**How to use this Scheme of Work**

This Scheme of Work (SoW) is a suggested approach for a 120-hour course to enable the completion of the **International GCSE Chemistry (4CH1)** qualification content. It provides an approximate teaching time of 90 hours, with approximately 30 hours dedicated to consolidation, summative assessment, feedback, and exam preparation. International GCSEs have 120 - 140 guided learning hours. The assumption is made that each lesson is roughly one hour and that there are 2 hours of teaching time over 60 weeks and reflects how centres could use the time for practical activities.

This Scheme of Work is not intended to be prescriptive. This document is editable to allow for any adaptations you may wish to make to best suit your teaching style and learner needs.

The columns in this Scheme of Work indicate:

* An approximate number of lessons allocated to the course content.
* Which section of the specification this lesson relates to. Please note that **emboldened** content is not assessed in double award.
* Explicit reference is made to what course content needs covering in lessons.
* Suggested activities that provide teaching ideas and resources that could be used to support the teaching of lessons, including relevant textbook page numbers; lab book page numbers (if relevant); practical support and references to the teaching hub, where you will be able to find additional resources and information, such as worksheets, required prior knowledge and common misconceptions. All underlined content has an associated hyperlink.
* Skills assessed through the examination.
* Skills that could be acquired through teaching and delivery within lessons.

**Why transferable skills?**

In recent years, higher education institutions and global employers have consistently flagged the need for students to develop a range of transferable skills to enable them to respond with confidence to the demands of undergraduate study and the world of work. To support the design of our qualifications, we have mapped them to a transferable skills framework. The framework includes cognitive, intrapersonal, and interpersonal skills and each skill has been interpreted for each specification to ensure they are appropriate for the subject. Further information on transferable skills is available on the website. Pearson materials, including this Scheme of Work, will support you in identifying and developing these skills in students.

In the final two columns of this Scheme of Work, we have indicated which transferable skills are explicitly assessed, and where there are opportunities for them to be developed through teaching. Our intention is that teachers can use these columns to increase the opportunities for transferable skills development in students.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Lesson | TopicSub topic | Specification reference | Suggested activities | Suggested resources | Which skills acquired in this lesson are explicitly assessed through examination? | Which skills could be acquired through teaching and delivery in this lesson? |
| 1 | **Section 1: Principles of chemistry**(a) States of matter | **Students will be able to:** 1.1 understand the three states of matter in terms of the arrangement, movement and energy of the particles1.2 understand the interconversions between the three states of matter in terms of:* the names of the interconversions
* how they are achieved
* the changes in arrangement, movement and energy of the particles
 | Activities:* Model particle behaviour in the three states using trays of marbles; draw diagrams of the results.

Demonstrations:* Phet Simulation – States of matter
* Bromine diffusing into a gas jar of air.

Class practicals:* Melting and freezing stearic acid
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp.3–6[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 1: States of matter](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/d8b80cacbe324de19e260b6b6888ed69) [Phet Simulation – States of matter](https://phet.colorado.edu/sims/html/states-of-matter-basics/latest/states-of-matter-basics_all.html)[Melting and freezing stearic acid teacher sheet](https://edu.rsc.org/experiments/melting-and-freezing-stearic-acid/1747.article) | Analysis | AnalysisProblem solving |
| 2  | **Section 1: Principles of chemistry**(a) States of matter | **Students will be able to:** 1.3 understand how the results of experiments involving the dilution of coloured solutions and diffusion of gases can be explained.1.4 know what is meant by the terms:* solvent
* solute
* solution
* saturated solution
 | Activities:* Match key terms to definitions.
* Discussion about solutions holding different amounts of solute: tears, sea water and brine as three examples.

Demonstrations:* Simple test tube comparison of solubility of three substances, e.g. potassium nitrate, sodium chloride and calcium hydroxide.
* How does temperature affect solubility – what happens when you try to brew tea in cold vs hot water?

Class practicals:* The effect of temperature on solubility
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 6–9[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 2: Diffusion and solutions](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/2b39565dc74c47759b07cf64d3faa395) [The effect of temperature on solubility teacher sheet](https://edu.rsc.org/experiments/the-effect-of-temperature-on-solubility/482.article) | ReasoningAnalysisProblem solving | ReasoningAdaptive learningProductivityAnalysisProblem solving |
| 3 | **Section 1: Principles of chemistry**(a) States of matter | **Students will be able to:** **1.5C know what is meant by the term solubility in the units g per 100 g of solvent****1.6C understand how to plot and interpret solubility curves*****1.7C practical: investigate the solubility of a solid in water at a specific temperature.*** | Activities: * Students plot graph using data provided.

Class practicals:* Investigate the solubility of a solid in water at a specific temperature
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 8–12**Pearson Edexcel International GCSE (9–1) Chemistry Lab Book:**pp. 2–4[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 3: Solubility curves](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/6d02486a21aa4d42b2f99eaf088b0c97) | ReasoningAnalysisProblem solving | ReasoningAdaptive learningProductivityAnalysisProblem solving |
| 4 | **Section 1: Principles of chemistry**(b) Elements, compounds and mixtures | **Students will be able to:** 1.8 understand how to classify a substance as an element, a compound or a mixture1.9 understand that a pure substance has a fixed melting and boiling point, but that a mixture may melt or boil over a range of temperatures | Activities:* Classify a range of diagrams as either element, compound, or mixture.
* Label diagrams of equipment used in each method.

Class practicals:* Purification of an impure solid
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 14–17[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 4: Elements, compounds, and mixtures](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/db86d67a56bb406cbcbb37baf9334617)[Purification of an impure solid teacher sheet](https://edu.rsc.org/experiments/purifying-an-impure-solid/483.article#:~:text=Procedure,frequently%20with%20a%20glass%20rod.) | Critical thinkingInterpretationExecutive function | Critical thinkingInterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 5 | **Section 1: Principles of chemistry**(b) Elements, compounds and mixtures | **Students will be able to:** 1.10 describe these experimental techniques for the separation of mixtures:* Filtration
* crystallisation
 | Activities:* For a range of scenarios, use information to decide if they use filtration or crystallisation to separate them and justify.
* Label diagrams of equipment used in each method.

Class practicals:* Separating sand and salt using filtration and evaporation.
* The art of crystallisation.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 14–17[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 5: Separating mixtures](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/8ae652edfdca4bf2ae424320bfe4425f) [Separating sand and salt using filtration and evaporation teacher sheet.](https://edu.rsc.org/experiments/separating-sand-and-salt-by-filtering-and-evaporation/386.article)[The art of crystallisation teacher sheet.](https://edu.rsc.org/download?ac=14101)[The art of crystallisation extra resources.](https://edu.rsc.org/resources/the-art-of-crystallisation/1379.article) | Critical thinkingInterpretationExecutive function | Critical thinkingInterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 6 | **Section 1: Principles of chemistry**(b) Elements, compounds and mixtures | **Students will be able to:** 1.10 describe these experimental techniques for the separation of mixtures:* simple distillation
* fractional distillation
 | Activities:* For a range of scenarios, use information to decide if they use simple or fractional distillation to separate them and justify.
* Label diagrams of equipment used in each method.

Demonstrations:* The fractional distillation of crude oil

Class practicals:* Recovering water from copper (II) sulfate solution using simple distillation.
* Investigating composition of ink (distillation)
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 18–19[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 6: Separating techniques: Distillation](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/040487c95fa141258ae9e6801ddde0a9)[The fractional distillation of crude oil teacher sheet.](https://edu.rsc.org/experiments/the-fractional-distillation-of-crude-oil/754.article)[Recovering water from copper (II) sulfate solution using simple distillation teacher sheet](https://edu.rsc.org/experiments/recovering-water-from-copperii-sulfate-solution/1768.article)[Investigating composition of ink (distillation) teacher sheet](https://www.pearson.com/content/dam/one-dot-com/one-dot-com/uk/documents/subjects/science/GCSE-core-practical-sheets/Chemistry/cp1b-investigating-composition-of-ink-distillation-ts.pdf)[Investigating composition of ink (distillation) student sheet](https://www.pearson.com/content/dam/one-dot-com/one-dot-com/uk/documents/subjects/science/GCSE-core-practical-sheets/Chemistry/cp1b-investigating-composition-of-ink-distillation.pdf) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 7 | **Section 1: Principles of chemistry**(b) Elements, compounds and mixtures | **Students will be able to:** 1.10 describe these experimental techniques for the separation of mixtures:* Paper chromatography

1.11 understand how a chromatogram provides information about the composition of a mixture.1.12 understand how to use the calculation of Rf values to identify the components of a mixture. | Activities:* Label diagram of a chromatogram.
* Calculate Rf values.
* Identify unknown substances from chromatograms.
* Describe how to carry out paper chromatography.
* Compare different types of chromatography.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 19–21[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 7: Chromatography](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/9a44377b22bf4f7fba11d833e0a954a9) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 8 | **Section 1: Principles of chemistry**(b) Elements, compounds and mixtures | **Students will be able to:** 1.13 *practical: investigate paper chromatography using inks/food colourings.* | Class practicals: * Investigate paper chromatography using inks/food colourings.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 19–21**Pearson Edexcel International GCSE (9–1) Chemistry Lab Book:** pp. 5–7[Practical video](https://www.youtube.com/watch?v=cug9UCq7TZA)[Practical teacher sheet](https://www.pearson.com/content/dam/one-dot-com/one-dot-com/uk/documents/subjects/science/GCSE-core-practical-sheets/Chemistry/cp1a-investigating-composition-ink-chromatography-ts.pdf)[Practical student sheet](https://www.pearson.com/content/dam/one-dot-com/one-dot-com/uk/documents/subjects/science/GCSE-core-practical-sheets/Chemistry/cp1a-investigating-composition-Ink-chromatography.pdf) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 9 | **Section 1: Principles of chemistry**(c) Atomic structure | **Students will be able to:** 1.14 know what is meant by the terms atom and molecule.1.15 know the structure of an atom in terms of the positions, relative masses and relative charges of subatomic particles. 1.16 know what is meant by the terms atomic number, mass number, isotopes, and relative atomic mass (Ar) | Activities:* Complete a table of properties of subatomic particles.
* Identify the atomic number and mass number of a range of elements.
* Given atomic number and mass number, make a model of a nucleus of an atom using polystyrene balls.
* Given atomic numbers and mass numbers, find atomic structure of different isotopes.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 24–28[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 8: Atomic Structure](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/ca292592f962451fb03b3b653b05351e) | Reasoning | ReasoningInitiative |
| 10 | **Section 1: Principles of chemistry**(c) Atomic structure | **Students will be able to:** 1.16 know what is meant by the terms atomic number, mass number, isotopes, and relative atomic mass (Ar)1.17 be able to calculate the relative atomic mass of an element (Ar) from isotopic abundances. | Activities:* Describe how an isotope differs from elements on the periodic table
* Identify which atoms are isotopes, given data on their atomic structure.
* Calculate the Ar of a number of different elements given their percentage isotopic compositions.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 24–28[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 1: Isotopes and Relative Atomic mass](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/278be187a30548b39615e52e5c6525d0) | Reasoning | ReasoningInitiative |
| 11 | **Section 1: Principles of chemistry**(a) States of matter(b) Elements, compounds and mixtures(c) Atomic structure | Consolidation | Activities: * Review keywords relating to the previous topics.
* Multiple-choice questions to review prior knowledge.
* Re-teach previously identified challenging topics, anticipating where errors/misconceptions arise.
* Modelling how to answer questions.
* Students mark exemplar work using mark schemes.
 | Relevant textbook pages from topics assessed. | Critical thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Executive function Innovation  | Critical thinking Problem solving Analysis Reasoning Interpretation Continuous learning Initiative Self-direction Responsibility Perseverance Productivity Self regulation (metacognition, forethought, reflection) Integrity Self- monitoring/self- evaluation/self- reinforcement  |
| 12 | Assessment | Activities:* Students complete assessment using exam questions related to topics.
 | [Examwizard](https://www.examwizard.co.uk/) for access to exam questions. |
| 13 | Feedback | Activities:* Identify misconceptions through marking and re-teach.
* Use new models/examples in re-teach.
* What went well/even better if examples of student work and improve.
* Multiple choice questions based on re-teach.
* Students re-attempt same/similar questions to check for progress and asses using mark schemes.
 | Relevant textbook pages from topics assessed. |
| 14 | **Section 1: Principles of chemistry**(d) The Periodic Table | **Students will be able to:** 1.18 understand how elements are arranged in the Periodic Table:* in order of atomic number
* in groups and periods

1.19 understand how to deduce the electronic configurations of the first 20 elements from their positions in the Periodic Table 1.20 understand how to use electrical conductivity and the acid-base character of oxides to classify elements as metals or non-metals1.21 identify an element as a metal or a non-metal according to its position in the Periodic Table | Activities:* Make a model of an atom using paper and card, to show electrons, shells, and the nucleus.
* Draw electronic configurations of the first 20 elements.
* Cut out diagrams and arrange on a blank Periodic Table.
* Identify a range of elements as metals or non-metals.
* Compare the properties of metals and non-metals.

