

Science KS3 Knowledge Sequencing			
By the end of key stage THREE we want all students of Science to know and do the following key things: Understand key Biological, Physics, and Chemical processes; conduct scientific analysis and evaluation; offer simple evaluations of practical procedures; utilise knowledge of key practical equipment and techniques; and consider the impact of different variables on reactions and outcomes.			
Prior Knowledge		In KS3, students of Science will build on the following prior learning: Key Stage Two understanding of key Scientific Processes, such as materials and their properties, Earth and Space, Life Processes and Living Things and Physical Process. Develop existing appreciation of practical testing of theory and their existing awareness of the Scientific Method. Build on earlier consideration of different variables, and earlier consideration of the need for prediction in science.	
Future Knowledge		The Curriculum in KS3 Science will prepare students for the following future learning: Confident knowledge of Key Stage Four key terms; application of core knowledge to a range of scientific and real-world scenarios; competent description; accomplished practical skills; manipulate and analyse qualitative & quantitative data with reasoning; offer coherent conclusions well-reasoned judgements	
Year 7	Term	<b>Key Knowledge</b>	<b>Assessment Focus</b>
	1	Assess risks. Using practical equipment accurately and safely, plan, and evaluate investigation. Introduction of key terminology. Cellular structures and organisation of tissues, relating structure to function. Use models to represent matter, practical skills. Model Transfer of Heat. Energy – stores, transfers, sources, units and applications. Plan and execute investigation independently.	Assessment for learning task – induction and Energy transfer. Cells and tissues, Particles and Energy transfer test.
	2	Understand reproduction and adaptations of key organs. Link puberty and menstruation. Understand the reproduction of plants, plan an investigation. The periodic table and its patterns. Introduce the atomic model, elements, compounds and chemical reactions. Understand the meaning of forces & apply to predict their effects, analyse results.	Assessment for learning task – Reproduction and Forces and effects. Reproduction, Atoms and elements and Forces and effects test.
	3	Understand how organisms are interrelated and the impact farming techniques can have locally and globally. Introduce acids and alkalis and neutralisation reactions. Knowledge of electricity, circuits and components. Practical skills: building circuits. Evaluation skills.	Assessment for learning task – Electricity. Environment and adaptation, acids and alkalis and electricity test.
	4	Knowledge of variation, to include genetic and environmental. Classification of organisms. Conservation of mass linked to pure and impure substances and methods of separation. Practical skills: separating mixtures. Plan and execute an investigation. Energy and fuels, renewable and non-renewable sources. Evaluation skills.	Assessment for learning task – Solutions. Variation and classification, solutions and energy resources test.
	5	Knowledge and application of photosynthesis. Knowledge of how scientists answer questions. Chemical and physical reactions, gas tests. Planning an investigation. Magnets and electromagnets to include magnetic field plots.	Assessment for learning task – Simple chemical reactions. Photosynthesis, simple chemical reactions and magnets and electromagnets test.
	6	Relate understanding of balanced diet to deficiencies, anatomy and functions of the digestive system. Making and recording observations. Elements and compounds, particle diagrams. Understand the meaning of forces & apply to predict their effects. Evaluate methodology.	Assessment for learning task – Food and digestion and Motion. Food and digestion, compounds and motion test.
Year 8	Term	<b>Key Knowledge</b>	
	1	Structure and function of the lungs with gas exchange and circulation. History of the periodic table and electron configuration. Scientific thinking: spotting patterns. Friction and how lightning is generated. Using equations to calculate power, current and voltage.	Assessment for learning task – Lungs and gas exchange. Lungs and gas exchange, periodic table and domestic and static electricity test.
	2	Understand different forms of respiration and the vital role it plays in everyday life. Application of the reactivity series to metal extraction with real world applications of understanding the periodic table and reactivity series. Writing a risk assessment. Use models to represent Waves. Presenting and interpreting data.	Assessment for learning task – Extracting metals. Respiration, extracting metals and waves and sound test.
