

**Course Outline: Applied Science**

**Year 12**

**Rationale:** Units 1 and 2 are delivered simultaneously at appropriate points so information and skills learned in Unit 1 can be utilised in Unit 2 portfolio work. Unit 1 content is done in an order that allows earlier fundamental content to inform later aspects of the unit. It is done in order as recommended by the specification. The aim of Unit 1 is that learners develop an understanding of key concepts in science and its applications, building on their knowledge and understanding of the National Curriculum KS4 Science subject content gained in previous studies. As a result of studying this unit, learners will be able to apply these key concepts to vocational situations and contexts. In unit 2, amongst other key indicators learners will demonstrate their knowledge and understanding of:

- the scientific basis of a range of analytical and experimental techniques
- the use of standard procedures to ensure that the results of analysis can be replicated
- the production and application of risk assessments
- how to analyse errors quantitatively and use this analysis to determine whether experimental results are within tolerance of theoretical or expected values

The aim of unit 3 is to build on the applied contexts explored by learners to enable them to analyse and evaluate scientific information, to develop critical thinking skills and to understand the use of the media to communicate scientific ideas and theories. Learners will develop an understanding of how science is used in organisations and of the roles and responsibilities of their scientifically-qualified staff.

In year two learners move on the units 4, 5 and 6b. The aim of unit 4 is that learners develop an understanding of human anatomy and physiology, building on their knowledge and understanding of the National Curriculum KS4 Science subject content gained in previous studies.

In unit 5, learners will use secondary sources to research a scientific topic and develop an outline for the practical Investigation, plan the practical investigation and justify the approaches suggested, prepare risk assessments and carry out the practical investigation, record data in an appropriate format, analyse data to draw conclusions, evaluate the techniques used and the outcomes achieved, produce a scientific report on their investigation, and prepare a presentation of their investigation for an appropriate audience.

In unit 6b is learners gain an understanding of some of the key areas in modern medical physics. It will allow them to look at the scientific basis for modern diagnostic and therapeutic techniques and evaluate the advantages and disadvantages of a range of methods of diagnosing and/ or treating different conditions.

	CONTENT	KEY/FUNDAMENTAL CONCEPTS	ASSESSMENT
Autumn Term	Unit 1 Biology 1(c) Chemistry 2(a)(c) Physics 3(a)  Unit 2 portfolio work: Biology Chemistry Physics	<b>Unit 1</b> <b>Biology</b> - Heart structure, cardiac cycle <b>Chemistry</b> - The mole RAM & RFM/ Balancing equations Concentration calculations Titrations Titrations Atomic structure Electronic configurations <b>Physics</b> - energy and power, efficiency  <b>Unit 2</b> <b>Biology</b> - Physiological measurements coursework 1st draft <b>Chemistry</b> - <b>Physics</b> – Specific Heat capacity	<b>Unit 1</b> <b>Biology</b> – in class assessment on first half term study <b>Chemistry</b> - in class assessment on first half term study <b>Physics</b> – Useful energy and efficiency  <b>Unit 2</b> <b>Biology</b> - Physiological measurements coursework <b>Physics</b> - Specific Heat capacity
Half-term			

	<p>Unit 1 Biology 1(e) Chemistry 2(b)(d) Physics 3(a)</p> <p>Unit 2 portfolio work: Biology Chemistry Physics</p>	<p><b>Unit 1</b> <b>Biology</b> - Lungs and breathing</p> <p>Respiration</p> <p><b>Chemistry</b> - Emission spectra Covalent bonding Ionic bonding Metallic Bonding &amp; alloys/ bonding summary Periodicity &amp; the periodic table Gas calculations (RTP/STP <b>Physics</b> - U values, energy sources</p> <p><b>Unit 2</b> <b>Biology</b> - Physiological measurements coursework <b>Chemistry</b> - <b>Physics</b> – Specific Heat capacity</p>	<p><b>Unit 1</b> <b>Biology</b> – In class assessment on material covered so far. <b>Chemistry</b> - In class assessment on material covered so far. <b>Physics</b> - In class assessment on material covered so far.</p> <p><b>Unit 2</b> <b>Biology</b> - Physiological measurements coursework <b>Chemistry</b> - Volumetric analysis <b>Physics</b> - Specific Heat capacity</p>	
Christmas Holiday				
Spring Term	<p>Unit 1 Biology 1(f) Chemistry 2(e) Physics 3(b)</p> <p>Unit 2 portfolio work: Biology Chemistry Physics</p>	<p><b>Unit 1</b> <b>Biology</b> - Photosynthesis <b>Chemistry</b> - Energy profiles (exo/endo/Ea) Enthalpy changes Enthalpy practicals (combustion &amp; neut) <b>Physics</b> - electrical circuits, conductors and semi</p> <p><b>Unit 2</b> <b>Biology</b> - Respiration in maggots <b>Chemistry</b> - <b>Physics</b> - Resistivity of a wire</p>	<p><b>Unit 1</b> <b>Physics</b> – Electricity</p> <p><b>Unit 2</b> <b>Biology</b> - Respiration in maggots coursework <b>Chemistry</b> - Colorimetry <b>Physics</b> - Resistivity of a wire</p>	
	Half-term			
	<p>Unit 1 Biology 1(f) Chemistry 2(e) Physics 3(c)</p> <p>Unit 2 portfolio work: Biology Chemistry Physics</p>	<p><b>Unit 1</b> <b>Biology</b> - Food chains and energy flow <b>Chemistry</b> - Hess cycles</p> <p><b>Physics</b> - Newton's 1st, Momentum</p> <p><b>Unit 2</b> <b>Biology</b> - Photosynthesis coursework <b>Chemistry</b> - <b>Physics</b> - Resistivity of a wire</p>	<p><b>Unit 2</b> <b>Biology</b> - Photosynthesis coursework <b>Chemistry</b> – Colorimetry and Volumetric analysis improvements. <b>Physics</b> - Resistivity of a wire</p>	
Easter Holiday				

