CNCS

KS4 Biology: Curriculum Overview

Rationale: In Year 10 and 11 students will build on prior knowledge from KS3 and develop their skills in key foundation concepts in chemistry ready for sitting the external examinations in Term 3.1 of Y11. In Year 10 pupils will complete the paper 1 topics and sit a paper 1 mock at the end of Year 10. In Year 11 pupils will complete the paper 2 topics and sit mocks in Paper 1 and Paper 2. Students will learn how to work safely in a lab and investigate scientific questions. Students will revisit and be introduced to a range of specific subject terminology, learning how to identify and discuss this appropriately. Furthermore, students will be given opportunities to develop their own personal responses to scientific problems and consider how to apply their knowledge to them

Year 10 students will know/ have studied: C1 Atomic Structure and the Periodic Table C2 Bonding C3 Quantitative Chemistry C4 Chemical changes C5 Energy changes **Year 11 students will know/ have studied:** C6 The rate and extent of chemical changes C7 Organic Chemistry C8 Chemical Analysis C9 Chemistry of the atmosphere C10 Using resources	**Year 10 student will be able to:** Work safety in lab and carry out investigations. They will be able to question and have begun to understand the world around them from the units studied. They will answer exam questions will confidence and skill and complete Chemistry Paper 1 **Year 11 student will be able to:** Work safety in lab and carry out investigations. They will be able to question and have begun to understand the world around them from the units studied. They will answer exam questions will confidence and skill and complete Chemistry Paper 1 and 2

Term	Outline	Assessment	Home Learning	Key Skills/ End Point
Year 10 Term 1	**C1 Atomic Structure and the Periodic Table** Student will: • Understand the properties of subatomic particles (protons, neutrons, and electrons) and explore relative charges and mass of particles. • Learn how electronic configuration determines chemical properties. • Understand the history of atomic models from Dalton's theory to the modern nuclear model. • Compare the plum pudding model with the nuclear model based on Rutherford's scattering experiment. • Understand Bohr's contribution and the discovery of protons and neutrons. • Differentiate between elements, compounds, and mixtures.	**Pitstops** C1.1 Atomic Structure C1.2 Atomic Structure C2 Bonding **1.2 End of term assessment (C1 and C2)** **Skills tested:** AO1: Demonstrate knowledge and understanding of: scientific ideas;	Weekly content recall and application questions set on Educake	**Skills:** • Recall of key knowledge through the use of low stakes testing. • Application of knowledge to unfamiliar contexts through exam question modelling. Interpretation of diagrams used to represent key processed. • Development of maths skills through converting units and calculating rate or surface area • Describing and explaining of graphical data when investigating the osmosis or bacterial growth.

	• Describe, explain and give examples of separation processes and suitable techniques. • Understand how compounds form through chemical bonding. • Learn how to write chemical formulae and balanced equations • Identify trends and organisation of elements based on atomic number in the periodic table • Explain how group and period trends predict chemical behaviour • Understand the noble gases (Group 0) and learn why they are unreactive due to a full outer shell. • Understand the alkali metals (Group 1) and study their reactivity trend, reactions with water, and storage methods. • Understand the halogens (Group 7) and compare reactivity, displacement reactions, and physical properties. CHEMISTRY ONLY: • Understand the transition metals: Investigate their colourful compounds, multiple oxidation states, and catalytic uses. **C2 Bonding, structure and the properties of matter** Students will: • Understand the three types of strong chemical bonds: ionic, covalent, and metallic. • Explain bonding in terms of electrostatic forces, electron transfer, and electron sharing. • Describe the formation of ionic bonds between metals and non-metals and use dot and cross diagrams to represent electron transfer in ionic bonding. • Examine the structure of ionic compounds and their electrostatic forces in a lattice. • Understand how atoms share electrons in covalent bonding and draw and interpret dot and cross diagrams for covalent molecules. • Recognise small molecules, polymers, and giant covalent structures such as diamond and silicon dioxide. • Explain how delocalised electrons allow metals to conduct heat and electricity. • Recognize metallic bonding in metals and alloys. • Compare the properties of ionic compounds, small molecules, polymers, giant covalent structures, and metals and compare	scientific techniques and procedures. AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.		• Development of evaluative skills: use of stem cells to treat medical conditions. • Development of practical skills during the RP activities; taking measurements, recording results, assessing risks. **End point:** • Students are able to recall key knowledge and apply this knowledge to exam questions from different areas. • Students can interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts. • Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate medical treatments.