Demonstrations:* Properties of transition metals and their compounds
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 30–36[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 1: The Periodic table](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/5303420f61754db88e89bed47ea26a19)[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 12: Metals and non-metals](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/6d03aba2df0c41b6b47b52102bb5e906)[Properties of transition metals and their compounds teacher sheet](https://edu.rsc.org/experiments/properties-of-the-transition-metals-and-their-compounds/472.article) | AnalysisInterpretation | AnalysisProblem solvingInterpretation |
| 15 | **Section 1: Principles of chemistry**(d) The Periodic Table | **Students will be able to:** 1.22 understand how the electronic configuration of a main group element is related to its position in the Periodic Table1.23 understand why elements in the same group of the Periodic Table have similar chemical properties1.24 understand why the noble gases (Group 0) do not readily react. | Activities:* Draw electronic configurations for group 0 elements.
* Research uses of group 0 elements and explain why they are good for this use.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 33–35[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 11: Using electronic configurations](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/c07d38f9ac5c4f0f8206be29d4468fa5) | AnalysisInterpretation | AnalysisProblem solvingInterpretation |
| 16 | **Section 1: Principles of chemistry**(f) Ionic bonding | **Students will be able to:** 1.37 understand how ions are formed by electron loss or gain1.38 know the charges of these ions:* metals in Groups 1, 2 and 3
* non-metals in Groups 5, 6 and 7
* Ag+, Cu2+, Fe2+, Fe3+, Pb2+, Zn2+
* hydrogen (H+), hydroxide (OH–), ammonium (NH4+), carbonate (CO32–), nitrate (NO3-), sulfate (SO42–)
 | Activities:* Table to identify the number of protons, neutrons and electrons in atoms and their ions.
* Students practice drawing ions from atoms.
* Predict the charge of an ion based on the group that it is in.
* Predict the formulae of named compounds using a table of common ions.

Demonstrations:* Build an atom simulation to show how atomic structure links to ion formation.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 75–78.[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 15: Ions](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/ba6824718483486baf14384c730418fc)[Build an atom simulation](https://phet.colorado.edu/en/simulations/build-an-atom) | AnalysisProblem solving | AnalysisProblem solvingInterpretation |
| 17 | **Section 1: Principles of chemistry**(f) Ionic bonding | **Students will be able to:** 1.39 write formulae for compounds formed between the ions listed above1.40 draw dot-and-cross diagrams to show the formation of ionic compounds by electron transfer, limited to combinations of elements from Groups 1, 2, 3 and 5, 6, 7*only outer electrons need be shown.* | Activities: * Draw dot and cross diagrams of electron transfer and ion formation for combinations of elements listed.
* Work out the formulae and name of the compounds formed.

Demonstrations: The migration of ions during electrolysis of potassium manganate (VII) | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 75–78[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 16: Ionic bonds](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/54d3f9e772724bd8954c6c3f737b1473) [The migration of ions during electrolysis of potassium manganate (VII) teacher sheet](https://edu.rsc.org/experiments/the-migration-of-ions-during-electrolysis-of-potassium-manganatevii/418.article) | Analysis | AnalysisProblem solving |
| 18 | **Section 1: Principles of chemistry**(f) Ionic bonding  | **Students will be able to:** 1.41 understand ionic bonding in terms of electrostatic attractions1.42 understand why compounds with giant ionic lattices have high melting and boiling points1.43 know that ionic compounds do not conduct electricity when solid but do conduct electricity when molten and in aqueous solution. | Activities:* Compare the properties of ionic compounds as solids, molten and when in aqueous solutions.
* Explain differences in properties.

Demonstrations:* Electrolysis of molten zinc chloride.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 81–83[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 17: Properties of ionic lattices](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/2a5f0fdc745647e89ec70eb66397ca84)[Electrolysis of molten zinc chloride teacher sheet](https://edu.rsc.org/experiments/electrolysis-of-molten-zinc-chloride/826.article) | Analysis | AnalysisProblem solving |
| 19 | **Section 1: Principles of chemistry**(g) Covalent bonding  | **Students will be able to:** 1.44 know that a covalent bond is formed between atoms by the sharing of a pair of electrons1.45 understand covalent bonds in terms of electrostatic attractions1.46 understand how to use dot-and-cross diagrams to represent covalent bonds in:* diatomic molecules, including hydrogen, oxygen, nitrogen, halogens and hydrogen halides
* inorganic molecules including water, ammonia and carbon dioxide
* organic molecules containing up to two carbon atoms, including methane, ethane, ethene and those containing halogen atoms.
 | Activities: * Identifying different particles from diagrams of them.
* Drawing dot and cross diagrams of molecules.
* Drawing displayed formulae of the molecules.
* Making models from displayed formulae.

Demonstrations:* Covalent bonding simulation

Class practicals:* Which substances conduct electricity?
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 85–91[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 22: Covalent bonding](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/55f2a0ca1105424193f927c104101c3e)[Covalent bonding simulation](https://javalab.org/en/covalent_bond_en/)[Which substances conduct electricity? Teacher sheet](https://edu.rsc.org/experiments/which-substances-conduct-electricity/1789.article) | Analysis | AnalysisProblem solving |
| 20 | **Section 1: Principles of chemistry**(g) Covalent bonding  | **Students will be able to:** 1.47 explain why substances with a simple molecular structures are gases or liquids, or solids with low melting and boiling points*the term intermolecular forces of attraction can be used to represent all forces between molecules*1.48 explain why the melting and boiling points of substances with simple molecular structures increase, in general, with increasing relative molecular mass | Activities: * Arrange different sized molecules in order of boiling/melting point.
* Explain why in fractional distillation the different covalently bonded hydrocarbons will reach different fractions.

Demonstrations: * Use of moly mods to create different sized structures to model increase in size increasing intermolecular forces of attraction.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 92–93[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 23: Simple covalent molecules](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/05df250ca47f4664899be4b62be1268d) | Problem solving | Problem solvingReasoning |
| 21 | **Section 1: Principles of chemistry**(g) Covalent bonding  | **Students will be able to:** 1.49 explain why substances with giant covalent structures are solids with high melting and boiling points1.50 explain how the structures of diamond, graphite and C60 fullerene influence their physical properties, including electrical conductivity and hardness.1.51 know that covalent compounds do not usually conduct electricity. | Activities:* Label structures of allotropes of carbon.
* Compare properties of different allotropes of carbon.
* Create models of different allotropes of carbon e.g. using plasticine as atoms and toothpicks as bonds.

Demonstrations: Allotropes of sulfur  | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 93–97[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 24: Allotropes of carbon](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/38213e0281504eab9586a6f9153632a2)[Allotropes of sulfur teacher sheet](https://edu.rsc.org/experiments/allotropes-of-sulfur/686.article) | Problem solvingInterpretation | Problem solvingReasoningInterpretation |
| 22 | **Section 1: Principles of chemistry**e) Chemical formulae, equations and calculations | **Students will be able to:** 1.25 write word equations and balanced chemical equations (including state symbols): * for reactions studied in this specification
* for unfamiliar reactions where suitable information is provided

1.26 calculate relative formula masses (including relative molecular masses) (Mr) from relative atomic masses (Ar) | Activities:* Drawing displayed formulae of molecules and calculating the Mr.
* Balance a number of equations,

Demonstrations:* Balancing chemical equations simulation.
* Weighing out one mole of different substances: reinforcing that all these masses contain the same number of particles.

Determine relative molecular mass by weighing gases. | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 38–44[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 41: Writing equations and relative formula mass](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/5ce5f8c222a04cd6a2e971fe4e05edab)[Balancing chemical equations simulation](https://phet.colorado.edu/sims/html/balancing-chemical-equations/latest/balancing-chemical-equations_all.html)[Determine relative molecular mass by weighing gases teacher sheet](https://edu.rsc.org/experiments/determining-relative-molecular-mass-by-weighing-gases/832.article) | Problem solvingInterpretation | Problem solvingInterpretationAdaptive learning |
| 23 | **Section 1: Principles of chemistry**(d) The Periodic Tablee) Chemical formulae, equations and calculations(f) Ionic bonding(g) Covalent bonding  | Consolidation | Activities: * Review keywords relating to the previous topics.
* Multiple-choice questions to review prior knowledge.
* Re-teach previously identified challenging topics, anticipating where errors/misconceptions arise.
* Modelling how to answer questions.
* Students mark exemplar work using mark schemes.
 | Relevant textbook pages from topics assessed. | Critical thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Executive function Innovation  | Critical thinking Problem solving Analysis Reasoning Interpretation Continuous learning Initiative Self-direction Responsibility Perseverance Productivity Self regulation (metacognition, forethought, reflection) Integrity Self- monitoring/self- evaluation/self- reinforcement  |
| 24 | Assessment | Activities:* Students complete assessment using exam questions related to topics.
 | [Examwizard](https://www.examwizard.co.uk/) for access to exam questions. |
| 25 | Feedback | Activities:* Identify misconceptions through marking and re-teach.
* Use new models/examples in re-teach.
* What went well/even better if examples of student work and improve.
* Multiple choice questions based on re-teach.
* Students re-attempt same/similar questions to check for progress and asses using mark schemes.
 | Relevant textbook pages from topics assessed. |
| 26 | **Section 2: Inorganic chemistry**(a) Group 1 (alkali metals) | **Students will be able to:** 2.1 understand how the similarities in the reactions of these elements with water provide evidence for their recognition as a family of elements2.2 understand how the differences between the reactions of these elements with air and water provide evidence for the trend in reactivity in Group 1 | Activities:* Draw conclusions about patterns and trends in Group 1 from the results of the demonstration.
* Determine order of reactivity of unknown metals from data and then deduce the unknown metals.

Demonstrations: * Heating group 1 metals in air and in chlorine
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 122–126 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 18: Reactions of group 1 metals](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/369ea98ea7f1433e92de823cba452ac8)[Heating group 1 metals in air and in chlorine teacher sheet](https://edu.rsc.org/experiments/heating-group-1-metals-in-air-and-in-chlorine/732.article) | Problem solvingInterpretation | Problem solvingInterpretationAdaptive learning |
| 27 | **Section 2: Inorganic chemistry**(a) Group 1 (alkali metals) | **Students will be able to:** 2.3 use knowledge of trends in Group 1 to predict the properties of other alkali metals**2.4C explain the trend in reactivity in Group 1 in terms of electronic configurations.** | Activities:* Arrange the electron configurations of group 1 elements in order of radius size/distance of outer electrons from nucleus to explain the trend in reactivity in Group 1.

Demonstrations: * Reactions of the alkali metals
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 122–129[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 19: Reactivity trend of the Group 1 Metals](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/3bafe2f3f0bc459ca8d7e808b5c81813)[Reactions of the alkali metals teacher sheet](https://edu.rsc.org/experiments/reactivity-trends-of-the-alkali-metals/731.article) | Problem solvingInterpretation | Problem solvingInterpretationAdaptive learning |
| 28 | **Section 2: Inorganic chemistry**(b) Group 7 (halogens) | **Students will be able to:** 2.5 know the colours, physical states (at room temperature) and trends in physical properties of these elements2.6 use knowledge of trends in Group 7 to predict the properties of other halogens | Activities:* Watch a video or demonstration and note the trends in colour and room temperature state of halogens.
* Deduce the reactivity series of the halogens from displacement experiments.
* Deduce the likely properties of fluorine and astatine.

Demonstrations:* Halogen reactions with iron wool.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 130–131 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 20: Properties of the Halogens](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/7634b2d1f60d4ccd85bd15e54ccd4f8a)[Halogen reactions with iron wool teacher sheet.](https://edu.rsc.org/experiments/halogen-reactions-with-iron-wool/804.article) | Problem solvingInterpretation | Problem solvingInterpretationAdaptive learning |
| 29 | **Section 2: Inorganic chemistry**(b) Group 7 (halogens) | **Students will be able to:** 2.7 understand how displacement reactions involving halogens and halides provide evidence for the trend in reactivity in Group 7**2.8C explain the trend in reactivity in Group 7 in terms of electronic configurations.** | Activities:* Arrange the electron configurations of group 7 elements in order of radius size/distance of outer electrons from nucleus to explain the trend in reactivity in Group 7.
* Deduce chemical, ionic and half equations from experimental results to identify redox behaviour in displacement reactions.

Class practicals:Halogens in aqueous solution and their displacement reactions.  | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 132–135[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 1 / Lesson 21: Reactivity of the Halogens](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/f05c69fdf3a847d49eb9f9cdf23f7800)[Halogens in aqueous solution and their displacement reactions teacher sheet.](https://edu.rsc.org/experiments/halogens-in-aqueous-solution-and-their-displacement-reactions/733.article) | Problem solvingInterpretation | Problem solvingInterpretationAdaptive learning |
| 30 | **Section 2: Inorganic chemistry**(c) Gases in the atmosphere | **Students will be able to:** 2.9 know the approximate percentages by volume of the four most abundant gases in dry air2.10 understand how to determine the percentage by volume of oxygen in air using experiments involving the reactions of metals (e.g. iron) and non-metals (e.g. phosphorus) with air | Activities:* Draw a pie chart showing the composition of dry unpolluted air.
* Calculate the percentage volume of oxygen in air using given experimental data from different samples of air.

