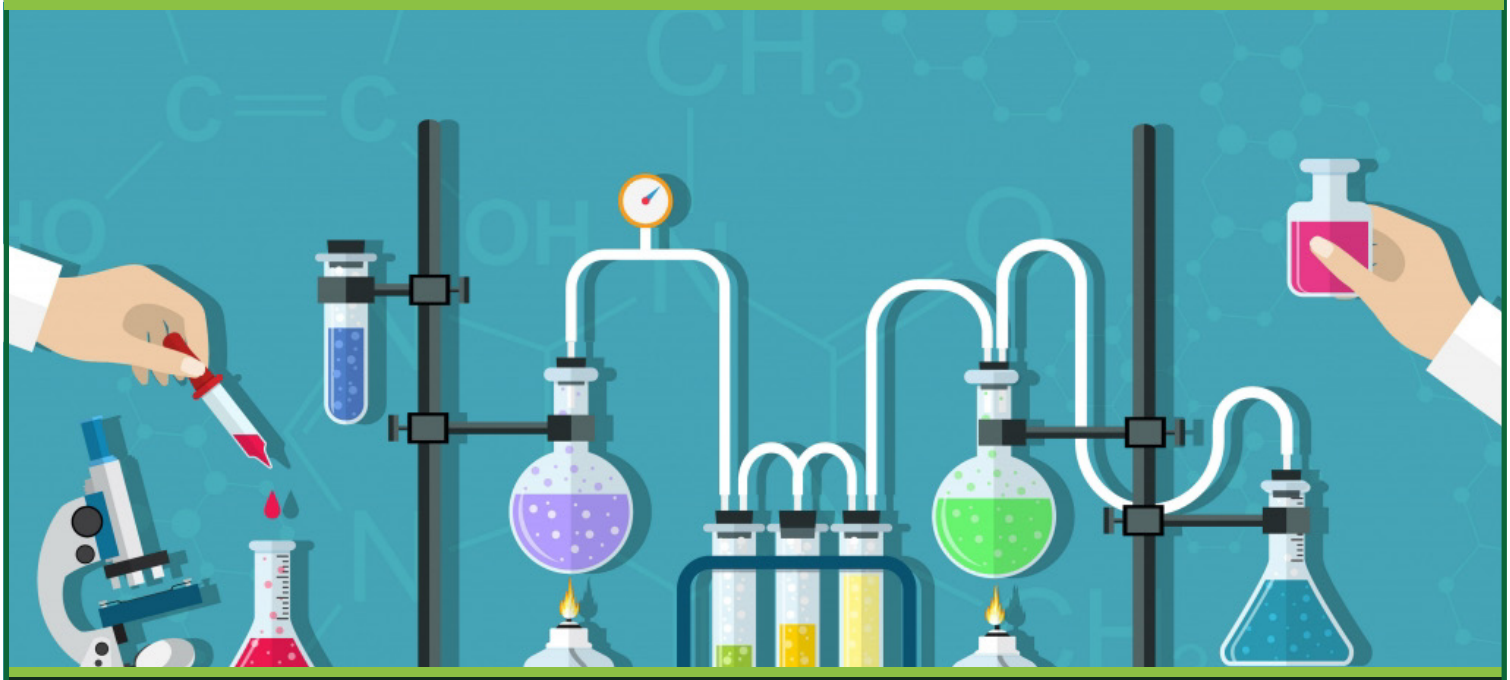
Bentley Wood
High School for Girls

Chemistry Bridging Work

Year 10 into 11 for 2025/26



Name: _____

Tutor Group: _____

Teacher: _____

Year 10 into 11 Chemistry Bridging Work

Congratulations on completing Year 10 and entering the final stage of your chemistry journey! This bridging work will help you review and reinforce key ideas from Year 10, ensuring a supported transition into Year 11. Your bridging work composes of two parts:

- **Exam analysis reflection for Chemistry-posted on Teams**
- **This booklet**

Exam analysis reflection: You should have completed the exam analysis sheet for paper 1 and paper 2 in lessons. Following this you should use the reflection document to choose appropriate reflection tasks based on the questions you answered. For each question in the paper, complete one task below and complete all work in purple pen.

If you scored highly, explore the Go Further options to stretch your understanding.

