

**2021 Year 7 - 9 Curriculum Map  
and  
Skills Descriptors  
Science**

Practical Skills

Mathematical application

Literacy

Apparatus

Scientific Techniques

Science Capital

Year/Term	Unit of Work	CORE KNOWLEDGE	Link to KS2	KEY SKILLS
7 Autumn 1 Physics	FORCES: GRAVITY	Difference between mass and weight. What is gravitational field strength. Force diagrams	Year 3 - contact and non-contact forces. Year 5 - gravity, air resistance, water resistance and friction	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
7 Autumn 1 Physics	FORCES: SPEED Motion	Effect of forces on speed Studying the effect of motion Distance/time graphs Relative motion	Year 5 - gravity, identifying the effects of air resistance, water resistance and friction that act between moving surfaces.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
7 Autumn 1 Chemistry	MATTER: PARTICLE MODEL (Particles)	Arrangement of particles in solid, liquid and gases How particles change state Diffusion of gas pressure Introduction to Density	Year 4 - Identify solids, liquids and gases. Change of states.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
7 Autumn 1 Chemistry	MATTER: SEPARATING MIXTURES (Pure and impure substances)	Pure and impure substances Dissolving and solutions Factors affecting solubility Separating mixture – Filtration, evaporation, distillation Chromatography	Year 5 - separating mixtures (filtering, sieving, evaporating). Identify reversible changes (dissolving, mixing and changes of state). Non - reversible chemical reactions - burning.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
<b>ASSESSMENT 1: Induction assessment</b>				
7 Autumn 2 Biology	ORGANISMS: CELLS (Cells and tissues)	Use of microscopes Structure and function of cells How cells are specialised Simple and complex organisms Organisation (Cells to organ systems)		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital

7 Autumn 2 Biology	ORGANISMS: MOVEMENT (Muscles and bones)	The skeletal system Muscles and movement Joints and movement Recreation drugs and health	Year 3 - function of skeleton and muscles.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
7 Autumn 2 Physics	ELECTROMAGNETS : VOLTAGE AND RESISTANCE (Electricity)	Circuit symbols and diagrams Insulators and conductors Voltage, current and resistance	Year 4 - common appliances that run on electricity, simple circuits, naming basic parts, their function. Common conductors and insulators. Year 6 - symbols, voltage.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
7 Autumn 2 Physics	CURRENT	Current and electrostatic force Series circuits Parallel circuits	Year 4 - common appliances that run on electricity, simple circuits, naming basic parts, their function. Common conductors and insulators.	Practical Skills Mathematical application Apparatus Scientific Techniques Science Capital
<b>ASSESSMENT 2: Gravity, Speed, Particles, Separation techniques, Cells, Movement, Voltage, Resistance and Current</b>				
7 Spring 1 Chemistry	REACTIONS: METALS AND NON-METALS	Metals Non-metals Displacement and reactivity series Oxidation  EXTENSTION TOPIC: WRITING /BALANCING CHEMICAL EQUATIONS		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
7 Spring 1 Chemistry	REACTIONS: ACIDS AND ALKALIS	Everyday acids and alkalis Indicators and pH Dilution and safety Neutralisation Concentration		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques

				Science Capital
7 Spring 1 Biology	ECOSYSTEM: INTERDEPENDENC E (Environment and adaptations)	Organisms and their habitats Food chains and food webs Competition and cooperation Human effects on the environment	Year 4 - Food chains Year 6 - adaptations.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
7 Spring 1 Biology	ECOSYSTEMS: PLANT REPRODUCTION (Reproduction in plants)	Flowers Seed and fruit formation Seed dispersal Plant reproduction (fertilisation)	Year 3 - identify and describe the functions of different parts of plant. Explore the part that flowers playing the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
<b>ASSESSMET 3: Metals, Acids and Alkalis, Interdependence, Plant Reproduction</b>				
7 Spring 2 Physics	ENERGY: ENERGY TRANSFER (Energy Transfers)	Energy stores Energy transfers Calculating useful energy Dissipated energy examples		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
7 Spring 2 Physics	ENERGY: ENERGY COSTS (Energy Resources)	How do we get energy from the Sun? How we can use energy stores. Fossil fuels Renewable energy		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
<b>ASSESSMENT 4: Written test (all previous topics)</b>				
7 Summer 1 Chemistry	EARTH: UNIVERSE (Exploring space)	Sun, Earth and Moon Sunlight hours during the year Stars Exoplanets		Practical Skills Mathematical application Literacy Apparatus