	3	Structure and function of the skeleton, joints and muscles. Making and recording observations. Acids and alkalis, understand chemical reactions. Plan an investigation. Light to include lenses, reflection, refraction and colour. Drawing ray diagrams.	Assessment for learning task – Muscles and bones. Muscles and bones, reactions of acids and Light test.
	4	Mechanisms of inheritance to include natural and artificial selection. Types of chemical reactions and factors that affect the rates of chemical reactions. Draw a graph. Pressure and moments, calculate pressure and density.	Assessment for learning task – Describing chemical reactions. Inheritance and evolution, describing chemical reactions and pressure, floating and moments test.
	5	Understand how drugs affect health. Analyse and evaluate lifestyle choices, using data. Structure of the Earth and atmosphere. Model & analyse Rock Cycle & Weathering Processes. Structure of rocks. Evaluate our impact on climate using graphical data. Conduction, convection and radiation. Planning an investigation.	Assessment for learning task – Drugs and Health. Drugs and health, Earth and atmosphere and heat transfer test.
	6	Different types of microorganisms and defence responses. Innovative materials, how to describe properties and their use in everyday different situations. Solar system. Modelling and identifying patterns. Plan and execute an investigation.	Assessment for learning task – Microbes. Microbes, innovative materials and exploring space test.
Year 9	Term	<b>Key Knowledge Biology</b>	
	1	Build on Cells and tissues module, developing knowledge of cells and microscopy, practical techniques (using a microscope, biological drawing, osmosis), using formulae to make calculations, starting to make conclusions from experimental data.	Diffusion long answer question
	2	Build on Bones and Muscles module and develop knowledge of Cell Division and Transport into Cells. Practical skills (planning, understanding variables; collecting and analysing data) Drawing graphs; calculating percentage change; start to evaluate a practical.	Mitosis long answer question Cell Biology test
	3	Build on Food and digestion and develop knowledge of tissues and enzymes, practical skills (following instructions, collecting and analysing data, chemical tests), applying knowledge to experimental data.	Enzyme long answer question Cell division and digestion test
	4	Build on Breathing and Respiration Module and develop knowledge of respiratory and circulatory systems, introduction to correlation and causation, introduction to evaluating pros and cons of medical treatment. Introduction to independent revision techniques; building applying knowledge to novel scenarios arising in past paper questions.	Heart long answer question Cumulative knowledge test
	5	Build on Plants and photosynthesis and develop knowledge of tissues and water movement, applying knowledge to experimental data to explain phenomena.	Organisation test
	6	Build on microbes and drugs and health modules to develop knowledge of Infection and Response, developing in-depth explanations; reading and researching independently for information; analysing quantitative data about disease incidence. Practical skills: aseptic technique.	Immune response long answer question
Year 9	Term	<b>Key Knowledge Chemistry</b>	
	1	Build on Atoms and elements, solutions and develop knowledge of the structure of atoms. Practical separation techniques. Modelling of atom through history. Maths skills – conservation of mass. Recognising & explaining trends and patterns.	Atomic structure long answer question Atomic structure test

	2	Build on the periodic table and extracting metals modules and develop knowledge of bonding and the reactivity series. Dot and cross diagrams, the history of the periodic table. Recognising and explaining trends and patterns.	Periodic Table long answer question Periodic table test
	3	Build on simple chemical reactions, compounds and reactions of acids and alkalis modules to develop knowledge of chemical reactions and writing equations. Practical skills: apparatus and techniques, including measurement and the safe use of equipment. Proving an hypothesis.	Displacement reaction long answer question
	4	Build on Acids and alkalis and reactions of acids to develop knowledge of neutralisation. Introduction to independent revision techniques; building applying knowledge to novel scenarios arising in past paper questions.	Neutralisation long answer question Cumulative knowledge test
	5	Build on Acids and alkalis and reactions of acids to develop knowledge of strong and weak acids. Practical skills: carrying out a titration.	Chemical changes test
	6	Build on Chemical compounds and atomic structure modules to develop knowledge of different types of bonding and linking this to properties of the substance. Modelling bonding diagrams. Practical skills: safely use equipment, drawing graphs, apply knowledge to experimental data.	Ionic and covalent long answer question Bonding test
	<b>Term</b>	<b>Key Knowledge Physics</b>	
Year 9	1	Build on Energy transfers and energy resources modules to develop knowledge of Energy: Energy stores and transfers (work done), kinetic/gravitational/elastic energy. Maths skills: using formulae to make calculations.	Energy transfer calculations. Conservation and dissipation of energy test.
