



Biology, Chemistry & Physics Vertical Plans (year1-year5)

Unit title	Key Concept	Related Concept	Global context	Statement of inquiry	Objectives	ATL Skills	Content
Year1							
Recently added to the curriculum							
Year 2							
Food and digestion	Systems	Energy, Model and Function	Identities and Relationships	A person's health is influenced by cultural and conditional changes to diet	Criteria A, B and D	Thinking Skills Research Skills Self-management Communication Social Skills	<ol style="list-style-type: none"> 1. Nutrients 2. A balanced diet 3. Digestion and absorption 4. The human digestive system 5. Enzymes
The circulatory system and respiratory system	Systems	Functions and interactions	Identities and relationships	The human body's systems interact to support the common function of maintaining a person's health	Criteria A& D	Thinking skills Social skills Self-Management skills Research skills	<ol style="list-style-type: none"> 1. The human circulatory system 2. The heart 3. Blood 4. Blood vessels 5. The human respiratory system 6. Gas exchange 7. Aerobic respiration
Year3							
Plants	Systems	Models, interaction and function	Identities and relationships students will explore the relationship between plants and their surroundings	The interaction between plants and their surroundings refers to the relationship between model and function	Criteria A, B & C	Thinking Skills Research Skills Self-management Communication	<ol style="list-style-type: none"> 1. Photosynthesis 2. Mineral salts for plants 3. Plants and water 4. Flowers 5. Pollination 6. Fertilization 7. Fruits

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Variation and inheritance	Relations	Models & Patterns	Identities and relationships students will explore the identity of humans	The genetic identity shows a relationship between models and patterns	Criteria A & D	Thinking Skills Research Skills Self-management Communication	<ol style="list-style-type: none"> 1. Keys 2. Variation 3. Inheritance 4. More about inheritance 5. Selective breeding 6. Natural selection <i>Charles Darwin</i>
Year4							
How is life organized?	Relations	Patterns & Function	Identities and relationships Students will explore how living things are classified into groups with similar identities	Identity is determined by the relationship between different levels of organization which share patterns and functions	Criteria A & D	Thinking Skills Self-management	<ol style="list-style-type: none"> 1. What are the characteristics of living things 2. What are cells 3. What roles do cells carry out? 4. What are tissues, organs and organ system 5. What does it mean for organisms to be related 6. Should scientists use new research to reorganize organisms into different classification groups
What processes and Biological	Systems	Movement, Energy & Transformation	Scientific and technical innovation Students will explore how innovations	Biological systems are supported by biological & chemical processes and the transformation of	Criteria A, B & C	Thinking Skills Research Skills Self-management Communication	<ol style="list-style-type: none"> 1. Water is an important biological molecule. 2. All living things are made up of biological and organic molecules 3. What are some chemical reactions which occur inside



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molecules support life			could lead to these processes being manipulated and utilized to meet growing energy and food needs	energy which is being utilized by scientific and technical innovation			<p>cells</p> <ol style="list-style-type: none"> 4. What occurs in the process of cellular respiration? 5. Why are enzymes needed 6. What processes are involved in movement and transport? 7. “Plants” what processes are involved to sustain life in plants
Species interaction and the impact of humans	Change	Balance & Environment	<p>Globalization and sustainability</p> <p>Students will explore the impact of humans on the environment</p>	Sustainability and balance of different ecosystems and environments are disturbed and Changed by the interfering of humans	Criteria A & D	<p>Thinking Skills</p> <p>Research Skills</p> <p>Self-management</p> <p>Communication</p>	<ol style="list-style-type: none"> 1. How do organisms interact 2. What are the interconnected roles and functions that contribute to a balanced ecosystem? 3. Flow of energy 4. Members of a food web. 5. How do changes in species functions and interactions influence the balance in an ecosystem? 6. Symbiotic relationships 7. How do elements essential for life cycle between the environment and organisms? “Carbon and Nitrogen cycles” 8. How do the choices people make affect the environment (Human impact)

