Science 5-Year Curriculum Overview

	Autumn Term		Spring Term		Summer Term	
Year 7	**7a.BC** **Working and thinking scientifically:** Using scientific skills/equipment. **Biology: Cells** Identify the key aspects of plant and animal cell structures. **Chemistry: Particles and their behaviour** Use model particles to explain observations. **STEM- Mechanical support*	**7b.PB** **Physics: Energy** Compare different devices and processes that involve energy and fuels **Biology: Structure and function of body systems** Understand how the body works -the respiratory and skeletal system. **STEM- Human Biology and health*	**7c.C** **Chemistry: Elements, atoms and compounds** Know materials are made from atoms of one or more element. **Chemistry: The Periodic table** Understand the periodic table and its elements used in our everyday life's. **STEM Advancements in chemical sensors and detection methods.*	**7d.PB** **Physics: Light** Understand the transmission of light and the use of ray diagrams to describe how light changes **Biology: Reproduction** Understand adolescence and emotions. Compare reproduction in animals and plants. **STEM- Mathematics statistics- Population Modelling*	**7e.CP** **Chemistry: Separation techniques** Understand the difference between pure substances, mixtures, solutions and how mixtures can be separated. **Physics: Electricity and magnetism** Explore series and parallel circuits. Compare permanent magnets and electromagnets. **STEM-Engineering*	**7f.CP** **Chemistry: The Earth** Explore the different layers of the Earth. Understand how rocks are classified and recycled. **Physics: Space** Understand the forces that influence the physical world around us. **STEM- Astronomy*
Unit Links:	KS2 Working scientifically, Living things, States of matter **8a, 8a.B, 7c.C, 8b.C**	KS2 Animals including humans **8b.P**	KS2- Properties and changes in materials **8c.C 7b.B**	KS2 Light, Evolution and inheritance **7d.P 8b.P**	KS2 Properties and changes in materials, Electricity, Forces, Magnets **7c.C, 9a.C,**	KS2 Earth, Rocks, Space **7c.C**
Year 8	**8a.B** **Working and thinking scientifically:** Further develop science enquiries, answer scientific questions about the world around them and make predictions. **Biology: Biological processes** Understand process of photosynthesis and the adaptations of leaves. **STEM- Maths-Data analysis*	**8b.CP** **Chemistry: Reactions** Discover how atoms rearrange and join differently to make new substances. Understand what a chemical reaction is. **Physics: Sound** Outline characteristics of waves, our auditory perception, and the diverse applications of sound. Take a closer look at the basic parts of the ear. **STEM- Acoustics- Audio Engineering*	**8c.BC** **Biology: Health and lifestyle** Explore the concepts of health and disease, a balanced diet and the positive and negative effects drugs have on the body **Chemistry: Metals and other materials** Observe patterns in the chemical properties of metals and non- metals. Use the reactivity series to make predictions and identify different extraction methods. **STEM-Materials Science/Engineering*	**8d.PB** **Physics: Forces** The introduction to forces. Understand why things move and change. Examine how both balanced and unbalanced forces impact the motion of objects. **Biology: Ecosystems and adaptations** Examine feeding relationships within food chains. Analyse the adaptations of several organisms that help them to survive. **STEM Environmental science*	**8e.CP** **Chemistry: Acids and alkalis** Make connections between everyday household acid and alkali substances and the use of Indicators. Know acid and alkali= produce a neutralisation reaction. **Physics: Motion and pressure** Analyse motion graphs to see how an object's speed changes. Use the particle model to explain gas pressure. Understand atmospheric pressure and liquid pressure. **STEM-Mechanical engineering*	**8f.B** **Biology: Inheritance** Observe the differences between organisms in a species, and whether the variation and characteristics are inherited, environmental or both. Understand that characteristics can be discontinuous or continuous. Learn the process of evolution through natural selection. **STEM- Changing the world*