				Scientific Techniques Science Capital
7 Summer 1 Chemistry	EARTH: EARTH STRUCTURE (Earth and atmosphere)	The Earth and its atmosphere The rock cycle 1 The rock cycle 2 Human activity Recycling	Year 3 - simple physical properties of different types of rocks.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
7 Summer 1 Biology	GENES: VARIATION (Variation and classification)	The variety of life Variation in living things Genetic variation Environment variation Continuous and discontinuous variation	Year 4 - classification Year 6 - classification Year 6 - basic of genetic variation.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
7 Summer 1 Biology	GENES: HUMAN REPRODUCTION (Reproduction in animals)	Male and female (human) reproductive systems Puberty and the menstrual cycle Sexual intercourse and reproduction Pregnancy and birth		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
<b>ASSESSMENT 5: Earth Structure, Universe, Variation, Human Reproduction</b>				
7 Summer 2 Physics	WAVES: SOUND (Waves and sound)	Wave basics (Amplitude, Frequency, Wavelength) Sound waves Sound and ultrasound Investigating sound Speed of sound and echoes	Year 4 - How sound is made, how sound travel through a medium of ear, Pitch, volume of sound.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
7 Summer 2 Physics	WAVES: LIGHT (Light)	Travelling light Reflection and refraction Lenses Coloured light	Year 3 - reflection of the light, formation of shadows. Year 6 - light travels in straight lines, explain how eye works.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques

ASSESSMENT 6  
END OF YEAR ASSESSMENT: Written test (ALL TOPICS)

Year/Term	Unit of Work	CORE KNOWLEDGE	Link to KS2	KEY SKILLS
8 Autumn 1 Physics	FORCES: CONTACT FORCES (Forces and effects)	Forces and interactions Effect of forces on shape Balanced and unbalanced forces Friction forces	Year 5 - Recognise that some mechanisms, including levers, pulleys and gears , allow a smaller force to have a greater effect.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
8 Autumn 1 Physics	FORCES: PRESSURE (Application of forces)	Pressure Pressure in fluids Floating and sinking		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
8 Autumn 1 Chemistry	MATTER: PERIODIC TABLE	A guided tour Spotting patterns Predicting properties		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
8 Autumn 1 Chemistry	MATTER: ELEMENTS	Difference between atoms, elements and compounds. Elements: symbols and properties Naming compounds Polymers		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
<b>ASSESSMENT 1: Forces, Pressure, Periodic Table, Elements</b>				
8 Autumn 2 Biology	ORGANISMS: BREATHING (Lungs and gas exchange)	The respiratory system Lungs and gas exchange Breathing	Year 6 - Identifying the main parts of the human circulatory system, describe the functions of heart, blood vessels and blood.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital

8 Autumn 2 Biology	ORGANISMS: DIGESTION (Food and Digestion)	Healthy eating – 7 food groups Food tests – starch, protein, lipids Digestive system – enzymes and absorption	Year 3 - types and amount of nutrition needed to survive. Year 4 - Functions of the basic parts of the digestive system	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
8 Autumn 2 Physics	ELECTROMAGNETS; MAGNETISM	What are magnetic materials? Different types of magnets. How do magnets behave? Magnetism and the earth		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
8 Autumn 2 Physics	ELECTROMAGNETS: ELECTROMAGNETS	What are electromagnets? How are electromagnets made (solenoid and core)? How can we make electromagnets stronger? Uses of electromagnets.		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
<b>ASSESSMENT 2: Written test (all previous topics)</b>				
8 Spring Physics	ENERGY: WORK	Describing work done How levers reduce work done Distance and displacement Work done= force x distance Inelastic and elastic deformation		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
8 Spring 1 Physics	ENERGY: HEATING AND COOLING (Heat transfer)	Conduction Convection Radiation Insulation		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
8 Spring 1 Chemistry	EARTH: RESOURCES CLIMATE	Gases of the atmosphere Carbon cycle		Practical Skills Mathematical application



