Q1. Jack is investigating acids and metals. (Total 4 marks)

(a) What gas is produced when magnesium reacts with hydrochloric acid? (2 marks)

- Hydrogen / H_2. **Accept:** "hydrogen gas".
    - Answer: Hydrogen / H_2. (1 mark)
- **Any clear alternative** mention that it is flammable / pops with a lit splint — can be rewarded as second mark if stated. (1 mark)

(b) Write a word equation for the reaction of magnesium with hydrochloric acid. (2 marks)

- Magnesium + hydrochloric acid → magnesium chloride + hydrogen. (1 mark for correct reactants and products, 1 mark for correct order/word equation format)
    - e.g. "magnesium + hydrochloric acid → magnesium chloride + hydrogen" (2 marks)
    - Minor spelling errors accepted if meaning is clear.

Q2. Tom tests different metals with sulfuric acid. (Total 3 marks)

(a) Which metal reacts fastest with dilute acid: magnesium, copper, or zinc? (1 mark)

- **Magnesium.** (1 mark)

(b) Explain why copper does not react with dilute acid. (2 marks)

- Copper is **less reactive** than hydrogen / below hydrogen in the reactivity series. (1 mark)
- Therefore it **cannot displace hydrogen** from the acid / no reaction occurs. (1 mark)
    - Alternative wording: "no reaction because copper is unreactive with dilute acids" gains marks if both ideas covered.

Q3. Harry investigates the reactivity series. (Total 4 marks)

(a) State what is meant by the reactivity series. (2 marks)

- A **list/ranking of metals** in order of their reactivity. (1 mark)
- It shows which metals **displace others / which react more readily** (with water, acids or displace ions). (1 mark)

(b) Explain why potassium reacts more vigorously with water than sodium. (2 marks)

- Potassium has a **larger atomic radius / outer electron is further from nucleus** (or greater electron shielding). (1 mark)
- So its outer electron is **lost more easily** (lower ionisation energy) → reacts more vigorously. (1 mark)

Q4. Ben observes displacement reactions. (Total 4 marks)

(a) Write the word equation for the reaction of iron with copper(II) sulfate solution. (2 marks)

- Iron + copper(II) sulfate → iron(II) sulfate + copper. (1 mark for correct reactants/products, 1 mark for correct products formed)
    - Alternative correct ionic/ symbol equation acceptable in words for full marks.

(b) Explain why iron can displace copper from copper(II) sulfate. (2 marks)

- Iron is **more reactive** than copper / above copper in the reactivity series. (1 mark)
- Therefore iron **displaces copper ions** ($Fe \rightarrow Fe^{2+}$; $Cu^{2+} \rightarrow Cu$) forming iron(II) sulfate and solid copper. (1 mark)

Q5. Daniel tests acids with indicators. (Total 3 marks)

(a) Name an indicator that turns red in acids. (1 mark)

- **Litmus** (turns red in acid) OR **methyl orange** (red in strong acids; orange->red depending) — accept **methyl orange**, **litmus**. (1 mark)

(b) Describe the colour change of universal indicator from acid to alkali. (2 marks)

- Colour changes from **red/orange** in acid through **yellow/green** (neutral) to **blue/purple** in alkali. (Award marks for two clear steps)
    - e.g. “red → green → purple” (1 mark for acid colour and alkali colour; 1 mark for intermediate/ direction)
    - Accept variations if they show acid (red/orange) and alkali (blue/purple).

Q6. Oliver investigates neutralisation reactions. (Total 4 marks)

(a) Write the word equation for the reaction between hydrochloric acid and sodium hydroxide. (2 marks)

- Hydrochloric acid + sodium hydroxide → sodium chloride + water. (1 mark for correct reactants/products, 1 mark for correct word equation format)

(b) Explain what happens to the hydrogen ions (H^+) during neutralisation. (2 marks)

- H^+ ions **react with OH^- ions** from the base. (1 mark)
- They form **water (H_2O)**. (1 mark)

Q7. Ethan studies the pH scale. (Total 4 marks)

(a) What is the pH of a neutral solution? (1 mark)

- **pH 7.** (1 mark)

(b) State whether a solution of hydrochloric acid with pH 2 is strong or weak. (1 mark)

- **Strong acid.** (1 mark)

(c) Explain what happens to the concentration of H^+ ions as the pH decreases. (2 marks)

