

This term in Biology (Combined Science) we will be learning about:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
K N O W L E D G E	<ul style="list-style-type: none"> ❑ 4.2.2l Explain how the natural resting heart rate is controlled and how irregularities can be corrected ❑ 4.2.2r Describe and evaluate treatments for coronary heart disease and heart failure (inc drugs, mechanical devices or transplant) ❑ 4.2.2v Describe how different types of diseases may interact and translate disease incidence information between graphical and numerical forms 	<ul style="list-style-type: none"> ❑ 4.2.2d Explain the effect of temperature and pH on enzymes ❑ 4.2.2g Describe the features and functions of bile and state where it is produced and released from ❑ 4.2.2k Explain how the heart moves blood around the body (inc role & position of the aorta, vena cava, pulmonary artery & vein and coronary arteries) ❑ 4.2.2q Describe what happens in coronary heart disease & what statins are used for ❑ 4.2.2s Recall that heart valves can become faulty & describe the consequences of this ❑ 4.2.2t Describe how patients can be treated in the case of heart failure ❑ 4.2.2w Describe what risk factors are & give examples discussing human and financial costs of non-communicable diseases at local, national and global levels 	<ul style="list-style-type: none"> ❑ 4.2.2b Describe basic features of enzymes (inc rate calculations for chemical reactions) ❑ 4.2.2e Describe the digestive enzymes, including their names, sites of production and actions ❑ 4.2.2j Describe the structure of the human heart and lungs (inc how lungs are adapted for gaseous exchange) ❑ 4.2.2o Describe blood and identify its different components, inc identifying blood cells from photographs/diagrams ❑ 4.2.2p Describe the functions of blood components, including adaptations to function ❑ 4.2.2x Describe what cancer is and explain the difference between benign and malignant tumours 	<ul style="list-style-type: none"> ❑ 4.2.1a Describe the levels of organisation within living organisms ❑ 4.2.2a Describe the digestive system & how it works as an organ system ❑ 4.2.2c Describe the lock and key theory as a model of enzyme action & explain how the shape a of the active sites makes the enzyme specific ❑ 4.2.2f Describe how the products of digestion are used ❑ 4.2.2m Describe the structure & function of arteries, veins and capillaries ❑ 4.2.2u Describe health and the explain causes of ill-health and the relationship between health and disease ❑ 4.2.2y Describe the known risk factors for cancer, including genetic and lifestyle risk factors
S K I L L S & A P P L I C A T I O N		<ul style="list-style-type: none"> ❑ 4.2.2n Use simple compound measures such as rate and carry out rate calculations for blood flow 	<ul style="list-style-type: none"> ❑ 4.2.2h RP4: use qualitative reagents to test for a range of carbohydrates, lipids and proteins ❑ 4.2.2i RP5: investigate the effect of pH on the rate of reaction of amylase enzyme 	

This term in Biology (Combined Science) we will be learning about:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
KNOWLEDGE	<ul style="list-style-type: none"> <input type="checkbox"/> 4.2.3g Describe the role of stomata and guard cells in the control of gas exchange and water loss 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.2.3b Explain how the structure of plant tissues are related to their function within the leaf (plant organ) inc stomata and guard cells <input type="checkbox"/> 4.2.3c Recall the plant parts that form a plant organ system that transports substances around the plant <input type="checkbox"/> 4.2.3d Explain how root hair cells, xylem and phloem are adapted to their functions <input type="checkbox"/> 4.2.3e Describe the process of transpiration and translocation including the role of the different plant tissues <input type="checkbox"/> 4.2.3f Explain how the rate of transpiration can be affected by different factors (inc naming the factors) 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.2.3a Describe plant tissues (epidermal, palisade mesophyll, spongy mesophyll, xylem, phloem and meristem) and describe their functions 	
SKILLS & APPLICATION				