	2	Build on waves and sound, and heat transfer modules to develop knowledge of Thermal Energy: Power, efficiency, insulation, Practical - Thermal insulation. Application to everyday situations. Maths skills: manipulating formulae, interpreting data from tables/graphs.	Required practical 2 write up. Energy transfer by heating test
	3	Build on knowledge of energy resources to develop knowledge of energy resources (renewable/non-renewable) including the history of nuclear energy development. Application to everyday situations. Maths skills: interpreting data from tables/graphs.	Energy resources test
	4	Build on knowledge of electric circuits to develop knowledge of Electricity: static electricity, application of Ohms law. Required Practical: Resistance. Maths skills: manipulating formulae and interpreting graphs. Introduction to independent revision techniques; building applying knowledge to novel scenarios arising in past paper questions.	Resistance of a wire graphs Cumulative knowledge test
	5	Build on knowledge of electric circuits to develop knowledge of Electricity: circuits (series and parallel) and their components. Required Practical: IV Characteristics. Maths skills: manipulating formulae and interpreting graphs.	Electric circuits test.
	6	Build on energy resources and electric circuits modules to develop knowledge of Electricity: Domestic electricity & National Grid, Current (AC/DC) electricity, safety, and energy transfers. Maths skills: using formulae to make calculations.	Electricity in the home test.

Opportunities for developing literacy skills and developing learner confidence and enjoyment in reading	Links to British Values	Links to Careers	Links to Other Personal Development
<p><b>FROM THE LIBRARY</b></p> <p><i>Animals Multicell life.</i> 571.61  <i>Cells and Systems</i> 574.8  <i>Energy 531</i> (DK)  <i>Killer Energy</i> 500  <i>Making Life</i>; Richard Walker 612  <i>Fertility and Reproduction</i>; Cara Acred. Issues section  <i>Everything You Ever Wanted to Know About Periods</i>; Charlotte Owen- 613  <i>Incredible Plants</i>; Barbara Taylor-581  <i>Plant</i>; DK eyewitness- 581  <i>Plant Classification</i>; Richard Spilsbury-580.12  <i>Energy</i>; J. Challoner-531  <i>Fatal Forces</i> ;Nick Arnold -531  <i>Force and Motion</i>; DK eyewitness Guide-531  <i>Diversity of life</i>; Robert Sneddon-571.6  <i>Eco Systems and Environment</i>; A Fullick-577  <i>Food Chains and Webs</i>; Anita Ganeri-5  <i>Climate, the Environment and People</i>; Gary Cambers-910  <i>The Environment</i>; Michael Allaby-363.7  <i>Chemicals in Action</i>; Chris Oxlade-546.24  <i>Acids Bases and Salts</i>; Brian Knapp-546.24  <i>Shocking Electricity</i>; Nick Arnold -530  <i>An Inconvenient Truth</i>; Al Gore-363.73  <i>Air Pollution: Our Impact on the Planet</i>; Chapman, Matthew &amp; Bowden-363.73  <i>Energy, Resources and Environment</i>; J. Blunden-333.79  <i>Fuels for the Future</i>; Steve parker-620  <i>Elephants on Acid and other Bizarre Experiments</i>; Alex Boese-500  <i>Really Rotten Experiments</i>-500  <i>Plant Physiology</i>; Irene Ridge-581</p>	<p><b>Mutual respect:</b> Debates about ethical and moral issues, such as whether we should test drugs on animals, or whether nuclear bombs should be developed. All students are able to share their viewpoints respectfully.</p> <p><b>Rule of law:</b> When conducting practical work, we have to follow rules about Health and Safety to ensure the safety of everyone in the laboratory. When conducting experiments involving animals, we have to abide by laws to ensure that animals are not treated cruelly. When using radioactive sources, certain members of the department are trained as Radiation Protection Supervisors to comply with Health and Safety laws.