This bridging work booklet: There are three sections to this booklet.

1. Reviews of each Required Practical you have covered so far in chemistry with an opportunity to review different aspects of individual practical work;
2. Exam Question Practice – get into the mindset of an examiner! Practice some commonly tested exam questions in chemistry with top tips from our exam board, AQA.
3. Autumn Term Preparation

Together with this, there will be links to useful videos that directly link to the module/topic in case you need further support. Please also use your CGP and Kerboodle textbooks to support with your revision. Recommended Websites:

- Savemyexams
- BBC Bitesize
- AHammondBiology
- Thesciencehive

This is the first piece of work you will be assessed in September and will set the tone for the rest of the academic year. It's an opportunity for you to showcase your knowledge, skills, and growth since Year 10. Work hard, stay focused, and demonstrate what you are capable of achieving.

Section 1: Required Practicals

Recommended Videos (remember reactants / reagents can vary and will not always be the same!):

1. Preparation of a pure, dry salt
    a. Making Salts - GCSE Science Required Practical
    b. GCSE Chemistry - Neutralisation Reactions
2. Electrolysis
    a. Electrolysis - GCSE Science Required Practical
    b. GCSE Chemistry - Electrolysis Part 3 - Aqueous Solutions
3. Temperature Changes
    a. Temperature Changes - GCSE Science Required Practical
    b. AQA GCSE Science Revision Chemistry "Required Practical 4: Temperature Changes
4. Rates of Reaction
    a. Rates Of Reaction - GCSE Science Required Practical
    b. Rates Of Reaction 2 (Collecting Gas) - GCSE Science Required Practical

For any practical activity can students answer these 10 questions?

1. What is the dependent variable and the independent variable?
2. Therefore, what other factors could affect the results and need to be controlled (control variables)?
3. What will I measure or record?
4. What would an appropriate experimental control be?
5. How could I improve the accuracy of my experiment/investigation?
6. How could I improve the precision of my experiment/investigation?
7. How could I improve the validity of my experiment/investigation?
8. What else could I do with this experiment? What could I change to investigate something else?
9. What is my greatest source error?
10. What pattern or trend do my results show and how do I explain this?

Please note because not all investigations have all these characteristics, not all of these questions can be answered for all Required Practicals.

1 – Preparation of a pure, dry salt

Correctly order the steps to produce soluble salts:

_ Filter the excess solid out of the solution

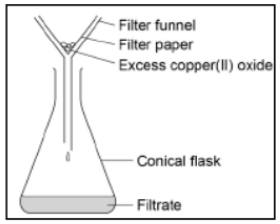
_ Keep adding the solid until no more reacts

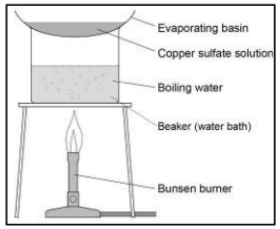
_ Heat the solution to evaporate some of the water

_ Leave the salt solution to cool and dry so it crystallises

_ React an acid with a solid insoluble substance (e.g. metal, metal oxide, or metal carbonate)

Name the separation technique shown in each diagram





Name the type of reaction that takes place when dilute hydrochloric acid reacts with calcium oxide.

Write a balanced symbol equation for the reaction of dilute hydrochloric acid with calcium oxide.

When carrying out this reaction, the student used an **excess** of calcium oxide. Why?

A student added solid calcium oxide to dilute hydrochloric acid in a beaker.
The student added solid calcium carbonate to dilute hydrochloric acid in another beaker.
Describe **one** difference between the two reactions that the student would **see**.

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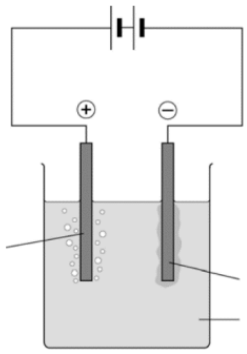
2 - Electrolysis

Label the diagram using the following words

anode **cathode** **salt solution**



Predict the products at each electrode in the electrolysis of:

Sodium bromide solution

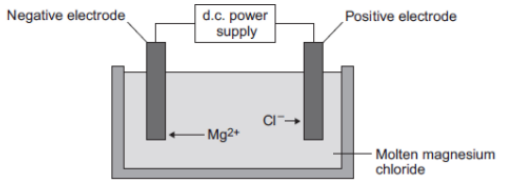
Positive electrode:

Negative electrode:

Copper nitrate solution

Positive electrode:

Negative electrode:



Why does the magnesium need to be molten?

