

Evaluating experiments and suggesting improvements

Education in Chemistry

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Which investigation method, A or B, would be best to answer the research question?

Research question	Method A	Method B	A or B?
What volume of sulfuric acid is required to neutralise the magnesium hydroxide in one dose of milk of magnesia?	Fill a burette with sulfuric acid. Measure one dose of milk of magnesia into a conical flask and add a few drops of methyl orange. Record the initial value in the burette, then add the acid to the conical flask while swirling, until the solution turns clear, and remains peach coloured. Record the final volume on the burette. Repeat the procedure until you get two values within 0.1 cm^3 .	Fill a burette with sulfuric acid. Measure out a dose of milk of magnesia into a conical flask and add a few drops of methyl orange. Open the tap on the burette and start the timer. Swirl the conical flask. Stop timing when the solution turns clear and peach coloured.	
What is the order of reactivity for the halogens?	Take solutions of the halogens (chlorine, bromine and iodine), and add each of them to solutions of the halides (potassium chloride, potassium bromide, and potassium iodide) on a dropping tile. Observe any colour changes.	React each of the halogens (chlorine, bromine, and iodine) with hot iron wool. Record any observations during the reactions.	
Is the reaction between hydrochloric acid and sodium hydroxide exothermic or endothermic?	Measure out 25 cm^3 hydrochloric acid and place a thermometer in the beaker. When the temperature reading is stable, add 25 cm^3 of sodium hydroxide solution and stir with the thermometer. Record the temperature every 15 seconds for 3 minutes.	Put some hydrochloric acid into a beaker and place a thermometer in the beaker. When the temperature reading is stable, add some sodium hydroxide and stir with the thermometer. Record whether the temperature increases or decreases.	

<p>What is the initial rate of reaction for the reaction between magnesium ribbon and dilute hydrochloric acid?</p>	<p>Put 25 cm³ of dilute hydrochloric acid into a conical flask. Add 1 g magnesium ribbon to the flask, and collect the hydrogen produced over water. Record the time taken to produce 100 cm³ of hydrogen gas.</p>	<p>Put 25 cm³ of dilute hydrochloric acid into a conical flask. Add 1 g magnesium ribbon to the flask, and collect the hydrogen produced over water. Record the volume of hydrogen every 10 seconds until the reaction is complete.</p>	
<p>Is manganese(IV) oxide a catalyst for the decomposition of hydrogen peroxide?</p>	<p>Weigh out 0.5 g of manganese(IV) oxide. Add this to a solution of hydrogen peroxide and record any observations. Then filter off the remaining solid using pre-weighed filter paper, rinse with distilled water, leave to dry, and re-weigh the filter paper and solid.</p>	<p>Measure out 25 cm³ of hydrogen peroxide. Add 0.5 g of manganese(IV) oxide and collect the oxygen formed in a gas syringe. Record the time taken to form 50 cm³ of oxygen gas.</p>	
<p>What is the order of reactivity of iron, zinc and magnesium?</p>	<p>Hold iron wool in tongs, and heat in a Bunsen flame. When the wool starts to glow, lower it into a gas jar of pure oxygen. Record your observations. Repeat the experiment with zinc ribbon and then magnesium ribbon.</p>	<p>Measure out approximately 25 cm³ of copper sulfate solution into a polystyrene cup and place a thermometer in the solution. When the temperature reading is stable, add a spatula of iron powder. Record the maximum temperature. Repeat the procedure with zinc, and then magnesium.</p>	
<p>How does the rate of reaction between acid and marble change for different surface areas of marble chips?</p>	<p>Measure 25 cm³ of hydrochloric acid into a conical flask and place on a balance. Add 5 g of large marble chips and place cotton wool in the neck of the flask. Record the mass every 30 seconds for 3 minutes. Repeat using medium chips and then small chips.</p>	<p>Measure out 25 cm³ of hydrochloric acid. Add 5 g of large marble chips and collect the carbon dioxide formed in a gas syringe. Record the time taken to form 50 cm³ of oxygen gas. Repeat using medium chips and then small chips.</p>	