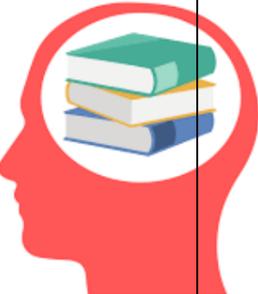


W	Year: 10	Subject: Combined science	Autumn 1		Autumn 2		Spring 1		
Intent	Subject Concepts (Substantive knowledge) 		<ul style="list-style-type: none"> • Human Biology 	(B5, B6, B7) Infection and response <u>Practical opportunities</u> Model the spread of disease – iodine and milk	<u>Prior Knowledge:</u> <ul style="list-style-type: none"> • Identify the different types of microbes • Describe the aspects of a healthy lifestyle • Explain how to prevent infections 	(B8, B9) Bioenergetics <u>Practical opportunities</u> Investigate the effect of light intensity on the rate of photosynthesis Respiration practical – breathing rate increase (effect of exercise – link with KS3) Starch on leaf – link to KS3 topics, energy for plant	<u>Prior Knowledge:</u> <ul style="list-style-type: none"> • State the word equations for photosynthesis and respiration • Explain basic factors that affect PS and respiration • Describe the effect of exercise on heart rate • Year 7 Cell covering the basic structure and function of cells and their organelles • Year 8 Respiration and Photosynthesis Topics cover all the basics of bio energetics topic 	(B10, B11) Homeostasis and response <u>Practical opportunities</u> Investigate the effect of a factor on human reaction time	<u>Prior Knowledge:</u> <ul style="list-style-type: none"> • Define a Healthy lifestyle • Describe the role of the nervous system • Identify Specialised cells
			Chemistry	(C4) Chemical calculations <u>Practical opportunities</u> Use titration to investigate reacting volumes	<u>Prior Knowledge:</u> <ul style="list-style-type: none"> • Draw and label the Structure of the atom • Calculate the numbers of protons, neutrons and electrons • Use the Periodic Table to find atomic mass 	(C5) Chemical changes <u>Practical opportunities</u> Prepare a salt from an insoluble metal carbonate or oxide Investigate the electrolysis of a solution	<u>Prior Knowledge:</u> <ul style="list-style-type: none"> • Explain the differences between physical and chemical changes • Describe exothermic and endothermic reactions 	(C7) Energy Changes <u>Practical opportunities</u> Investigating temperature change	<u>Prior Knowledge:</u> <ul style="list-style-type: none"> • State how to identify a chemical reaction • Describe the Properties of metals • Describe how to use the pH scale
			Physics	(P8, P9) Forces in balance	<u>Prior Knowledge:</u> <ul style="list-style-type: none"> • Describe balanced and unbalanced forces • Calculate speed • Explain the difference between Mass and weight • State the difference between a scalar and a vector and give examples 	(P9, P10) Forces in Motion	<u>Prior Knowledge:</u> <ul style="list-style-type: none"> • Describe balanced and unbalanced forces • Calculate speed • Explain the difference between Mass and weight • State the difference between a scalar and a vector and give examples 	(P6) Particle model of matter (P7) Start atomic structure	<u>Prior Knowledge:</u> <ul style="list-style-type: none"> • Definition of density • Explain and draw the Particle model and the three states of matter
			Disciplinary Knowledge	<ul style="list-style-type: none"> • Explain everyday and technological applications of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and arguments. 		<ul style="list-style-type: none"> • Explain everyday and technological applications of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and arguments. 		<ul style="list-style-type: none"> • Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviours, allowing it to remain alive and functional even as external 	

		<ul style="list-style-type: none"> Recognise the importance of peer review of results and of communicating results to a range of audiences. Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts Representing distributions of results and make estimations of uncertainty. Use scientific vocabulary, terminology and definitions. Recognise the importance of scientific quantities and understand how they are determined. Use SI units (eg kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate. Use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano). Interconvert units. WS 4.6 Use an appropriate number of significant figures in calculation. Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts Interpreting observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions. Interconvert units. 	<ul style="list-style-type: none"> Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts. Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts Interpreting observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions. Interconvert units. 	<p>conditions change within some range. Feedback mechanisms can encourage through positive feedback or discourage through negative feedback what is going on inside the living system.</p> <ul style="list-style-type: none"> Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts. Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts Evaluate risks both in practical science and the wider societal context, including perception of risk in relation to data and consequences. Interpreting observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions Being objective, evaluating data in terms of accuracy, precision, repeatability and reproducibility and identifying potential sources of random and systematic error.