This term in Chemistry (Combined Science) we will be learning about:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
KNOWLEDGE	<ul style="list-style-type: none"> ❑ 4.1.2j Describe the reactivity and properties of group 1 alkali metals with reference to their electron arrangement and predict their reactions ❑ 4.1.2k Describe the properties of Gp 7 halogens and how they relate to their electron arrangement, including trends in molecular mass, mpt, bpt and reactivity 	<ul style="list-style-type: none"> ❑ 4.1.1h Describe how the atomic model has changed over time due to new experimental evidence, inc discovery of the atom and scattering experiments (inc the work of James Chadwick) ❑ 4.1.1m Describe isotopes as atoms of the same element with different numbers of neutrons ❑ 4.1.2c Explain why elements in the same group have similar properties and how to use the periodic table to predict the reactivity of elements ❑ 4.1.2e Explain the creation & attributes of Mendeleev's periodic table ❑ 4.1.2i Describe the properties of noble gases, including bpt, predict trends down the group and describe how their properties depend on the outer shell of electrons 	<ul style="list-style-type: none"> ❑ 4.1.1i Describe the difference between the plum pudding model of the atom and the nuclear model of the atom ❑ 4.1.1p Describe how electrons fill energy levels in atoms, and represent the electron structure of elements using diagrams and numbers ❑ 4.1.2b Describe how elements with similar properties are placed in the periodic table ❑ 4.1.2d Describe the early attempts to classify elements ❑ 4.1.2g Explain how the atomic structure of metals and non-metals relates to their position in the periodic table ❑ 4.1.2h Describe noble gases (group 0) & explain their lack of reactivity ❑ 4.1.2l Describe the reactions of group 7 halogens with metals and non-metals 	<ul style="list-style-type: none"> ❑ 4.1.2a Recall how the elements in the periodic table are arranged ❑ 4.1.2f Identify metals and non-metals on the periodic table, compare and contrast their properties
SKILLS & APPLICATION				

This term in Chemistry (Combined Science) we will be learning about:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
KNOWLEDGE	<ul style="list-style-type: none"> ❑ 4.2.1d Describe the limitations of using dot and cross, ball and stick, two and three-dimensional diagrams to represent a giant ionic structure ❑ 4.2.2c Discuss the limitations of particle theory ❑ 4.2.2l Describe the structure of fullerenes & their uses, including Buckminsterfullerene & carbon nanotubes 	<ul style="list-style-type: none"> ❑ 4.2.1c Describe the structure of ionic compounds, including the electrostatic forces of attraction, and represent ionic compounds using dot and cross diagrams ❑ 4.2.1g Represent covalent bonds between small molecules, repeating units of polymers and parts of giant covalent structures using diagrams ❑ 4.2.2g Explain how the structure of polymers affects their properties ❑ 4.2.2h Explain how the structure of giant covalent structures affects their properties ❑ 4.2.2j Explain why alloys are harder than pure metals in terms of the layers of atoms ❑ 4.2.2k Explain the properties of graphite, diamond and graphene in terms of their structure and bonding 	<ul style="list-style-type: none"> ❑ 4.2.1f Describe covalent bonds & identify different types of covalently bonded substances, small molecules, large molecules & giant covalent structures ❑ 4.2.1b Describe how some ions have the electronic structure of a gas 0 element & how charges of ions relate to its group number ❑ 4.2.2e Explain how the structure of ionic compounds affects their properties, including mpt, bpt & conduction of electricity (sodium chloride only) ❑ 4.2.2f Explain how the structure of small molecules affects their properties ❑ 4.2.2i Explain how the structure of metals & alloys affects their properties, including explaining why they are good conductors 	<ul style="list-style-type: none"> ❑ 4.2.1a Describe the three main types of bonds: ionic, covalent and metallic bonds in terms of electrostatic forces and the transfer or sharing of electrons ❑ 4.2.1j Describe the arrangement of atoms and electrons in metallic bonds and draw diagrams the bonding in metals ❑ 4.2.2a Name the three states of matter, identify them from a simple model and state which changes of state happen at melting and boiling points ❑ 4.2.2b Explain changes of state using particle theory and describe factors that affect the melting and boiling point of a substance ❑ 4.2.2d Recall what (s), (l), (g) and (aq) mean when used in chemical equations and be able to use them appropriately
SKILLS & APPLICATION		<ul style="list-style-type: none"> ❑ 4.2.1e Work out the empirical formula of an ionic compound from a given model or diagram that shows the ions in the structure ❑ 4.2.1h Draw dot and cross diagrams for the molecules of hydrogen, chlorine, oxygen, nitrogen, hydrogen chloride, water, ammonia and methane 	<ul style="list-style-type: none"> ❑ 4.2.1i Deduce the molecular formula of a substance from a given model or diagram in these forms showing the atoms and bonds in the molecule 	