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Year 5							
How do organisms sustain themselves?	Relationships	Form, function and balance	IDENTITIES AND RELATIONSHIPS Students will explore the relationship between the size of an organism and the efficiency of transfer of substances.	The form, function and balance of specialized structures is developed based on the relationships with the size of organisms	Criteria A, B & C	Thinking Skills Research Skills Self-management Communication	<ol style="list-style-type: none"> How can the process of digestion be modelled? How does gas exchange support the body How are substances transported around an organism? Why do the conditions within organisms need to be kept in balance? "Homeostasis and excretory system" Are there dangers in using drugs to control weight? What factors affect human health? "Immune system" In what ways do organisms respond to changes in their surroundings? "Nervous system"
How do characteristics pass from one generation to another?	Relationships	Evidence; Models and Patterns	Identities and Relationships Students will explore the scientific evidence that leads to models that lead to	Identities and Relationships are determined by genetics were evidences lead to models that help to clarify patterns of inheritance	Criteria A & D	Thinking Skills	<ol style="list-style-type: none"> What does the structure of DNA reveal about its function? In what way is DNA the basis for inheritance and evolution? What are alleles? How does the genetic code produce physical characteristics?



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			understand patterns of genetics				4. How do single-celled organisms reproduce? What is mitosis
How have different forms of life arisen?	Change	Interaction & Environment	Globalization and sustainability	The change in a species is affected by the interactions with the environment, global biodiversity has been impacted in ways that may not be sustainable	Criterion A	Thinking Skills	<ol style="list-style-type: none"> 1. What is the evidence for evolution? 2. What examples of natural selection are there? 3. How have changes in habitats led to the development of new species? 4. What is meiosis? How do changes in the genetic code lead to variation? 5. How can scientists work out how closely related species are? 6. What effects do genetic mutations have on the survival of species?



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Year 1							
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Year 2							
States of matter	Systems	Form, Models & Transfer	Scientific and Technical innovation	How the ideas of diffusion and gas pressure have been reflected in our daily life?	<p>Criterion A: “Knowing and understanding”</p> <p>Criterion C: Processing & Evaluating</p> <p>Criterion B: Inquiring & Designing</p>	<p>Thinking Skills</p> <p>Research Skills</p> <p>Communication Skills</p> <p>Social Skills</p> <p>Self-Management Skills</p>	<ul style="list-style-type: none"> • Particle theory • Diffusion • Investigating diffusion • Brownian motion • Gas pressure
Elements, compounds And Mixtures.	Change	Forms & Consequences	Globalization and Sustainability	Substances changing form at the atomic and molecular level, and the consequences of industrial practices in making these substances.	<p>Criterion A: “Knowing and understanding”</p> <p>Criterion D: “Reflecting on the impacts of science”</p> <p>Criterion C: Processing & Evaluating</p>	<p>Thinking Skills</p> <p>Research Skills</p> <p>Communication Skills</p> <p>Social Skills</p> <p>Self-Management Skills</p>	<ul style="list-style-type: none"> • Atoms • Atoms and elements • The periodic table • Compounds • Formulae • Compounds and mixtures • More about mixtures • Separating mixtures • Chromatography • Solutions • Solubility • Solubility investigation



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					Criterion B: Inquiring & Designing		
Year 3							
Material properties “atomic structure and periodic table”	Systems	Model Patterns Development	Scientific and technical innovation Periodic Table is a creative work of scientists, who kept on modifying it from time to time. The contribution of Mendeleev gave the basis for Modern longform periodic table.	Patterns within systems development affected scientific and technical innovation	Criterion A: “Knowing and understanding” Criterion D: “Reflecting on the impacts of science”	Thinking Skills Research Skills	<ul style="list-style-type: none"> • The structure of the atom • Periodic Table • Trends in group 1 • Trends in some other groups
Reactivity and Rates of reaction	Change	consequences Interaction	Scientific and technical innovation	The interactions of different materials cause changes that may have consequences on Humans.	Criterion A: “Knowing and understanding”	Thinking Skills Research Skills Communication Skills Social Skills	<ul style="list-style-type: none"> • Metals and their reactions with oxygen, water and dilute acid • The reactivity series • Displacement reactions • Measuring the rate of reaction • Changes in the rate of reaction

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			Students will explore the impact of scientific and technological advances on Humans		<p>Criterion D: “Reflecting on the impacts of science”</p> <p>Criterion C: Processing & Evaluating</p> <p>Criterion B: Inquiring & Designing</p>	Self-Management Skills	<ul style="list-style-type: none"> Factors affecting the rate of reaction (Surface area, temperature and concentration) catalysts
Year4							
The nature of matter	Change	Transfer Energy	Scientific and Technical Innovation	A change in matter is a consequence of energy differences between substances which scientists and technicians use to create a range of innovative products	<p>Criterion A: “Knowing and understanding”</p> <p>Criterion D: “Reflecting on the impacts of science”</p> <p>Criterion C: Processing & Evaluating</p>	Thinking Skills Research Skills Communication Skills Social Skills Self-Management Skills	<ul style="list-style-type: none"> Define <i>the term</i> matter To distinguish in the properties of the three states of matter. Define m.p , b.p , sublimation , volatility To classify the matter into pure substances and mixtures Deduce the effect of impurities on m.p and b.p