Unit links:	**7aB, 7bP, 8bC, 8dB,**	**7dP, 8aB,**	**8fB, 7Cc,**	**8ab, 8eP**	**8dP, 8bC**	**7d.B**
Year 9	9a.**BC** **Biology:** **CB1 (11) - Key concepts in biology** Understand the key concepts within biology on a cellular level. **Triple: testing foods, core practical.** **Chemistry:** **CC1 – CC2 (7) - States of matter/Methods of separating and purifying substances** Explore how materials can be separated from one another using their properties. **STEM: methods used to obtain potable water, determining different component in food. Chromatography used for ink investigation.*	9b. **PB** **Physics:** **CP1 (4) - Motion** Quantities have directions (such as forces). Calculate speeds and accelerations, and how to represent changes in the distance moved and speeds on graphs. **CP2 (9) - Motion and forces** Understand Newton's Laws of Motion. **Triple: braking distance and energy** **Biology:** **CB2 (7) - Cells and control** How plants and animals develop to complex organisms. **Triple: The brain; The brain and spinal cord problems; The eye** **STEM: numeracy. Use of forces to design and create new objects. Understand how animal and plan grow to design new devices.*	9c. **CP** **Chemistry:** **CC3-4 (6) - Atomic structure and periodic table** Understand atoms and their structure. **Physics:** **CP3 (6) – Conservation of energy** Understand how energy can be transferred and stored, how to reduce energy transfers and renewable and non-renewable resources. **STEM: Understand the properties of different elements that could help to create different type of materials. How to use renewable energy to reduce greenhouse effect and climate change.*	9d. **BC** **Biology:** **CB3 (6) – Genetics** Learn about DNA code that produces our characteristics and the processes that are passed on from parents to their offspring. **TRI** **Sexual and asexual reproduction, Protein Synthesis, Genetic Variants and phenotypes, Mendel, Multiple and missing alleles** **Chemistry:** **CC5- 7 (8) - Ionic bonding/ Covalent bonding/ Types of substances** Understanding how bonds are formed and broken to help us explain even the simplest physical change or chemical reaction. **STEM: Gene machine and gene testing*	9e. **P** **Physics:** **CP4 (4) - Waves** Understand waves transfer energy, description of properties of waves, including Refraction. calculating wave speed. **TRI: Waves crossing boundaries, Ears and hearing, Ultrasound, Infrasound** **Physics:** **CP5 (6) - Light and electromagnetic spectrum** Identify different forms of radiation that we cannot see and explain their uses and dangers. **TRI: Ray diagram, colours, Lenses, Radiation and temperature** **STEM: Polarization*	9f. **BC** **Biology:** **CB4 (5) - Natural selection and genetics** Explain how organisms are changed genetically by natural selection and by humans. **TRI** **Tissue culture, GM and agriculture** **Fertilisers and Biological contro**l **Chemistry:** **CC8 (9) - Acids and alkalis** Explore the nature and properties of acidic and alkaline solutions ***STEM** **STEM: Tissue formation for germline development, and in cancer development*
Unit Links:	**7e.C, 10a,b,d,f .B**	**8e. P, 10c.P**	10c.P	**7a.B, 10,a.B**	**7d.P, 10b.P, 11b.P**	**8f.B, 10a.B, 8e.C**

Year 10	**10a. BC** **Biology:** **CB5 (8) - Health disease and development of medicines** Understand the different causes of ill health including the role of pathogens, the effect of different antibiotics on bacterial growth, the relevance the work of key scientists played in the prevention of spread of disease, the specific and non-specific human immune defences. **TRI: virus life cycle, plant defence and disease, monoclonal antibodies.** **Chemistry:** **CC9 (3) - Calculation involving masses** Understand how to calculate masses and the concentration of a solution. Recognise the importance of Avogadro's constant to determine the formula of a compound. **STEM: numeracy, practical lab science*	**10b. PB** **Physics:** **CP6 (8) - Radioactivity** Recall atoms and their structure and understand how atoms can produce radiation when they change. **Tri; Using radioactivity, radioactivity in medicine, nuclear energy, nuclear fission and fusion.