This term in Combined Science (Physics) we will be learning about Energy:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
KNOWLEDGE	<ul style="list-style-type: none"> <input type="checkbox"/> 4.1.2c Explain ways we can reduce the amount of energy wasted <input type="checkbox"/> 4.1.2g Suggest how we can increase the efficiency of an example <input type="checkbox"/> 4.1.3d Evaluate the different energy resources <input type="checkbox"/> 4.1.3e Justify why an energy resource has been chosen 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.1.1l Explain that power depends on both energy transferred and time <input type="checkbox"/> 4.1.2b Explain that some energy is wasted and give an example <input type="checkbox"/> 4.1.2d Describe how the thickness and thermal conductivity of the walls affect how fast it cools <input type="checkbox"/> 4.1.3c Explain why some energy resources are more reliable than others 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.1.1b Describe how energy is transferred from one store to another in an example <input type="checkbox"/> 4.1.1j Define 'power' <input type="checkbox"/> 4.1.1h Define 'specific heat capacity' 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.1.1a State the different stores of energy <input type="checkbox"/> 4.1.2a State the law of conservation of energy <input type="checkbox"/> 4.1.3a Define what a renewable energy resource is and give some examples. <input type="checkbox"/> 4.1.3b List some ways that different energy resources are used such as in transport
SKILL & APPLICATION		<ul style="list-style-type: none"> <input type="checkbox"/> 4.1.1e Calculate elastic potential energy stored in a spring using the equation <input type="checkbox"/> 4.1.1g Use the specific heat capacity equation <input type="checkbox"/> 4.1.1i RPI: Investigate specific heat capacity 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.1.1c Work out the amount of useful and wasted energy in an example <input type="checkbox"/> 4.1.1d Recall and apply the kinetic energy equation <input type="checkbox"/> 4.1.1f Recall and apply the gravitational potential energy equation <input type="checkbox"/> 4.1.2f Recall and apply the efficiency equation 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.1.1k Recall and use the power equation

Key Vocab: Energy, Insulation, Power, Renewable

This term in Combined Science (Physics) we will be learning about Particle Model of Matter:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
KNOWLEDGE	<ul style="list-style-type: none"> <input type="checkbox"/> 4.3.3b Explain how temperature affects pressure 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.3.2f Explain the difference between specific heat capacity and specific latent heat <input type="checkbox"/> 4.3.3a Explain how temperature affects the motion of gas particles 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.3.1c Explain the properties of solids, liquids and gases <input type="checkbox"/> 4.3.1f Explain why a change of state is reversible <input type="checkbox"/> 4.3.2b Explain what internal energy is 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.3.1b Draw diagrams to show solids, liquids and gases <input type="checkbox"/> 4.3.1e Recall the name of each change of state <input type="checkbox"/> 4.3.2a State the definition of internal energy
SKILLS & APPLICATION		<ul style="list-style-type: none"> <input type="checkbox"/> 4.3.2d Calculate the specific latent heat using the equation <input type="checkbox"/> 4.3.2e Interpret heating and cooling graphs 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.3.1d RP5: Find the densities of different objects <input type="checkbox"/> 4.3.2c Use the specific heat capacity equation 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.3.1a Calculate the density of a material