Implementation	<p>Common Misconceptions</p>	<ul style="list-style-type: none"> How communicable diseases are spread, students do not always appreciate the different modes of transmission of different pathogens <ul style="list-style-type: none"> vaccines are possible alternatives to the use of antibiotics. Bacteria are the only pathogens that antibiotics can be used to treat. When an antibiotic no longer works, the bacteria has not developed antibodies to it so it is not "immune". Instead, it has developed resistance to that antibiotic Understanding that the relative molecular (formula) mass is simply the sum of the relative atomic masses of the component elements. Difference between mass and weight https://spark.iop.org/misconceptions https://www.physicsclassroom.com/getattachment/Physics-Video-Tutorial/Newtons-Laws/Force-and-Motion-Misconceptions/Lecture-Notes/LessonNotes.pdf?lang=en-US 	<ul style="list-style-type: none"> Breathing is not the same as respiration. Plants respire all the time, not just at night when they have finished photosynthesising. Respiration is the release of energy, not the production of energy. Plants obtain their energy directly from the sun. Plants have multiple sources of food (heterotrophic as well as autotrophic). Carbon dioxide, water, and minerals are food. Plants feed by absorbing food through their roots. Plants use heat from the sun as a source of energy for photosynthesis Sunlight is a food. Sunlight is composed of molecules. Sunlight is consumed in photosynthesis. Plants absorb water through their leaves. Plants produce oxygen for our benefit Difference between mass and weight https://spark.iop.org/misconceptions https://www.physicsclassroom.com/getattachment/Physics-Video-Tutorial/Newtons-Laws/Force-and-Motion-Misconceptions/Lecture-Notes/LessonNotes.pdf?lang=en-US The distance an object travels and its displacement are always the same. An objects speed is the same as its velocity. If an object is accelerating, then the object is speeding up. An objects acceleration cannot change direction. Acceleration always occurs in the same direction, as an object is moving. If an object has a speed of zero (even instantaneously), it has no acceleration The only natural motion is for an object to be at rest. If an object is at rest, no forces are acting on the object. A rigid solid cannot be compressed or stretched. Only animate objects can exert a force. Thus, if an object is at rest on a table, no forces are acting on it. Force is a property of an object. An object has force, and when it runs out of force it stops moving. 	<ul style="list-style-type: none"> "Negative feedback is detrimental for the body; positive is better for the body." "Homeostasis means that the body always does what is best for itself."- Not always. Homeostasis is the ability to maintain constant internal conditions. However, sometimes the constant the body is maintaining is not idea. Such as when the body maintains a high blood pressure.

Enabling or Adapting the Curriculum	SEND Students	<ul style="list-style-type: none"> Provide keywords to support the topic and understanding Model spread of disease – practical Use molymod or molecular diagrams to count the number of atoms and therefore only represent the chemical formula without giving away any other information Formula card templates - https://edu.rsc.org/resources/molecular-model-misconceptions/2392.article (H) Mole refers to a certain mass rather than a number, and that different substances of equal mass are made up of the same number of moles Provide writing frames and support for answer 6 mark questions Teach keyword vocabulary and break down ie photo – light, lysis to split Breaking text into chunks on powerpoints Dual coding - visual clues Scaffolding for long text, graphing Use coloured slides Modelling Subtitles on any videos 	<ul style="list-style-type: none"> Provide keywords to support the topic and understanding Stomata in leaves – opportunity to recap previous knowledge through practical (link with microscopes yr 7 and 8) - https://youtu.be/Haiiw5HSHG0 Model practicals/show on youtube (provide links on Teams), step by step instructions Make a 3D cube model of a leaf Provide writing frames and support for answer 6 mark questions Teach keyword vocabulary and break down ie photo – light, lysis to split Breaking text into chunks on powerpoints Dual coding - visual clues Scaffolding for long text, graphing Use coloured slides Modelling Subtitles on any videos Provide writing frames and support for answer 6 mark questions 	<ul style="list-style-type: none"> Provide keywords to support the topic and understanding Provide writing frames and support for answer 6 mark questions Teach keyword vocabulary and break down ie photo – light, lysis to split Breaking text into chunks on powerpoints Dual coding - visual clues Scaffolding for long text, graphing Use coloured slides Modelling Subtitles on any videos Provide writing frames and support for answer 6 mark questions
