

Rivers Academy Age Related Expectations - **Science**

	End of KS4	Year 12	Year 13
<p><b><u>Biology</u></b></p> <p>High level of describing and explaining when analysing and interpreting data. Students will also develop their ability to apply their knowledge to new contexts.</p>	<p>I am able to apply knowledge and understanding of scientific ideas to unusual contexts.</p>	<p>I am able to apply my understanding of concepts to new situations. I am comfortable dealing with information in new and novel scientific contexts.</p>	<p>I am able to think synoptically and connect old ideas with newer ones. I am also able to apply my understanding to new situations with far more complicated ideas than I could last year. I can understand that processes usually occur in parallel and not sequentially.</p>
	<p>e.g. I can apply Photosynthesis concepts, related to RPA's (required practicals) to prove the Science or Hypothesis formed from my knowledge of Photosynthesis.</p>	<p>e.g. I can apply concepts of how pressure affects the anatomy of the heart. I could also understand how the properties of water make it a suitable medium for all life. If someone were to introduce a new enzyme to me with some data, I would be able to surmise its role and understand how it is affected by various experimental conditions.</p>	<p>e.g. I can like my ideas about enzymes and protein trafficking to concepts surrounding genetic regulation. I am able to understand that photosynthesis is a far more complex process than the word equation implies.</p>
<p><b><u>Chemistry</u></b></p> <p>Analyse and Apply in depth knowledge to complex Chemical processes.</p>	<p>I am able to apply knowledge and understanding of scientific ideas to unusual contexts.</p>	<p>I can apply a range of concepts to a variety of basic concepts such as the structure of the atom; the interaction of matter and energy; how to control reactions; patterns in the Periodic Table; understanding carbon-based molecules.</p>	<p>I can further develop the ideas about enthalpy, rates and equilibria further, applying more quantitative methods to their analysis.</p>

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	e.g. I can apply knowledge of Catalysts/Biological catalyst and factors affecting rates of reaction to explain other reactions e.g. Enzymes in Biology.	e.g. I can apply the theory and learn essential practical skills such as synthesising organic solids, investigating rates of reaction and carrying out redox titrations.	e.g. I can develop the knowledge of the periodic table to explore transition metal chemistry. I can apply Organic chemistry and analysis to the chemistry of aromatic compounds and thus deepen understanding of carbonyl compounds and organic functional groups containing nitrogen. I can interpret NMR spectra as a spectroscopic method for analysing organic compounds.
<b><u>Physics</u></b>  Explaining, solving and interpreting.	I am able to apply knowledge and understanding of scientific ideas to unusual contexts.	I can apply a range of concepts to unfamiliar situations. I can use these concepts to solve problems, either mathematically or in the form of written explanations.	I can apply multiple concepts to unfamiliar problems. I can use these /concepts to solve problems, either mathematically or in the form of written explanations.
	e.g. I can apply knowledge of thermal conductivity in scenarios previously unknown to me.	e.g. I can solve numerical problems using Newton's laws and can explain in words why that is the solution.	e.g. I can solve problems involving planetary motion, applying the concepts of gravity and circular motion simultaneously.
<b><u>Working Scientifically</u></b>  Investigations involving high levels of precision and detail.	I am able to apply and transfer knowledge and understanding of scientific enquiry, techniques and procedures to unusual contexts.	Students can follow written procedures, use correct instrumentation with minimum assistance, carry out techniques methodically and make adjustments, identify and account for different types of variables, identify risks and make adjustment, use safety equipment correctly, make accurate observations, obtain accurate and precise data taking into account	Students can follow written procedures, use correct instrumentation with minimum assistance, carry out techniques methodically and make adjustments, identify and account for different types of variables, identify risks and make adjustment, use safety equipment correctly, make accurate observations, obtain accurate

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		units and conversations, use software to process data and carry out research citing source of information.	and precise data taking into account units and conversations, use software to process data and carry out research citing source of information.
	<p>e.g. <u>Physics</u></p> <p>I am able to apply my understanding from the lab experiment to how insulation can help save energy in houses.</p> <p>e.g. <u>Biology</u></p> <p>I am able to apply ideas around inverse square law and photosynthesis to carry out an experiment in light intensity's effect on photosynthesis.</p> <p>e.g. <u>Chemistry</u></p> <p>I am able to apply ideas around reactivity series and electrolysis to separate salt.</p>	<p>In physics students carry out investigations into interference patterns, the value of the 'g', the resistivity of a wire, internal resistance, young's modulus and stationary waves.</p> <p>In Biology, I can carry out microbiological research where I will develop my aseptic technique, I will also be able to competently carry out dissection and serial dilution.</p> <p>In Chemistry I will follow written procedures, apply investigative approaches and methods when using instruments and equipment. Safely uses a range of practical equipment and materials, Make and record observations and Research, reference and create practical reports.</p>	<p>In physics students carry out investigations into simple harmonic motion, charles law, capacitors, the force on a current carrying wire, induced EMF and the inverse square law of gamma radiation.</p> <p>In Biology, I will research, develop and perform my own practical experiment in the effect of a named factor on photosynthesis. I will also use a colorimeter and further my use of the ever important serial dilution methodology.</p> <p>In Chemistry I will further develop my practical skills by following written procedures, applying investigative approaches and methods when using instruments and equipment. Safely use a</p>

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