Demonstration:* How much oxygen is used when iron wool rusts?
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 137–141[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 3 / Lesson 61: Core practical – the atmosphere](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/88b8f7406dc247c2b31905da117c5544) [How much oxygen is used when iron wool rusts? Teacher sheet](https://edu.rsc.org/experiments/how-much-oxygen-is-used-when-iron-wool-rusts/453.article) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 31 | **Section 2: Inorganic chemistry**(c) Gases in the atmosphere | **Students will be able to:**2.14 *practical: determine the approximate percentage by volume of oxygen in air using a metal or a non-metal.* | Activities: * Put the steps into the correct order for how to carry out the practical.
* Make suggests about how the precision and validity could be improved.

Class practicals: * Determine the approximate percentage by volume of oxygen in air using a metal or a non-metal.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 137–141**Pearson Edexcel International GCSE (9–1) Chemistry Lab Book**: pp. 16–17[Determine the approximate percentage by volume of oxygen in air using a metal or a non-metal teacher support](https://pmt.physicsandmathstutor.com/download/Chemistry/GCSE/Notes/Edexcel-IGCSE/Practical-Skills/05.%20Investigating%20Oxygen%20in%20the%20Air.pdf) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 32 | **Section 2: Inorganic chemistry**(c) Gases in the atmosphere | **Students will be able to:** 2.13 know that carbon dioxide is a greenhouse gas and that increasing amounts in the atmosphere may contribute to climate change. | Activities:* Label a diagram showing the greenhouse effect.
* Create a storyboard to explain what happens in the greenhouse effect and how this can lead to climate change.
* Analyse global temperature and carbon dioxide concentration changes to draw conclusions.

Demonstrations:* Modelling the greenhouse effect
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 142–143[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 3 / Lesson 62: The greenhouse effect](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/d9c5843a227d4989b3d0c06f05af0f50)[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 3 / Lesson 63: Climate change](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/5a810c9af5fb4a218f2cebd2f585da11)[Modelling the greenhouse effect teacher sheet](https://edu.rsc.org/experiments/modelling-the-greenhouse-effect/1543.article) | Analysis | AnalysisPersonal and social responsibility |
| 33 | **Section 2: Inorganic chemistry**(c) Gases in the atmosphere | **Students will be able to:** 2.11 describe the combustion of elements in oxygen, including magnesium, hydrogen and sulphur2.12 describe the formation of carbon dioxide from the thermal decomposition of metal carbonates, including copper(II) carbonate | Activities:* Evaluate methods of producing carbon dioxide.
* Research the large-scale production of carbon dioxide, explaining the demand for this gas.

Demonstrations: * The density of carbon dioxide

Class practicals: * Thermal decomposition of metal carbonates
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 104, 142 and 147[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 3 / Lesson 64: Oxidation reactions](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/fb9ea4ebb6b5441ebc37e04a5d0ff549) [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 3 / Lesson 65: Decomposition of carbonates](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/c40f60bd23634f88a81d974386d4f9d5)[The density of carbon dioxide teacher sheet](https://edu.rsc.org/experiments/the-density-of-carbon-dioxide/1775.article)[Thermal decomposition of metal carbonates teacher sheet](https://edu.rsc.org/experiments/thermal-decomposition-of-metal-carbonates/450.article) | Analysis | AnalysisReasoning |
| 34 | **Section 2: Inorganic chemistry**(a) Group 1 (alkali metals)(b) Group 7 (halogens)(c) Gases in the atmosphere | Consolidation | Activities: * Review keywords relating to the previous topics.
* Multiple-choice questions to review prior knowledge.
* Re-teach previously identified challenging topics, anticipating where errors/misconceptions arise.
* Modelling how to answer questions.
* Students mark exemplar work using mark schemes.
 | Relevant textbook pages from topics assessed. | Critical thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Executive function Innovation  | Critical thinking Problem solving Analysis Reasoning Interpretation Continuous learning Initiative Self-direction Responsibility Perseverance Productivity Self regulation (metacognition, forethought, reflection) Integrity Self- monitoring/self- evaluation/self- reinforcement  |
| 35 | Assessment  | Activities:* Students complete assessment using exam questions related to topics.
 | [Examwizard](https://www.examwizard.co.uk/) for access to exam questions.  |
| 36 | Feedback | Activities:* Identify misconceptions through marking and re-teach.
* Use new models/examples in re-teach.
* What went well/even better if examples of student work and improve.
* Multiple choice questions based on re-teach.
* Students re-attempt same/similar questions to check for progress and asses using mark schemes.
 | Relevant textbook pages from topics assessed. |
| 37 | **Section 2: Inorganic chemistry**(d) Reactivity series | **Students will be able to:** 2.15 understand how metals can be arranged in a reactivity series based on their reactions with:* water
* dilute hydrochloric or sulfuric acid

2.17 know the order of reactivity of these metals: potassium, sodium, lithium, calcium, magnesium, aluminium, zinc, iron, copper, silver, gold | Activities:* Place metals in a reactivity series based on their reactions.
* Make predictions about the reactivity of a metal given its place in the reactivity series.
* Make a poster showing what happens in a displacement reaction.
* Write word equations and balanced symbol equations (with state symbols) for a range of reactions.

Class practicals: Reactivity of metals | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 145–146 and pp. 150–156[Reactivity of metals](https://edu.rsc.org/resources/reactivity-and-displacement-reactions/4011107.article) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 38 | **Section 2: Inorganic chemistry**(d) Reactivity series | **Students will be able to:** 2.21 *practical: investigate reactions between dilute hydrochloric and sulfuric acids and metals (e.g. magnesium, zinc and iron).* | Activities:* Write word equations and balanced symbol equations (with state symbols) for a reactions carried out in the practical.

Class practicals: Investigate reactions between dilute hydrochloric and sulfuric acids and metals (e.g. magnesium, zinc and iron). | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 145–146 and pp. 150–156**Pearson Edexcel International GCSE (9–1) Chemistry Lab Book:**pp. 18–19[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 28: Core practical – Reactivity series](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/00567cc86ce6421082f9db010a28d12a) [Investigate reactions between dilute hydrochloric and sulfuric acids and metals teacher support](https://pmt.physicsandmathstutor.com/download/Chemistry/GCSE/Notes/Edexcel-IGCSE/Practical-Skills/06.%20Acid%20and%20Metal%20Reactions.pdf) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 39 | **Section 2: Inorganic chemistry**(d) Reactivity series | **Students will be able to:** 2.16 understand how metals can be arranged in a reactivity series based on their displacement reactions between:* metals and metal oxides
* metals and aqueous solutions of metal salts

2.20 in terms of gain or loss of oxygen and loss or gain of electrons, understand the terms:* oxidation
* reduction
* redox
* oxidising agent

reducing agent, in terms of gain or loss of oxygen and loss or gain of electrons. | Activities:* Use practical results to write chemical equations for displacement reactions.
* Deduce ionic equations from given chemical equations for displacement reactions.
* Match key terms to their definitions and identify them in equation examples.

Demonstrations: * Thermit reaction
* The reaction between zinc and copper oxide

Class practicals: * Competition for oxygen
* Displacement reactions between metals and their salts
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 146–150[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 29: Displacement reactions involving metals oxides](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/c41ce1cdab2542a4977e7661dba9abbc)[Thermit reaction teacher sheet](https://edu.rsc.org/experiments/the-thermite-reaction-between-aluminium-and-ironiii-oxide/724.article)[The reaction between zinc and copper oxide teacher sheet](https://edu.rsc.org/experiments/reacting-zinc-and-copperii-oxide/723.article#:~:text=Copper(II)%20oxide%20and%20zinc%20metal%20react%20together%20in%20an,the%20idea%20of%20competition%20reactions.)[Competition for oxygen teacher sheet](https://edu.rsc.org/resources/competition-for-oxygen-reacting-metals-with-oxides/415.article)[Displacement reactions between metals and their salts teacher sheet](https://edu.rsc.org/experiments/displacement-reactions-between-metals-and-their-salts/720.article#:~:text=In%20this%20experiment%2C%20a%20strip,out%20this%20series%20of%20reactions.) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 40 | **Section 2: Inorganic chemistry**(d) Reactivity series | **Students will be able to:** 2.18 know the conditions under which iron rusts2.19 understand how the rusting of iron may be prevented by:* barrier methods
* galvanising
* sacrificial protection
 | Activities:* Draw conclusions from rusting experiments to compare effectiveness of different corrosion prevention methods.
* Learn OILRIG (Oxidation Is Loss, Reduction Is Gain) or LEO says GER (Loss of Electrons is Oxidation, Gain of Electrons is Reduction) or make up a mnemonic to remember redox behaviour in terms of electron transfer.

Class practical: * The causes of rusting

Preventing rust  | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 139, 156–157 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 31: Rusting](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/5f8bedd7d5ab4e0ab4dcfd13a7bac736) [The causes of rusting teacher sheet](https://edu.rsc.org/experiments/what-causes-iron-to-rust/434.article#:~:text=Very%20simply%2C%20rusting%20is%20the,part%20of%20the%20process%20too.)[Preventing rust teacher sheet](https://edu.rsc.org/experiments/preventing-rust/1763.article) | Problem solvingInterpretation | Problem solvingInterpretationAdaptive learning |
| 41 | **Section 2: Inorganic chemistry**(e) Extraction and uses of metals | **Students will be able to:** **2.22C know that most metals are extracted from ores found in the Earth’s crust and that unreactive metals are often found as the uncombined element****2.23C explain how the method of extraction of a metal is related to its position in the reactivity series, illustrated by carbon extraction for iron and electrolysis for aluminium****2.24C be able to comment on a metal extraction process, given appropriate information*****detailed knowledge of the processes used in the extraction of a specific metal is not required.*** | Activities:* Make a poster about the chemical reactions in a blast furnace.
* Draw and label a diagram of aluminium electrolysis.
* Research the uses of aluminium and iron. Relate the uses to the properties of the metals.
* Evaluate the advantages of recycling aluminium over extracting it from ore, given key facts about both processes.

Demonstration: * The real reactivity of aluminium
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 160–162 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 32: Extracting metals](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/c662fd1f143b46cf8ae94707b57c43b4)[The real reactivity of aluminium teacher sheet](https://edu.rsc.org/exhibition-chemistry/the-real-reactivity-of-aluminium/2020076.article#:~:text=Aluminium%20exposed&text=It%20is%20highly%20reactive%2C%20though,air%2C%20providing%20excellent%20corrosion%20resistance.) | Critical thinkingReasoning | Critical thinkingReasoningAdaptive learning |
| 42 | **Section 1: Principles of chemistry**(h) Metallic bonding | **Students will be able to:** **1.52C know how to represent a metallic lattice by a 2-D diagram****1.53C understand metallic bonding in terms of electrostatic attractions****1.54C explain typical physical properties of metals, including electrical conductivity and malleability** | Activities:* Draw diagrams to explain malleability and conductivity in metals.

Class practical:* The reactivity of the group 2 metals
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 98–100[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 27: Metallic bonding](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/8309ce6460aa4db994b8a8aaf20529ea)[The reactivity of the group 2 metals teacher sheet](https://edu.rsc.org/experiments/the-reactivity-of-the-group-2-metals/409.article) | Critical thinkingReasoning | Critical thinkingReasoningAdaptive learning |
| 43 | **Section 2: Inorganic chemistry**(e) Extraction and uses of metals | **Students will be able to:** **2.25C explain the uses of aluminium, copper, iron and steel in terms of their properties*the types of steel will be limited to low-carbon (mild), high-carbon and stainless*****2.26C know that an alloy is a mixture of a metal and one or more elements, usually other metals or carbon****2.27C explain why alloys are harder than pure metals.** | Activities:* Draw diagrams to explain malleability and conductivity in metals.
* Research the different uses of alloys and why they are used instead of pure metals.

Class practicals:* Modelling alloys with plasticine.
* Comparing the melting points of solder, tin and lead

Making solder as an alloy of tin and lead | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 163–165 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 3 / Lesson 33: Uses of metals and alloys](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/8621168d7da24189a0fc85197f67a43a)[Modelling alloys with plasticine teacher sheet](https://edu.rsc.org/experiments/modelling-alloys-with-plasticine/1755.article)[Comparing the melting points of solder, tin and lead teacher sheet](https://edu.rsc.org/experiments/comparing-the-melting-points-of-solder-tin-and-lead/447.article)[Making solder as an alloy of tin and lead teacher sheet](https://edu.rsc.org/experiments/making-solder-as-an-alloy-of-tin-and-lead/1742.article) | Critical thinkingReasoning | Critical thinkingReasoningAdaptive learning |
| 44 | **Section 2: Inorganic chemistry**(f) Acids, alkalis and titrations | **Students will be able to:** 2.28 describe the use of litmus, phenolphthalein and methyl orange to distinguish between acidic and alkaline solutions2.29 understand how to use the pH scale, from 0–14, can be used to classify solutions as strongly acidic (0–3), weakly acidic (4–6), neutral (7), weakly alkaline (8–10) and strongly alkaline (11–14)2.30 describe the use of universal indicator to measure the approximate pH value of an aqueous solution2.31 know that acids in aqueous solution are a source of hydrogen ions and alkalis in aqueous solution are a source of hydroxide ions. | Activities:* Complete a pH chart showing the pH of everyday substances.
* Write a short magazine article entitled ‘What causes acidity’
* Sort a range of substances into either acidic, neutral or alkaline categories.