	Disadvantaged Students	<ul style="list-style-type: none"> Bring career links into lessons (aspirational) External trips – linked with STEM co-ordinator? Access to revision guides Support with exam questions through use of displays and key terminology Support long answer questions with sentence starters Use of CGP books to support in PLC lessons 	<ul style="list-style-type: none"> Bring career links into lessons (aspirational) External trips – linked with STEM co-ordinator? Access to revision guides Support with exam questions through use of displays and key terminology Support long answer questions with sentence starters Use of CGP books to support in PLC lessons 	<ul style="list-style-type: none"> Bring career links into lessons (aspirational) External trips – linked with STEM co-ordinator? Access to revision guides Support with exam questions through use of displays and key terminology Support long answer questions with sentence starters Use of CGP books to support in PLC lessons
	More Able Students	<ul style="list-style-type: none"> Debating – to vaccinate or not https://resource.download.wjec.co.uk/vtc/2015-16/15-16_27/pdf/unit03/activities/to-vaccinate-debating-cards.pdf Build into lessons well-designed extension tasks promote higher-order skills such as speculation, inference, prediction, hypothesis and synthesis, as well as nurturing independence and self-knowledge. Asking probing questions Encourage effective discussion between teacher and pupil open-ended tasks that do not have one right answer Set an independent task, such as a further investigation invite students to decide how they would like to demonstrate their learning to you or the rest of the class after an agreed length of time. 	<ul style="list-style-type: none"> Algae to fuel – extend understanding - https://www.energy.gov/eere/education/articles/energy-101-algae-fuels Chromatography of leaf pigments – link with separating substances KS3. Lactic acid in athlete's – task on Kerboodle pg 126 Alcoholic yeast Do the practical puddle chemistry (will help with misconceptions) https://www.chemedx.org/system/files/learningtouseosolubilityrules.pdf Build into lessons well-designed extension tasks promote higher-order skills such as speculation, inference, prediction, hypothesis and synthesis, as well as nurturing independence and self-knowledge. Asking probing questions Encourage effective discussion between teacher and pupil open-ended tasks that do not have one right answer Set an independent task, such as a further investigation invite students to decide how they would like to demonstrate their learning to you or the rest of the class after an agreed length of time. 	<ul style="list-style-type: none"> Diabetes in young people, The search for genetics https://www.stem.org.uk/elibrary/resource/27540 Kidney failure - https://www.stem.org.uk/resources/elibrary/resource/26476/kidney-failure Build into lessons well-designed extension tasks promote higher-order skills such as speculation, inference, prediction, hypothesis and synthesis, as well as nurturing independence and self-knowledge. Asking probing questions Encourage effective discussion between teacher and pupil open-ended tasks that do not have one right answer Set an independent task, such as a further investigation invite students to decide how they would like to demonstrate their learning to you or the rest of the class after an agreed length of time.
Literacy/Numeracy Skills 	LITERACY	<ul style="list-style-type: none"> Biology keywords Literacy tasks https://resources.eduqas.co.uk/pages/ResourceSingle.aspx?rId=874 Chemistry keywords Physics keywords 	<ul style="list-style-type: none"> Bioenergetics keywords Hydroponics literacy task (taken from combined science Kerboodle pg118) Chemistry keywords Physics keywords Write a story to explain a journey which can be plotted as a motion graph 	<ul style="list-style-type: none"> Biology topic keywords https://thescienceteacher.co.uk/writing-in-science/ Chemistry keywords Break apart key vocabulary - The Greek root <i>therm</i> means temperature or heat, which gives us a clue about all reactions: there is energy exchange! <i>Endo</i> means "within" while <i>exo</i> means "outside," so these types of reactions are opposite. Physics keywords

	<p>Reading</p> <ul style="list-style-type: none"> How exercise affects your immunity and susceptibility to infection – article link to the areas being covered https://www.stem.org.uk/resources/elibrary/resource/30205/figh-ting-fit-suitable-home-teaching further reading into the topic of microbes and disease https://microbiologysociety.org/why-microbiology-matters/what-is-microbiology/microbes-and-the-human-body/microbes-and-disease.html Class textbooks BBC bitesize Revision guides 	<ul style="list-style-type: none"> Life magazine link - https://www.suttongrammar.sutton.sch.uk/ckfinder/userfiles/files/Life%20Magazine%202023%20issue%201.pdf Class textbooks BBC bitesize Revision guides 	<ul style="list-style-type: none"> Keeping things steady - https://www.stem.org.uk/resources/elibrary/resource/27689/keeping-things-steady-suitable-home-teaching Diabetes in young people - https://www.stem.org.uk/elibrary/resource/27540 All about the kidneys from catalyst magazine - https://www.stem.org.uk/resources/elibrary/resource/27621/kidneys-suitable-home-teaching Class textbooks BBC bitesize Revision guides