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					Criterion B: Inquiring & Designing		<ul style="list-style-type: none"> To draw the heating curve and cooling curve of different substances. Outline the types of chemical reactions To distinguish between physical and chemical changes State the main points of kinetic model Define the term diffusion To deduce the diffusion in liquid and gas Define the term isotopes Solve problems involving relative atomic mass(isotopes) Calculate number of protons, neutrons, electrons in different atoms and ions Write electron configuration of different atoms and ions
Elements and compounds	Systems	Patterns	Scientific and Technical Innovation	Scientific and technical innovation has allowed us to identify patterns in the properties of	Criterion A: “Knowing and understanding”	Thinking Skills Research Skills Communication Skills Social Skills	<ul style="list-style-type: none"> Define the terms groups, periods. To identify the group number and period number

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				chemical elements and so build systems to classify them	<p>Criterion D: “Reflecting on the impacts of science”</p> <p>Criterion B: Inquiring & Designing</p>	Self-Management Skills	<p>from the electron configuration</p> <ul style="list-style-type: none"> To distinguish between metals , non-metals and metalloids To distinguish between main group elements and transition elements To identify general trends in the periodic table To identify general properties of alkali metals, halogens, alkali earth metals, noble gas To distinguish between metallic bonding and covalent bonding, ionic bonding To write the formulae of chemical compounds.
Chemical reactions	Change	Interaction	Globalization and Sustainability	Chemical industry has brought change that affects global interactions with positive and negative environmental impacts	<p>Criterion A: “Knowing and understanding”</p> <p>Criterion D:</p>	Thinking Skills Research Skills Communication Skills Social Skills Self-Management Skills	<ul style="list-style-type: none"> Mass and gaseous volume relationships in chemical reactions To distinguish between chemical and physical change.



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					<p>“Reflecting on the impacts of science”</p> <p>Criterion C: Processing & Evaluating</p> <p>Criterion B: Inquiring & Designing</p>		<ul style="list-style-type: none"> To distinguish between exothermic and endothermic reaction To write a balanced chemical equations To identify the types of chemical reactions To define the terms reducing agents, oxidizing agents To determine how to use state symbols in an equation To write an ionic equation
Quantitative chemistry	Systems	Balance Conservation	Scientific and technical innovation: how humans use their understanding of scientific principles	The scientifically constructed systems for balancing chemical equations require the numbers and types of atoms to be conserved.	<p>Criterion A: “Knowing and understanding”</p> <p>Criterion D: “Reflecting on the</p>	<p>Thinking Skills</p> <p>Research Skills</p> <p>Communication Skills</p> <p>Social Skills</p> <p>Self-Management Skills</p>	<ul style="list-style-type: none"> Theories of acids and bases Define relative formula mass calculate relative formula mass of a substance calculate the amounts of compounds reacted together or produced in reactions Define the term MOLE.



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					<p>impacts of science”</p> <p>Criterion C: Processing & Evaluating</p> <p>Criterion B: Inquiring & Designing</p>		<ul style="list-style-type: none"> • calculate the number of moles of a given amount • Distinguish between <i>Empirical and molecular formulae</i> • Calculate the empirical formulae • Calculate percentage yield and percentage purity of product • State Avogadro’s law • Determine the volume of gas produced • Calculate the concentration of solution • To calculate the concentration of an unknown acid solution when it reacted with a standard solution of an alkali
How far? How fast	Change	Energy	Orientation in space and time	Change in the balance called chemical equilibrium is affected by the collisions of	Criterion A: “Knowing and understanding	Thinking Skills Research Skills Communication Skills Social Skills	<ul style="list-style-type: none"> • To define the term Hydrocarbons • To distinguish between Endothermic and exothermic process • To define the term Heat of reaction