Demonstrations:* The pH scale simulation 1
* The pH scale simulation 2
* Disappearing ink
* Hydrogen chloride gas: demonstrating its effect on moist blue litmus paper and on dry blue litmus paper.
* Solutions of HCl in methylbenzene and in water: testing the solutions with blue litmus paper.

Class practicals: * Testing acids and bases on a microscale
* Acid or alkali? Acidic or alkaline?
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 167–170 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 3 / Lesson 49: Acids, alkalis, and indicators](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/a3c35c74c12a4f369cd4eb2fa10a6210)[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 3 / Lesson 50: The pH scale](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/746f780e25474c4b9e8cc2e24a1d9dcc) [The pH scale simulation](https://edu.rsc.org/resources/ph-scale-basics-simulation/1459.article#:~:text=The%20pH%20scale%2C%20from%200,pH%20values%20greater%20than%207.) 1 [The pH scale simulation](https://phet.colorado.edu/sims/html/ph-scale/latest/ph-scale_all.html) 2[Disappearing ink teacher sheet](https://edu.rsc.org/experiments/disappearing-ink/424.article)[Acid or alkali? Acidic or alkaline? Teacher sheet](https://edu.rsc.org/experiments/acid-or-alkali-acidic-or-alkaline-a-litmus-paper-test/1708.article)[Testing acids and bases on a microscale teacher sheet](https://edu.rsc.org/experiments/testing-acids-and-bases-on-a-microscale/564.article) | Analysis | AnalysisReasoning |
| 45 | **Section 2: Inorganic chemistry**(f) Acids, alkalis and titrations | **Students will be able to:** 2.32 know that alkalis can neutralise acids**2.33C describe how to carry out an acid-alkali titration.** | Activities:* Predict products made in neutralisation reactions.
* Draw diagrams to summarise what happens in neutralisation reactions.
* Label a diagram showing titration equipment

Demonstrations: * Neutralisation circles

Class practical:* Neutralisation of an acidic solution
* Titrating sodium hydroxide with hydrochloric acid
 | Pearson Edexcel International GCSE (9–1) Chemistry Student Book: pp. 170–172 and pp. 181 and 182[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 3 / Lesson 51: Neutralisation](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/746f780e25474c4b9e8cc2e24a1d9dcc) [Neutralisation circles teacher sheet](https://edu.rsc.org/experiments/neutralisation-circles/702.article)[Neutralisation of an acidic solution teacher sheet](https://edu.rsc.org/experiments/neutralising-an-acidic-solution/1756.article)[Titrating sodium hydroxide with hydrochloric acid teacher sheet](https://edu.rsc.org/experiments/titrating-sodium-hydroxide-with-hydrochloric-acid/697.article) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 46 | **Section 1: Principles of chemistry**(h) Metallic bonding**Section 2: Inorganic chemistry**(d) Reactivity series(e) Extraction and uses of metals(f) Acids, alkalis and titrations | Consolidation | Activities: * Review keywords relating to the previous topics.
* Multiple-choice questions to review prior knowledge.
* Re-teach previously identified challenging topics, anticipating where errors/misconceptions arise.
* Modelling how to answer questions.
* Students mark exemplar work using mark schemes.
 | Relevant textbook pages from topics assessed. | Critical thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Executive function Innovation  | Critical thinking Problem solving Analysis Reasoning Interpretation Continuous learning Initiative Self-direction Responsibility Perseverance Productivity Self regulation (metacognition, forethought, reflection) Integrity Self- monitoring/self- evaluation/self- reinforcement  |
| 47 | Assessment  | Activities:* Students complete assessment using exam questions related to topics.
 | [Examwizard](https://www.examwizard.co.uk/) for access to exam questions.  |
| 48 | Feedback | Activities:* Identify misconceptions through marking and re-teach.
* Use new models/examples in re-teach.
* What went well/even better if examples of student work and improve.
* Multiple choice questions based on re-teach.
* Students re-attempt same/similar questions to check for progress and asses using mark schemes.
 | Relevant textbook pages from topics assessed. |
| 49 | **Section 2: Inorganic chemistry**(g) Acids, bases and salt preparations | **Students will be able to:** 2.34 know the general rules for predicting the solubility of ionic compounds in water:* common sodium, potassium and ammonium compounds are soluble
* all nitrates are soluble
* common chlorides are soluble, except those of silver and lead(II)
* common sulfates are soluble, except for those of barium, calcium and lead(II)
* common carbonates are insoluble, except for those of sodium, potassium and ammonium
* common hydroxides are insoluble except for those of sodium, potassium and calcium (calcium hydroxide is slightly soluble)

2.38 know that metal oxides, metal hydroxides and ammonia can act as bases, and that alkalis are bases that are soluble in water. | Activities:* Write chemical equations for the preparation of given soluble salts.
* Learn solubility rules for a solubility quiz.
* Predict whether given salts are soluble or insoluble in water.
* Given the name of a soluble salt, suggest methods for preparing it.
* Define bases and alkalis.
* Write equations for the reactions of different acids with metals, bases and metal carbonates.
* Predict products of reactions.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 167–170, 173–177, 185-187 and p. 191 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 3 / Lesson 54: Reactions of bases](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/bce78cf6ac2f4f63a54377f206eb0023)  | Analysis | AnalysisReasoning |
| 50 | **Section 2: Inorganic chemistry**(g) Acids, bases and salt preparations | **Students will be able to:** 2.35 understand acids and bases in terms of proton transfer2.36 understand that an acid is a proton donor and a base is a proton acceptor2.37 describe the reactions of hydrochloric acid, sulfuric acid and nitric acid with metals, bases and metal carbonates (excluding the reactions between nitric acid and metals) to form salts | Activities:* Compare acids and bases in terms of proton transfer, using diagrams to support.
* Sort a range of chemicals into acids, bases or alkalis.
* Write equations for the reactions of different acids with metals, bases and metal carbonates.
* Predict products of reactions.

Class practicals:* Reaction between a metal oxide and dilute acid.
* Reactions of metals with acids producing salts
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 167–170, 173–177, 185-187 and p. 191 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 3 / Lesson 53: Reactions of acids](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/954fee28206543ffb95973807cbe2290)[Reaction between a metal oxide and dilute acid teacher sheet.](https://edu.rsc.org/experiments/reacting-copperii-oxide-with-sulfuric-acid/1917.article)[Reactions of metals with acids producing salts teacher sheet](https://edu.rsc.org/experiments/reactions-of-metals-with-acids-producing-salts/446.article) | Analysis | AnalysisReasoning |
| 51 | **Section 2: Inorganic chemistry**(g) Acids, bases and salt preparations | **Students will be able to:** 2.39 describe an experiment to prepare a pure, dry sample of a soluble salt, starting from an insoluble reactant **2.40C describe an experiment to prepare a pure, dry sample of a soluble salt, starting from an acid and alkali** | Activities:* Write up the experimental method of the salt preparation experiments.
* Label diagrams of the apparatus used.
* Storyboard of the method for carrying out each type of reaction.
* Compare both types of reactions e.g. equipment used.
* Write word equations and balanced symbol equations, with state symbols, for different reactants.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 176–180 and 185–187 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 3 / Lesson 56: Preparing a soluble salt by titration](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/de7d7ae9f63644b5bf61d18e77bbd84e) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 52 | **Section 2: Inorganic chemistry**(g) Acids, bases and salt preparations | **Students will be able to:** 2.42 *practical: prepare a sample of pure, dry hydrated copper(II) sulfate crystals starting from copper(II) oxide.* | Class practicals:* Prepare a sample of pure, dry hydrated copper(II) sulfate crystals starting from copper(II) oxide.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 176–180 and 185–187 **Pearson Edexcel International GCSE (9–1) Chemistry Lab Book**: pp. 20–22[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 3 / Lesson 55: Core practical – Preparing soluble salts](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/ca2c96d90ba04292af0ab73402924d30) [Practical video](https://www.youtube.com/watch?v=mNebkJ7_48s&t=4s)[Practical teacher sheet](https://www.pearson.com/content/dam/one-dot-com/one-dot-com/uk/documents/subjects/science/GCSE-core-practical-sheets/Chemistry/cp3-preparation-of-copper-sulfate-soluble-salt-ts.pdf)[Practical student sheet](https://www.pearson.com/content/dam/one-dot-com/one-dot-com/uk/documents/subjects/science/GCSE-core-practical-sheets/Chemistry/cp3-preparation-of-copper-sulfate-soluble-salt.pdf) |  |  |
| 53 | **Section 2: Inorganic chemistry**(g) Acids, bases and salt preparations | **Students will be able to:** **2.41C describe an experiment to prepare a pure, dry sample of an insoluble salt, starting from two soluble reactants****2.43C *practical: prepare a sample of pure, dry lead(II) sulfate.*** | Activities:* Write up the experimental method of the salt preparation experiments.
* Label diagrams of the apparatus used.
* Write chemical and ionic equations for the preparation of given insoluble salts.
* Given the name of an insoluble salt, suggest methods for preparing it.

Class practicals:* Prepare a sample of pure, dry lead (II) sulfate.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 183, 184 and 185**Pearson Edexcel International GCSE (9–1) Chemistry Lab Book**: p. 23[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 3 / Lesson 57: Core practical – Preparing insoluble salts](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/bb407baaac5647c7bd8b342210c604e8)[Prepare a sample of pure, dry lead (II) sulfate teacher sheet.](https://pmt.physicsandmathstutor.com/download/Chemistry/GCSE/Notes/Edexcel-IGCSE/Practical-Skills/08.%20Preparing%20Lead%28II%29%20Sulfate.pdf) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 54 | **Section 2: Inorganic chemistry**(h) Chemical tests | **Students will be able to:** 2.44 describe tests for these gases:* hydrogen
* oxygen
* carbon dioxide
* ammonia
* chlorine
 | Activities:* Match the method and the positive result to the gas being tested for.
* Suggest the identity of unknown substances, given results.
* Arrange the steps for how to carry out different tests for gases into the correct order.
* Match the statement to the correct type of test (e.g. use of limewater to testing for carbon dioxide)

Class practicals:* Generating, collecting, and testing gases
 | Pearson Edexcel International GCSE (9–1) Chemistry Student Book: pp. 191–192 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 34: Tests for gases](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/8a0d5461b35345699822ec0e923aa79e)[Generating, collecting, and testing gases teacher sheet](https://edu.rsc.org/experiments/generating-collecting-and-testing-gases/693.article) | Analysis | AnalysisReasoning |
| 55 | **Section 2: Inorganic chemistry**(h) Chemical tests | **Students will be able to:** 2.45 describe how to carry out a flame test2.46 know the colours formed in flame tests for these cations:* Li+ is red
* Na+ is yellow
* K+ is lilac
* Ca2+ is orange-red
* Cu2+ is blue-green.

2.47 describe tests for these cations:* NH4+ using sodium hydroxide solution and identifying the gas evolved
* Cu2+, Fe2+ and Fe3+ using sodium hydroxide solution
 | Activities:* Match the positive result to the ion/cation being tested for.
* Arrange the steps for how to carry out flame tests into the correct order.
* Write chemical and ionic equations for reactions encountered in ion tests.
* Suggest the identity of unknown substances, given ion test results.

Class practicals:* Flame tests
* Testing salts for anions and cations
 | Pearson Edexcel International GCSE (9–1) Chemistry Student Book: pp. 191–192 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 35: Tests for positive ions](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/709b2f6a22f7442ba3453731e4746cc5)[Flame tests teacher sheet](https://edu.rsc.org/experiments/flame-tests-the-wooden-splint-method/759.article)[Testing for anions and cations teacher sheet](https://edu.rsc.org/experiments/testing-salts-for-anions-and-cations/464.article) | Analysis | AnalysisReasoning |
| 56 | **Section 2: Inorganic chemistry**(h) Chemical tests | **Students will be able to:** 2.48 describe tests for these anions:* Cl–, Br– and I– using acidified silver nitrate solution
* SO42– using acidified barium chloride solution
* CO32– using hydrochloric acid and identifying the gas evolved

2.49 describe a test for the presence of water using anhydrous copper(II) sulphate2.50 describe a physical test to show whether a sample of water is pure. | Activities:* Match the positive result to the ion/cation being tested for.
* Arrange the steps for how to test for pure water into the correct order.
* Write chemical and ionic equations for reactions encountered in ion tests.
* Suggest the identity of unknown substances, given ion test results.
* Research and present methods for determining the purity of water, and how water can be purified.