	<p>Writing:</p> <ul style="list-style-type: none"> Short story - A journey of a microbe and how it infects the body/spreads – how the body responds Research project on non-communicable diseases Definition quizzes – all three key areas 6 mark questions End of topic tests 	<ul style="list-style-type: none"> Writing a practical to investigate the effect of exercise on the body Definition quizzes – all three key areas 6 mark questions End of topic tests 	<ul style="list-style-type: none"> Definition quizzes – all three key areas 6 mark questions End of topic tests
	<p>Oracy:</p> <ul style="list-style-type: none"> Debating – to vaccinate or not https://resource.download.wjec.co.uk/vtc/2015-16/15-16_27/pdf/unit03/activities/to-vaccinate-debating-cards.pdf Cold calling, answering questions in class Class discussion on topic areas being addressed Reading out loud Answering questions Feedback through discussion and debates 	<ul style="list-style-type: none"> Cold calling, answering questions in class Class discussion on topic areas being addressed Reading out loud Answering questions Feedback through discussion and debates 	<ul style="list-style-type: none"> Cold calling, answering questions in class Class discussion on topic areas being addressed Reading out loud Answering questions Feedback through discussion and debates
	<p>NUMERACY</p> <ul style="list-style-type: none"> Looking at data and graphs, analysing data Differences between diseases and infections - HIV and AIDS the difference (activity using graph and data) https://thescienceteacher.co.uk/infection-and-response/ Numeracy tasks - https://resources.eduqas.co.uk/pages/ResourceSingle.aspx?rId=874 Chemical calculations - Calculating, relative formula mass and moles Ratios of atoms Balancing equations Calculations for resultant force and acceleration Calculating breaking distance Drawing motion graphs 	<ul style="list-style-type: none"> Recording data form required practical, analysis for limiting factors Reading scales and using apparatus Measuring photosynthetic rates Using data to compare respiration types (Graphs and Tables) - Lactic acid in athletes – task on Kerboodle pg 126 Calculations for resultant force and acceleration Calculating breaking distance Drawing motion graphs 	<ul style="list-style-type: none"> Interpret data about sweating and temperature - https://practicalbiology.org/control-and-communication/homeostasis/interpreting-information-about-sweating-and-temperature Drawing cooling curves using data
<p>Digital Strategy</p> 	<ul style="list-style-type: none"> Christmas lectures on virus – particular focus on corona virus - https://www.rigb.org/explore-science/explore/video/going-viral-how-covid-changed-science-forever-invisible-enemy-2021 https://www.rigb.org/explore-science/explore/video/going-viral-how-covid-changed-science-forever-perfect-storm-2021 <p>Cognito videos – all science subjects</p> <ul style="list-style-type: none"> Interactive whiteboards for ipads - https://whiteboard.fi/ Use of ipads to complete forms quiz to support PLC and teacher assessment Interactive physics simulation and questions - physcis concept builder phet simulations - all three sciences 	<ul style="list-style-type: none"> Investigate the effect of light intensity on the rate of photosynthesis – Phet simulations, you tube videos Photosynthesis biology lab - https://study.com/academy/lesson/lab-5-photosynthesis.html Online biology lab - https://study.com/academy/topic/bioenergetics.html Use of phet simulator - https://phet.colorado.edu/en/simulations/forces-and-motion-basics Interactive whiteboards for ipads - https://whiteboard.fi/ Use of ipads to complete forms quiz to support PLC and teacher assessment Interactive physics simulation and questions - physcis concept builder phet simulations - all three sciences 	<ul style="list-style-type: none"> Testing reaction rates online – sheep dash https://games.kidzsearch.com/computer/title/sheep-dash-how-fast-are-your-reactions-23781 Homeostasis simulation - https://pbslm-contrib.s3.amazonaws.com/WGBH/conv16/conv16-int-bcc/index.html Interactive whiteboards for ipads - https://whiteboard.fi/ Use of ipads to complete forms quiz to support PLC and teacher assessment Interactive physics simulation and questions - physcis concept builder phet simulations - all three sciences

	Home Learning				<ul style="list-style-type: none"> • https://sciencebob.com/category/experiments/ • Podcasts - https://www.bbc.co.uk/bitesize/articles/zdrk7v4 				<ul style="list-style-type: none"> • Required practical – video on forms quiz with questions to answer. Link with variables, exam techniques and data analysis 				•			
Impact	Composite Assessment				Date:		Content:	Baseline test on topics covered in year 9 for all three sciences	Date:		Content:	<p>Synoptic assessment on all content covered in terms 1 and 2.</p> <p>Synoptic assessment on all content covered in terms 1 and 2.</p> <p>Synoptic assessment on all content covered in terms 1 and 2.</p>	Date:		Content:	<p>Synoptic assessment on all content covered since September</p> <p>Synoptic assessment on all content covered since September</p> <p>Synoptic assessment on all content covered since September</p>