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				particles in space and time	Criterion C: Processing & Evaluating	Self-Management Skills	<ul style="list-style-type: none"> To draw the energy diagram for endo and exo reactions Define the term Bond energy To calculate the heat of reaction To define the term Heat of neutralization To define Activation energy To determine the factors affect the rate of reaction Define the term catalyst. Define the term Reversible reaction. .Apply le Chatelier principle on chemical reactions
Year 5							
Stoichiometry	Systems	Balance Conservation	Scientific and Technical Innovation	The scientifically constructed systems for balancing chemical equations require the numbers and types of atoms to be conserved.	OBJECTIVE A: KNOWING AND UNDERSTANDING OBJECTIVE C: PROCESSING AND	Thinking skills: Social skills: Communication skills: Self-management skills: Research skills:	<ul style="list-style-type: none"> Mass and gaseous volume relationships in chemical reactions Naming and writing formulas for ionic and covalent compounds. To define relative atomic mass (RAM) To distinguish between mass number and RAM



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					<p>EVALUATING</p> <p>OBJECTIVE D: REFLECTING ON THE IMPACT OF SCIENCE</p>		<ul style="list-style-type: none"> To calculate RAM for an element given relative abundance and mass number of each isotope of an element To define the terms mole , molar mass, Avogadro's constant and relative molecular mass (RMM) To calculate RMM ,for different compounds To calculate the mass of a substance given number of moles or number of particles To solve problems concerning percentage composition To define empirical formula and molecular formula To determine empirical formula and molecular formula from percentage by mass analysis Calculate theoretical yields from chemical equations. Determine the limiting reactant and the reactant in excess when quantities of reacting substances are given.



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							<ul style="list-style-type: none"> • Solve problems involving theoretical, experimental and percentage yield. • Apply Avogadro's law to calculate reacting volumes of gases. • Apply the concept of molar volume at standard temperature and pressure in calculations. • Solve problems involving the relationship between temperature, pressure and volume for a fixed mass of an ideal gas. • Solve problems using the ideal gas equation, $PV = nRT$ • Solutions • Distinguish between the terms <i>solute</i>, <i>solvent</i>, <i>solution</i> and <i>concentration</i> (g dm^{-3} and mol dm^{-3}). • Solve problems involving concentration, amount of solute and volume of solution. • Solve problems involving concentration, amount of solute and volume of solution during chemical reactions.



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Acids and bases	Relationships	Function	Fairness and Development	The strength of acids and bases is related to the function of the degree of dissociation and determines how they should be used and disposed of.	<p>OBJECTIVE A: KNOWING AND UNDERSTANDING</p> <p>OBJECTIVE B: INQUIRING AND DESIGNING</p> <p>OBJECTIVE C: PROCESSING AND EVALUATING</p> <p>OBJECTIVE D: REFLECTING ON THE IMPACT OF SCIENCE</p>	<p>Thinking skills:</p> <p>Social skills:</p> <p>Communication skills:</p> <p>Self-management skills:</p> <p>Research skills:</p>	<ul style="list-style-type: none"> Theories of acids and bases Define <i>acids</i> and <i>bases</i> according to the Brønsted–Lowry and Lewis theories. Deduce whether or not a species could act as a Brønsted–Lowry and/or a Lewis acid or base. Deduce the formula of the conjugate acid (or base) of any Brønsted–Lowry base (or acid). Strong and weak acids and bases State whether a given acid or base is strong or weak. Distinguish between <i>strong</i> and <i>weak</i> acids and bases, and determine the relative strengths of acids and bases, using experimental data Distinguish between <i>strong</i> and <i>weak</i> acids and bases in terms of the extent of dissociation, reaction with water and electrical conductivity. The pH scale Distinguish between aqueous solutions that are <i>acidic</i>,



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							<p><i>neutral or alkaline</i> using the pH scale.</p> <ul style="list-style-type: none"> Identify which of two or more aqueous solutions is more acidic or alkaline using pH values. State that each change of one pH unit represents a 10-fold change in the hydrogen ion concentration $[H^+(aq)]$. Deduce changes in $[H^+(aq)]$ when the pH of a solution changes by more than one pH unit. Calculations involving acids and bases State the expression for the ionic product constant of water (K_w). Deduce $[H^+(aq)]$ and $[OH^-(aq)]$ for water at different temperatures given K_w values. Solve problems involving $[H^+(aq)]$, $[OH^-(aq)]$, pH and pOH. Neutralization reactions and acid–base titrations