What would you **see** at the positive electrode?

A student calculated the mass of magnesium produced and got these results

Experiment	Mass of magnesium produced in grams
1	1.13
2	0.63
3	1.11
4	1.09

Suggest **one** possible reason for the anomalous result.

Calculate the mean mass of magnesium

Complete the table to identify the element produced at each electrode

Solution	Positive electrode (anode)			Negative electrode (cathode)		
	Observations	Element formed	State	Observations	Element formed	State
Copper (II) chloride	Bubbles of gas Bleaches blue litmus white			Brown/red solid coating on rod		
Sodium chloride	Bubbles of gas Bleaches blue litmus white			Bubbles of gas (more rapid production)		

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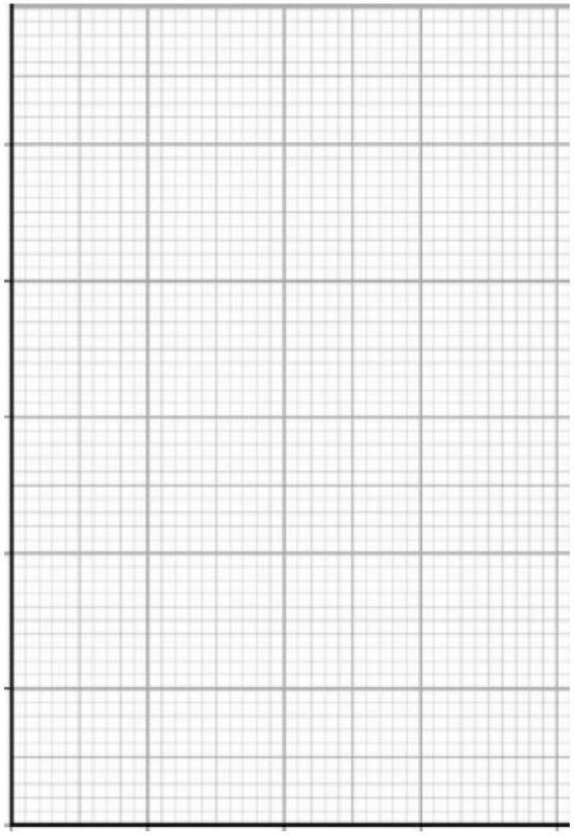
3 – Temperature changes

Total volume of NaOH added / cm^3	Mean maximum temperature / °C
0	22.5
5	24.3
10	27.2
15	29.1
20	31.1
25	31.9
30	32.3
35	31.6
40	30.8

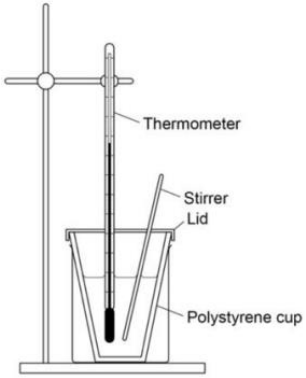
A student added sodium hydroxide to hydrochloric acid and measured the temperature.

Plot a graph of the student's results and draw two straight lines of best fit.

From the graph read off the maximum temperature change.



This is an example of an exothermic reaction. Can you explain why the results show the temperature starting to fall after a certain volume of sodium hydroxide had been added?



A student uses the above equipment to measure the energy change from the combustion of methanol.

What safety precautions should the student take?

The neutralisation reaction is exothermic. Sketch an energy profile diagram for this reaction.