		Fossil fuels and global warming Carbon sinks		Literacy Apparatus Scientific Techniques Science Capital
8 Spring 1 Chemistry	EARTH: RESOURCES (Extracting metals)	The reactivity series Extracting with carbon Extracting with electricity Using metals		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
<b>ASSESSMENT 3: Work, Heating and Cooling, Climate, Resources</b>				
8 Spring 2 Biology	GENES: INHERITANCE (Inheritance and evolution)	Inherited characteristics DNA Chromosomes Genes and genetic diagrams		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
8 Spring 2 Biology	GENES: EVOLUTION	Variation Genes, chromosomes and DNA Natural and artificial selection Extinction	Year 3 - Fossils	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
<b>ASSESSMENT 4: Written test (all previous topics)</b>				
8 Summer 1 Physics	WAVES: WAVE EFFECTS	How energy is transferred in a wave Amplitude, frequency and wavelength Understanding the above in terms of: Ultrasound/sound/loudspeaker/microphone, UV and pressure wave	Year 4 - How sound is made, how sound travel through a medium of ear, Pitch, volume of sound.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
8 Summer 1 Physics	WAVES: WAVE PROPERTIES	Transverse and longitudinal waves Reflection Absorption		Practical Skills Mathematical application Literacy

		Transmission		Apparatus Scientific Techniques Science Capital
8 Summer 1 Chemistry	REACTIONS: TYPES OF REACTIONS (Chemical reactions)	What are chemical and physical changes? Combustion Thermal decomposition Testing gases Writing chemical equations Conservation of matter	Year 5 - Identify reversible changes (dissolving, mixing and changes of state). Non - reversible chemical reactions - burning.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
8 Summer 1 Chemistry	REACTIONS: CHEMICAL ENERGY (Describing reactions)	Types of chemical reactions Energy transfer in reactions: exothermic and endothermic Energy levels Catalyst		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
<b>ASSESSMENT 5: Waves, Reactions</b>				
8 Summer 2 Biology	ECOSYSTEM: PHOTOSYNTHESIS (Photosynthesis)	Photosynthesis The importance of plants Structure and function of leaves Mineral and fertilisers		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
8 Summer 2 Biology	ECOSYSTEMS: RESPIRATION (Respiration)	Aerobic respiration Anaerobic respiration and exercise Anaerobic respiration in plants and micro-organisms		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital

ASSESSMENT 6  
END OF YEAR ASSESSMENT: Transition Part 1

Year/Term	Unit of Work	CORE KNOWLEDGE	Links to KS3	KEY SKILLS
9 Autumn 1 Physics	The EM Spectrum	Visible Light X rays Gamma rays Infrared waves Microwaves Energy penetration	4.2 Light	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
9 Autumn 1 Physics	Properties of Waves	Transverse and longitudinal waves Reflection Absorption Transmission	4.4 Wave Properties	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
9 Autumn 1 Chemistry	The Early Atmosphere	Carbon cycle Carbon sinks	7.3 Climate	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
9 Autumn 1 Chemistry	Testing gases	Fossil fuels and global warming Gases of the atmosphere	7.4 Earth Resources	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
<b>ASSESSMENT 1: Photosynthesis/ respiration questions</b>				
9 Autumn 2 Biology	Communities	The variety of life Variation in living things Genetic variation Environment variation Continuous and discontinuous variation	10.1 Variation	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital

9 Autumn 2 Biology	Abiotic and biotic factors	Natural and artificial selection Extinction		<b>Practical Skills</b> Mathematical application Literacy Apparatus Scientific Techniques Science Capital
9 Autumn 2 Biology	Adaptations and interdependence	Variation Genes, chromosomes and DNA	9.1 Interdependence	<b>Practical Skills</b> Mathematical application Literacy Apparatus Scientific Techniques Science Capital
<b>ASSESSMENT 2: Written test (all previous topics)</b>				
9 Spring Biology	Cell differentiation and specialisation	Basic cells recap <b>Microscope required practical</b> Differentiation Specialisation Structure to function <b>Culturing microorganisms BIO only</b>		
9 Spring Biology	Chromosomes, Mitosis and Stem cells	Chromosomes Why mitosis is needed Sequencing mitosis Stem cells Stem cell uses Ethical issues		<b>Practical Skills</b> Mathematical application Literacy Apparatus Scientific Techniques Science Capital
<b>ASSESSMENT 3: Written test (end of topic test)</b>				
9 Spring Chemistry	Atoms and Periodic table	Atomic structure Elements and compounds Writing chemical equations Separating mixtures History of the atom Electron structure Development of the periodic table		<b>Practical Skills</b> Mathematical application Literacy Apparatus Scientific Techniques Science Capital