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							<ul style="list-style-type: none"> • Sketch the general shapes of graphs of pH against volume for titrations involving strong and weak acids and bases, and explain their important features. • Solve titration problems using titration curves • Deduce whether salts form acidic, alkaline or neutral aqueous solutions
Organic chemistry	Change	Form Energy	Orientation in Space and Time	In order for structure and energy to continue driving change, finite fossil fuels will need to be replaced by renewable raw materials.	OBJECTIVE A: KNOWING AND UNDERSTANDING OBJECTIVE D: REFLECTING ON THE IMPACT OF SCIENCE	Thinking skills: Social skills: Communication skills: Self-management skills: Research skills:	<ul style="list-style-type: none"> • Introduction: Homologous series • Describe the features of a homologous series. • Predict and explain the trends in boiling points of members of a homologous series. • Distinguish between <i>empirical</i>, <i>molecular</i> and <i>structural</i> formulas. • Deduce structural formulas for the non-cyclic alkanes • IUPAC system of naming organic compounds • Apply IUPAC rules for naming the isomers of the non-cyclic alkanes



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							<ul style="list-style-type: none"> • Apply IUPAC rules for naming the isomers of the straight-chain alkenes • Deduce structural formulas for compounds containing one of the following functional groups: alcohol, aldehyde, ketone, carboxylic acid and halide. • Apply IUPAC rules for naming compounds containing one of the following functional groups: alcohol, aldehyde, ketone, carboxylic acid and halide. • Identify primary, secondary and tertiary carbon atoms in alcohols and halogenoalkanes. • Apply IUPAC rules for naming compounds containing one of the following functional groups: amine, amide, ester, ether and nitrile. • Apply IUPAC rules for naming cyclic hydrocarbones • State the characteristics of benzene ring and apply IUPAC rules for naming simple aromatic compounds



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Unit title	Key Concept	Related Concept	Global context	Statement of inquiry	Objectives	ATL Skills	Content
							<ul style="list-style-type: none"> • Combustion reactions of Fossil fuels • Addition reactions of alkenes (hydrogenation, halogenation, hydration, reaction with hydrogen halide and addition polymerization (synthesis of plastics))

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Year1							
Recently added to the curriculum							
Year 2							
Measuring Motion	Change	Movement	Orientation in Space and Time	Humans manipulate the interaction and balance of forces to control movement.	OBJECTIVE D: REFLECTING ON THE IMPACT OF SCIENCE OBJECTIVE A: KNOWING AND UNDERSTANDING	Thinking Skills Research Skills Self-management Communication	<ul style="list-style-type: none"> • Measuring speed • Speed check and calculations • Pattern of movements • Distance/Time graph



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Magnetism	Relationships	Balance	Scientific and Technical Innovation	how the balanced relationship between electricity and Magnetism has led to useful inventions.	OBJECTIVE A: KNOWING AND UNDERSTANDING OBJECTIVE B: INQUIRING AND DESIGNING	Thinking Skills Research Skills Self-management Communication	<ul style="list-style-type: none"> • Magnets and Magnetic materials • Magnetic poles • Magnetic field patterns • Making an electromagnet • Electric currents make magnetic fields
Year 3							
Forces in action	Systems	Development Models	Scientific and Technical Innovation	Principles and discoveries of many systems affected the development of different models.	Criteria A & B	Thinking Skills Research Skills Self-management Communication	<ul style="list-style-type: none"> • Density Measuring and Calculations • Pressure and pressure calculations • Pressure in gases and liquids • The turning effect of a force • The principle of moments and calculations
Electricity	Relationships	Energy, Transfer and Environment	Scientific and technical innovation	The concept of energy (Electricity and static electricity) Transferring can have significant relationships and roles	Criteria A, B & D	Thinking Skills Research Skills Self-management Communication	<ul style="list-style-type: none"> • Static electricity • Positive and negative charge • Conductors and insulators • Electric current in a circuit



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				in innovations that affect individuals, communities and environment.			<ul style="list-style-type: none"> • Changing circuits • Components in parallel
Year 4							
Units and measurements	Systems	Patterns Change	Globalization & Sustainability adaptation, ingenuity and progress	Scientists developed and improved an international system of units and this was the basic step to invent the measuring tools and devices.	Criterion A Knowing and understanding Criterion B Inquiring and designing Criterion C Processing and Evaluating Criterion D Reflecting on the impacts of science	Thinking Skills Self-management Communication	<ul style="list-style-type: none"> • Fundamental SI units and derived units • Density • The nature of random errors and systematic errors • Uncertainties • Accuracy and precision