Class practicals:* Testing salts for anions and cations
* A reversible reaction of hydrated copper (II) sulfate
* Testing the hardness of water
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 192, 194–196 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 37: Tests for negative ions and water](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/06e8b31d9c0040108e8d11c07e77abf3)[Testing for anions and cations teacher sheet](https://edu.rsc.org/experiments/testing-salts-for-anions-and-cations/464.article)[A reversible reaction of hydrated copper (II) sulfate teacher sheet](https://edu.rsc.org/experiments/a-reversible-reaction-of-hydrated-copperii-sulfate/437.article)[Testing the hardness of water teacher sheet](https://edu.rsc.org/experiments/testing-the-hardness-of-water/426.article) | Analysis | AnalysisReasoning |
| 57 | **Section 2: Inorganic chemistry**(g) Acids, bases and salt preparations(h) Chemical tests | Consolidation | Activities: * Review keywords relating to the previous topics.
* Multiple-choice questions to review prior knowledge.
* Re-teach previously identified challenging topics, anticipating where errors/misconceptions arise.
* Modelling how to answer questions.
* Students mark exemplar work using mark schemes.
 | Relevant textbook pages from topics assessed. | Critical thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Executive function Innovation  | Critical thinking Problem solving Analysis Reasoning Interpretation Continuous learning Initiative Self-direction Responsibility Perseverance Productivity Self regulation (metacognition, forethought, reflection) Integrity Self- monitoring/self- evaluation/self- reinforcement  |
| 58 | Assessment  | Activities:* Students complete assessment using exam questions related to topics.
 | [Examwizard](https://www.examwizard.co.uk/) for access to exam questions.  |
| 59 | Feedback | Activities:* Identify misconceptions through marking and re-teach.
* Use new models/examples in re-teach.
* What went well/even better if examples of student work and improve.
* Multiple choice questions based on re-teach.
* Students re-attempt same/similar questions to check for progress and asses using mark schemes.
 | Relevant textbook pages from topics assessed. |
| 60 | **Section 1: Principles of chemistry**(e) Chemical formulae, equations and calculations | **Students will be able to:** 1.27 know that the mole (mol) is the unit for the amount of a substance1.28 understand how to carry out calculations involving amount of substance, relative atomic mass (*A*r) and relative formula mass (*M*r). | Activities: * Carry out a range of calculations.
* Exercises using equations and the mole concept to predict mass of product or mass of reactant.

Demonstrations:* The volume of 1 mole of hydrogen gas
* Determine the relative molecular mass of butane.
* Molarity simulation
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 44–46[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 42: The mole](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/c4855813f00f4976a88fe8db766833d1)[The volume of 1 mole of hydrogen gas teacher sheet](https://edu.rsc.org/experiments/the-volume-of-1-mole-of-hydrogen-gas/452.article)[Determine the relative molecular mass of butane teacher sheet](https://edu.rsc.org/experiments/determining-the-relative-molecular-mass-of-butane/1720.article)[Molarity simulation](https://phet.colorado.edu/en/simulations/molarity) | Analysis | AnalysisReasoning |
| 61 | **Section 1: Principles of chemistry**(e) Chemical formulae, equations and calculations | **Students will be able to:** 1.29 calculate reacting masses using experimental data and chemical equations1.30 calculate percentage yield | Activities:* Exercises using equations and the mole concept to predict mass of product, mass of reactant or % yield

Class practicals:Determining the relative atomic mass of magnesium | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 46–58 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 43: Reacting masses and percentage yield](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/a1b907e5b6344c9d856235ea6a6d8f1d)[Determining the relative atomic mass of magnesium teacher sheet](https://edu.rsc.org/experiments/determining-the-relative-atomic-mass-of-magnesium/401.article) | Analysis | AnalysisReasoning |
| 62 | **Section 1: Principles of chemistry**(e) Chemical formulae, equations and calculations | **Students will be able to:** 1.31 understand how the formulae of simple compounds can be obtained experimentally, including metal oxides, water and salts containing water of crystallisation.1.32 know what is meant by the terms empirical formula and molecular formula1.33 calculate empirical and molecular formulae from experimental data | Activities:* Working out empirical formulae from mass or % by mass data.
* Converting empirical formulae to molecular formulae given molecular mass data.

Class practical:* Finding the formula of an oxide of copper
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 46–50 [Finding the formula of an oxide of copper teacher sheet](https://www.rsc.org/cpd/teachers/content/filerepository/CMP/00/000/544/cce-90.pdf?v=1463027109065) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 63 | **Section 1: Principles of chemistry**(e) Chemical formulae, equations and calculations | **Students will be able to:** 1.36 *practical:* *know how to determine the formula of a metal oxide by combustion (e.g. magnesium oxide) or by reduction (e.g. copper(II) oxide).* | Activities:* Put the steps of the method into the correct order.
* Justify equipment choices using words scientific terminology, such as precision, resolution.

Class practical:* Determine the formula of a metal oxide by combustion (e.g. magnesium oxide) or by reduction (e.g. copper (II) oxide).
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 46–50 **Pearson Edexcel International GCSE (9-1) Chemistry Lab Book**: pp. 8–12[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 46: Core practical – empirical formula](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/97ebf6906d20419692666cd4384c36ac)[Determine the formula of a metal oxide by combustion (e.g. magnesium oxide) or by reduction (e.g. copper (II) oxide) support](https://pmt.physicsandmathstutor.com/download/Chemistry/GCSE/Notes/Edexcel-IGCSE/Practical-Skills/03.%20Determining%20Formula%20of%20Metal%20Oxides.pdf) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 64 | **Section 1: Principles of chemistry**(e) Chemical formulae, equations and calculations | **Students will be able to:** **1.34C understand how to carry out calculations involving amount of substance, volume and concentration (in mol/dm3) of solution.** | Activities:* Exercises in calculating concentration given mass and solution volume.
* Exercises in calculating mass, given concentration and solution volume.
* Reacting mass calculations involving solutions.

Demonstrations:* Estimating the concentration of domestic bleach
* Concentration simulation
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 66–71 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 45: Concentration calculations](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/2d255bf5f4704af1beb14aef3451d152)[Estimating the concentration of domestic bleach teacher sheet](https://edu.rsc.org/experiments/estimating-the-concentration-of-bleach/1729.article)[Concentration simulation](https://phet.colorado.edu/en/simulations/concentration) | Analysis | AnalysisReasoning |
| 65 | **Section 1: Principles of chemistry**(e) Chemical formulae, equations and calculations | **Students will be able to:** **1.35C understand how to carry out calculations involving gas volumes and the molar volume of a gas (24** **dm3 and 24** **000** **cm3 at room temperature and pressure (rtp)).** | Activities:* Exercises using equations and the mole concept to predict volume of gaseous product or reactant.
* Exercises calculating reacting quantities using gas molar volume.

Class practical:* The volume of 1 mole of hydrogen gas
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 58–59 and pp. 64–67 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 44: Limiting reagents and gas volumes](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/66709f733db1419a9df198f5561190e5)[The volume of 1 mole of hydrogen gas teacher sheet](https://edu.rsc.org/experiments/the-volume-of-1-mole-of-hydrogen-gas/452.article) | Analysis | AnalysisReasoning |
| 66 | **Section 1: Principles of chemistry**(e) Chemical formulae, equations and calculations | Consolidation | Activities: * Review keywords relating to the previous topics.
* Multiple-choice questions to review prior knowledge.
* Re-teach previously identified challenging topics, anticipating where errors/misconceptions arise.
* Modelling how to answer questions.
* Students mark exemplar work using mark schemes.
 | Relevant textbook pages from topics assessed. | Critical thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Executive function Innovation  | Critical thinking Problem solving Analysis Reasoning Interpretation Continuous learning Initiative Self-direction Responsibility Perseverance Productivity Self regulation (metacognition, forethought, reflection) Integrity Self- monitoring/self- evaluation/self- reinforcement  |
| 67 | Assessment  | Activities:* Students complete assessment using exam questions related to topics.
 | [Examwizard](https://www.examwizard.co.uk/) for access to exam questions.  |
| 68 | Feedback | Activities:* Identify misconceptions through marking and re-teach.
* Use new models/examples in re-teach.
* What went well/even better if examples of student work and improve.
* Multiple choice questions based on re-teach.
* Students re-attempt same/similar questions to check for progress and asses using mark schemes.
 | Relevant textbook pages from topics assessed. |
| 69 | **Section 3: Physical chemistry**(a) Energetics | **Students will be able to:** 3.1 know that chemical reactions in which heat energy is given out are described as exothermic, and those in which heat energy is taken in are described as endothermic3.2 describe simple calorimetry experiments for reactions such as combustion, displacement, dissolving and neutralisation3.3 calculate the heat energy change from a measured temperature change using the expression *Q* = *m*cΔ*T* 3.4 calculate the molar enthalpy change (Δ*H*) from the heat energy change, *Q.**3.8 practical: investigate temperature changes accompanying some of the following types of change:** *salts dissolving in water*
 | Activities:* Complete exercises, identifying whether a reaction is exo- or endothermic given the temperature change.
* Match characteristics of exothermic and endothermic reactions to the correct one.
* Calculating ∆H from practical results.

Class practicals:* Investigate temperature changes accompanying some of the following types of change.
* Exothermic or endothermic?
* Heats of reaction
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 207 - 209 and 216–217**Pearson Edexcel International GCSE (9–1) Chemistry Lab Book**: pp. 24 and 29–30[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 81: Core practical – Heat changes in reactions](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/ba0de80f88b545eab8cd151b93d9936c)[Investigate temperature changes accompanying some of the following types of change teacher sheet](https://pmt.physicsandmathstutor.com/download/Chemistry/GCSE/Notes/Edexcel-IGCSE/Practical-Skills/09.%20Investigating%20Temperature%20Changes%20of%20Reactions.pdf)[Heats of reaction](https://www.rsc.org/cpd/teachers/content/filerepository/CMP/00/000/538/cce-84.pdf?v=1558953649341)[Exothermic or endothermic? Teacher sheet](https://edu.rsc.org/experiments/exothermic-or-endothermic-classifying-reactions/406.article) | Analysis | AnalysisReasoning |
| 70 | **Section 3: Physical chemistry**(a) Energetics | **Students will be able to:** 3.2 describe simple calorimetry experiments for reactions such as combustion, displacement, dissolving and neutralisation.3.3 calculate the heat energy change from a measured temperature change using the expression Q = mcΔT. 3.4 calculate the molar enthalpy change (ΔH) from the heat energy change, Q.3.8 *practical: investigate temperature changes accompanying some of the following types of change:** *neutralisation reactions*
 | Activities:* Carry out calculations for Q = mcΔT and for molar enthalpy change

Class practicals:* Investigate temperature changes accompanying some of the following types of change.
* Thermometric titration
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 209–211 and 217–219**Pearson Edexcel International GCSE (9–1) Chemistry Lab Book**: pp. 24–28[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 82: Core practical – Measuring and calculating energy changes](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/70f9094ea7b7421785454e23abcd03ae)[Investigate temperature changes accompanying some of the following types of change teacher sheet](https://pmt.physicsandmathstutor.com/download/Chemistry/GCSE/Notes/Edexcel-IGCSE/Practical-Skills/09.%20Investigating%20Temperature%20Changes%20of%20Reactions.pdf)[Thermometric titration teacher sheet](../../DELETE2/ail.google.com/mail/u/0#search/kevinomo1%40gmail.com?projector=1) | InterpretationExecutive functionAnalysis | InterpretationDecision makingExecutive functionResponsibilityTeamworkAnalysisReasoning |
| 71 | **Section 3: Physical chemistry**(a) Energetics | **Students will be able to:** 3.2 describe simple calorimetry experiments for reactions such as combustion, displacement, dissolving and neutralisation.3.3 calculate the heat energy change from a measured temperature change using the expression Q = mcΔT. 3.4 calculate the molar enthalpy change (ΔH) from the heat energy change, Q.**3.5C draw and explain energy level diagrams to represent exothermic and endothermic reactions.**3.8 *practical: investigate temperature changes accompanying some of the following types of change:** *Displacement reactions*
 | Activities:* Label energy level diagrams.
* Explain why there is a difference in energy for reactants and products.