	melting and boiling points to the strength of intermolecular forces and bonding • Investigate diamond, graphite, graphene, and fullerenes. • Understand how structure and bonding determine properties such as hardness, electrical conductivity, and strength. • Describe the properties of solids, liquids, and gases using the particle model and explain melting, boiling, and condensation in terms of energy transfers. • Predict states of substances at different temperatures based on their bonding and structure. (HT only) • Explain the limitations of the particle theory in relation to changes of state when particles are represented by solid inelastic spheres which have no forces between them. CHEMISTRY ONLY: • Understand nanoscience and how nanoparticles have unique properties. • Explore the uses, advantages, and risks of nanotechnology in medicine, electronics, and industry.			
Year 10 Term 2	C3 Quantitative Chemistry Students will: • Understand the law of conservation of mass and how it applies to chemical reactions. • Use balanced chemical equations to represent reactions quantitatively. • Calculate relative formula mass (Mr) by summing the atomic masses of elements in a compound. • Determine percentage by mass of elements within compounds. • Explain evident mass changes in reactions where a gas is a reactant or product. • Understand that all measurements have uncertainty and learn to estimate uncertainty in experiments. • Represent measurement distributions and use range and mean as measures of reliability. • Define concentration as mass per unit volume (g/dm³). (HT only)	**Formative assessments:** **2.1 & 2.2 Pit stops** C3.1 Quantitative chemistry (Foundation) C3.2 Quantitative chemistry (higher) C3.3 Quantitative Chemistry (TRIPLE) C4 Chemical Changes **2.2 End of term assessment C1, C2, C3** **Skills tested:** AO1: Demonstrate knowledge and understanding of: scientific ideas;	Weekly content recall and application questions set on Educake	Students are able to recall key knowledge and apply this knowledge to exam questions from different areas. Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts. Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided. **Skills tested:** AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures.

	• Define a mole and apply the Avogadro constant (6.02×10^{23} particles per mole). • Use relative formula mass (Mr) to calculate moles and mass relationships. • Interpret balanced equations in terms of moles. • Calculate masses of reactants and products from chemical equations. • Convert mass into moles to balance equations and obtain simple whole-number ratios. • Identify the limiting reactant in a chemical reaction and its effect on product formation. • Explain the relationship between mass of solute, solution volume, and concentration. CHEMISTRY ONLY • Calculate percentage yield and explain why actual yield may be lower than theoretical yield. • Understand and calculate atom economy to assess reaction efficiency and sustainability. • Calculate concentration in mol/dm³, mass of solute, and solution volume. • Perform titrations to determine acid and alkali concentrations. • Understand that equal moles of gases occupy the same volume under the same conditions. • Use molar volume (24 dm³ at RTP) to calculate gas volumes in reactions. **C4 Chemical changes** Students will: • Understand how metals react with oxygen to form metal oxides in oxidation reactions. • Learn about the reactivity series, arranging metals based on their reactions with water and acids. • Required practical 1: preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate using a Bunsen burner to heat dilute acid and a water bath or electric heater to evaporate the solution.	scientific techniques and procedures. AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.		AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures. Students are able to recall key knowledge and apply this knowledge to exam questions from different areas.

	• Investigate displacement reactions, showing how a more reactive metal can replace a less reactive metal in a compound. • Investigate the extraction of metals, including reduction with carbon for metals less reactive than carbon. • (HT only) Define oxidation as the loss of electrons and reduction as the gain of electrons. • Write ionic and half-equations to describe oxidation-reduction processes in displacement reactions. • Describe how acids react with metals to form salts and hydrogen gas. • (HT only) Explain these reactions in terms of electron transfer (redox reactions) • Investigate the neutralisation of acids by alkalis, bases, and metal carbonates, forming salts and water. • Predict the products of acid reactions based on the acid and base used. • Learn the practical method for producing pure, dry samples of soluble salts from acids and insoluble substances and use filtration and crystallisation to obtain salts. (RP1) • Understand how pH measures acidity and alkalinity using universal indicator or a pH probe. • Explain how acids release hydrogen ions (H^+) and alkalis release hydroxide ions (OH^-) in solution. • Investigate pH changes during neutralisation reactions. (CHEMISTRY Only) • Use titration techniques to measure reacting volumes of acids and alkalis. • (HT only) Calculate chemical quantities from titration results in mol/dm^3 and g/dm^3. Required practical 2: (chemistry only) determination of the reacting volumes of solutions of a strong acid and a strong alkali by titration. (HT only) • Differentiate between strong acids (fully ionised in solution) and weak acids (partially ionised).			