- As pH decreases, **[H^+] increases**. (1 mark)
- Each pH unit change corresponds to a **tenfold change** in hydrogen ion concentration (accept “pH 2 has more H^+ than pH 3 by ten times” as supporting). (1 mark)

Q8. Sam investigates metal oxides. (Total 3 marks)

(a) Which type of metal oxides are soluble in acids: basic or acidic? (1 mark)

- **Basic (metal) oxides**. (1 mark)

(b) Explain why magnesium oxide reacts with hydrochloric acid. (2 marks)

- Magnesium oxide is a **basic oxide** (1 mark)
- It **reacts with acid to form a salt (magnesium chloride) and water** (neutralisation). (1 mark)

Q9. Charlie studies reactions of acids with carbonates. (Total 3 marks)

(a) What gas is produced when hydrochloric acid reacts with calcium carbonate? (1 mark)

- **Carbon dioxide (CO_2).** (1 mark)

(b) Write a word equation for the reaction of hydrochloric acid with calcium carbonate. (2 marks)

- Calcium carbonate + hydrochloric acid → calcium chloride + carbon dioxide + water. (1 mark for correct reactants/products, 1 mark for correct word equation format)

Q10. Noah investigates the reactivity of metals. (Total 3 marks)

(a) Which is more reactive: zinc or iron? (1 mark)

- **Zinc** (1 mark)

(b) Explain why a more reactive metal displaces a less reactive metal from its compound. (2 marks)

- More reactive metal **loses electrons more easily** / forms ions more readily. (1 mark)

- Therefore it **reduces** the ion of the less reactive metal to the element and displaces it. (1 mark)

Q11. William tests acids with different indicators. (Total 4 marks)

(a) State the pH range of an acidic solution. (1 mark)

- **pH < 7** (1 mark)

(b) Name one indicator that can be used to measure pH. (1 mark)

- **Universal indicator**, **litmus**, or **methyl orange**. (1 mark)

(c) Describe the colour change of methyl orange in acids and alkalis. (2 marks)

- **Acid:** methyl orange turns **red / orange-red**. (1 mark)
- **Alkali:** methyl orange turns **yellow**. (1 mark)

Q12. Alex observes neutralisation. (Total 4 marks)

(a) Explain what is meant by neutralisation. (2 marks)

- Reaction between an **acid and a base / alkali** (1 mark)
- Producing a **salt and water** (1 mark)

(b) Give the general ionic equation for the reaction of an acid with a metal hydroxide. (2 marks)

- $H^+ + OH^- \rightarrow H_2O$ (1 mark for correct ions, 1 mark for correct product water)
    - Alternative: $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$ (full ionic equation for full clarity).

Q13. Jacob investigates displacement reactions. (Total 4 marks)

(a) Write a word equation for the reaction of zinc with copper(II) sulfate solution. (2 marks)

- Zinc + copper(II) sulfate → zinc sulfate + copper. (1 mark reactants/products, 1 mark correct word equation)

(b) Explain why zinc displaces copper from copper(II) sulfate. (2 marks)

- Zinc is **more reactive** than copper / above copper in reactivity series (1 mark)
- Zinc **reduces Cu^{2+} to Cu (solid)** and itself is oxidised to Zn^{2+} forming zinc sulfate (1 mark)

Q14. James studies acids and alkalis. (Total 4 marks)

(a) Name a soluble base. (1 mark)

- **Sodium hydroxide (NaOH)**, **potassium hydroxide (KOH)** etc. (1 mark)

(b) Explain what happens when an acid reacts with a soluble base. (2 marks)

- They **neutralise** (1 mark)
- Form a **salt and water** (1 mark)

(c) Give one example of a neutralisation reaction. (1 mark)

- e.g. **$HCl + NaOH \rightarrow NaCl + H_2O$** (word or symbol equation acceptable). (1 mark)

Q15. Luke investigates acids and metals. (Total 5 marks)

(a) Magnesium reacts with hydrochloric acid to produce hydrogen. Write the symbol equation. (2 marks)

- **$Mg + 2HCl \rightarrow MgCl_2 + H_2$** (1 mark for correct species, 1 mark for correct balancing)

(b) Explain why the reaction rate increases if the magnesium is powdered. (2 marks)

- Powdering **increases surface area** (1 mark)

- More surface area → **more frequent collisions** between reactant particles → faster reaction (1 mark)

(c) State one safety precaution Luke should take when handling hydrochloric acid. (1 mark)

- **Wear goggles and gloves / use a fume hood / add acid to water carefully** — any reasonable safety precaution. (1 mark)

Q16. Jack investigates reactions between metals and acids.