Class practicals:* Investigate temperature changes accompanying some of the following types of change
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 209–210 and 215–216**Pearson Edexcel International GCSE (9–1) Chemistry Lab Book**: pp. 24 and 31–33 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 83: Core practical – Energy level diagrams](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/a8e43d27eea24f9f9c7604fd80a96fe9)[Investigate temperature changes accompanying some of the following types of change teacher sheet](https://pmt.physicsandmathstutor.com/download/Chemistry/GCSE/Notes/Edexcel-IGCSE/Practical-Skills/09.%20Investigating%20Temperature%20Changes%20of%20Reactions.pdf) | InterpretationExecutive functionAnalysis | InterpretationDecision makingExecutive functionResponsibilityTeamworkAnalysisReasoning |
| 72 | **Section 3: Physical chemistry**(a) Energetics | **Students will be able to:** 3.2 describe simple calorimetry experiments for reactions such as combustion, displacement, dissolving and neutralisation.3.3 calculate the heat energy change from a measured temperature change using the expression Q = mcΔT 3.4 calculate the molar enthalpy change (ΔH) from the heat energy change, Q.3.8 *practical: investigate temperature changes accompanying some of the following types of change:** *combustion reactions*
 | Activities:* Carry out calculations for Q = mcΔT and for molar enthalpy change

Class practicals:* Investigate temperature changes accompanying some of the following types of change
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 211–214**Pearson Edexcel International GCSE (9–1) Chemistry Lab Book**: pp. 24, 34–36 and answers p. 56[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 84: Core practical – Measuring heat change for combustion reactions](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/2daa67babd7f4cb4a41551573ded5b0c)[Investigate temperature changes accompanying some of the following types of change teacher sheet](https://pmt.physicsandmathstutor.com/download/Chemistry/GCSE/Notes/Edexcel-IGCSE/Practical-Skills/09.%20Investigating%20Temperature%20Changes%20of%20Reactions.pdf) | InterpretationExecutive functionAnalysis | InterpretationDecision makingExecutive functionResponsibilityTeamworkAnalysisReasoning |
| 73 | **Section 3: Physical chemistry**(a) Energetics | **Students will be able to:** **3.6C know that bond-breaking is an endothermic process and that bond-making is an exothermic process.****3.7C use bond energies to calculate the enthalpy change during a chemical reaction.** | Activities:* Draw and label energy level diagrams for exothermic and endothermic reactions.
* Identify whether a reaction is exo- or endothermic given ∆H.
* Explain whyat happens in terms of bond breaking and making in exothermic and endothermic reactions.
* Carry out calculations to find out enthalpy change using bond energies, to determine if a reaction is endothermic or exothermic.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 219–222[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 85: Bond breaking and bond making](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/9549af334b344be1b4582e6b6423492d)[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 86: Bond energy calculations](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/dd7b5fb58a5949aa9bc774bb99bf87d1) | Analysis | AnalysisReasoning |
| 74 | **Section 3: Physical chemistry**(a) Energetics | Consolidation | Activities: * Review keywords relating to the previous topics.
* Multiple-choice questions to review prior knowledge.
* Re-teach previously identified challenging topics, anticipating where errors/misconceptions arise.
* Modelling how to answer questions.
* Students mark exemplar work using mark schemes.
 | Relevant textbook pages from topics assessed. | Critical thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Executive function Innovation  | Critical thinking Problem solving Analysis Reasoning Interpretation Continuous learning Initiative Self-direction Responsibility Perseverance Productivity Self regulation (metacognition, forethought, reflection) Integrity Self- monitoring/self- evaluation/self- reinforcement  |
| 75 | Assessment  | Activities:Students complete assessment using exam questions related to topics. | [Examwizard](https://www.examwizard.co.uk/) for access to exam questions.  |
| 76 | Feedback | Activities:* Identify misconceptions through marking and re-teach.
* Use new models/examples in re-teach.
* What went well/even better if examples of student work and improve.
* Multiple choice questions based on re-teach.
* Students re-attempt same/similar questions to check for progress and asses using mark schemes.
 | Relevant textbook pages from topics assessed. |
| 77  | **Section 4: Organic chemistry**(a) Introduction | **Students will be able to:** 4.1 know that a hydrocarbon is a compound of hydrogen and carbon only4.2 understand how to represent organic molecules using empirical formulae, molecular formulae, general formulae, structural formulae and displayed formulae4.3 know what is meant by the terms homologous series, functional group and isomerism. | Activities:* Use molecular models to derive displayed and molecular formulae.
* Match definitions to key terms.
* Group molecules in terms of their homologous series.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 255–260[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 67: Introduction to organic chemistry](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/2701a54b2dd34d69bd924bd2e85491b8) [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 68: Homologous series](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/e167d0aead5c4029a6da10efbe097a5b) | Critical thinkingProblem solving | Critical thinkingProblem solvingAdaptive learning |
| 78 | **Section 4: Organic chemistry**(a) Introduction | **Students will be able to:** 4.4 understand how to name compounds relevant to this specification using the rules of International Union of Pure and Applied Chemistry (IUPAC) nomenclature - *students will be expected to name compounds containing up to six carbon atoms*4.5 understand how to write the possible structural and displayed formulae of an organic molecule given its molecular formula | Activities:* Make models of alkanes.
* Use molecular models to find the isomers of pentane.
* Draw displayed formulae.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 257–264, 287, 288, 293, 294 and 297–299[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 69: Naming organic compounds](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/0693d566903d49e38ed6e821b44e4d16)[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 70: Isomers](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/f0145bc861c148a99033281fea5b541e) | Critical thinkingProblem solving | Critical thinkingProblem solvingAdaptive learning |
| 79 | **Section 4: Organic chemistry**(b) Crude oil | **Students will be able to:** 4.7 know that crude oil is a mixture of hydrocarbons4.8 describe how the industrial process of fractional distillation separates crude oil into fractions4.9 know the names and uses of the main fractions obtained from crude oil: refinery gases, gasoline, kerosene, diesel, fuel oil and bitumen4.10 know the trend in colour, boiling point and viscosity of the main fractions. | Activities: * Complete a diagram of a fractionating tower, detailing chain length, boiling point, and use of each fraction.
* Write a description of how the process of fractional distillation works.

Demonstrations:* The fractional distillation of crude oil.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 268–272[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 73: Crude oil](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/3de6cb25fd804f288b088434ca7ca829)[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 74: Fractions](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/54cfe48e3b2349d3b7552ed7e5938a69) [The fractional distillation of crude oil teacher sheet](https://edu.rsc.org/experiments/the-fractional-distillation-of-crude-oil/754.article) | Interpretation | InterpretationAdaptive learning |
| 80 | **Section 4: Organic chemistry**(b) Crude oil | **Students will be able to:** 4.6 understand how to classify reactions of organic compounds as substitution, addition and combustion*. Knowledge of reaction mechanisms is not required.* | Activities:* Draw diagrams to summarise reactions of organic compounds.
* Write chemical equations for a range of different types of reactions.
* For different examples of reactions, classify them as substitution, addition or combustion based on limited clues
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 264-265, 270–271, 279, 280 and 283[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 72: Types of organic reactions](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/f9fa9f90d7d04dc1876e14b51c134fbc) | Interpretation | InterpretationPersonal and social responsibility |
| 81 | **Section 4: Organic chemistry**(b) Crude oil | **Students will be able to:** 4.11 know that a fuel is a substance that, when burned, releases heat energy4.12 know the possible products of complete and incomplete combustion of hydrocarbons with oxygen in the air4.13 understand why carbon monoxide is poisonous, in terms of its effect on the capacity of blood to transport oxygen; *references to haemoglobin are not required* | Activities:* Write chemical equations for combustion reactions.
* Research news articles about carbon monoxide poisoning incidents.
* Produce a gas safety advertisement, explaining the cause and dangers of incomplete combustion.

Demonstrations:* The products of combustion of methane
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 264-265, 270–271, 279, 280 and 283[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 75: Hydrocarbons as fuels](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/c253db61e55a4e178601b63ccc5d4d6a)[The products of combustion of methane](https://edu.rsc.org/experiments/identifying-the-products-of-combustion/707.article) | Interpretation | InterpretationPersonal and social responsibility |
| 82 | **Section 4: Organic chemistry**(b) Crude oil | **Students will be able to:** 4.14 know that, in car engines, the temperature reached is high enough to allow nitrogen and oxygen from air to react, forming oxides of nitrogen4.15 explain how the combustion of some impurities in hydrocarbon fuels results in the formation of sulfur dioxide4.16 understand how sulfur dioxide and oxides of nitrogen oxides contribute to acid rain. | Activities:* Match gases to their effect on the environment.
* Write equations to summarise how impurities are formed during combustion.
* Create a cartoon strip to explain how acid rain is formed.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** p. 272-273[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 76: Acid rain](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/39aa7e7c86b54a3381152abe83151b7e) | InterpretationAnalysis | InterpretationCommunicationAnalysisProblem solvingAdaptive learning |
| 83 | **Section 4: Organic chemistry**(b) Crude oil | **Students will be able to:** 4.17 describe how long-chain alkanes are converted to alkenes and shorter-chain alkanes by catalytic cracking (using silica or alumina as the catalyst and a temperature in the range of 600–700 ºC)4.18 explain why cracking is necessary, in terms of the balance between supply and demand for different fractions. | Activities:* Use molecular models to explain why alkenes are formed during catalytic cracking.
* Use chemical equations in cracking reactions to predict a product or reactant.
* Research the reasons for cracking.

Demonstration:* Cracking hydrocarbons
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 273–275 and 277–279[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 79: Cracking](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/a853b3db713f43ffb2adcb54b6b9199c) [Cracking hydrocarbons teacher sheet](https://edu.rsc.org/experiments/cracking-hydrocarbons-in-liquid-paraffin-with-a-catalyst/681.article) | AnalysisInterpretation | AnalysisProblem solvingAdaptive learningInterpretation Personal and social responsibility |
| 84 | **Section 3: Physical chemistry**(b) Rates of reaction | **Students will be able to:** 3.9 describe experiments to investigate the effects of changes in surface area of a solid, concentration of a solution, temperature and the use of a catalyst on the rate of a reaction3.10 describe the effects of changes in surface area of a solid, concentration of a solution, pressure of a gas, temperature and the use of a catalyst on the rate of a reaction3.11 explain the effects of changes in surface area of a solid, concentration of a solution, pressure of a gas and temperature on the rate of a reaction in terms of particle collision theory | Activities:* Draw graphs to show the effect of concentration on rate of reaction.
* Deduce a trend from the graph, e.g. ‘doubling concentration doubles rate’.
* Draw particle pictures to illustrate surface area and concentration effects.
* Write a particle theory explanation for the effects of surface area and of concentration on reaction rate.

Demonstrations:* Iodine clock reaction
* Reactions & rates simulation

Class practicals: * The effect of concentration on reaction rate
* Burning milk powder
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:**pp. 227–233[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 38: Rates of reaction: surface area and concentration](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/77a7bc0d8ee44cd8b8a830e982005e6b)[Iodine clock reaction teacher sheet](https://edu.rsc.org/experiments/iodine-clock-reaction-demonstration-method/744.article)[Reactions & rates simulation](https://phet.colorado.edu/en/simulations/reactions-and-rates)[The effect of concentration on reaction rate teacher sheet](https://edu.rsc.org/experiments/the-effect-of-concentration-on-reaction-rate/743.article)[Burning milk powder teacher sheet](https://edu.rsc.org/experiments/burning-milk-powder/830.article) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 85 | **Section 3: Physical chemistry**(b) Rates of reaction | **Students will be able to:** 3.15 *practical: investigate the effect of changing the surface area of marble chips and of changing the concentration of hydrochloric acid on the rate of reaction between marble chips and dilute hydrochloric acid.* | Class practicals: * Investigate the effect of changing the surface area of marble chips and of changing the concentration of hydrochloric acid on the rate of reaction between marble chips and dilute hydrochloric acid.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 231–233**Pearson Edexcel International GCSE (9–1) Chemistry Lab Book**: pp. 37–41[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 39: Core practical – the effect of concentration and surface area on the rate of reaction](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/57f55bb43ab54a3592bbdf8e7eedab44)[Practical video](https://www.youtube.com/watch?v=Bfu7QZqm1b8&feature=emb_imp_woyt)[Practical teacher sheet](https://www.pearson.com/content/dam/one-dot-com/one-dot-com/uk/documents/subjects/science/GCSE-core-practical-sheets/Chemistry/cp6a-rates-of-reaction-vol-of-gas-ts.pdf)[Practical student sheet](https://www.pearson.com/content/dam/one-dot-com/one-dot-com/uk/documents/subjects/science/GCSE-core-practical-sheets/Chemistry/cp6a-rates-of-reaction-vol-of-gas.pdf) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 86 | **Section 3: Physical chemistry**(b) Rates of reaction | **Students will be able to:** 3.12 know that a catalyst is a substance that increases the rate of a reaction, but is chemically unchanged at the end of the reaction 3.13 know that a catalyst works by providing an alternative pathway with lower activation energy**3.14C draw and explain reaction profile diagrams showing ΔH and activation energy**3.16 *practical: investigate the effect of different solids on the catalytic decomposition of hydrogen peroxide solution.* | Activities:* Label reaction profile diagrams to illustrate the effect of a catalyst vs without a catalyst.

