

SUBJECT:	Science	YEAR GROUP:	9
PURPOSE OF STUDY			
<p>A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.</p>			
THE NATIONAL CURRICULUM FOR SCIENCE AIMS TO ENSURE THAT ALL PUPILS:		NATIONAL CURRICULUM LINKS	
<p>A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics.</p> <p>The national curriculum for science aims to ensure that all pupils: develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.</p>		<p>Cross curricular links:</p> <p>Maths: Understanding the different measurements within chemicals Understanding the different angles</p> <p>English: Being able to write evaluations for experiments and findings</p>	
TOPICS COVERED:			
<ul style="list-style-type: none"> • Materials, cycles and energy • Genetics and evolution • Energetics and energy • Using the periodic table • Electricity and electromagnetism • Forces and speed 			

INTENT OF SUBJECT:

The main aim in Science is for pupils to think about and understand the world around them.

At Key Stage 3 we:

- Engage and enthuse pupils in the learning of Science
- Develop a range of skills to allow pupils to investigate scientific phenomena
- Establish a thorough foundation of knowledge and understanding of key scientific principles.

SKILLS OVERVIEW BY HALF TERM:

AUTUMN ONE

Photosynthesis

- 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
- the adaptations of leaves for photosynthesis

AUTUMN TWO

Genetics and evolution

- Inheritance, chromosomes, DNA and genes heredity as the process by which genetic information is transmitted from one generation to the next
- a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model
- 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 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
- the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material

SPRING ONE	SPRING TWO
<p>Energy</p> <ul style="list-style-type: none"> - Calculation of fuel uses and costs in the domestic context - comparing energy values of different foods (from labels) (kJ) - comparing power ratings of appliances in watts (W, kW) - comparing amounts of energy transferred (J, kJ, kW hour) - domestic fuel bills, fuel use and costs - fuels and energy resources. <p>Energy changes and transfers</p> <ul style="list-style-type: none"> - simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged - heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference: use of insulators - other processes that involve energy transfer: changing motion, dropping an object, - completing an electrical circuit, stretching a spring, metabolism of food, burning fuels. <p>Changes in systems</p> <ul style="list-style-type: none"> - energy as a quantity that can be quantified and calculated; the total energy has the - same value before and after a change - comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions - using physical processes and mechanisms, rather than energy, to explain the 	<p>The periodic table</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. - Applying the periodic table

SUMMER ONE	SUMMER TWO
<p>Electricity and electromagnetism</p> <p>Current electricity</p> <ul style="list-style-type: none"> - electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge - potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current - differences in resistance between conducting and insulating components (quantitative). <p>Static electricity</p> <ul style="list-style-type: none"> - separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects - the idea of electric field, forces acting across the space between objects not in contact. <p>Magnetism</p> <ul style="list-style-type: none"> - magnetic poles, attraction and repulsion - magnetic fields by plotting with compass, representation by field lines - Earth's magnetism, compass and navigation - the magnetic effect of a current, electromagnets, D.C. motors (principles only). 	<p>Forces and motion</p> <ul style="list-style-type: none"> - forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only) - change depending on direction of force and its size. <p>Describing motion</p> <ul style="list-style-type: none"> - speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time) - the representation of a journey on a distance-time graph - relative motion: trains and cars passing one another.