Key Vocab: Density, Specific Heat Capacity

This term in Combined Science (Physics) we will be learning about Electricity:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
KNOWLEDGE	<ul style="list-style-type: none"> ❑ 4.2.2d Explain what happens when you have resistors in series and parallel ❑ 4.2.4e Explain how power is related to potential difference and energy 	<ul style="list-style-type: none"> ❑ 4.2.1d Explain what causes a current to flow ❑ 4.2.1i Explain the shape of the IV graphs for lamps, diodes, thermistors and LDRs ❑ 4.2.3d Explain why the live wire is dangerous ❑ 4.2.4a Explain how power is related to potential difference and current ❑ 4.2.4h Explain why the National Grid system is efficient 	<ul style="list-style-type: none"> ❑ 4.2.1e Describe what happens to current when you increase the resistance ❑ 4.2.3a Explain the difference between direct and alternating current ❑ 4.2.4c Describe how appliances transfer energy ❑ 4.2.4f Describe the relationship between power and energy 	<ul style="list-style-type: none"> ❑ 4.2.1a Recall the different circuit symbols ❑ 4.2.1b Define 'current' ❑ 4.2.1h Define 'ohmic conductor' ❑ 4.2.3b Describe the function of each wire in a three-core cable ❑ 4.2.3c State the potential difference of each wire in a plug ❑ 4.2.4g State what the National Grid is
SKILLS & APPLICATION	<ul style="list-style-type: none"> ❑ 4.2.2e Solve complex circuit problems 	<ul style="list-style-type: none"> ❑ 4.2.1j Explain how to measure the resistance of a component ❑ 4.2.2a Explain how current and potential difference change in a series circuit ❑ 4.2.2b Explain how current and potential difference change in a parallel circuit 	<ul style="list-style-type: none"> ❑ 4.2.1c Recall and apply the charge, current & time equation ❑ 4.2.1f Calculate current, potential difference or resistance using Ohm's Law ❑ 4.2.1k RP4: Investigate the IV characteristics of different components ❑ 4.2.4b. Calculate power by recalling and applying the equations ❑ 4.2.4d Calculate energy transferred using the equations 	<ul style="list-style-type: none"> ❑ 4.2.1g RP3: Investigate the factors affecting the resistance of electrical circuits ❑ 4.2.2c Calculate the total resistance of two components in series

Key Vocab: Current, Potential Difference, Resistance, Series

This term in Combined Science (Physics) we will be learning about Atomic Structure:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
KNOWLEDGE	<ul style="list-style-type: none"> 4.4.2h. Discuss the importance of publishing and peer review 	<ul style="list-style-type: none"> 4.4.1d. Describe the history of the atom 4.4.2g. Compare the hazards of contamination and irradiation 	<ul style="list-style-type: none"> 4.4.1a. Describe the structure of an atom 4.4.1c. Use symbols to show different isotopes 4.4.2a. Describe what activity is and how we measure it 	<ul style="list-style-type: none"> 4.4.1b. Define electrons, neutrons, protons, isotopes and ions 4.4.2b. Describe the properties of alpha, beta and gamma radiation 4.4.2e. Define half-life
SKILLS & APPLICATION	<ul style="list-style-type: none"> 4.4.2f. Find the half-life of an isotope using data or a graph 	<ul style="list-style-type: none"> 4.4.2c. Evaluate which source of radiation is best to use in a given situation 	<ul style="list-style-type: none"> 4.4.2d. Complete balanced nuclear equations 	

Key Vocab: Atom, Isotope, Radioactive Decay

This term in Combined Science (Physics) we will be learning about Waves:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
KNOWLEDGE	<ul style="list-style-type: none"> ❑ 4.6.2h Explain how radio waves can be produced ❑ 4.6.2i Explain that atoms can result in electromagnetic waves being generated 	<ul style="list-style-type: none"> ❑ 4.6.2c Explain that our eyes only detect a limited range of electromagnetic waves ❑ 4.6.2d Explain how different wavelengths are reflected, refracted, absorbed or transmitted differently ❑ 4.6.2f Explain what refraction is ❑ 4.6.2j State examples of the dangers of each type of electromagnetic radiation 	<ul style="list-style-type: none"> ❑ 4.6.1.a Describe waves as either transverse or longitudinal ❑ 4.6.1.c Define amplitude, wavelength, frequency, period and wave speed ❑ 4.6.2k State the uses of each type of electromagnetic radiation 	<ul style="list-style-type: none"> ❑ 4.6.1b Define a waves as transfers of energy ❑ 4.6.1f Identify amplitude and wavelength on a diagram ❑ 4.6.1l Describe what happens to a wave at a boundary ❑ 4.6.2a Describe what electromagnetic waves are ❑ 4.6.2b List the groups of electromagnetic waves in order of wavelength
SKILL & APPLICATION		<ul style="list-style-type: none"> ❑ 4.6.2e Draw ray diagrams to illustrate the refraction of a wave ❑ 4.6.2g RP10: Investigate infrared radiation 	<ul style="list-style-type: none"> ❑ 4.6.1e Recall and use the wave equations ❑ 4.6.1j RP8: Measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid 	<ul style="list-style-type: none"> ❑ 4.6.1d State different methods of measuring wave speeds ❑ 4.6.1g Describe how to measure the speed of sound waves in air ❑ 4.6.1h Describe how to measure the speed of ripples on a water surface

