Ethanoic acid: metals and carbonates

Teacher / technician

YEAR 11 / LESSON 100 / CHEMISTRY ONLY

Staff preparation and answer guidance. Keep separate from student sheets. Small-scale qualitative comparison; no flame tests or quantitative acid-strength determination.

Coverage and delivery

Chemistry only: 4.36C–4.37C. Dilute ethanoic acid reactions; vinegar is an aqueous mixture containing ethanoic acid.

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
Tubes / rack / protection	3 tubes, 1 rack; goggles each	45 tubes; 15 racks; 30 goggles
0.050 M ethanoic acid	15 cm^3 per pair	300 cm^3 including spare
Magnesium / carbonate	1 cm strip / up to 0.5 cm^3	15 strips; 20 cm^3 0.40 M carbonate

Immediate safety

Wear eye protection; keep tubes open, avoid splashes and keep all flames away. Do not taste vinegar or laboratory solutions.

Preparation and delivery

Read alongside the student method

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1. For 15 pairs provide 225 cm³ 0.050 M ethanoic acid; prepare 300 cm³ including spare. Provide 15 pre-cut 1 cm magnesium strips and 20 cm³ 0.40 M sodium carbonate including spare; pupils use at most 0.5 cm³ per pair.

2. Provide 45 tubes, 15 racks/cylinders, separate labelled droppers, forceps, waste vessels and 30 eye protectors. Staff clean surface oxide from magnesium if required, away from pupils; issue only small strips.

3. Wear eye protection and prevent splashes. Hydrogen is flammable; extinguish all flames and do not collect or ignite gas. Keep tubes open and point away from faces. Sodium carbonate at this concentration can irritate.

4. Trial the dilute-acid reaction locally; it may be slow and magnesium may remain. Do not increase concentration during class to force a visible result. No hydrochloric-acid comparison or pH-indicator solvent is included.

5. Staff collect residual magnesium separately and manage solutions under the local disposal plan. Do not place reacting metal in sealed waste. Allow 10 minutes setup, 20 observation and 30 equations/cleanup.

Close of lesson

- Staff collect remaining metal and solutions under the local waste plan. Wash equipment and hands.

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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- Accept actual observations; expected gas evolution may be slow for dilute weak acid and surface-coated metal.
- Magnesium ethanoate and hydrogen.
- Sodium ethanoate, carbon dioxide and water.
- $2CH_3COOH + Mg \rightarrow (CH_3COO)_2Mg + H_2$; $2CH_3COOH + Na_2CO_3 \rightarrow 2CH_3COONa + CO_2 + H_2O$.
- It shows whether changes occur without adding the tested reactant; other variables remain matched.
- Different gases can form bubbles; independent tests are needed. Hydrogen gives a lighted-splint pop; CO_2 makes limewater cloudy, described only here.

References and provenance

Pearson Chemistry specification

RSC dilute ethanoic-acid reactions

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.