(a) What is produced when zinc reacts with hydrochloric acid?

- Hydrogen gas (1 mark)
- Zinc chloride (1 mark)
  [2 marks]

(b) Word equation:

- Zinc + Hydrochloric acid → Zinc chloride + Hydrogen (2 marks total)
  - Correct reactants and products (1 mark)
  - Correct word equation structure (1 mark)
    [2 marks]

Total: 4 marks

Q17. Tom is studying the reactivity of metals.

(a) Which metal is more reactive: iron or magnesium?

- Magnesium (1 mark)
  [1 mark]

(b) Explanation:

- Magnesium is higher in the reactivity series (1 mark)
- Therefore reacts faster/more vigorously with acids (1 mark)
  [2 marks]

Total: 3 marks

Q18. Harry is investigating displacement reactions.

(a) Word equation:

- Iron + Copper sulfate → Iron sulfate + Copper (2 marks)
    - Correct reactants (1 mark)
    - Correct products (1 mark)
      [2 marks]

(b) Explanation:

- Iron is more reactive than copper (1 mark)
- So iron displaces copper from its compound (1 mark)
  [2 marks]

Total: 4 marks

Q19. Ben tests acids using indicators.

(a) Indicator that turns red in acids:

- Litmus (1 mark)
  [1 mark]

(b) Universal indicator in alkali:

- Turns blue/purple (1 mark)
- Correctly identifies it as showing high pH/basic (1 mark)
  [2 marks]

Total: 3 marks

Q20. Daniel investigates neutralisation.

(a) Word equation:

- Hydrochloric acid + Sodium hydroxide → Sodium chloride + Water (2 marks)
    - Correct reactants (1 mark)
    - Correct products (1 mark)
      [2 marks]

(b) Explanation:

- H^+ ions from acid combine with OH^- ions from alkali (1 mark)
- To form water (1 mark)
  [2 marks]

Total: 4 marks

Q21. Oliver is learning about the pH scale.

(a) pH of neutral solution:

- 7 (1 mark)
  [1 mark]

(b) Solution with pH 12:

- Alkaline (1 mark)
  [1 mark]

(c) Explanation:

- As pH increases, H^+ concentration decreases (1 mark)
- Correct reference to inverse logarithmic scale accepted (1 mark)
  [2 marks]

Total: 4 marks

Q22. Ethan is testing metal oxides.

(a) Which type soluble in acids:

- Basic oxides (1 mark)
  [1 mark]

(b) Explanation:

- Calcium oxide is a base (1 mark)
- Neutralises acid to form salt + water (1 mark)
  [2 marks]

Total: 3 marks

Q23. Sam studies reactions of acids with carbonates.

(a) Gas produced:

- Carbon dioxide (1 mark)
  [1 mark]

(b) Word equation:

- Hydrochloric acid + Calcium carbonate → Calcium chloride + Carbon dioxide + Water (2 marks)
  - Correct reactants (1 mark)
  - Correct products (1 mark)
    [2 marks]

Total: 3 marks

Q24. Charlie is learning about the reactivity series.

(a) More reactive:

- Zinc (1 mark)
  [1 mark]

(b) Explanation:

- A more reactive metal can displace a less reactive one (1 mark)
- Because it more readily loses electrons/forms ions (1 mark)
  [2 marks]

Total: 3 marks

Q25. Noah investigates acids with indicators.

(a) Indicator to measure pH:

- Universal indicator / pH probe (1 mark)
  [1 mark]

(b) Methyl orange:

- Red in acid (1 mark)
- Yellow in alkali (1 mark)
  [2 marks]

Total: 3 marks

Q26. William observes neutralisation.

(a) Neutralisation explanation:

- Reaction between acid and base (1 mark)
- Produces salt + water (1 mark)
  [2 marks]

(b) General ionic equation:

- $H^+ + OH^- \rightarrow H_2O$ (2 marks)
    - Correct ions (1 mark)

- Correct product (1 mark)
  [2 marks]

Total: 4 marks

Q27. Alex investigates displacement reactions.

