

Year	Week	Lesson title	Lesson Objectives
Year 10	1/2	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	1/2	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	1/2	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	1/2	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	3/4	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	3/4	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	3/4	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	3/4	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	5/6	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	5/6	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	7/8t	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	7/8	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	7/8	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	7/8	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	9/10	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	9/10	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	9/10	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	11/12	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	13/14	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	13/14	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	13/14	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	13/14	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	15/16	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	15/16	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	15/16	Required practical: Preparing a pure,	<ul style="list-style-type: none"> ● React a carbonate with an acid to make a salt.

		dry sample of a salt from an insoluble oxide or carbonate	<ul style="list-style-type: none"> Describe each step in the procedure. Determine the purity of the product.
Year 10	15/16	pH and neutralisation	<ul style="list-style-type: none"> Estimate the pH of solutions. Identify weak and strong acids and alkalis. Investigate pH changes when a strong acid neutralises a strong alkali
Year 10	15/16	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	17/18	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	17/18	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	19/20	Electrolysis	<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	19/20	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	9/20	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	19/20	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	21/22	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	21/22	Key concepts: Pure substances	<ul style="list-style-type: none"> Describe, explain and exemplify processes of separation. Suggest separation and purification techniques for mixtures. <ul style="list-style-type: none"> Distinguish pure and impure substances using melting point and boiling point data.
Year 10	21/22	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	23/24	Chromatography	<ul style="list-style-type: none"> ● Explain how to set up chromatography paper. ● Distinguish pure from impure substances. ● Interpret chromatograms and calculate R_f values.
Year 10	23/24	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	25/26	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	25/26	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	25/26	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	25/26	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	27/28	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	27/28	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	27/28	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	27/28	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	29/30	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	29/30	The Earth's early atmosphere	<ul style="list-style-type: none"> ● Explore the origins of the Earth's atmosphere.

			<ul style="list-style-type: none"> 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	31/32	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	31/32	How carbon dioxide decreased	<ul style="list-style-type: none"> Explore the processes that changed the amount of carbon dioxide in the atmosphere. Find out what ice cores tell us about the atmosphere. Explore how carbon dioxide levels have changed over time.
Year 10	31/32	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	31/32	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	33/34	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	33/34	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	33/34	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	33/34	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	33/34	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	35/36	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 this support the hypothesis that air pollution makes asthma worse
Year 10	35/36	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.
Year 11	1/2	Skills Lesson 1	<ul style="list-style-type: none"> Calculate and use Mean, Significant Figures and Standard Form Identify anomalous results from sets on tabulated and graphical data

Year 11	1/2	Skills Lesson 2 Variables	<ul style="list-style-type: none"> Identify variables from methods Select variables in practical sessions Understand the terms independent, dependent and control variables
Year 11	1/2	Skills Lesson 3 Writing methods	<ul style="list-style-type: none"> Identify what makes a good method to include repeatability. Be able to write their own method given the variables Write improvements to methods to make a method more precise, accurate / repeatable
Year 11	1/2	Skills Lesson 4 Graphs	<ul style="list-style-type: none"> Identifying type of graph suitable for sets of discrete / continuous data (bar, scatter, line) Drawing and interpreting graphical data, including correct axis and scales Draw and use the slope of a tangent to a curve as a measure of rate of change
Year 11	3/4	Skills Lesson 5 Conclusions	<ul style="list-style-type: none"> Use data from an experiment to make a conclusion Use a conclusion to predict the outcome of further experiments and suggest experiments to test them Evaluate a method / investigation to identify limitations in methods results and analysis Suggest ways to improve investigations Identify and explain sources of error that could lead to anomalous results
Year 11	3/4	Skills Assessment	Assessment
Year 11	3/4	Required Practical 8 Making a Pure Dry Salt	<ul style="list-style-type: none"> Making salts revision - React an acid and a metal to make a salt. Predict the formulas of salts. Write balanced symbol equations and half equations.
Year 11	3/4	Required Practical 8 Making a Pure Dry Salt	<ul style="list-style-type: none"> Making salts revision - React an acid and a metal to make a salt. Predict the formulas of salts. Write balanced symbol equations and half equations.
Year 11	5/6	Required Practical 8 Making a Pure Dry Salt	<ul style="list-style-type: none"> Practical: React a carbonate with an acid to make a salt. Describe each step in the procedure. Determine the purity of the product
Year 11	5/6	Required Practical 8 Making a Pure Dry Salt	<ul style="list-style-type: none"> Exam Questions / Practical Write up
Year 11	5/6	6 Week Assessment	<ul style="list-style-type: none">
Year 11	5/6	6 Week Assessment Feedback	<ul style="list-style-type: none">
Year 11	7/8	Required Practical 10 Temperature Change	<ul style="list-style-type: none"> Theory 1 Reactions of Metals/ Reactivity Series Revise the reactions of metals to include displacement reactions
Year 11	7/8	Required Practical 10 Temperature Change	<ul style="list-style-type: none"> Theory 2 Endo and Exothermic Reactions Revise reaction profiles and bond energy calculations to calculate the overall energy change in a reaction Identify endo / exothermic reactions f

