Acids, bases and salts: diagnostic review

Teacher / technician

YEAR 10 / LESSON 58 / CHEMISTRY + SCIENCE (DOUBLE AWARD)

Staff preparation and answer guidance. Keep separate from student sheets. Original desk-based review; shared-core questions plus clearly separated Chemistry-only extension. No chemical handling and no exam-board mark-scheme claim.

Coverage and delivery

Shared review: 2.28–2.32 and 2.34–2.39/2.42. Questions 5–6 are Chemistry-only extensions (2.33C, 2.40C–2.41C/2.43C).

Allow about 60 minutes. Follow the student sequence and use the answers to check reasoning.

Requisition • class of 30, working in 15 pairs

Item	Per pair / setup	Class total
Booklet / writing tools	1 per learner	30 sets
Calculator / periodic table	1 calculator each; table per pair	30 calculators; 15 tables

Immediate safety

No laboratory reagents or heating. Written references to lead compounds do not authorise a pupil experiment.

Preparation and delivery

Read alongside the student method

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1. Provide 30 booklets, calculators and 15 periodic tables. Do not issue reagents; the lead-salt question is written reasoning only.

2. Use 10 minutes retrieval, 20 independent work, 15 feedback, 10 rewriting and 5 exit ticket. Require shared-core learners to attempt questions 1–4 only; extension questions are explicitly separate.

3. Collect diagnostic categories rather than an invented examination grade. Accept correct equivalent equations and explanations; ask pupils to show why each method step is necessary.

4. Do not mark an observation correct merely because it matches an expected colour. The questions test what can be inferred from evidence.

5. For the final shared-core improvement task, require distinct filtration and crystallisation stages, and the difference between surface drying and dehydration of a hydrate.

Close of lesson

• Keep corrected answers and return shared materials.

Check before teaching

Check the cards, reference data and quantities against this requisition. Keep the staff answer guide separate until the checking stage. Supplied numerical practice datasets are labelled examples; they are not class measurements.

Answers and teaching notes

Expected explanations • do not give as experimental observations

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• Not necessarily. Yellow methyl orange permits pH above about 4.4; colourless phenolphthalein permits pH below about 8.2. The overlap includes acidic, neutral and alkaline values. Two such colours do not establish exactly pH 7.

• CuO is an insoluble base. NH_3 accepts H^+ to form NH_4^+ and need not contain OH^- initially. Alkalis are the soluble subset of bases.

• Use warm dilute acid and small portions of CuO until a little remains after reaction; filter off excess, keep filtrate, concentrate gently, cool/crystallise and blot surface liquid. Avoid strong heating of hydrated crystals.

• $MgO + 2HCl \rightarrow MgCl_2 + H_2O$. $CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$. Fizzing indicates gas formation but a specific gas test is needed for identification.

• Chemistry only: 19.60 and 19.65; mean 19.625 cm^3 (19.63 to 2 d.p.). Exclude 20.30. Repeat the measured reacting volumes in clean apparatus without indicator, then concentrate/crystallise.

• Chemistry only: $Pb(NO_3)_2 + Na_2SO_4 \rightarrow PbSO_4 + 2NaNO_3$; $Pb^{2+}(aq) + SO_4^{2-}(aq) \rightarrow PbSO_4(s)$. Wash away soluble contamination, dry under staff control, collect solids and all liquids as lead waste.

• Exit-ticket check: insoluble describes low solubility, neutral acid–base balance, pure composition and dry absence of adhering liquid. A dry hydrate still contains crystal water.

References and provenance

Pearson Chemistry specification

Prepared 22 November 2026. Original wording, tables and questions. Sources inform the concepts and technique; the lesson scope and classroom quantities are explicitly described here. No laboratory trial or final school risk approval is claimed.