Key Vocab: Amplitude, Frequency, Refracted, Transverse Wave

This term in Biology (Combined Science) we will be learning about:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
KNOWLEDGE	<ul style="list-style-type: none"> ❑ 4.7.3e Explain the consequences of peat bog destruction 	<ul style="list-style-type: none"> ❑ 4.7.3j Describe both positive and negative human interactions in an ecosystem and explain their impact on biodiversity ❑ 4.7.3k Describe programmes that aim to reduce the negative effects of humans on ecosystems and biodiversity 	<ul style="list-style-type: none"> ❑ 4.7.3b Describe the impact of human population growth and increased living standards on resource use and waste production ❑ 4.7.3c Explain how pollution can occur, and the impacts of pollution ❑ 4.7.3g Explain the consequences of deforestation ❑ 4.7.3h Describe how the composition of the atmosphere is changing, and the impact of this on global warming ❑ 4.7.3i Describe some biological consequences of global warming 	<ul style="list-style-type: none"> ❑ 4.7.3a Describe what biodiversity is, why it is important, and how human activities affect it ❑ 4.7.3d Describe how humans reduce the amount of land available for other animals and plants ❑ 4.7.3f Describe what deforestation is and why it has occurred in tropical areas
SKILLS & APPLICATION				

This term in Biology (Combined Science) we will be learning about:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
KNOWLEDGE	<ul style="list-style-type: none"> ❑ 4.5.2d Explain how features of the nervous system are adapted to their function, including a reflex arc (inc all types of neurone and the synapse) ❑ 4.5.3f Explain how glucagon interacts with insulin to control blood glucose levels in the body ❑ 4.5.3k Describe the effect of ADH on the permeability of the kidney tubules & explain how the water level in the body is controlled by ADH ❑ 4.5.3q Explain how hormones are used to treat infertility, inc the steps in IVF ❑ 4.5.3t Explain the roles of thyroxine & adrenaline in the body as negative feedback systems 	<ul style="list-style-type: none"> ❑ 4.5.1b Describe the common features of all control systems ❑ 4.5.3d Explain what type 1 and type 2 diabetes are & how they are treated ❑ 4.5.3i Recall that protein digestion leads to excess amino acids inside the body & describe what happens to these ❑ 4.5.3l Describe how kidney failure can be treated by organ transplant or dialysis & recall the basic principles of dialysis ❑ 4.5.3n Describe the roles of the hormones involved in the menstrual cycle (FSH, LH & oestrogen) ❑ 4.5.3o Explain how the different hormones interact to control the menstrual cycle & ovulation ❑ 4.5.3s Describe the functions of adrenaline & thyroxine in the body & recall where they are produced 	<ul style="list-style-type: none"> ❑ 4.5.2b Describe how information passes through the nervous system ❑ 4.5.2c Describe what happens in a reflex action and why reflex actions are important ❑ 4.5.3c Describe the body's response when blood glucose concentration is too high ❑ 4.5.3e Describe the body's response when blood glucose concentration is too low ❑ 4.5.3h Describe the consequences of losing or gaining too much water for body cells ❑ 4.5.3j Describe how the kidneys produce urine ❑ 4.5.3p Describe how fertility can be controlled by hormonal and non-hormonal methods of contraception (giving specific examples from the spec) 	<ul style="list-style-type: none"> ❑ 4.5.1a Describe what homeostasis is & why it is important stating specific examples from the human body ❑ 4.5.2a State the function of the nervous system & name its important components ❑ 4.5.3a Describe the endocrine system, including the location of the pituitary, pancreas, thyroid, adrenal gland, ovary & testis & the role of hormones ❑ 4.5.3b State that blood glucose concentration is monitored and controlled by the pancreas ❑ 4.5.3g Describe how water, ions & urea are lost from the body ❑ 4.5.3m Describe what happens at puberty in males and females, inc knowledge of reproductive hormones
SKILLS & APPLICATION		<ul style="list-style-type: none"> ❑ 4.5.3r Evaluate the risks and benefits of fertility treatments 		<ul style="list-style-type: none"> ❑ 4.5.2e RP7: plan and carry out an investigation into the effect of a factor on human reaction time