	• Explain the relationship between pH and hydrogen ion concentration, where a decrease of 1 in pH means a tenfold increase in H^+ concentration. • Define electrolysis as the decomposition of a compound using electricity. • Describe the movement of positive ions to the cathode (reduction) and negative ions to the anode (oxidation). • Predict the products of electrolysis for molten ionic compounds, such as lead bromide. • Understand why metals form at the cathode and non-metals at the anode. • Explain why electrolysis is used to extract reactive metals, such as aluminium from bauxite. • Describe the role of cryolite in reducing melting points and why carbon anodes must be replaced due to reaction with oxygen. • Predict the products of electrolysis for aqueous solutions, considering the reactivity of elements and discharge of ions. • Investigate the electrolysis of solutions using inert electrodes. • (HT only) Write and balance half-equations for reactions at the cathode (reduction) and anode (oxidation). Required practical 3: investigate what happens when aqueous solutions are electrolysed using inert electrodes. This should be an investigation involving developing a hypothesis.			
Year 10 Term 3	**C5 Energy Changes** • Understand that energy is conserved in chemical reactions. • Define exothermic reactions as those that release energy to the surroundings, increasing temperature (e.g., combustion, oxidation, neutralisation). • Define endothermic reactions as those that absorb energy from the surroundings, decreasing temperature (e.g., thermal decomposition, citric acid and sodium hydrogencarbonate). • Investigate and evaluate the practical applications of energy changes, such as hand warmers and self-heating cans. • Conduct practical experiments to measure temperature changes in reactions.	**Formative assessment:** **Pitstops:** C5 energy changes **End of Year assessment (a FULL Paper 1 MOCK)** **Skills tested:** AO1: Demonstrate knowledge and understanding of: scientific ideas;	Weekly content recall and application questions set on Educake	Students are able to recall key knowledge and apply this knowledge to exam questions from different areas. Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts. Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided. **Skills tested:** AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures.

	• Learn that chemical reactions occur when particles collide with enough energy. • Understand activation energy as the minimum energy required for a reaction to start. • Draw and interpret reaction profiles (energy level diagrams) for exothermic and endothermic reactions, identifying reactants, products, activation energy, and overall energy change. • Required Practical 4: investigate the variables that affect temperature changes in reacting solutions such as, eg acid plus metals, acid plus carbonates, neutralisations, displacement of metals. **(HT Only)** • Understand that bond breaking requires energy (endothermic), and bond formation releases energy (exothermic). • Calculate energy changes in reactions using bond energy values. • Explain why a reaction is exothermic or endothermic based on bond energy calculations. **(CHEMISTRY Only)** • Understand that chemical cells use chemical reactions to produce electricity. • Investigate how voltage is affected by electrode types and electrolytes. • Differentiate between non-rechargeable and rechargeable batteries and evaluate their advantages and limitations. • Explain how fuel cells, such as hydrogen fuel cells, generate electricity through the oxidation of hydrogen, producing water as a byproduct. • Evaluate the advantages and disadvantages of hydrogen fuel cells compared to rechargeable batteries. • (HT Only) Write half-equations for the reactions occurring in hydrogen fuel cells.	scientific techniques and procedures. AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.		AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures. Students are able to recall key knowledge and apply this knowledge to exam questions from different areas. Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts. Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided.

Year 11 Term 1	C6 The rate and extent of chemical change Students will • Understand that the rate of a chemical reaction is determined by how fast reactants are used up or products are formed. • Learn and apply the equations for calculating the mean rate of reaction using mass, volume, or moles of reactants/products. • Develop graphical skills to interpret reaction data, plot graphs, and use tangents to determine reaction rates. • (HT only) Calculate the gradient of a tangent to determine the instantaneous rate of reaction at a specific time. • Investigate how concentration, pressure, surface area, temperature, and catalysts affect reaction rates. • Apply collision theory to explain how increasing collision frequency and energy affects reaction rates. Required practical 5: investigate how changes in concentration affect the rates of reactions by a method involving measuring the volume of a gas produced and a method involving a change in colour or turbidity. • Understand that catalysts speed up reactions by lowering activation energy without being used up. • Identify catalysts in reactions and explain how they increase efficiency in industry. • Understand that some reactions are reversible, meaning products can react to reform reactants. • Investigate how energy changes in reversible reactions mean that if a reaction is exothermic in one direction, it is endothermic in the other. • Explain dynamic equilibrium, where forward and reverse reactions occur at the same rate in a closed system. (HT Only) • Predict how equilibrium shifts in response to changes in concentration, temperature, and pressure using the equilibrium rules	Baseline Paper 1 Area of weakness from Summer Mocks (Year 10) Pitstops C6 Rate of reaction C7 Organic chemistry November MOCKS Latest Paper 1 Skills tested: AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.	2018-2023 Chemistry paper 1 combined or separate depending on course. Educake homework for level 1 practice for foundation Complete paper week A, green pen with mark scheme week B – sent via email and uploaded on classcharts	**Skills:** • Recall of key knowledge through the use of low stakes testing. • Application of knowledge to unfamiliar contexts through exam question modelling. Interpretation of diagrams used to represent key processed. • Development of maths skills through converting units. • Describing and explaining of graphical data when investigating the effect of named factors reaction time • Development of practical skills during the RP activities; taking measurements, recording results, assessing risks. **End point:** • Students are able to recall key knowledge and apply this knowledge to exam questions from different areas. • Students can interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts. • Students are able to analyse information given to them, and apply their knowledge gained through the course.