Year 11	7/8	Required Practical 10 Temperature Change	<ul style="list-style-type: none"> ● Practical
Year 11	7/8	Required Practical 10 Temperature Change	<ul style="list-style-type: none"> ● Exam Questions / Practical Write up
Year 11	9/10	Mocks	<ul style="list-style-type: none"> ●
Year 11	9/10	Mocks	<ul style="list-style-type: none"> ●
Year 11	9/10	Mock Feedback	<ul style="list-style-type: none"> ●
Year 11	9/10	Mock Feedback	<ul style="list-style-type: none"> ●
Year 11	11/12	Required Practical 9 Electrolysis	<p>Theory 1</p> <ul style="list-style-type: none"> ● Review the connection between the reactivity series and the ways metals are extracted ● 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.
Year 11	11/12	Required Practical 9 Electrolysis	<p>Theory 2</p> <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 11	11/12	Required Practical 9 Electrolysis	<ul style="list-style-type: none"> ● Practical
Year 11	11/12	Required Practical 9 Electrolysis	<ul style="list-style-type: none"> ● Exam Questions / Practical Write Up
Year 11	12/13	Required Practical 9 Electrolysis	<ul style="list-style-type: none"> ● Exam Questions / Practical Write Up
Year 11	12/13	Required Practical 12 Chromatography	<p>Theory</p> <ul style="list-style-type: none"> ● Explain how to set up chromatography paper. ● Distinguish pure from impure substances. ● Interpret chromatograms and calculate R_f values.
Year 11	12/13	Required Practical 12 Chromatography	<ul style="list-style-type: none"> ● Practical

Year 11	12/13	Required Practical 12 Chromatography	<ul style="list-style-type: none"> ● Exam Questions / Practical Write Up
Year 11	14/15	6 Week Assessment	<ul style="list-style-type: none"> ●
Year 11	14/15	6 Week Assessment Feedback	<ul style="list-style-type: none"> ●
Year 11	14/15	Required Practical 11 Part 1 Gas Collection	<ul style="list-style-type: none"> ● Revision of Collision Theory ● Identify the different factors that can increase the rate of reaction and relate to the frequency of successful collisions
Year 11	14/15	Required Practical 11 Part 1 Gas Collection	<ul style="list-style-type: none"> ● Measuring / Calculating Rates ● Identify and describe the different methods we can use to measure the rate of a reaction ● Calculate the rate of reaction (average rate and at specific times using tangents)
Year 11	16/17	Required Practical 11 Part 1 Gas Collection	<ul style="list-style-type: none"> ● Practical – investigate the effect of concentration on rate of reaction ● Gas collection over water
Year 11	16/17	Required Practical 11 Part 1 Gas Collection	<ul style="list-style-type: none"> ● Graphs ● Draw graphs of data collected and use in analysis of identified factor that was affecting rate ● Draw conclusions of what the data shows ● Identify improvements to methods
Year 11	16/17	3 Week Assessment	<ul style="list-style-type: none"> ●
Year 11	16/17	Required Practical 11 Part 1 Gas Collection	<ul style="list-style-type: none"> ● Exam Questions / Continued Practical Write Up
Year 11	18/19	Required Practical 11 Part 2 Disappearing Cross	<ul style="list-style-type: none"> ● Practical – investigate the effect of temperature / concentration on how long it takes to produce a precipitate
Year 11	18/19	Required Practical 11 Part 2 Disappearing Cross	<ul style="list-style-type: none"> ● Graphs ● Draw graphs of data collected and use in analysis of identified factor that was affecting rate ● Draw conclusions of what the data shows ● Identify improvements to methods
Year 11	18/19	Required Practical 11 Part 2 Disappearing Cross	<ul style="list-style-type: none"> ● Exam Questions / Continued Practical Write Up

