

Year 10	Recap Electronic Structure	<ul style="list-style-type: none"> ● Use diagrams and symbols to show which energy levels they occupy. ● Explain how the electronic structure of atoms follows a pattern. ● Recognise that the number of electrons in an element's atoms outer shell corresponds to the element's group number. ● Use the periodic table to make predictions.
Year 10	Ionic bonding	<ul style="list-style-type: none"> ● Represent an ionic bond with a diagram. ● Draw dot and cross diagrams for ionic compounds. ● Work out the charge on the ions of metals from the group number of the element.
Year 10	Ionic compounds	<ul style="list-style-type: none"> ● Identify ionic compounds from structures. ● Explain the limitations of diagrams and models. ● Work out the empirical formula of an ionic compound.
Year 10	Covalent bonding	<ul style="list-style-type: none"> ● Identify single bonds in molecules and structures. ● Draw dot and cross diagrams for small molecules. ● Deduce molecular formulae from models and diagrams.
Year 10	Metallic bonding	<ul style="list-style-type: none"> ● Describe that metals form giant structures. ● Explain how metal ions are held together. ● Explain the delocalisation of electrons.
Year 10	Three states of matter	<ul style="list-style-type: none"> ● Use data to predict the states of substances. ● Explain the changes of state. ● Use state symbols in chemical equations.
Year 10	Properties of ionic compounds	<ul style="list-style-type: none"> ● Describe the properties of ionic compounds. ● Relate their melting points to forces between ions. ● Explain when ionic compounds can conduct electricity.
Year 10	Properties of small molecules	<ul style="list-style-type: none"> ● Identify small molecules from formulae. ● Explain the strength of covalent bonds. ● Relate the intermolecular forces to the bulk properties of a substance.
Year 10	Polymer structures	<ul style="list-style-type: none"> ● Recognise polymers from their unit formulae. ● Explain why some polymers can stretch. ● Explain why some plastics do not soften on heating.
Year 10	Giant covalent structures	<ul style="list-style-type: none"> ● Recognise giant covalent structures from diagrams. ● Explain the properties of giant covalent structures. ● Recognise the differences in different forms of carbon.
Year 10	Properties of metals and alloys	<ul style="list-style-type: none"> ● Identify metal elements and their properties, and metal alloys. ● Describe the purpose of a tin-lead alloy. ● Explain why alloys have different properties to those of elements.
Year 10	Diamond	<ul style="list-style-type: none"> ● Identify why diamonds are so hard. ● Explain how the properties relate to the bonding in diamond. ● Explain why diamond differs from graphite.

Year 10	Graphite	<ul style="list-style-type: none"> ● Describe the structure and bonding of graphite. ● Explain the properties of graphite. ● Explain the similarity to metals.
Year 10	Graphene and fullerenes	<ul style="list-style-type: none"> ● Describe the structure of graphene. ● Explain the structure and uses of the fullerenes. ● Explain the structure of nanotubes.
Year 10	Key concept: Sizes of particles and orders of magnitude	<ul style="list-style-type: none"> ● Identify the scale and measurements of length. ● Explain the conversion of small lengths to metres. ● Explain the relative sizes of electrons, nuclei and atoms.
Year 10	Maths skills: Visualise and represent 2D and 3D shapes	<ul style="list-style-type: none"> ● Use two-dimensional (2D) diagrams and 3D models to: <ul style="list-style-type: none"> ○ represent atoms, molecules and ionic structure ○ represent giant covalent structures ○ calculate empirical formulae of ionic structures.
Year 10	Metal oxides	<ul style="list-style-type: none"> ● Explore what happens when metals burn or corrode. ● Classify chemical changes as oxidation or reduction. ● Review the properties of metal oxides.
Year 10	Oxidation and reduction in terms of electrons	<ul style="list-style-type: none"> ● Observe some reactions between metal atoms and metal ions. ● Learn to write ionic equations and half equations. ● Classify half equations as oxidation or reduction.