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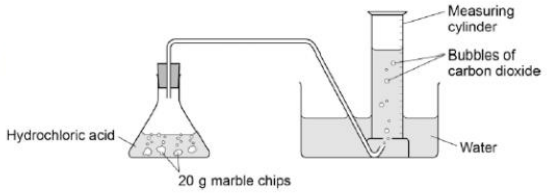
4 – Rates of reaction

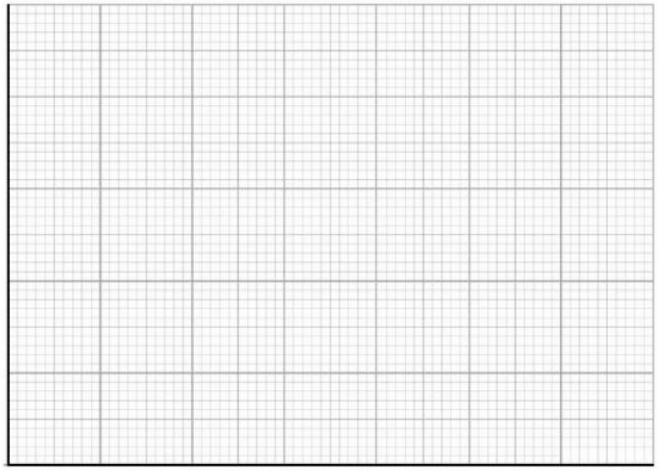
A student measures the volume of gas produced during a reaction using the equipment shown.



Plot a graph of the results.

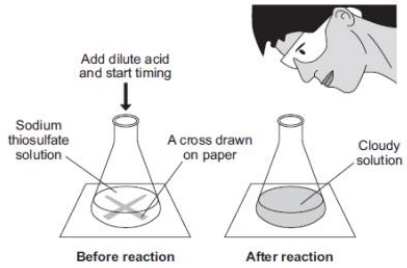
Time in s	Volume of gas in dm^3
0	0.000
30	0.030
60	0.046
90	0.052
120	0.065
150	0.070
180	0.076
210	0.079
240	0.080
270	0.080

Volume of gas in dm^3



Time in s

Describe and explain the shape of the graph.



A student reacted sodium thiosulfate and hydrochloric acid. He changed the concentration of hydrochloric acid each time.

The student measured the time taken for the cross to no longer be visible.

Complete the sentence.

As the student increases the concentration of the hydrochloric acid, the time taken for the cross to disappear will _____.

Explain your answer using collision theory.

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Section 2: Exam Question Practice

Recommended Video: GCSE Chemistry - Allotropes of Carbon - Diamond and Graphite

Explain why graphite conducts electricity.

Answer in terms of the structure and bonding in graphite.

(3)

Describe the structure and bonding of diamond.

[3 marks]

Explain why diamond has a very high melting point.

[3 marks]

Recommended Videos: Making Salts - GCSE Science Required PracticalGCSE Chemistry - Neutralisation Reactions

This question is about zinc and compounds of zinc.

A student produces pure crystals of zinc chloride by reacting zinc oxide with hydrochloric acid.

The equation for the reaction is:

$$ZnO(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2O(l)$$

The student adds zinc oxide to hydrochloric acid until the zinc oxide is in excess.

Give **one** observation that the student could make to show that the zinc oxide is in excess.

[1 mark]

Why is excess zinc oxide used rather than excess hydrochloric acid?

[1 mark]

Name **one other** compound that the student could add to hydrochloric acid to produce zinc chloride.

[1 mark]

Describe how the student should obtain crystals of zinc chloride from a solution of zinc chloride.

[2 marks]

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A student is given three metals, **X**, **Y** and **Z** to identify.

The metals are magnesium, iron and copper.

Plan an investigation to identify the three metals by comparing their reactions with dilute hydrochloric acid.

Your plan should give valid results.

[4 marks]

Recommended Video: GCSE Chemistry - Global Warming & Climate Change

Carbon dioxide is a greenhouse gas.

Describe the greenhouse effect in terms of the interaction of short and long wavelength radiation with matter.

(4)

Section 3: Numeracy Skills. Read and answer the questions below.

Significant figures and decimal places

The number of decimal places is how many digits (including zeros) are after the decimal point in a number. To work out how many significant figures are in a number, count all the digits *except* any zeros at the beginning of the number (as soon as you count the first non-zero digit, count any zeros after that, including ones at the end).

e.g. The number 0.02030 has five decimal places (five digits after the decimal point: '0', '2', another '0', '3' and a final '0'). It has four significant figures because you do not count the first two '0's (called **leading zeros**) – but you do count the '0' in the middle of the number (a **contained** or **trapped zero**) and at the very end (**trailing zeros**).

When you are **adding** or **subtracting** numbers, you should give the answer to the same number of **decimal places** as the numbers you are adding or subtracting. If the numbers do not all have the same number of decimal places in them, give your answer to the same number of decimal places as the one with the **fewest**.