This term in Chemistry (Combined Science) we will be learning about 4.3 Quantitative Chemistry:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
K N O W L E D G E	<ul style="list-style-type: none"> <input type="checkbox"/> 4.3.2a State that chemical amounts are measured in moles (mol) and explain what a mol is with reference to relative formula mass and Avogadro's constant <input type="checkbox"/> 4.3.2e Explain the effect of limiting the quantity of a reactant on the amount of products in terms of moles or masses in grams <input type="checkbox"/> 4.3.2g Explain how the mass of a solute and the volume of a solution is related to the concentration of the solution 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.3.1e Explain observed changes of mass during chemical reactions in non-enclosed systems using the particle model when given the balanced symbol equation <input type="checkbox"/> 4.3.1f Explain why whenever a measurement is made there is always some uncertainty about the result obtained 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.3.1b Explain the use of the multipliers in equations in normal script before a formula and in subscript within a formula 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.3.1a State that mass is conserved and explain why, including describing balanced equations in terms of conservation of mass
S A P P L I C A T I O N	<ul style="list-style-type: none"> <input type="checkbox"/> 4.3.2f Calculate the mass of solute in a given volume of solution of known concentration in terms of mass per given volume of solution 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.3.2b Use the relative formula mass of a substance to calculate the number of moles in a given mass of the substance <input type="checkbox"/> 4.3.2c Calculate the masses of reactants and products when given a balanced symbol equation <input type="checkbox"/> 4.3.2d Use moles to write a balanced equation when given the masses of reactants and products (inc changing the subject of the equation) 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.3.1d Calculate the relative formula masses of reactants and products to prove that mass is conserved in a balanced chemical equation 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.3.1c Describe what the relative formula mass (Mr) of a compound is and calculate the relative formula mass of a compound, given its formula

This term in Chemistry (Combined Science) we will be learning about:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
KNOWLEDGE	<ul style="list-style-type: none"> <input type="checkbox"/> 4.6.2d Explain that the position of equilibrium depends on the conditions of the reaction and the equilibrium will change to counteract any changes to conditions <input type="checkbox"/> 4.6.2e Explain and predict the effect of a change in concentration of reactants or products, temperature, or pressure of gases on the equilibrium position of a reaction 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.6.1g Describe the role of a catalyst in a chemical reaction and state that enzymes are catalysts in biological systems <input type="checkbox"/> 4.6.2b Explain that, for reversible reactions, if a reaction is endothermic in one direction, it is exothermic in the other direction <input type="checkbox"/> 4.6.2c Describe the State of dynamic equilibrium of a reaction as the point when the forward and reverse reactions occur at exactly the same rate 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.6.1f Use collision theory to explain changes in the rate of reaction, including discussing activation energy <input type="checkbox"/> 4.6.2a Explain what a reversible reaction is, including how the direction can be changed and represent it using symbols: $A + B \rightleftharpoons C + D$ 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.6.1d Describe how different factors affect the rate of a chemical reaction, including the concentration, pressure, surface area, temperature and presence of catalysts
SKILLS & APPLICATION	<ul style="list-style-type: none"> <input type="checkbox"/> 4.6.1c Calculate the gradient of a tangent to the curve on the graph and use this as a measure of the rate of reaction 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.6.1b Draw and interpret rates graphs and use the tangent to the graph as a measure of the rate of reaction <input type="checkbox"/> 4.6.1h Draw and interpret reaction profiles for catalysed reactions 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.6.1a Calculate the rate of a chemical reaction over time, using either quantity of reactant used or the quantity of product formed, measured in g/s, cm³/s or mol/s 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.6.1e RP5: Investigate how changes in concentration affect the rates of reactions by a method involving measuring the volume of a gas produced, change in colour or turbidity