Demonstrations:* Reactions & rates simulation
* Catalysis of a sodium thiosulfate and iron (III) nitrate reaction

Class practical:* Investigate the effect of different solids on the catalytic decomposition of hydrogen peroxide solution.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 234–238**Pearson Edexcel International GCSE (9–1) Chemistry Lab Book**: pp. 42–44[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 2 / Lesson 40: Energy and rates of reaction](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/c9f55e616aab4be2b366c89f055f0259)[Reactions & rates simulation](https://phet.colorado.edu/en/simulations/reactions-and-rates)[Catalysis of a sodium thiosulfate and iron (III) nitrate reaction teacher sheet](https://edu.rsc.org/experiments/catalysis-of-a-sodium-thiosulfate-and-ironiii-nitrate-reaction/442.article)[Investigate the effect of different solids on the catalytic decomposition of hydrogen peroxide solution support](https://pmt.physicsandmathstutor.com/download/Chemistry/GCSE/Notes/Edexcel-IGCSE/Practical-Skills/11.%20Effect%20of%20Catalysts%20on%20Rate%20of%20Reaction.pdf) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 87 | **Section 4: Organic chemistry**(a) Introduction(b) Crude oil**Section 3: Physical chemistry**(b) Rates of reaction | Consolidation | Activities: * Review keywords relating to the previous topics.
* Multiple-choice questions to review prior knowledge.
* Re-teach previously identified challenging topics, anticipating where errors/misconceptions arise.
* Modelling how to answer questions.
* Students mark exemplar work using mark schemes.
 | Relevant textbook pages from topics assessed. | Critical thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Executive function Innovation  | Critical thinking Problem solving Analysis Reasoning Interpretation Continuous learning Initiative Self-direction Responsibility Perseverance Productivity Self regulation (metacognition, forethought, reflection) Integrity Self- monitoring/self- evaluation/self- reinforcement  |
| 88 | Assessment  | Activities:* Students complete assessment using exam questions related to topics.
 | [Examwizard](https://www.examwizard.co.uk/) for access to exam questions.  |
| 89 | Feedback | Activities:* Identify misconceptions through marking and re-teach.
* Use new models/examples in re-teach.
* What went well/even better if examples of student work and improve.
* Multiple choice questions based on re-teach.
* Students re-attempt same/similar questions to check for progress and asses using mark schemes.
 | Relevant textbook pages from topics assessed. |
| 90 | **Section 3: Physical chemistry**(c) Reversible reactions and equilibria | **Students will be able to:** 3.17 know that some reactions are reversible and this is indicated by the symbol ⇌ in equations3.18 describe reversible reactions such as the dehydration of hydrated copper(II) sulfate and the effect of heat on ammonium chloride. | Activities:* Students are to write down their observations.
* Research examples where reversible reactions are useful in real life, and why.

Demonstrations:* The ‘blue bottle’ experiment

Class practicals: * A reversible reaction of hydrated copper (III) sulfate
* Heating ammonium chloride.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 240–241 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 87: Reversible reactions](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/1f88eff294a2457e8ba7d15ccf9c6248)[The ‘blue bottle’ experiment teacher sheet](https://edu.rsc.org/experiments/the-blue-bottle-experiment/729.article)[A reversible reaction of hydrated copper (III) sulfate teacher sheet](https://edu.rsc.org/experiments/a-reversible-reaction-of-hydrated-copperii-sulfate/437.article)[Heating ammonium chloride teacher sheet](https://edu.rsc.org/download?ac=12435) | Analysis | AnalysisProblem solving |
| 91 | **Section 3: Physical chemistry**(c) Reversible reactions and equilibria | **Students will be able to:** **3.19C know that a reversible reaction can reach dynamic equilibrium in a sealed container****3.20C know that the characteristics of a reaction at dynamic equilibrium are:*** **the forward and reverse reactions occur at the same rate**
* **the concentrations of reactants and products remain constant**
 | Activities:* Group of 3 with 20 small similar objects e.g. pencils. 10 objects in the tray and 10 objects on the table. One person from the group should take objects out of the tray, and the second person should put objects back. The third person should keep time, so that both people work at the same rate. Relate this model to a reversible reaction and dynamic equilibrium.
* For a range of scenarios, identify if they are at equilibrium or not.
* Discuss what would happen if a fourth person was removing the items completely from the model – would equilibrium ever be reached and why?

Demonstration:* Easy equilibrium
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 241–242 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 88: Equilibrium](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/f91ea500b52c4db9a09186a1cf4ae704)[Easy equilibrium teacher support](https://edu.rsc.org/exhibition-chemistry/easier-equilibrium/3007629.article) | Analysis | AnalysisProblem solving |
| 92 | **Section 3: Physical chemistry**(c) Reversible reactions and equilibria | **Students will be able to:** **3.22C know that a reversible reaction can reach dynamic equilibrium in a sealed container*** **an increase (or decrease) in temperature shifts the position of equilibrium in the direction of the endothermic (or exothermic) reaction.**
* **an increase (or decrease) in pressure shifts the position of equilibrium in the direction that produces fewer (or more) moles of gas (references to Le Chatelier's principle are not required)**
 | Activities:* For a range of scenarios, predict what direction the equilibrium will move and explain why.
* Give students balanced equation for Haber process and students predict conditions that would produce the highest yield.

Demonstrations:* Reversible reaction simulation
* The effect of concentration and temperature on an equilibrium
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 235-238 and 242–246[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 89: Changes in position of equilibrium](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/98b513807a494ecab66f6c6b81e60c40)[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 90: Choosing conditions for maximum equilibrium yield](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/0fbd209ecf0d476085679a5f8e8b527b)[Reversible reactions simulation](https://phet.colorado.edu/en/simulations/reversible-reactions) [The effect of concentration and temperature on an equilibrium teacher sheet](https://edu.rsc.org/experiments/the-effect-of-concentration-and-temperature-on-an-equilibrium-le-chateliers-principle/1737.article#:~:text=The%20equilibrium%20ICl(l)%20%2B,can%20be%20repeated%20many%20times.) | Analysis | AnalysisProblem solving |
| 93 | **Section 3: Physical chemistry**(c) Reversible reactions and equilibria | **Students will be able to:** **3.21C understand why a catalyst does not affect the position of equilibrium in a reversible reaction** | Activities:* Discuss why compromises must be made for conditions in industry.
* Research the use of different catalysts in different industries.
* Compare the rates of reactions/products formed to determine the best catalyst.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 235-238 and 242–246[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 91: Catalysts in equilibria](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/6c6a2c08913c4c34b641dfa66e15fa7f) | Analysis | AnalysisProblem solving |
| 94 | **Section 4: Organic chemistry**(c) Alkanes | **Students will be able to:** 4.19 know the general formula for alkanes4.20 explain why alkanes are classified as saturated hydrocarbons4.21 understand how to draw the structural and displayed formulae for alkanes with up to five carbon atoms in the molecule, and to name the unbranched-chain isomers | Activities:* Determine the formula for several alkanes, based on the general formula.
* Complete a table showing the name, molecular formula, structural formula, and displayed formula of each of the first five unbranched-chain alkanes.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 277–280[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 77: Alkanes](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/1463960ac8b2442caddbf34d72f6c1eb)  | InterpretationAnalysis | InterpretationCommunicationAnalysisProblem solvingAdaptive learning |
| 95 | **Section 4: Organic chemistry**(c) Alkanes | **Students will be able to:** 4.22 describe the reactions of alkanes with halogens in the presence of ultraviolet radiation, limited to mono-substitution; *knowledge of reaction mechanisms is not required.* | Activities:* Draw out examples of each reaction.
* Compare each type of reaction.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 277–280[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 78: Reactions of alkanes](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/94243da1aeb2464097d076360180f8a0) | InterpretationAnalysis | InterpretationCommunicationAnalysisProblem solvingAdaptive learning |
| 96 | **Section 4: Organic chemistry**(d) Alkenes | **Students will be able to:** 4.23 know that alkenes contain the functional group >C=C<4.24 know the general formula for alkenes4.25 explain why alkenes are classified as unsaturated hydrocarbons | Activities:* Determine the formula for several alkanes, based on the general formula.
* Complete a table showing the name, molecular formula, structural formula, and displayed formula of each of the first five unbranched-chain alkenes.
* Compare alkanes to alkenes in terms of names, molecular formula, structural formula, and displayed formula.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 282–284[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 92: Alkenes](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/8f1974c72acf4a7789eef749c24fd1a0)  | Analysis | AnalysisProblem solvingAdaptive learning |
| 97 | **Section 4: Organic chemistry**(d) Alkenes | **Students will be able to:** 4.26 understand how to draw the structural and displayed formulae for alkenes with up to four carbon atoms in the molecule, and name the unbranched-chain isomers; *knowledge of cis/trans or E/Z notation is not required*4.27 describe the reactions of alkenes with bromine, to produce dibromoalkanes4.28 describe how bromine water can be used to distinguish between an alkane and an alkene. | Activities:* Write an account of observations from practical and write chemical equations to explain observations.
* Write a chemical equation, using displayed formulae for the bromination of methane.

Class practical:* Testing for unsaturation with bromine on a microscale
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 282–284[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 4 / Lesson 93: Reactions of alkenes](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/94654a9b47804bf381479dbff9ba42df) [Testing for unsaturation with bromine on a microscale teacher sheet](https://edu.rsc.org/experiments/testing-for-unsaturation-with-bromine-on-a-microscale/552.article) | Analysis | AnalysisProblem solvingAdaptive learning |
| 98 | **Section 4: Organic chemistry**(e) Alcohols | **Students will be able to:** **4.29C know that alcohols contain the functional group −OH** **4.30C understand how to draw structural and displayed formulae for methanol, ethanol, propanol (*propan-1-ol only*) and butanol (*butan-1-ol only*), and name each compound; *the names propanol and butanol are acceptable*** | Activities:* Complete a table showing the name, molecular formula, structural formula and displayed formula of each the first four unbranched-chain alcohols.
* Create moly mod structures for different alcohols based on the name alone.
* Balance equations for the oxidation of ethanol.

Class practical:* The properties of alcohols.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 287–290[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 5 / Lesson 95: Alcohols](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/58cccc22666a4f9aa3ee37fa3cb2d969) [The properties of alcohols teacher sheet](https://edu.rsc.org/experiments/the-properties-of-alcohols/463.article) | Analysis | AnalysisProblem solvingAdaptive learning |
| 99 | **Section 4: Organic chemistry**(e) Alcohols | **Students will be able to:** **4.31C know that ethanol can be oxidised by:*** **burning in air or oxygen (complete combustion)**
* **reaction with oxygen in the air to form ethanoic acid (microbial oxidation)**
* **heating with potassium dichromate(VI) in dilute sulfuric acid to form ethanoic acid**
 | Activities:* Write an account of observations from practical and write chemical equations to explain observations.
* Write a chemical equation, using displayed formulae for the reactions of alcohol.

Class practical:* Oxidation of ethanol
* A microscale oxidation of alcohols
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 287–290[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 5 / Lesson 96: Reactions of alcohols](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/b77eead9d0ac481996280e5fb6ab19d3) [Oxidation of ethanol teacher sheet](https://edu.rsc.org/experiments/oxidation-of-ethanol/1757.article)[A microscale oxidation of alcohols teacher sheet](https://edu.rsc.org/experiments/a-microscale-oxidation-of-alcohols/553.article) | Analysis | AnalysisProblem solvingAdaptive learning |
| 100 | **Section 4: Organic chemistry**(e) Alcohols | **Students will be able to:** **4.32C know that ethanol can be manufactured by:*** **reacting ethene with steam in the presence of a phosphoric acid catalyst at a temperature of about 300 ºC and a pressure of about 60–70 atm**
 | Activities:* List the advantages and disadvantages this method of ethanol production
* Research uses of ethanol and link each use to the appropriate production method.
* Read and discuss news articles about ‘gasohol’ and biofuels.
* Balance equations for the production, combustion, and dehydration of ethanol.

Class practicals: * Dehydrating ethanol to form ethene.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 287–291[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 5 / Lesson 97: Manufacturing ethanol by hydration](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/272c863cfc564782ad0ddff73b6cabff)[Dehydrating ethanol to form ethene teacher sheet](https://edu.rsc.org/experiments/dehydration-of-ethanol-to-form-ethene/1718.article) | Analysis | AnalysisProblem solvingAdaptive learning |
| 101 | **Section 4: Organic chemistry**(e) Alcohols | **Students will be able to:** **4.32C know that ethanol can be manufactured by:*** **the fermentation of glucose, in the absence of air, at an optimum temperature of about 30 ºC and using the enzymes in yeast**

**4.33C understand the reasons for fermentation, in the absence of air, and at an optimum temperature.** | Activities:* List the advantages and disadvantages this method of production of ethanol.
* Provide students with a cartoon strip with the images but no text to explain how ethanol can be manufactured by the fermentation of glucose.
* Compare the two methods of ethanol production studied.