(a) Word equation:

- Zinc + Copper sulfate → Zinc sulfate + Copper (2 marks)
  - Correct reactants (1 mark)
  - Correct products (1 mark)
    [2 marks]

(b) Explanation:

- Zinc is more reactive than copper (1 mark)
- Displaces copper from solution (1 mark)
  [2 marks]

Total: 4 marks

Q28. Jacob is testing acids and bases.

(a) Soluble base:

- Sodium hydroxide / Potassium hydroxide (1 mark)
  [1 mark]

(b) Explanation:

- Acid reacts with base (1 mark)
- Produces salt and water (1 mark)
  [2 marks]

(c) Example:

- $HCl + NaOH \rightarrow NaCl + H_2O$ (1 mark)
  [1 mark]

Total: 4 marks

Q29. James investigates magnesium and hydrochloric acid.

(a) Symbol equation:

- $Mg + 2HCl \rightarrow MgCl_2 + H_2$ (2 marks)
  - Correct reactants (1 mark)
  - Correct products (1 mark)
    [2 marks]

(b) Explanation:

- Powdered Mg has larger surface area (1 mark)
- More frequent collisions → faster rate (1 mark)
  [2 marks]

(c) Safety precaution:

- Wear goggles / handle acid carefully (1 mark)
  [1 mark]

Total: 5 marks

Q30. Luke tests acids with metal carbonates.

(a) Gas produced:

- Carbon dioxide (1 mark)
  [1 mark]

(b) Word equation:

- Calcium carbonate + Nitric acid → Calcium nitrate + Carbon dioxide + Water (2 marks)
  [2 marks]

(c) Explanation:

- Gas bubbles due to CO_2 escaping (1 mark)
- Seen as effervescence (1 mark)
  [2 marks]

Total: 5 marks

Q31. Jack investigates reactivity with water.

(a) Faster metal:

- Potassium (1 mark)
  [1 mark]

(b) Explanation:

- Potassium is higher in reactivity series (1 mark)
- Reacts more vigorously with water (1 mark)
  [2 marks]

Total: 3 marks

Q32. Tom studies acids and hydrogen ions.

(a) Ion responsible for acidity:

- H^+ (1 mark)
  [1 mark]

(b) Explanation:

- Strong acids fully ionise (1 mark)

- Producing high concentration of H^+ → low pH (1 mark)
  [2 marks]

Total: 3 marks

Q33. Harry observes neutralisation.

(a) General word equation:

- Acid + Base → Salt + Water (1 mark)
  [1 mark]

(b) Alkali definition:

- A soluble base (1 mark)
- Produces OH^- ions in water (1 mark)
  [2 marks]

Total: 3 marks

Q34. Ben tests indicators.

(a) Indicator turning blue in alkali:

- Litmus (1 mark)
  [1 mark]

(b) Universal indicator from pH 3 → pH 10:

- Changes from red/orange (acid) → green (neutral) → blue/purple (alkali) (2 marks)
  [2 marks]

Total: 3 marks

Q35. Daniel investigates metal oxides.

(a) Oxides reacting with acids:

- Basic oxides (1 mark)
  [1 mark]

(b) Explanation:

- Magnesium oxide is a base (1 mark)
- Reacts with acid to form salt + water (1 mark)
  [2 marks]

Total: 3 marks

Q36. Oliver tests metals with acid.

(a) Symbol equation:

- $Mg + 2HCl \rightarrow MgCl_2 + H_2$ (2 marks)
  [2 marks]

(b) Explanation:

- Hydrogen ions in acid are reduced (1 mark)
- To form hydrogen gas (1 mark)
  [2 marks]

(c) Safety precaution:

- Wear goggles / use small amounts of acid (1 mark)
  [1 mark]

Total: 5 marks

Q37. Ethan observes displacement reactions.

(a) Word equation:

- Iron + Copper sulfate → Iron sulfate + Copper (2 marks)
  [2 marks]

(b) Explanation:

- Iron more reactive than copper (1 mark)
- Displaces copper (1 mark)
  [2 marks]

Total: 4 marks

Q38. Sam investigates acids and alkalis.