	C7 Organic Chemistry Student will: • Understand that crude oil is a finite resource formed from ancient biomass. • Learn that crude oil is a mixture of hydrocarbons, mainly alkanes with the general formula C_nH_{2n+2} • Recognise the first four alkanes: methane, ethane, propane, and butane. • Explain how fractional distillation separates crude oil into useful fractions by evaporation and condensation. • Understand that crude oil provides fuels (e.g., petrol, diesel, kerosene) and feedstock for producing polymers, solvents, lubricants, and detergents. • Recognise that boiling point, viscosity, and flammability depend on hydrocarbon size. • Write balanced equations for complete combustion of hydrocarbons, producing carbon dioxide and water. • Understand that cracking breaks down long-chain hydrocarbons into shorter, more useful molecules. • Compare catalytic cracking and steam cracking processes. • Recognise that cracking produces alkanes and alkenes. • Learn how alkenes react with bromine water (colour change test). • Understand the importance of cracking in producing fuels and raw materials for polymers. (CHEMISTRY Only) • Learn that alkenes contain a C=C double bond and are unsaturated hydrocarbons. • Understand the general formula of alkenes: C_nH_{2n} (e.g., ethene, propene, butene, pentene).			

	• Recognise alkene reactions, including combustion, addition of hydrogen, water, and halogens. • Learn the structure, reactions, and uses of alcohols (methanol, ethanol, propanol, butanol). • Understand fermentation as a method of ethanol production. • Recognise carboxylic acids (methanoic, ethanoic, propanoic, and butanoic acid) and their functional group (-COOH). • Describe their reactions with carbonates, water, and alcohols to form esters. • (HT only) Explain why carboxylic acids are weak acids in terms of ionisation and pH. • Understand addition polymerisation, where alkene monomers form polymers (e.g., poly(ethene) and poly(propene)). • Recognise polymer structure from monomer formulas and repeating units. • (HT only) Explain condensation polymerisation, where monomers with two functional groups form polymers (e.g., polyesters). • (HT only) Understand that amino acids polymerise to form proteins. • Recognise that DNA (deoxyribonucleic acid) is a natural polymer made from nucleotide monomers in a double helix structure. • Understand that proteins, starch, and cellulose are also naturally occurring biological polymers.			
Year 11 Term 2	**C8 Chemical analysis** Students will: • Understand that pure substances are single elements or compounds that melt and boil at specific temperatures.	Pitstops C8 Chemical Analysis February Mocks Edited latest Paper 2 for triple and	Chemistry Paper 2 based exam style questions, combined or	**Skills:** • Recall of key knowledge through the use of low stakes testing. • Application of knowledge to unfamiliar contexts through exam