Demonstrations:* Fermentation
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 287–291[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 5 / Lesson 98: Fermentation](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/3878db6178e743b28c3682d22bcc0df9)[Fermentation teacher sheet](https://edu.rsc.org/experiments/fermentation-of-glucose-using-yeast/470.article) | Analysis | AnalysisProblem solvingAdaptive learning |
| 102 | **Section 3: Physical chemistry**(c) Reversible reactions and equilibria**Section 4: Organic chemistry**(c) Alkanes(d) Alkenes(e) Alcohols | Consolidation | Activities: * Review keywords relating to the previous topics.
* Multiple-choice questions to review prior knowledge.
* Re-teach previously identified challenging topics, anticipating where errors/misconceptions arise.
* Modelling how to answer questions.
* Students mark exemplar work using mark schemes.
 | Relevant textbook pages from topics assessed. | Critical thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Executive function Innovation  | Critical thinking Problem solving Analysis Reasoning Interpretation Continuous learning Initiative Self-direction Responsibility Perseverance Productivity Self regulation (metacognition, forethought, reflection) Integrity Self- monitoring/self- evaluation/self- reinforcement  |
| 103 | Assessment  | Activities:* Students complete assessment using exam questions related to topics.
 | [Examwizard](https://www.examwizard.co.uk/) for access to exam questions.  |
| 104 | Feedback | Activities:* Identify misconceptions through marking and re-teach.
* Use new models/examples in re-teach.
* What went well/even better if examples of student work and improve.
* Multiple choice questions based on re-teach.
* Students re-attempt same/similar questions to check for progress and asses using mark schemes.
 | Relevant textbook pages from topics assessed. |
| 105 | **Section 4: Organic chemistry**(f) Carboxylic acids | **Students will be able to:** **4.34C know that carboxylic acids contain the functional group**   **4.35C understand how to draw structural and displayed formulae for unbranched-chain carboxylic acids with up to four carbon atoms in the molecule, and name each compound****4.37C know that vinegar is an aqueous solution containing ethanoic acid.** | Activities:* Complete a table showing the name, molecular formula, structural formula and displayed formula of each the first four unbranched-chain carboxylic acids.
* Discussion of where carboxylic acids are found: vinegar, bee or ant stings, milk, fruit.…
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book:** pp. 289–295 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 5 / Lesson 99: Carboxylic acids](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/2caee594e6e049d6b37d092c442229b1)  | Analysis | AnalysisProblem solvingAdaptive learning |
| 106 | **Section 4: Organic chemistry**(f) Carboxylic acids | **Students will be able to:** **4.36C describe the reactions of aqueous solutions of carboxylic acids with metals and metal carbonates** | Activities:* Reactions of carboxylic acids – less or more reactive than other laboratory acids.
* Predict products formed from a range of reactions between different carboxylic acids and metals/metal carbonates.
* Balance equations for the reactions of ethanoic acid.

Demonstration:* The acidic reactions of ethanoic acid
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 289–295 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 5 / Lesson 100: Reactions of carboxylic acids](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/2ff2402265b94121b1a774447459308b)[The acidic reactions of ethanoic acid teacher sheet](https://edu.rsc.org/experiments/the-acidic-reactions-of-ethanoic-acid/462.article) | Analysis | AnalysisProblem solvingAdaptive learning |
| 107 | **Section 4: Organic chemistry**(g) Esters | **Students will be able to:** **4.38C know that esters contain the functional group****4.39C know that ethyl ethanoate is the ester produced when ethanol and ethanoic acid react in the presence of an acid catalyst****4.40C understand how to write the structural and displayed formulae of ethyl ethanoate****4.41C understand how to write the structural and displayed formulae of an ester, given the name or formula of the alcohol and carboxylic acid from which it is formed and vice versa****4.42C know that esters are volatile compounds with distinctive smells and are used as food flavourings and in perfumes** | Activities:* Discussion/research of where esters are found: flavourings, odorants.
* Review naming system used and compare to alcohols and carboxylic acids.
* Draw diagrams to summarise how esters form.
* Students given the name of different esters and have to draw the structural and displayed formula in a table.

Class practicals:* Making esters from alcohols and acids
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 298–299[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 5 / Lesson 103: Esters](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/f32d0db89c0e4073a90b45a759eb1322)[Making esters from alcohols and acids teacher sheet](https://edu.rsc.org/experiments/making-esters-from-alcohols-and-acids/1743.article) | Analysis | AnalysisProblem solvingAdaptive learning |
| 108 | **Section 4: Organic chemistry**(g) Esters | **Students will be able to:** **4.43C *practical: prepare a sample of an ester such as ethyl ethanoate.*** | Class practicals:* Prepare a sample of an ester such as ethyl ethanoate.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: p. 300**Pearson Edexcel International GCSE (9–1) Chemistry Lab Book**: pp. 45–46[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 5 / Lesson 104: Core practical – preparing esters](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/5c6fb35fe8cd40b7961d9b55e57e8319)[Prepare a sample of an ester such as ethyl ethanoate teacher support.](https://pmt.physicsandmathstutor.com/download/Chemistry/GCSE/Notes/Edexcel-IGCSE/Practical-Skills/12.%20Preparing%20Esters.pdf) | Analysis | AnalysisProblem solvingAdaptive learning |
| 109  | **Section 4: Organic chemistry**(h) Synthetic polymers | **Students will be able to:** 4.44 know that an addition polymer is formed by joining up many small molecules called monomers4.45 understand how to draw the repeat unit of an addition polymer, including poly(ethene), poly(propene), poly(chloroethene) and (poly)tetrafluroethene4.46 understand how to deduce the structure of a monomer from the repeat unit of an addition polymer and vice versa | Activities:* Exercises in drawing the repeat unit of polymers and identifying the monomer given a polymer’s repeat unit.
* Research different addition polymers and explain why they are good for that use.

Demonstrations:* The nylon rope trick
* Making rayon

Class practicals: * Identifying polymers
* Addition polymerisation with phenylethene
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 302–307 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 5 / Lesson 105: Addition polymers](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/3a2981da0d0e4f798c0a79865ee6e48e) [The nylon rope trick teacher sheet](https://edu.rsc.org/experiments/making-nylon-the-nylon-rope-trick/755.article) [Making rayon teacher sheet](https://edu.rsc.org/experiments/making-rayon/1745.article)[Identifying polymers teacher sheet](https://edu.rsc.org/experiments/identifying-polymers-by-density/385.article)[Addition polymerisation with phenylethane teacher sheet](https://edu.rsc.org/experiments/addition-polymerisation-with-phenylethene/479.article) | Analysis  | AnalysisProblem solvingAdaptive learning |
| 110 | **Section 4: Organic chemistry**(h) Synthetic polymers | **Students will be able to:** **4.48C know that condensation polymerisation, in which a dicarboxylic acid reacts with a diol, produces a polyester and water****4.49C understand how to write the structural and displayed formula of a polyester, showing the repeat unit, given the formulae of the monomers from which it is formed including the reaction of ethanedioic acid and ethanediol:** | Activities:* Draw the structural and displayed formula of polyester.
* Represent equations for condensation polymerisation reactions.
* Research different condensation polymers and explain why they are good for that use.
* Compare condensation polymers to addition polymers.

Class practical* Urea-methanal polymerisation
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 308–310[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 5 / Lesson 107: Condensation polymers](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/3d172ae1f72c4260a3517f38e48e2edb) [Urea-methanal polymerisation teacher sheet](https://edu.rsc.org/experiments/urea-methanal-polymerisation/1784.article) | Analysis  | AnalysisProblem solvingAdaptive learning |
| 111 | **Section 4: Organic chemistry**(h) Synthetic polymers | **Students will be able to:** 4.47 explain problems in the disposal of addition polymers, including:* their inertness and inability to biodegrade
* the production of toxic gases when they are burned

**4.50C know that some polyesters, known as biopolyesters, are biodegradable.** | Activities:* Research the uses and environmental impact of addition and condensation polymers and linking these to the polymers’ properties.
* Suggest alternative ways to dispose of addition polymers that reduce the environmental damage.
* Analyse data to evaluate the impact of different polymers
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 307–310[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 5 / Lesson 106: Addition polymer disposal](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/d017ffe334d348608f424e9684839193)[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 5 / Lesson 108: Condensation polymer disposal](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/8b85bf5570744eb68c01d82f3822627d)  | Analysis Problem solving | AnalysisProblem solvingAdaptive learningPersonal and social responsibility  |
| 112 | **Section 1: Principles of chemistry**(i) Electrolysis | **Students will be able to:** 1.51 know that covalent compounds do not usually conduct electricity**1.55C understand why covalent compounds do not conduct electricity****1.56C understand why ionic compounds conduct electricity only when molten or in aqueous solution****1.57C know that anion and cation are terms used to refer to negative and positive ions respectively.** | Activities:* Label diagram of electrolysis diagram, including the movement of ions.
* Classify a range of ions as either cations or anions and determine what electrode they would move to.
* Plan an experiment to distinguish between electrolyte and non-electrolyte.

Class practicals:* Migration of coloured ions.
* Electrolysis of brine.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 76, 92, 96, 101–102[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 5 / Lesson 109: Introduction to electrolysis](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/c75be35ba087465f9d42828893e2eb0c)[Migration of coloured ions teacher sheet](https://edu.rsc.org/exhibition-chemistry/migration-of-coloured-ions/2020064.article)[Electrolysis of brine teacher sheet](https://edu.rsc.org/experiments/electrolysis-of-brine/735.article) | AnalysisReasoning | AnalysisReasoningInterpretation |
| 113 | **Section 1: Principles of chemistry**(i) Electrolysis | **Students will be able to:** **1.58C describe experiments to investigate electrolysis, using inert electrodes, of molten compounds (including lead(II) bromide) and aqueous solutions (including sodium chloride, dilute sulfuric acid and copper(II) sulfate) and to predict the products****1.59C write ionic half-equations representing the reactions at the electrodes during electrolysis and understand why these reactions are classified as oxidation or reduction** | Activities:* Determine ions present in compounds and aqueous solutions, and what electrode they would move to.
* Write ionic half- equations at each electrode for the electrolysis experiments.
* Predict products and write ionic half- equations at each electrode for a range of different molten compounds.

Demonstration:* The electrolysis of molten lead bromide.
* The electrolysis of copper(II) sulfate solution
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 103–106 [Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 5 / Lesson 110: Electrolysis of molten compounds](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/f204422f5c854854951e97634f989373)[The electrolysis of molten lead bromide teacher sheet](https://edu.rsc.org/experiments/electrolysis-of-molten-leadii-bromide/1725.article)[The electrolysis of copper (II) sulfate solution teacher sheet](https://edu.rsc.org/experiments/electrolysis-of-copperii-sulfate-solution/476.article) | InterpretationExecutive function | InterpretationExecutive functionResponsibility |
| 114 | **Section 1: Principles of chemistry**(i) Electrolysis | **Students will be able to:** **1.60C *practical: investigate the electrolysis of aqueous solutions.*** | Class practicals: * Investigate the electrolysis of aqueous solutions.
 | **Pearson Edexcel International GCSE (9–1) Chemistry Student Book**: pp. 106–109**Pearson Edexcel International GCSE (9–1) Chemistry Lab Book**: pp. 13–15[Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub / Term 5 / Lesson 112: Core practical – Investigate the electrolysis of aqueous solutions](https://pearsonteachinghubs.lms.pearsonconnexus.com/teacher/31058907/activity/102d6436ab07477cbeef3a84df50319a)[Practical video](https://www.youtube.com/watch?v=AiEpVTySk70&t=1s)[Practical teacher sheet](https://www.pearson.com/content/dam/one-dot-com/one-dot-com/uk/documents/subjects/science/GCSE-core-practical-sheets/Chemistry/cp4-electrolysis-copper-sulfate-ts.pdf)[Practical student sheet](https://www.pearson.com/content/dam/one-dot-com/one-dot-com/uk/documents/subjects/science/GCSE-core-practical-sheets/Chemistry/cp4-electrolysis-copper-sulfate.pdf) | InterpretationExecutive function | InterpretationDecision makingExecutive functionResponsibilityTeamwork |
| 115 | **Section 4: Organic chemistry**(f) Carboxylic acids(g) Esters(h) Synthetic polymers**Section 1: Principles of chemistry**(i) Electrolysis | Consolidation | Activities: * Review keywords relating to the previous topics.
* Multiple-choice questions to review prior knowledge.
* Re-teach previously identified challenging topics, anticipating where errors/misconceptions arise.
* Modelling how to answer questions.
* Students mark exemplar work using mark schemes.
 | Relevant textbook pages from topics assessed. | Critical thinking Problem solving Analysis Reasoning Interpretation Decision making Adaptive learning Executive function Innovation  | Critical thinking Problem solving Analysis Reasoning Interpretation Continuous learning Initiative Self-direction Responsibility Perseverance Productivity Self regulation (metacognition, forethought, reflection) Integrity Self- monitoring/self- evaluation/self- reinforcement  |
| 116 | Assessment  | Activities:* Students complete assessment using exam questions related to topics.
 | [Examwizard](https://www.examwizard.co.uk/) for access to exam questions.  |
| 117 | Feedback | Activities:* Identify misconceptions through marking and re-teach.
* Use new models/examples in re-teach.
* What went well/even better if examples of student work and improve.
* Multiple choice questions based on re-teach.
* Students re-attempt same/similar questions to check for progress and asses using mark schemes.
 | Relevant textbook pages from topics assessed. |
| 118-120 | ***These lessons are allocated for revision and exam time but can also be used flexibly if you want to spend more time on certain topics or embed more frequent assessments throughout the year.*** |