(a) Example of strong acid:

- Hydrochloric / Sulfuric / Nitric (1 mark)
  [1 mark]

(b) Explanation:

- Strong acids fully ionise (1 mark)
- Higher concentration of H^+ → lower pH (1 mark)
  [2 marks]

(c) Weak acid in vinegar:

- Ethanoic acid (1 mark)
  [1 mark]

Total: 4 marks

Q39. Charlie studies pH indicators.

(a) Methyl orange in acid:

- Red (1 mark)
  [1 mark]

(b) Methyl orange in alkali:

- Yellow (1 mark)
  [1 mark]

(c) Universal indicator explanation:

- Shows a range of colours (1 mark)
- Corresponding to gradual pH change (1 mark)
  [2 marks]

Total: 4 marks

Q40. Noah investigates acids with carbonates.

(a) Word equation:

- Magnesium carbonate + Hydrochloric acid → Magnesium chloride + Carbon dioxide + Water (2 marks)
  [2 marks]

(b) Effervescence explanation:

- CO_2 gas released (1 mark)
- Seen as bubbling (1 mark)
  [2 marks]

(c) Gas name:

- Carbon dioxide (1 mark)
  [1 mark]

Total: 5 marks

Q41. James investigates magnesium and hydrochloric acid.

(a) Balanced symbol equation:

- $Mg + 2HCl \rightarrow MgCl_2 + H_2$ (2 marks)
  - Correct formulae of reactants and products (1 mark)

- Correct balancing (1 mark)
  [2 marks]

(b) 3.0 g Mg → H_2 volume

- Step 1: Mr Mg = 24 (1 mark)
- Step 2: moles Mg = 3 ÷ 24 = 0.125 mol (1 mark)
- Step 3: 1 mol Mg → 1 mol H_2, so 0.125 mol H_2 formed (1 mark)
- Step 4: Volume = 0.125 × 24 = 3.0 L (1 mark)
  [4 marks]

Total: 6 marks

Q42. Tom studies reactivity with acids.

(a) Explanation:

- Zinc is more reactive than hydrogen (1 mark)
- So zinc displaces hydrogen from HCl (1 mark)
- Copper is less reactive than hydrogen so no reaction (1 mark)
  [3 marks]

(b) Prediction:

- Magnesium reacts vigorously (1 mark)
- Produces magnesium sulfate + hydrogen (1 mark)
  [2 marks]

Total: 5 marks

Q43. Harry investigates neutralisation.

(a) Ionic equation:

- $H^+ + OH^- \rightarrow H_2O$ (2 marks)
    - Correct ions (1 mark)
    - Correct product (1 mark)
      [2 marks]

(b) Explanation:

- Acid provides H^+ ions (1 mark)
- Base provides OH^- ions (1 mark)
- They combine to form water, leaving a salt in solution (1 mark)
  [3 marks]

Total: 5 marks

Q44. Ben studies pH and acidity.

(a) Explanation:

- Strong acids fully ionise (1 mark)
- Weak acids only partially ionise (1 mark)
- Strong acids therefore have higher $[H^+]$ → lower pH (1 mark)
  [3 marks]

(b) $pH = -\log[H^+]$

- $[H^+] = 10^{-2}$ mol/dm³ (2 marks)
    - Correct formula use (1 mark)
    - Correct answer (1 mark)
      [2 marks]

Total: 5 marks

Q45. Daniel observes displacement.

(a) Balanced symbol equation:

- $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$ (2 marks)
    - Correct formulae (1 mark)
    - Correct balancing (1 mark)
      [2 marks]

(b) Explanation:

- Iron more reactive than copper (1 mark)
- Displaces copper from solution (1 mark)
  [2 marks]

(c) Application:

- Extraction of metals / thermite welding / sacrificial protection (any 1 valid example) (1 mark)
- Explanation e.g. displacement provides desired product or prevents rusting (1 mark)
  [2 marks]

Total: 6 marks

Q46. Oliver and carbonates.

(a) Balanced symbol equation:

- $CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$ (2 marks)
  [2 marks]

(b) 10 g $CaCO_3 \rightarrow CO_2$

- Step 1: Moles $CaCO_3 = 10 \div 100 = 0.1$ mol (1 mark)
- Step 2: 1 mol $CaCO_3 \rightarrow$ 1 mol CO_2, so 0.1 mol CO_2 (1 mark)

- Step 3: Mass CO_2 = 0.1 × 44 = 4.4 g (1 mark)
  [3 marks]

Total: 5 marks

Q47. Ethan and reactivity series.