This term in Chemistry (Combined Science) we will be learning about:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
K N O W L E D G E		<ul style="list-style-type: none"> <input type="checkbox"/> 4.7.1f Describe the process of cracking and state that the products of cracking include alkanes and alkenes and describe the test for alkenes 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.7.1c Describe the process of fractional distillation, state the names & uses of fuels that are produced from crude oil by fractional distillation 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.7.1a Describe what crude oil is & where it comes from, including the basic composition of crude oil & the general chemical formula for the alkanes <input type="checkbox"/> 4.7.1b State the names of the first four members of the alkanes & recognise substances as alkanes from their formulae
S A K P I L L S & C A T I O N	<ul style="list-style-type: none"> <input type="checkbox"/> 4.7.1g Balance chemical equations as examples of cracking when given the formulae of the reactants and products 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.7.1e Describe and write balanced chemical equations for the complete combustion of hydrocarbon fuels <input type="checkbox"/> 4.7.1h Explain why cracking is useful and why modern life depends on the uses of hydrocarbons 	<ul style="list-style-type: none"> <input type="checkbox"/> 4.7.1d Describe trends in the properties of hydrocarbons, including bpt, viscosity and flammability & explain how they are used as fuels 	

This term in Combined Science (Physics) we will be learning about Forces:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
K N O W L E D G E	<ul style="list-style-type: none"> ❑ 4.5.3b Explain why more than one force has to be applied to change the shape of an object 	<ul style="list-style-type: none"> ❑ 4.5.1h Describe examples of the forces acting on an isolated object ❑ 4.5.2d Explain why work done against friction causes a rise in the temperature ❑ 4.5.3e Explain why a change in the shape of an object only happens when more than one force is applied 	<ul style="list-style-type: none"> ❑ 4.5.1c Describe the interaction between two objects and the force produced on each as a vector ❑ 4.5.1f Describe what the object's 'centre of mass' is ❑ 4.5.2b Describe what a joule is ❑ 4.5.3c Describe the difference between elastic and inelastic deformation 	<ul style="list-style-type: none"> ❑ 4.5.1a Identify scalar and vector quantities ❑ 4.5.1b Give examples of contact or non-contact forces ❑ 4.5.1d Describe what weight is ❑ 4.5.3a Describe examples of the forces involved in stretching
S A K P I L L P S I & C A T I O N	<ul style="list-style-type: none"> ❑ 4.5.1j Use free body diagrams and accurate vector diagrams to resolve multiple forces ❑ 4.5.1k Use vector diagrams to illustrate resolution of forces, equilibrium situations and determine the resultant of two forces 	<ul style="list-style-type: none"> ❑ 4.5.1i Use free body diagrams to qualitatively describe examples where several forces act on an object ❑ 4.5.3f Interpret data from an investigation to explain possible causes of a linear and non-linear relationship between force and extension ❑ 4.5.3g Calculate work done in stretching (or compressing) a spring 	<ul style="list-style-type: none"> ❑ 4.5.1e Calculate weight by recalling and using the equation ❑ 4.5.2a Calculate the work done by recalling and using the equation ❑ 4.5.3d Describe the extension of an elastic object below the limit of proportionality 	<ul style="list-style-type: none"> ❑ 4.5.1g Calculate the resultant of two forces ❑ 4.5.2c Convert between newton-metres and joules. ❑ 4.5.3h RP6: Investigate the relationship between force and extension for a spring.