Year 10	Reactivity series	<ul style="list-style-type: none"> ● Compare the reactivity of metals. ● Observe some reactions between metal atoms and metal ions. ● Consider why some metals are more reactive than others.
Year 10	Extraction of metals	<ul style="list-style-type: none"> ● Find out where metals come from. ● Extract iron from its oxide using carbon. ● Consider how other metals are extracted from their ores.
Year 10	Reaction of metals with acids	<ul style="list-style-type: none"> ● React an acid and a metal to make a salt. ● Predict the formulas of salts. ● Write balanced symbol equations and half equations.
Year 10	Neutralisation of acids and salt production	<ul style="list-style-type: none"> ● React an acid and an alkali to make a salt. ● Predict the formulas of salts. ● Write balanced symbol equations.
Year 10	Soluble salts	<ul style="list-style-type: none"> ● React an acid and a metal to make a salt. ● Predict the formulas of salts. ● Write balanced symbol equations and half equations.
Year 10	Required practical: Preparing a pure, dry sample of a salt from an insoluble oxide or carbonate	<ul style="list-style-type: none"> ● React a carbonate with an acid to make a salt. ● Describe each step in the procedure. ● Determine the purity of the product.
Year 10	pH and neutralisation	<ul style="list-style-type: none"> ● Estimate the pH of solutions.

		<ul style="list-style-type: none"> ● Identify weak and strong acids and alkalis. ● Investigate pH changes when a strong acid neutralises a strong alkali.
Year 10	Strong and weak acids	<ul style="list-style-type: none"> ● Explore the factors that affect the pH of an acid. ● Find out how the pH changes when an acid is diluted. ● Find out how the concentrations of solutions are measured.
Year 10	Key concept: Electron transfer, oxidation and reduction	<ul style="list-style-type: none"> ● Review ion formation. ● Classify half equations as oxidation or reduction. ● Review patterns in reactivity.
Year 10	The process of electrolysis	<ul style="list-style-type: none"> ● Explore what happens when a current passes through a solution of ions. ● Find out what an electrolyte is and what happens when it conducts electricity. ● Find out how electricity decomposes compounds.
Year 10	Electrolysis of molten ionic compounds	<ul style="list-style-type: none"> ● Look in detail at the electrolysis of lead bromide. ● Communicate the science behind the extraction of elements from molten salts. ● Write balanced half equations for electrolysis reactions.
Year 10	Using electrolysis to extract metals	<ul style="list-style-type: none"> ● Review the connection between the reactivity series and the ways metals are extracted. ● Consider how aluminium is extracted from aluminium oxide. ● Learn the oxidation and reduction reactions involved.
Year 10	Electrolysis of aqueous solutions	<ul style="list-style-type: none"> ● Investigate the products formed when copper sulfate is electrolysed ● Predict what products other solutions will give ● Write half equations for reactions at electrodes
Year 10	Required practical: Investigating what happens when aqueous solutions are electrolysed using inert electrodes	<ul style="list-style-type: none"> ● Devise a hypothesis. ● Devise an investigation to test your hypothesis. ● Decide whether the evidence supports your hypothesis.
Year 10	Maths skills: Make order of magnitude calculations	<ul style="list-style-type: none"> ● Explore the factors that affect the acidity of rain. ● Find out how acid concentrations are compared. ● Explore the link between hydrogen ion concentration and pH.
Year 10	Key concepts: Pure substances	<ul style="list-style-type: none"> ● Describe, explain and exemplify processes of separation. ● Suggest separation and purification techniques for mixtures. <p>Distinguish pure and impure substances using melting point and boiling point data.</p>
Year 10	Formulations	<ul style="list-style-type: none"> ● Identify formulations given appropriate information. ● Explain the particular purpose of each chemical in a mixture. ● Explain how quantities are carefully measured for formulation.
Year 10	Chromatography	<ul style="list-style-type: none"> ● Explain how to set up chromatography paper. ● Distinguish pure from impure substances.

