit 3: Informed:</b> Learners will demonstrate a sound knowledge and understanding of scientific concepts, procedures, processes and techniques and their application within a practical context. Learners will interpret and analyse their own	Lots of practical work, including possible field work trips  Sp1-5 Mo 1-4 So 1-3 Cu 1,3,4 BV 3-5	All 5 practicals that are to be taught are GCSE practicals – energy content in fuels will be better known by students of edexcel exam board as it is their change in temperature required

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	C Drawing conclusions and evaluation			<p>data and secondary data, leading to reasoned judgements on the qualitative and quantitative data they have collected during their investigation. They will be able to draw links between different scientific concepts, procedures, processes and techniques to make a hypothesis and plan an investigation. Learners will be able to make evaluative judgements on scientific data, processes and procedures that make reference to scientific reasoning.</p> <p><b>Mature:</b> Learners will demonstrate a thorough understanding of how scientific concepts, procedures, processes and techniques can be integrated and applied within a practical</p>		<p>practical. Students at the other schools will have covered it at some point in KS3 or KS4. Depending on prior knowledge will depend on how deep the teaching is needed.</p>
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				context. They will interpret, analyse and evaluate their own collected data and secondary data to support judgements and conclusions drawn. Learners will use and integrate knowledge and understanding of scientific concepts, procedures, processes and techniques to make a hypothesis and plan an investigation that is fully supported by scientific reasoning. Learners will be able to provide rationalised evaluative judgements on scientific data, processes and procedures that are fully supported by scientific reasoning.		
	Unit 8 A Understand the impact of disorders of the musculoskeletal system and their	Learners would use information gained from research, visits, dissections/videos, models and simulations to produce	NS: analysis of the structure  NS: new content taught	<b>Informed:</b> A.P1 Explain the functional role of the musculoskeletal system in the human body.	Possible trip to sports science lab  Sp 2	Students who have completed PE btec or sports science btec will have

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	associated corrective treatments	an illustrated report explaining and analysing the structure and function of the musculoskeletal system. An evaluation of a related disorder/dysfunction of the system and associated treatments must be included	RV: function of skeletal system from GCSE	A.P2 Describe the effect of disorder of muscles and joints and possible corrective treatment(s). <b>Mature:</b> A.M1 Compare how disorders of the musculoskeletal system can affect how muscles bring about movement of joints and the role of corrective treatment(s). A.D1 Evaluate the effect of corrective treatment(s) associated with a musculoskeletal disorder	Mo3,4 So1,3 Cu3-4 BV 2	greater knowledge of this topic, prior knowledge checks will be completed in the teaching of the unit
<b>Term 2 Teacher not teaching unit 8 will be revising and re-teaching unit 1 content for re-takes And unit 3 content for retakes. After prep for exams</b>	B Understand the impact of disorders on the physiology of the lymphatic system and the associated corrective treatments	Research work using the internet and TV documentaries to help learners to create a presentation that describes and explains the structure and function of the lymphatic system in promoting a healthy body. An evaluative case study of the effect of a disorder/dysfunction of the system and possible	NS: Lymphatic system is not covered at GCSE however some of the organs involved students will be aware of	<b>Informed:</b> B.P3 Describe the gross anatomy and function of the organs of the lymphatic system. B.P4 Describe the effect of a disorder on the lymphatic system and possible corrective treatment(s). <b>Mature:</b> B.M2 Explain the physiological reasoning	Sp 2 Mo3,4 So1,3 Cu3-4 BV 2	This is new content however students will be aware of some of the organs involved within the lymphatic system

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teachers can do individual resubmissions for units if they are needed.		treatments must be included.		for corrective treatment(s) associated with a disorder of the lymphatic system. B.D2 Evaluate the effect of corrective treatment(s) for a disorder of the lymphatic system.		
<b>Term 3 (half term)</b>	C Explore the physiology of the digestive system and the use of corrective treatments for dietary-related diseases	A lab book/record of investigations modelling the functioning of the various parts of the digestive system. Photographs and information from the investigations will be used to create an information leaflet that explains the role and location of organs and evaluates dietary disorder in the system and possible treatments. Observation records of practical work undertaken to assess the nutrient content of food will be required. Evidence and conclusions from the investigations will be incorporated into the information leaflet.	NS: Functioning of the digestive system  RV: building on top of GCSE knowledge of the digestive system	<b>Informed:</b> C.P5 Explain the role and location of organs involved in digestion. C.P6 Correctly carry out investigations to establish sources and importance of key nutrients for a balanced diet. C.P7 Describe the symptoms of nutrient deficiency as a result of dietary-related disease. <b>Mature:</b> C.M3 Analyse the role of digestive enzymes on nutrient uptake in each part of the digestive system.	Possible trip to butchers/full pig dissection?  Sp 2 Mo3,4 So1,3 Cu3-4 BV 2	Students will be aware from GCSE the enzymes and organs involved with digestion. Prior knowledge checks will be performed before teaching to see how much knowledge students have.

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				C.M4 Explain the use of corrective treatment(s) for nutrient deficiency C.D3 Evaluate the effect of dietary disease and corrective treatment(s) on human health.		
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