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Forces and Motion (Kinematics)	Change	Movement Systems Balance	Identities and relationships Personal health	Safety devices in mechanical transportation systems have developed with time by various Technical Innovations.	Criterion A Knowing and understanding Criterion B Inquiring and designing Criterion C Processing and Evaluating Criterion D Reflecting on the impacts of science	Thinking Skills Research Skills Self-management Communication	<ul style="list-style-type: none"> • A scalar quantity is a quantity that has magnitude (size) only. • A vector quantity is a quantity that is only described completely if both its magnitude (size) and direction are given. • Speed, Velocity & acceleration • Motion graphs and transformations between different graphs (distance/displacement–time & speed/velocity–time) • Equations of motion (used to determine the stopping distance, for example, of cars speeding in a residential area. This can lead into discussions on safety, the importance of laws/rules on the road and so on) • Free fall

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Forces and motion (dynamics)	Systems	Consequences Interaction Movement	Scientific and Technical Innovation How humans use their understanding of scientific principles	The way in which bodies move within a dynamic system is a consequence of the interaction between them.	Criterion A Knowing and understanding Criterion B Inquiring and designing Criterion C Processing and Evaluating Criterion D Reflecting on the impacts of science	Thinking Skills Research Skills Self-management Communication	<ul style="list-style-type: none"> • Newton's first law: in the absence of a net external force, a body is either at rest or moves in a straight line with constant velocity. • Newton's second law: the rate of change of momentum is proportional to the applied force. • Newton's third law: action and reaction are opposite and equal • Newton's laws of motion-accidents and safety get further explored through the concept of forces, mass and acceleration. • Mass, weight and gravity • Gravitational force: universal law of gravitation, acceleration due to gravity.



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							<ul style="list-style-type: none"> • Momentum is the product of an object's mass and its velocity • Concept of impulse – the change in momentum is equal to the impulse and is important when studying car safety • The law of conservation of momentum • Moving in circles: for an object to follow a circular path, a centripetal force must act • Hooke's law
Year 5							
Work and energy	change	Energy Interactions	Scientific and technical innovation: how humans use their understanding of scientific principles	The energy transformations in machines make the life easier, but will have some negative impacts on our life	Criterion A Knowing and understanding Criterion B Inquiring and designing Criterion C	Thinking Skills Research Skills Self-management Communication	<ul style="list-style-type: none"> • Work and energy • Forms of energy • Energy transformations • Sources of energy • Power and efficiency



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					Processing and Evaluating Criterion D Reflecting on the impacts of science		
Thermal effects	Change	Energy Interactions	Globalization and sustainability: the relationship between local and global processes	Understanding heat exchange and energy transfer in substances may lead to better solutions in environmental and global issues	Criterion A Knowing and understanding Criterion B Inquiring and designing Criterion C Processing and Evaluating Criterion D	Thinking Skills Research Skills Self-management Communication	<ul style="list-style-type: none"> • Particle theory • Temperature • Conduction • Convection • Radiation • Evaporation and boiling • Thermal expansion • Specific heat capacity • Latent heat

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					Reflecting on the impacts of science		
Waves and sound	Change	Movement	Scientific and technical innovation	Wave motion could explain many natural phenomena, and can be used in many applications and devices	Criterion A Knowing and understanding Criterion D Reflecting on the impacts of science	Thinking Skills Research Skills Self-management Communication	<ul style="list-style-type: none"> • wave characteristics and equation • transverse and longitudinal waves • wave effects (reflection, refraction, diffraction and interference) • nature of sound waves • speed of sound and echo • sound characteristics
Rays and waves	Change	Energy Interactions	Scientific and technical innovation	Understanding the behavior of light when it passes a boundary is essential in optical applications	Criterion A Knowing and understanding Criterion B Inquiring and designing Criterion C Processing and Evaluating Criterion D	Thinking Skills Research Skills Self-management Communication	<ul style="list-style-type: none"> • light features and shade • reflection of light and images in plane mirrors • refraction of light and Snell's law • total internal reflection • lenses, ray diagrams, images, lens equation • adding and subtracting colors • electromagnetic waves-production and different bands



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					Reflecting on the impacts of science		
Electricity	Relationships	Energy	Scientific and technical innovation	Displacing electric charge will produce electric potential and electric potential energy, this energy is used to run circuits.	Criterion A Knowing and understanding	Thinking Skills	Electric Charge Current in a simple circuit Potential difference Resistance (1, 2)