	• Use melting point and boiling point data to distinguish pure substances from mixtures. • Learn that formulations are carefully designed mixtures with specific properties, including medicines, fuels, cleaning agents, and food products. • Understand that chromatography separates mixtures by distribution between a stationary and a mobile phase. • Learn how to calculate Rf values to identify compounds based on their movement through a solvent. • Interpret chromatograms to distinguish pure and impure substances. Required practical 6: investigate how paper chromatography can be used to separate and tell the difference between coloured substances. Students should calculate Rf value. • Understand the different gas tests and results for hydrogen, carbon dioxide, oxygen and chlorine. (CHEMISTRY only) • Identify the metal ions based on distinct flame colours • Identify the metal ions using sodium hydroxide solution. • Identify that carbonates react with dilute acid to produce carbon dioxide, tested with limewater. • Identify the halide ions when it reacts with silver nitrate (in nitric acid) and the precipitate colours. • Identify the sulfate ions react with barium chloride (in hydrochloric acid) to form a white precipitate. Required practical 7: use of chemical tests to identify the ions in unknown single ionic compounds • Understand that instrumental methods (e.g., flame emission spectroscopy) provide accurate, sensitive, and rapid identification of elements and compounds.	combined (higher and foundation) <u>Skills tested:</u> AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures. **<u>Pitstops</u>** C9 Chemistry of the atmosphere	separate depending on course. Educake homework for level 1 practice for foundation Complete paper week A, green pen with mark scheme week B – sent via email and uploaded on classcharts	question modelling. Interpretation of genetic diagrams. • Development of maths skills through converting units and calculating probability • Describing and explaining of graphical data • Development of practical skills during the RP activities; taking measurements, recording results, assessing risks. **End point:** • Students are able to recall key knowledge and apply this knowledge to exam questions from different areas. • Students can interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts. • Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate various theories/processes. **Skills:** Students are able to recall key knowledge and apply this knowledge to exam questions from different areas. Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts.

	• Learn how flame emission spectroscopy is used to identify metal ions based on their unique spectral lines and to measure concentration of metal ions in a sample. • Interpret spectroscopic data using reference charts. **C9 Chemistry of the atmosphere** • Understand the current composition of the atmosphere (80% nitrogen, 20% oxygen, and small amounts of carbon dioxide, water vapour, and noble gases). • Explore theories on the Earth's early atmosphere, including the role of volcanic activity and the development of oceans in reducing carbon dioxide levels. • Learn how photosynthetic organisms contributed to oxygen production, allowing animal life to evolve. • Investigate how carbon dioxide levels decreased through photosynthesis, sedimentary rock formation, and fossil fuel formation. • Identify greenhouse gases (carbon dioxide, methane, and water vapour) and explain how they trap heat in the Earth's atmosphere. • Evaluate the impact of human activities (burning fossil fuels, deforestation, agriculture) on greenhouse gas emissions. • Recognise the complexity of climate models and the importance of peer-reviewed evidence in climate science. • Discuss global climate change, including its potential effects on weather patterns, sea levels, biodiversity, and agriculture. • Learn about the carbon footprint and ways to reduce emissions, considering both practical solutions and limitations. • Investigate how combustion of fossil fuels releases harmful pollutants (carbon monoxide, sulfur dioxide, nitrogen oxides, particulates, and unburned hydrocarbons). • Predict the products of combustion based on fuel composition and burning conditions. • Understand the effects of pollutants: Carbon monoxide, sulfur dioxide and nitrogen oxides, particulates (soot). **C10 Using resources**	C10 Using resources		Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided

	• Understand how natural resources provide materials for human needs (food, water, shelter, energy). • Identify the difference between finite and renewable resources and the need for sustainable development. • Explore the role of chemistry in improving industrial and agricultural processes for sustainable solutions. • Learn the difference between pure water and potable water and how freshwater, seawater, and wastewater are treated for human consumption. Required practical 8: analysis and purification of water samples from different sources, including pH, dissolved solids and distillation. • Investigate the process of desalination and its energy demands. • Examine the stages of wastewater treatment and the challenges of ensuring safe water supply • (HT only) Understand the alternative methods of metal extraction (phytomining, bioleaching) due to decreasing availability of metal ores. • Evaluate the economic and environmental benefits of recycling metals and reducing the need for mining. • Evaluate the environmental impact of different products, from raw material extraction to disposal • Understand how selective Life Cycle Assessment LCAs can be used to misrepresent environmental impacts (e.g., advertising claims). • Explore ways to reduce resource consumption through reuse, recycling, and sustainable materials. (CHEMISTRY only) • Investigate corrosion and its prevention, including barrier methods, sacrificial protection, and alloying.			

	• Study common alloys (bronze, brass, steel) and their uses based on physical properties. • Compare the properties and uses of ceramics, polymers, and composites. • Explore the difference between thermosetting and thermosoftening polymers. • Understand the Haber process as an example of industrial chemical synthesis, including the compromise between yield, energy use, and cost. • Investigate NPK fertilisers, their role in agriculture, and how they are industrially manufactured from natural sources. • Compare industrial fertiliser production with laboratory preparation of similar compounds.			
Year 11 Term 3	Pupils will follow a bespoke revision programme covering paper 1 and paper 2. This will be inline with the collapsed curriculum that the school offer. -	**3.2 End of term assessment** Pupils will sit external examinations in Chemistry **Skills tested:** AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry,		

		techniques and procedures. AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.		