Year 11	18/19	Pause lesson	<ul style="list-style-type: none"> ● Consolidation of previous practical sessions
Year 11	20/21	6 Week Assessment	<ul style="list-style-type: none"> ●
Year 11	20/21	6 Week Assessment Feedback	<ul style="list-style-type: none"> ●
Year 11	20/21	Reversible reactions and energy changes	<ul style="list-style-type: none"> ● Investigate reversible reactions. ● Explore the energy changes in a reversible reaction. ● Find out how reaction conditions affect reversible reactions
Year 11	20/21	Equilibrium	<ul style="list-style-type: none"> ● Recognise reactions that can reach equilibrium. ● Find out what happens to the reactants and products at equilibrium. ● Use Le Chatelier's principle to make predictions.
Year 11	22/23	Mocks	<ul style="list-style-type: none"> ●
Year 11	22/23	Mocks	<ul style="list-style-type: none"> ●
Year 11	22/23	Mock Feedback	<ul style="list-style-type: none"> ●
Year 11	22/23	Changing concentration and equilibrium	<ul style="list-style-type: none"> ● Distinguish between reactants and products. ● Explore how changing their concentrations affects reversible reactions. ● Use Le Chatelier's principle to make predictions about changing concentrations.
Year 11	24/25	Changing temperature and equilibrium	<ul style="list-style-type: none"> ● Distinguish between exothermic and endothermic forward reactions. ● Explore how changing the temperature affects reversible reactions. ● Use Le Chatelier's principle to make predictions about changing temperatures.
Year 11	24/25	Changing pressure and equilibrium	<ul style="list-style-type: none"> ● Recognise the number of product and reactant molecules in a reaction. ● Explore how changing the pressure affects reversible reactions. ● Use Le Chatelier's principle to make predictions about changing pressures.
Year 11	24/25	Calculations	<ul style="list-style-type: none"> ● Atomic Structure – Proton, Neutron and Electron Numbers ● Calculate Relative Atomic Mass (A_r) using isotopic abundances ●
Year 11	24/25	Calculations	<ul style="list-style-type: none"> ● Calculate Relative Formula Mass (M_r)

Year 11	26/27	Calculations	<ul style="list-style-type: none"> ● Law of Conservation of Mass ● Balancing Equations
Year 11	26/27	Calculations	<ul style="list-style-type: none"> ● Calculate the percentage mass of an element in a compound
Year 11	26/27	Calculations	<ul style="list-style-type: none"> ● Calculating concentration of Solutions – in g dm⁻³ (and mol dm⁻³) ● Converting between in g dm⁻³ and mol dm⁻³
Year 11	26/27	3 Week Assessment	<ul style="list-style-type: none"> ●
Year 11	28/29	Calculations	<ul style="list-style-type: none"> ● Calculating Moles using the equation Moles = Mass / Mr
Year 11	28/29	Calculations	<ul style="list-style-type: none"> ● Calculating Number of Particles using Avogadro's constant
Year 11	28/29	Calculations	<ul style="list-style-type: none"> ● Reacting Masses ● Using previous calculation theory – identify either the mass of reactant needed or the mass of product formed from a balanced equation
Year 11	28/29	Calculations	<ul style="list-style-type: none"> ● Limiting Reactants – Identify the limiting reactant using the balanced symbol equation and comparing the moles of each reactant ●