		Metals and non-metals Groups in the periodic table <i>Comparison with Group 1 elements and transition metals</i> <i>CHEM only</i> <i>Typical properties of transition metals CHEM only</i>		
9 Spring Physics	Energy	Stores and systems Potential energy Specific heat capacity <b>Specific heat capacity required practical</b> Conservation and transfers Efficiency Resources (renewable vs non-renewable)		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
<b>ASSESSMENT 4: Written test (all previous topics)</b>				
9 Summer Biology	Transport across membranes	Diffusion Osmosis <b>Osmosis required practical</b> Active transport Surface area/volume ratio Examples		Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
9 Summer Biology	Cell organisation Human  Plant	Organisation Enzymes and Digestion <b>Food tests required practical</b> <b>Enzymes required practical</b> Lungs recap Circulatory system Heart Disease and treatments  Organisation Transpiration and translocation	Year 6 - Identifying the main parts of the human circulatory system, describe the functions of heart, blood vessels and blood.	Practical Skills Mathematical application Literacy Apparatus Scientific Techniques Science Capital
<b>ASSESSMENT 5: Written test (end of topic test)</b>				

9 Summer Chemistry	Structure and Bonding	<p>Ionic bonding and compounds</p> <p>Covalent bonding and substances</p> <p><i>Sizes of particles and their properties CHEM only</i></p> <p><i>Uses of nanoparticles CHEM only</i></p> <p>Metallic bonding</p> <p>States of matter and changing states</p>		<p>Practical Skills</p> <p>Mathematical application</p> <p>Literacy</p> <p>Apparatus</p> <p>Scientific Techniques</p> <p>Science Capital</p>
9 Summer Chemistry	Quantitative chemistry	<p>Relative formula mass</p> <p>Conservation</p> <p>Limiting reactants</p> <p>Concentration</p> <p>Moles HT only</p> <p>Amounts of substances in equations HT only</p> <p>Using moles to balanced equations HT only</p> <p>Limiting reactants HT only</p> <p>Concentration of solutions HT only</p> <p><i>Percentage yield CHEM only</i></p> <p><i>Atom economy CHEM only</i></p> <p><i>Using concentrations of solutions in mol/dm<sup>3</sup> CHEM only</i></p> <p><i>Use of amount of substance in relation to volumes of gases CHEM only</i></p> <p><i>Percentage yield CHEM only</i></p>		<p>Practical Skills</p> <p>Mathematical application</p> <p>Literacy</p> <p>Apparatus</p> <p>Scientific Techniques</p> <p>Science Capital</p>
9 Summer Physics	Atomic Structure	<p>Model of the atoms</p> <p>Isotopes and radiation</p> <p>Nuclear equations</p> <p>Half-life</p> <p>Irradiation and contamination</p> <p>Background radiation PHY only</p> <p><i>Different half-lives of radioactive isotopes PHY only</i></p> <p><i>Uses of nuclear radiation PHY only</i></p> <p><i>Nuclear fission PHY only</i></p> <p><i>Nuclear fusion PHY only</i></p>		<p>Practical Skills</p> <p>Mathematical application</p> <p>Literacy</p> <p>Apparatus</p> <p>Scientific Techniques</p> <p>Science Capital</p>

9 Summer Physics	Particle model of matter	Motion in gases Density <b>Density required practical</b> Internal energy and change of state Specific latent heat <i>Pressure in gases PHY only</i> <i>Increasing the pressure of a gas PHY only</i>		<b>Practical Skills</b> Mathematical application Literacy Apparatus Scientific Techniques Science Capital
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ASSESSMENT 6

END OF YEAR ASSESSMENT: Transition Part 2