(Science) Long-Term Plan

Ousedale School
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Long-term planning (LTPs) - Planning how the key concepts, knowledge, skills identified in the Progression map will be delivered termly per year group
Ensuring that end points & NC/spec are covered
Identifying what assessments are planned and when
Ensuring whole school intent priorities to be planned for

(Year 9 Science)						
	Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Unit title:	Fundamentals of Forces / Inheritance, Classification, Evolution	B1 Cell Structure / Rate of Reaction	C1 Atoms, elements, compounds. P3 Energy Resources	B2 Cell Division/ P1 Energy Transfer	C2 Development of the periodic table / P2 Energy Transfer by heating	B3 Organs and the digestive system / B4 Organising animals and plants
Unit length:	13 / 8 lessons	13 /10 lessons	10 / 7 lessons	5 / 9 lessons	7 / 7 lessons	8/11 lessons
Key concepts:	Forces, motion, practical skills Research skills, inheritance, classification, evolution	Cells and organisation Rate of reaction, practical skills	Structure of the atom, elements and compounds, separating mixtures. Renewable and non - renewable	Cell cycle, cell division, Forms of energy, work, power	History of the periodic table. Trends and patterns in the periodic table and reasons for them. Energy transfer by conduction, convection, radiation.	Cells, tissues, organs, systems.
Knowledge/ Skills:	Variables, distance time graphs, acceleration, Newton's second law, momentum, collision / Evaluate sources, structure of DNA, genetic crosses, sex determination, classification, theories of evolution	Be able to explain how the development of microscopy techniques, particularly electron microscopy, has enabled scientists to investigate the sub-cellular structures. Be able to differentiate between eukaryotic and prokaryotic cells, and identify adaptations of specialised animal and plant cells. Be able to use the formula magnification = $\frac{\text{size of image}}{\text{size of real object}}$. And recall the transport of material into and out of	Describe atoms as fundamental chemical building blocks and explain the law of conservation of mass. Understanding of the differences between compounds and mixtures, and how mixtures can be separated using techniques such as filtration, crystallisation, distillation, and chromatography. Recall the evidence that lead to each new stage in the development of the atomic model. Be able to draw electronic structures up to element 20. In this chapter the students will	Recall the process of cell division and the three overall stages of the cell cycle. Recall cell differentiation, and be able to make connections between cell differentiation and the specialised cells. Recall that stem cells are undifferentiated cells that have the potential to become a specialised cell within an organism. Be able to describe some potential uses of stem cells, as well as the disadvantages and objections to the use of stem cells, particularly in	Recall the development of the periodic table, including the work of Dalton, Newlands, and Mendeleev. Identify the importance of an inherent pattern to the elements. An understanding of electronic structures and apply this to the arrangement of the periodic table and the chemical properties of Group 0, Group 1, and Group 7 elements. Identify trends in properties and reactivity. Compare transition elements with group 1. Understand the	Define a tissue, an organ, and an organ system. Recall the human digestive system in which several organs work together to digest and absorb food, breaking down large insoluble molecules so they can be absorbed into the bloodstream. Recognise carbohydrates, proteins, and lipids as large molecules that need to be digested, and be able to name the molecules they are broken down into and that enzymes that digest

		cells by diffusion, osmosis, and active transport. Be able to explain how adaptations of exchange surfaces are linked to the processes of material transport. Recall the factors that affect the rate of a reaction, including temperature, surface area, concentration, and pressure. Students should be able to explain the effect of each factor on the rate of reaction using collision theory. Translate from data to a representation with a model.	examine the different sources of energy that are used to generate electricity or provide heating for homes. They will consider the effect of the production and use of biofuels on the environment along with the concept of carbon-neutrality before outlining the use of nuclear power in comparison to fossil fuels. Describe and evaluate renewable resources such as wave power, wind power, hydroelectricity and tidal technology and how these can be used to generate electricity in specific locations. Outline the principles of solar cells and both small-scale and large-scale solar heating systems. Compare all of the energy resources in terms of local environmental impacts such as pollution and global environment impacts such as acid rain and contribution to global warming and consider the capital costs and operating costs of the resource	relation to medical treatments. Recall the energy stores model and the processes, such as forces and electrical currents, through which energy can be transferred. Work done by a force acting over a distance and how this concept can be used to analyse energy changes in gravitational stores, through lifting and falling, and elastic potential stores during stretching using the relevant mathematical relationships. Discuss the conservation of energy through changes in the gravitational, kinetic, and elastic stores. Consider the dissipation of energy during transfers such as those caused by friction or electrical heating, leading to the idea of efficiency during different energy changes and its calculation. Calculate the rate of energy transfer in different systems through the concept of power.	heating and cooling processes which transfer energy within a material or from one object to another. Investigate thermal conductivity and the differences in the processes of thermal conduction in metals and non-metals. Describe the transfer of energy between objects through absorption and emission of infra-red radiation as a part of the electromagnetic spectrum. This includes the factors that affect the rate of this transfer such as temperature and surface colour. Apply this knowledge to the concept of the Greenhouse Effect and its relationship to the wavelength of the radiation penetrating or being absorbed by Earth's atmosphere. Analyse the changes in temperature when a material is heated, leading to the experimental determination of specific heat capacity along with corresponding calculations. The need to reduce energy transfers to the surroundings by insulation, such as loft or cavity wall insulation.	carbohydrates, proteins, and lipids. Recall enzyme action and understand that enzymes are proteins with a specific shape including the active site. Recall the lock and key model in which the substrate has a specific shape complementary to the active site. Recall how each part of the digestive system is adapted to provide an optimum pH for each enzyme, including the role of bile in the small intestine.
End points covered:	Deep understanding of forces and motion. How to identify variables and how to control/ measure	Deep understanding of cells, organisation and movement of small molecules. Deep understanding of rate	Deep understanding of atoms, elements, compounds and the fundamental particles making them up. Pure	Deep understanding of cellular reproduction / deep understanding of energy transfer	Deep understanding of the periodic table Deep understanding of energy and waves	Deep understanding of cells and organisation, nutrition and digestion, gas exchange systems.

	them in order to test a hypothesis A deep understanding of inheritance and evolution. Cite and evaluate sources of information	of reaction. How to identify variables and how to control/ measure them in order to test a hypothesis. Draw appropriately labelled graphs.	and impure substances and how to separate them. Fuel uses and costs			Accurately follow or write a method correctly using a range of apparatus
NC/Spec coverage:	Forces and motion Inheritance and evolution	Cells, organisation, diffusion. Rate of reaction				
Cross-curricular links:	Maths, rearranging equations, ratio. History, Charles Darwin and Lamark	Maths Standard form. Re arrange equations.	Maths, addition and subtraction. Pie charts, percentage. History of the discovery of the structure of the atom	Maths, Re arrange equations with more than three subjects. Re arrange equations by using the square root function. RE ethics of cloning and stem cells	Maths re arrange equations. History of the periodic table.	
Assessments:	Forces end of unit test Inheritance end of unit test					
Other school intent priorities						
New experiences – broadening horizons						
Developing character – *Kind, Hard Working, Successful*						
Context specific need – diversity, inclusion;						

reading, literacy; mental health						
Curriculum Careers - Gatsby 4						