		<ul style="list-style-type: none"> ● Interpret chromatograms and calculate R_f values.
Year 10	Required practical: Investigate how paper chromatography can be used in forensic science to identify an ink mixture used in a forgery	<ul style="list-style-type: none"> ● Describe the safe and correct manipulation of chromatography apparatus and how accurate measurements are achieved. ● Make and record measurements used in paper chromatography. ● Calculate R_f values.
Year 10	Test for gases	<ul style="list-style-type: none"> ● Recall the tests for four common gases. ● Identify the four common gases using these tests. ● Explain why limewater can be used to detect carbon dioxide.
Year 10	Crude oil, hydrocarbons and alkanes	<ul style="list-style-type: none"> ● Describe why crude oil is a finite resource. ● Identify the hydrocarbons in the series of alkanes. ● Explain the structure and formulae of the alkanes.
Year 10	Fractional distillation and petrochemicals	<ul style="list-style-type: none"> ● Describe how crude oil is used to provide modern materials. ● Explain how crude oil is separated by fractional distillation. ● Explain why the boiling points of the fractions are different.
Year 10	Properties of hydrocarbons	<ul style="list-style-type: none"> ● Describe how different hydrocarbon fuels have different properties. ● Identify the properties that influence the use of fuels. ● Explain how the properties are related to the size of the molecules.
Year 10	Combustion	<ul style="list-style-type: none"> ● Describe the process of complete combustion. ● Balance equations showing the combustion of hydrocarbons. ● Explain the consequences of incomplete combustion.
Year 10	Cracking and alkenes	<ul style="list-style-type: none"> ● Describe the usefulness of cracking. ● Balance chemical equations as examples of cracking. ● Explain why modern life depends on the uses of hydrocarbons.
Year 10	Key concept: Intermolecular forces	<ul style="list-style-type: none"> ● Identify the bonds within a molecule and the forces between molecules. ● Explain changes of state. ● Explain how polymer structure determines its ability to stretch.
Year 10	Maths skills: Visualise and represent 3D models	<ul style="list-style-type: none"> ● Use three-dimensional (3D) models to represent hydrocarbons, polymers and large biological molecules.
Year 10	Proportions of gases in the atmosphere	<ul style="list-style-type: none"> ● Review the composition of the atmosphere. ● Measure the percentage of oxygen in the atmosphere. ● Consider why it stays the same.
Year 10	The Earth's early atmosphere	<ul style="list-style-type: none"> ● Explore the origins of the Earth's atmosphere. ● Consider the evidence that ideas about the early atmosphere are based on. ● Consider the strength of the evidence these ideas are based on.
Year 10	How oxygen increased	<ul style="list-style-type: none"> ● Explore the processes that changed the oxygen concentration in the atmosphere. ● Consider the role of algae. ● Consider why oxygen levels in the atmosphere didn't rise when oxygen was first produced.
Year 10	How carbon dioxide decreased	<ul style="list-style-type: none"> ● Explore the processes that changed the amount of carbon dioxide in the atmosphere.

		<ul style="list-style-type: none"> ● Find out what ice cores tell us about the atmosphere. ● Explore how carbon dioxide levels have changed over time.
Year 10	Key: concept: Greenhouse gases	<ul style="list-style-type: none"> ● Review the greenhouse effect. ● Explain how greenhouse gases trap heat. ● Consider the consequences of adding greenhouse gases to the atmosphere.
Year 10	Human activities	<ul style="list-style-type: none"> ● Consider the factors that affect the quality of scientific reports. ● Consider the reliability of computer models. ● Find out what peer review involves.
Year 10	Global climate change	<ul style="list-style-type: none"> ● Explore the consequences of climate change. ● Consider the risks to human health. ● Judge the seriousness of these consequences.
Year 10	Carbon footprint and its reduction	<ul style="list-style-type: none"> ● Find out what a carbon footprint is. ● Consider factors that contribute to our carbon footprints. ● Explore ways of reducing our carbon footprints.
Year 10	Limitations on carbon footprint reduction	<ul style="list-style-type: none"> ● Review the uncertainties about carbon emissions. ● Consider factors which limit our ability to reduce our carbon footprints. ● Decide which factors are most important.
Year 10	Atmospheric pollutants from fuels	<ul style="list-style-type: none"> ● Explore the products formed when fuels burn. ● Distinguish between complete and incomplete combustion. ● Write equations for complete and incomplete combustion.
Year 10	Properties and effects of atmospheric pollutants	<ul style="list-style-type: none"> ● Review the hazards associated with air pollutants. ● Investigate correlations between pollutant emissions and deaths from asthma. ● Consider whether these support the hypothesis that air pollution makes asthma worse.
Year 10	Maths skills: Use ratios, fractions and percentages	<ul style="list-style-type: none"> ● Consider ways of comparing the amounts of gases in the atmosphere. ● Review what balanced symbol equations show. ● Compare the yields in chemical reactions.