** **Tri: Astronomy (5)** **Biology:** **CB6 (6) - Plant structures and their structures** Acknowledge the different factors that affect the rate of photosynthesis. The rate of water uptake by a plant is affected by different factors. Recognise how the reactants for and products of products of photosynthesis are transported. Engage in scientific observations and draw a conclusion. **TRI: plant hormones** **STEM: Radioactivity in medicine*	**10c. CP** **Chemistry:** **CC10-12 (8) - Electrolytic processes/ Using metals/ Reversible reactions and equilibria** Observe the following processes, reactivity, oxidation, reduction and electrolysis. **TRI: Chemistry** **SC14- SC16 (9) - Quantitative Analysis, DE, Volume of gases, chemical and fuel cells.** **Physics:** **CP7-8 (3) - Energy forces doing work/ Forces and their effect** Recognise how the energy in a system changes, how to calculate power and work done. Explore how objects interact with each other. **TRI: Rotational forces,** **TRI; Solar system, gravity and orbits, life cycle of stars, red shift, origin of the universe,** **STEM: Working with mechanisms*	**10d. BC** **Biology:** **CB7 (6) (part 1) - Animal coordination, control and homeostasis** Recognise the importance of glands and their functions in mammals. Discover how hormones are transported to their target organs. Observe how the menstrual cycle is controlled by hormones and how hormones are used in contraception. Recognise the difference between type 1 and type 2 diabetes, how they occur, and treatment options. **TRI: thermoregulation, osmoregulation, the kidneys** **Chemistry:** **CC13 – 15 (10), TRI: Chemistry SC17-SC19 (10)** **Groups in the periodic table/ rates of reaction/ Heat energy changes in chemical reactions** Understand the properties of and the reactions of elements in group 1,7 and 0. The changes in conditions can affect the rates of reactions. **STEM: Understanding application of reactions to discovery.*	**10e. P** **Physics:** **CP9 (10) - Electricity and circuits** Explore current, charge, potential difference and resistance. Establish links between the domestic electrical supply in the UK and safety measures in residential settings. **TRI; Static electricity and dangers of static electricity and electric fields.** **STEM: Use of circuits in technology/engineering*	**10f. B** **Biology:** **CB8 (5) - Exchange and transport in animals** Understand the correct equation to calculate surface area and volume ratio. Make connections between the flow of blood and the circulatory system. Explore the parts of the heart and their functions. **STEM: exploring different Medicines*
Unit links:	9a.**B,** 9c.**C,** 9d. **B,** 9f. **B,** 9b. **B**	**8a.B 9a.B,** 9c.**C,** 9c.**P**	9d. **C,** 9c.**C,** 9c.**P**	9a.**B,** 9c.**C,** 9d. **C,** 9d. **B,** 9b. **B**	9c.**P, 10c. P**	**7b.B,** 9a.**B**
Year 11	11a. BC **Biology:** **CB9 (10) - Ecosystems and materials** Understand how ecosystems are organised. **Tri: assessing pollution, food security, rates of decomposition** **Chemistry** **CC16 – 17 (10), TRI SC20-21 – Fuels/ Earth and atmosphere science** Explore ideas around the advantages and disadvantages of using fuels to today's atmosphere and the effects of climate change. **STEM: Methods used to reduce pollution*	**11b. P** **Physics:** **CP10 –11 (5) - Magnetism/ Electromagnetic induction** Develop knowledge on magnetic fields. **TRI; Electric motors, generators, transformers and energy.** **CP12 – 13 (9) - Particle model/ Forces and matter** Learn how the particle model explains the properties of matter and what happens when energy is transferred to or from a substance. **Tri: pressure in fluids, pressure and upthrust** **STEM: Development of motors and generators*	**11c** **Chemistry:** **Tri: Hydrocarbons, alcohols and carboxylic acids and polymers (10)** **Tri: Qualitative analysis, testing for ions, properties of matter and nano particles. (7)** **Retrieval/Interleaved & Space Practice** **STEM: Use of nanoparticles*			
Unit links:	**7b.P, 7f.C, 8d.B**	**7e,P, 9c.C,10e.P**	**10d.C, 9C.C**			