Summer Term	<p>Unit 1 Biology 1(a)(b)(d) Chemistry - Revision Physics 3(c)</p> <p>Unit 2 portfolio work: Biology Chemistry Physics</p> <p>Unit 3 – introduction to unit.</p>	<p><b>Unit 1</b> <b>Biology</b> - Homeostasis</p> <p>Cells - structure etc</p> <p>Movement across membranes</p> <p><b>Physics</b> - collisions</p> <p><b>Unit 2</b> <b>Biology</b> – any outstanding improvements. <b>Chemistry</b> - any outstanding improvements. <b>Physics</b> - any outstanding improvements.</p> <p><b>Unit 3</b> <b>Delivery of Unit 3 at this point as article is released by the exam board so can be given to students at this point.</b></p> <p>Review of advanced notice article.</p>	Internal examinations
	Half-term		
	<p>Unit 1 revision. Biology Chemistry Physics</p> <p>Unit 3 PPQs</p>	<p><b>Unit 1</b> <b>Biology</b> – Revision of Unit 1 prior to examination. Start Unit 4 material following exam (Food and Digestion). <b>Chemistry</b> - Revision of Unit 1 prior to examination. Start Unit 5 material. <b>Physics</b> - Revision of Unit 1 prior to examination. Start unit 6b when appropriate depending on exam date.</p> <p><b>Unit 3</b> <b>Revision</b></p>	<p><b>External examinations.</b> <b>Unit 1 – Key concepts in science</b> <b>Unit 3 – Science in the modern world</b></p> <p><b>Unit 2 portfolio work submitted.</b></p>

**Notes:**

PEQ = Past Exam Questions

In the key/fundamental concepts column the number in the bracket *i.e.*(2.1.1) refer to the specification statements



**Course Outline:**

**Applied Science**

**Year 13**

	CONTENT	KEY/FUNDAMENTAL CONCEPTS	ASSESSMENT
Autumn Term	Unit 4 – as detailed in Key Concepts, studied with Biology specialist.	<b>Unit 4</b> - Digestion  Nervous system	Continued monitoring of Unit 5 and 6b portfolio work.
	Unit 5 – preparation for volumetric analysis.	Brain  Action potentials	
	Unit 6 – imaging and radioactivity	<b>Unit 5</b> – PO1 preparing for the scientific investigation. Completion of research and risk assessment. Begin PO2 and PO3 for Volumetric analysis. <b>Unit 6b</b> - Portfolio work: (Imaging and Radioactivity) (Tasks 1, 4, 2) Practical (Radioactive 1/2 life)	
<b>Half-term</b>			
Autumn Term	Unit 4 – as detailed in Key Concepts, studied with Biology specialist.	<b>Unit 4</b> - Synapses  Disorders of the nervous system	Mock examinations – based on Unit 4.
	Unit 5 – carry out volumetric analysis, analyse and evaluate.	Muscle structure  Neuromuscular junctions	
	Unit 6 – imaging and radioactivity	<b>Unit 5</b> – Continue PO3 for Volumetric analysis. Begin PO2 and PO3 for Colorimetry.  <b>Unit 6b</b> - Portfolio work: (Imaging and Radioactivity) (Tasks 1, 4, 2) Practical (Radioactive 1/2 life)	
<b>Christmas Holiday</b>			
Spring Term	Unit 4 – as detailed in Key Concepts, studied with Biology specialist.	<b>Unit 4</b> - Contraction of muscle  ATP	Continued monitoring of Unit 5 and 6b portfolio work.
	Unit 5 – plan and complete colorimetry investigation.	<b>Unit 5</b> - Continue PO3 for Colorimetry. Begin PO2 and PO3 for Hydrogen Peroxide decomposition.	
	Unit 6 – imaging and radioactivity	<b>Unit 6b</b> - Portfolio work: (Imaging and Radioactivity) (Task 3) Portfolio work (Light) (Tasks 2,4) Practical (Refractive index of glass)	
<b>Half-term</b>			
Spring Term	Unit 4 – as detailed in Key Concepts, studied with Biology specialist.	<b>Unit 4</b> - Review of muscle contraction  Haemoglobin	Continued monitoring of Unit 5 and 6b portfolio work.
	Unit 5 – plan and complete hydrogen peroxide investigation.	<b>Unit 5</b> – Complete PO3 for Hydrogen peroxide decomposition. Make improvements on overall portfolio.	
	Unit 6	<b>Unit 6b</b> - Portfolio work: (Imaging and Radioactivity) (Task 3) Portfolio work (Light) (Tasks 2,4) Practical (Refractive index of glass)	
<b>Easter Holiday</b>			

Summer Term	Unit 4 – as detailed in Key Concepts, studied with Biology specialist.	<b>Unit 4 – Revision</b>	Continued monitoring of Unit 5 and 6b portfolio work.
	Unit 5 – consumer report PO4.	<b>Unit 5</b> – Complete consumer report (PO4).	
	Unit 6 – refinement of portfolio work.	<b>Unit 6b</b> – Refining and improving Portfolio work	
Half-term			
	<u>Exams</u>	<u>Exams</u>	<u>Exams</u>