(a) Potassium vs sodium:

- Potassium is more reactive (1 mark)
- Has lower ionisation energy / loses electrons more easily (1 mark)
- Produces more vigorous/violent reaction (1 mark)
  [3 marks]

(b) Gold:

- Very low reactivity (1 mark)
- Lies below hydrogen in reactivity series, so does not react with water or acids (1 mark)
  [2 marks]

Total: 5 marks

Q48. Sam investigates oxides.

(a) Explanation:

- Magnesium oxide is basic and reacts with acids (1 mark)
- Copper oxide is less reactive, insoluble and does not react with dilute HCl (1 mark)
- Position in reactivity series explains difference (1 mark)
  [3 marks]

(b) Word equation:

- Magnesium oxide + Hydrochloric acid → Magnesium chloride + Water (2 marks)
  [2 marks]

Total: 5 marks

Q49. Charlie observes acids and bases.

(a) Strong vs weak:

- Strong acids fully ionise (1 mark)
- Weak acids only partially ionise (1 mark)
- Strong acids therefore give higher [H^+] at same concentration (1 mark)
  [3 marks]

(b) Example weak acid:

- Ethanoic acid / citric acid (1 mark)
  [1 mark]

(c) H^+ ions in neutralisation:

- H^+ combines with OH^- (1 mark)
- Forms water (1 mark)
  [2 marks]

Total: 6 marks

Q50. Noah and pH.

(a) Acidic pH range:

- 0–6 (accept <7) (1 mark)
  [1 mark]

(b) Universal indicator explanation:

- Shows a range of colours (1 mark)
- Each colour corresponds to a different pH (1 mark)
  [2 marks]

(c) pH 11:

- Alkaline (1 mark)
- Because >7 means excess OH^- ions (1 mark)
  [2 marks]

Total: 5 marks

Q51. William and neutralisation.

(a) General word equation:

- Acid + Metal hydroxide → Salt + Water (2 marks)
  [2 marks]

(b) Why called neutralisation:

- Acid's H^+ ions react with OH^- ions (1 mark)
- Cancel each other to form neutral water (1 mark)
  [2 marks]

(c) Example:

- $HCl + NaOH \rightarrow NaCl + H_2O$ (1 mark)
  [1 mark]

Total: 5 marks

Q52. Alex observes acids with metals.

(a) Gas produced:

- Hydrogen (1 mark)
  [1 mark]

(b) Explanation:

- Acid contains H^+ ions (1 mark)
- These are displaced/reduced to form H_2 gas (1 mark)
  [2 marks]

(c) Balanced symbol equation:

- $Mg + 2HCl \rightarrow MgCl_2 + H_2$ (2 marks)
  [2 marks]

Total: 5 marks

Q53. Jacob and displacement.

(a) Word equation:

- Zinc + Copper sulfate → Zinc sulfate + Copper (2 marks)
  [2 marks]

(b) Explanation:

- Zinc more reactive than copper (1 mark)
- Displaces copper from solution (1 mark)
  [2 marks]

(c) Industrial use:

- Extraction of metals (1 mark)
- Explanation e.g. used in thermite or sacrificial protection (1 mark)
  [2 marks]

Total: 6 marks

Q54. James and carbonates.

(a) Balanced symbol equation:

- $Na_2CO_3 + 2HCl \rightarrow 2NaCl + CO_2 + H_2O$ (2 marks)
  [2 marks]

(b) Explanation of bubbles:

- CO_2 gas released (1 mark)
- Seen as effervescence (1 mark)
  [2 marks]

(c) Safe gas collection:

- Use gas syringe / water displacement method (1 mark)
  [1 mark]

Total: 5 marks

Q55. Luke plans an experiment.

(6 marks max — allow 1 mark per key point)

- Apparatus: conical flask, delivery tube, gas syringe / measuring cylinder, acid + metal (1 mark)
- Add measured volume of acid to flask (1 mark)
- Add measured mass/size of metal (1 mark)
- Collect gas using syringe / displacement method (1 mark)
- Measure volume of gas at intervals / until reaction stops (1 mark)
- Repeat for reliability / compare metals (1 mark)

[6 marks]