

Science Curriculum Map - Year 9

Term	Units of Study	Curriculum Guidelines	• NC –Aims / Focus Points
<p style="text-align: center;">Autumn 1 Building blocks</p>	<ul style="list-style-type: none"> • The particle model • States of matter • Changes of state • Compounds and mixtures • Elements • Atomic model and structure • Cells in animals and plants • Waves • Transverse and longitudinal • Wave equation • Electromagnetic waves 	<ul style="list-style-type: none"> • cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope • the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts • the similarities and differences between plant and animal cells • The properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure • changes of state in terms of the particle model. a simple (Dalton) atomic model • differences between atoms, elements and compounds. • Waves on water as undulations which travel through water with 	<ul style="list-style-type: none"> • To ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience • To understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review

		<p>transverse motion; these waves can be reflected, and add or cancel – superposition.</p>	
<p>Autumn 2 Transport over larger differences</p>	<ul style="list-style-type: none"> • Respiration • Exchange surfaces • Human circulatory/ digestive/ nervous/ endocrine system • Plants • Photosynthesis • Chlorophyll • Factors affecting rates of photosynthesis 	<ul style="list-style-type: none"> • The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms, • the structure and functions of the human skeleton, to include support, protection, movement and making blood cells, • the tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts) , plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water 	<ul style="list-style-type: none"> • To select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate • use appropriate techniques, apparatus, and

		<p>from the soil via their roots.</p> <ul style="list-style-type: none"> the structure and functions of the gas exchange system in humans, including adaptations to function, the reactants in, and products of, photosynthesis, and a word summary for photosynthesis the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere 	
<p>Spring 1 Interactions with the environment</p>	<ul style="list-style-type: none"> Lifestyle and health Health and disease Homeostasis Contraception and reproduction 	<ul style="list-style-type: none"> the impact of exercise, asthma and smoking on the human gas exchange system 	<ul style="list-style-type: none"> To present reasoned explanations, including explaining data in

	<ul style="list-style-type: none">• Preventing and curing diseases• The human immune system• Vaccination and medicine	<ul style="list-style-type: none">• reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta• the effects of recreational drugs (including substance misuse) on behaviour, health and life processes.• the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases• □content of a healthy human diet: carbohydrates, lipids	<p>relation to predictions and hypotheses</p> <ul style="list-style-type: none">• evaluate data, showing awareness of potential sources of random and systematic error• identify further questions arising from their results.
--	-------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

		<p>(fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed</p> <ul style="list-style-type: none"> • □ calculations of energy requirements in a healthy daily diet 	
<p>SPRING 2 Building blocks for understanding</p>	<ul style="list-style-type: none"> • The periodic table • Chemical equations • Metals and non-metals 	<ul style="list-style-type: none"> • a simple (Dalton) atomic model □ □ differences between atoms, elements and compounds • chemical symbols and formulae for elements and compounds • conservation of mass changes of state and chemical reactions. • chemical reactions as the rearrangement of atoms • representing chemical reactions using formulae and using 	<ul style="list-style-type: none"> • To select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate • use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety • make and record observations and measurements using a range of methods for

		<p>equations</p> <ul style="list-style-type: none"> the varying physical and chemical properties of different elements the principles underpinning the Mendeleev Periodic Table the Periodic Table: periods and groups; metals and non-metals how patterns in reactions can be predicted with reference to the Periodic Table the properties of metals and non-metals the chemical properties of metal and non-metal oxides with respect to acidity. 	<p>different investigations; and evaluate the reliability of methods and suggest possible improvements</p>
<p>SUMMER 1 Explaining change</p>	<ul style="list-style-type: none"> The Earth's atmosphere The Carbon cycle Human impacts on the 	<ul style="list-style-type: none"> Earth as a source of 	<ul style="list-style-type: none"> To make and record observations and

	<p>environment</p> <ul style="list-style-type: none">• The water cycle• Ecosystems and biodiversity• Interdependence and competition• Variation• Evolution• Inheritance• Chromosomes and genes• Genotype and phenotype	<p>limited resources and the efficacy of recycling</p> <ul style="list-style-type: none">• the carbon cycle• the composition of the atmosphere• the production of carbon dioxide by human activity and the impact on climate. • the composition of the Earth • the structure of the Earth • the rock cycle and the formation of igneous, sedimentary and metamorphic rocks • heredity as the process by which genetic information is transmitted from one generation to the next • a simple model of	<p>measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements</p> <ul style="list-style-type: none">• apply sampling techniques.
--	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

		<p>chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model</p> <ul style="list-style-type: none">• differences between species• the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation• □the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection• changes in the	
--	--	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--

		<p>environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction</p> <ul style="list-style-type: none"> the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material. 	
<p>Summer 2 *Possible some topics take longer to cover so time has been left to allow for that. Also Crime Scene Investigation Projects to be completed</p>	<p>CSI Projects</p>	<p>Experimental skills and investigations</p>	<ul style="list-style-type: none"> To interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility km

Year 9