</p> <p><b>Tolerance:</b> Throughout the Science curriculum, scientists from different backgrounds will be discussed, including the challenges they faced because of their beliefs, viewpoints and protected characteristics. When discussing contentious issues, for example theories about the formation of the Universe, all viewpoints are considered while teaching the scientifically accepted ideas. Debates about ethical and moral issues, such as whether we should test drugs on animals, or whether nuclear bombs</p>	<p>Links to a broad range of careers are made at the start of each new topic area. They are given to students on their learning objectives sheets and projected on the introductory slide of each new topic.</p>	<ul style="list-style-type: none"> <li>• Developing a healthy lifestyle.</li> <li>• Developing healthy relationships.</li> <li>• Develop a set of positive personal traits, dispositions and virtues that informs their motivation and guides their conduct so that they reflect wisely, learn eagerly, behave with integrity and cooperate consistently well with others.</li> <li>• Develop confidence, resilience and knowledge so that they can keep themselves mentally healthy.</li> <li>• An inclusive environment that meets the needs of all pupils, irrespective of age, disability, gender reassignment, race, religion or belief, sex or sexual orientation.</li> </ul>

<p><i>Incredible Plants</i>; Barbara Taylor-581  <i>Cells and Systems</i>; Anita Ganeri-574.8  <i>Plants and Fungi: Multi Celled Life</i>; Robert Sneddon-571.6  <i>Chemicals in Action: Atoms</i> Chris Oxlade-541  <i>We Are All Made of Molecules</i>; Susin Neilsen. FIC-N  <i>Gasses Liquids and Solids</i>; Brian Knapp-546  <i>The Elements</i>; Dan Green-546  <i>Electricity and Magnetism</i>; Chris Oxlade-537  <i>How Does my Diet Affect Me?</i> Patsy Wesycott-613  <i>Nutrition and Diet Lisa Firth</i>- 613.2 ( Issues)  <i>Digestive System</i>; Carol Ballard-612.3  <i>Disgusting Digestion</i>; Nick Arnold-612  <i>Digesting</i>; Angela Royston-612.3  <i>Air and Water Chemistry</i>; Brian knapp-541  <i>Horrible Science: Chemical chaos</i>; Nick Arnold-500  <i>Fatal Forces</i>: Nick Arnold-500  <i>Force and Motion</i>: P. Lafferty-531  <i>Forces and Movement</i>; Peter Riley-531</p>	<p>should be developed. All students are able to share their viewpoints.</p> <p><b>Democracy:</b> Science is a democratic discipline. When developing new theories, it has to be accepted by a wide number of scientists before it is consider a scientific theory. Similarly, all experimental work has to be peer reviewed by others before it is accepted.</p> <p><b>Individual liberty:</b> Students have opportunities that will allow them to use their knowledge and understanding to pose scientific questions and define scientific problems. Students are introduced to the idea that Science cannot provide the answers to some questions, for example, where beliefs, opinions and ethics are important.</p>		
<p><b>Extra-Curricular and Co-Curricular Opportunities</b></p>	<p><b>Links with other subjects in the curriculum</b></p>		
<p>Biology club  Lego league  Project X  Quadcopter  Space centre trip  Stem days/ rotary tech challenge  Educake</p>	<p>Maths - classifying, counting, measuring, calculating, estimating, tables, graphs, statistics, algebra  Geography – Combustion, pollutants, environmental impacts, clean drinking water, product life cycles, food chains, biodiversity, climate change  Philosophy and ethics – ethical discussions around reproduction, vaccination  History – development of microscopes, medicines, structure of the atom, periodic table  Design and technology – Healthy diet, properties of metals and metal alloys  Personal development – healthy eating, impact of drugs and smoking  Music – vibrations, pitch and frequency  English and MFL: etymology of words</p>		