Key Vocab: Extension, Vector Quantity

This term in Combined Science (Physics) we will be learning about Force & Motion:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
KNOWLEDGE	<ul style="list-style-type: none"> ❑ 4.5.6.1g Explain that motion in a circle involves constant speed but changing velocity ❑ 4.5.6.2g Describe what inertia is and give a definition ❑ 4.5.6.2t Explain how a braking force reduce the vehicle's kinetic energy ❑ 4.5.6.2u Explain why a greater braking force causes a larger deceleration 	<ul style="list-style-type: none"> ❑ 4.5.6.1e Explain why the speed of wind and of sound through air varies ❑ 4.5.6.2c Explain how an object falling from rest reaches its terminal velocity ❑ 4.5.6.2h Estimate the speed, accelerations and forces of large vehicles ❑ 4.5.6.2v Estimate the forces involved in the deceleration of road vehicles ❑ 4.5.7c Describe examples of momentum in a collision 	<ul style="list-style-type: none"> ❑ 4.5.6.1b State the magnitude and direction of a displacement ❑ 4.5.6.1f Explain the difference between vectors and scalars ❑ 4.5.6.1j Describe an object which is slowing down as having a negative acceleration ❑ 4.5.6.2b Explain the changing motion of an object in terms of the forces acting on it ❑ 4.5.6.2d State and apply Newton's First Law ❑ 4.5.6.2n Evaluate the effect of various factors on thinking distance 	<ul style="list-style-type: none"> ❑ 4.5.6.1a Define distance and displacement ❑ 4.5.6.1c Recall some typical speeds for walking, running, cycling ❑ 4.5.6.2e Define and apply Newton's second law ❑ 4.5.6.2k Describe factors that can affect a driver's reaction time ❑ 4.5.6.2q State typical reaction times ❑ 4.5.6.2s Explain how the braking distance of a vehicle can be affected by different factors
SKILLS & CAPTION	<ul style="list-style-type: none"> ❑ 4.5.6.1m Determine distance travelled from a velocity-time graph ❑ 4.5.6.1n Measure the area under a velocity-time graph by counting squares ❑ 4.5.7b Apply the law of conservation of momentum 	<ul style="list-style-type: none"> ❑ 4.5.6.1l Represent and interpret motion from a velocity-time graph ❑ 4.5.6.1o Apply, but not recall, the acceleration equation ❑ 4.5.6.2j Apply Newton's Third Law to examples of equilibrium situations ❑ 4.5.6.2r Explain methods used to measure human reaction times ❑ 4.5.7a Calculate momentum 	<ul style="list-style-type: none"> ❑ 4.5.6.1i Draw and interpret distance-time graphs ❑ 4.5.6.1k Calculate the average acceleration of an object ❑ 4.5.6.2v Estimate the forces involved in road vehicles ❑ 4.5.6.2a Draw and interpret velocity-time graphs for terminal velocity ❑ 4.5.6.2i RP7: Investigate Newton's 2nd Law ❑ 4.5.6.2m Evaluate measurements from simple methods to measure reaction time 	<ul style="list-style-type: none"> ❑ 4.5.6.1d Calculate the average speed of an object ❑ 4.5.6.1h Represent and interpret motion from a distance-time graph ❑ 4.5.6.2f Recall and apply the Newton's 2nd Law equation ❑ 4.5.6.2l Explain methods used to measure human reaction times ❑ 4.5.6.2p Interpret graphs relating speed to stopping distance

Key Vocab: Acceleration, Displacement, Inertia (HT), Stopping Distance, Vector, Velocity

This term in Combined Science (Physics) we will be learning about Magnetism:

	Grade 7-9	Grade 5-6	Grade 4	Grade 1-3
KNOWLEDGE	<ul style="list-style-type: none"> 4.7.2f Explain how rotation is caused in an electric motor 	<ul style="list-style-type: none"> 4.7.2d State and use Fleming's left-hand rule 	<ul style="list-style-type: none"> 4.7.1c Explain how the behaviour of a magnetic compass is related to the Earth 4.7.2a Explain how a solenoid arrangement can increase the magnetic effect of the current 4.7.2b Draw the magnetic field pattern for a wire 	<ul style="list-style-type: none"> 4.7.1a Explain the difference between permanent and induced magnets. 4.7.1b Draw the magnetic field pattern of a bar magnet
SKILLS & APPLICATION		<ul style="list-style-type: none"> 4.7.2e Calculate the force on a conductor carrying a current 4.7.3h Use the transformer equations 		<ul style="list-style-type: none"> 4.7.1d Describe how to plot the magnetic field pattern of a magnet using a compass

Key Vocab: Magnetic Field