When you are multiplying or dividing, you should give the answer to the same number of **significant figures** as the numbers you are multiplying or dividing. If the numbers do not all have the same number of significant figures in them, give your answer to the same number of significant figures as the one with the **fewest**.

If the answer that you work out has more significant figures or decimal places than the numbers in the calculation, then you need to **round** your answer. Decide how many significant figures or decimal places to give the answer to, then look at the next digit to the right of the last one that you are going to include in your answer. If it is '5' or more then you need to 'round up' – increase the last digit by 1. If it is less than 5, do nothing.

WORKED EXAMPLE 1

Give the answer to this calculation: 1.457 + 3.92
Be careful to give your answer to the correct number of decimal places.

Solution

1.457 + 3.92 = 5.377 (if you put it into the calculator this is what you will see)

However, you should give the answer as ***5.38*** *because the number '3.92' has only two decimal*

The arithmetic mean

The arithmetic mean (sometimes just called 'the mean') is a type of **average** that you can calculate for a set of values. You do this by adding the numbers together and dividing by how many numbers there are altogether.

For example, if you take the temperature in your house four times during the day, you could work out the average temperature for that day by adding the four temperatures together and dividing by four.

Say the temperatures that you recorded were 18 °C, 19 °C, 22 °C and 21 °C. The mean average temperature would be calculated like this:

$$\text{average temperature} = \frac{18 + 19 + 22 + 21}{4} = \frac{80}{4} = 20\ ^\circ\text{C}$$

The rules about how many decimal places or significant figures to give in an arithmetic mean are complicated and depend on the data that you are working out the mean for. However, a useful guide is that *if you have to round* (in the above example there was no question of how many significant figures to include since the answer was exactly 20) then you should give the arithmetic mean to one more significant figure than is in the data.

Imagine you measure the temperature three times and get these values: 19 °C, 20 °C, 19 °C. The mean average temperature would be calculated like this:

$$\text{average temperature} = \frac{19 + 20 + 19}{3} = \frac{58}{3} = 19.3333333333\ ^\circ\text{C}$$

There is no justification (or need) for all those '3's in the answer, so applying the rule of using one more significant figure than the data, you should give the answer as **19.3 °C**.

WORKED EXAMPLE

A group of five students each measures the volume of gas produced by a chemical reaction in the first 30 seconds. Their results are shown below. Work out the average volume of gas produced.

Student 1 (cm^3)	Student 2 (cm^3)	Student 3 (cm^3)	Student 4 (cm^3)	Student 5 (cm^3)
43.4	40.5	39.8	42.9	41.1

Solution:

$$\text{average volume} = \frac{43.4 + 40.5 + 39.8 + 42.9 + 41.1}{5} = \frac{207.7}{5} = 41.54\ cm^3$$

Questions

1. How many significant figures are in the following numbers?

   a. 234.202.....

   b. 0.001304.....

   c. 0.070050.....

2. Give the answers to these calculations. Make sure that you give the answer to the correct number of decimal places, rounding if necessary.

   a. 1.479 + 0.3421 .....

   b. 12.323 – 0.85.....

   c. 0.003 + 0.012.....

3. Give the answers to these calculations. Make sure that you give the answer to the correct number of significant figures, rounding if necessary.

   a. 14.9 ÷ 3.0.....

   b. 147 × 0.025.....

   c. 3.87 × 1.575.....

4. The pH of a buffer solution was measured three times. The results were: 8.4, 8.5 and 8.3.
   What is the mean average pH?

   .....

   .....

5. Calculate 119.4 ÷ 3.21, giving your answer to the appropriate number of significant figures. *(1 mark)*

6. The mass of a solid was recorded using four different balances.
   The results were: 12.423 g; 12.5 g; 12.46 g and 12.4 g.

   a. Calculate the total of these masses. Give your answer to an appropriate number of decimal places.

   b. What is the arithmetic mean of these masses? Give your answer to two decimal places.

7. Five students measure the time taken for a colour change in a chemical reaction. Their results are shown in the table below.

Student	1	2	3	4	5
Time taken (s)	97	89	92	99	95

   What is the arithmetic mean average time for the reaction?

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