Welcome to A Level Chemistry

Determination of an unknown metal

Starter: "Pairs"

1. Name 2 products of sodium reacting with water.
2. State 2 equations involving the number of moles.
3. Name 2 types of chemical structure.
4. State 2 factors the affect the strength of attraction between the nucleus and valence electrons.

Extension question:

Write a balanced symbol equation for sodium reacting with water.

Welcome to A Level Chemistry

- ✓
- ✓
- ✓
- ✓ **moles of gas = volume ÷ 24dm³**
- ✓ **moles of dissolved solute = concentration x volume**
- Name 2 types of chemical structure;
- ✓ **Giant lattices and small molecules,**
- State 2 factors the affect the strength of attraction between the nucleus and valence electrons;
- ✓ **Nuclear charge, electrons shielding, and atomic radius.**

Extension question:

Write a balanced symbol equation for sodium reacting with water.

✓ **$2\ Na + 2\ H_2O \rightarrow 2\ NaOH + H_2$**

Welcome to Chemistry

Get ready to see your world in a new way….

How many atoms are the in a beaker of water?

How does your blood regulate its pH?

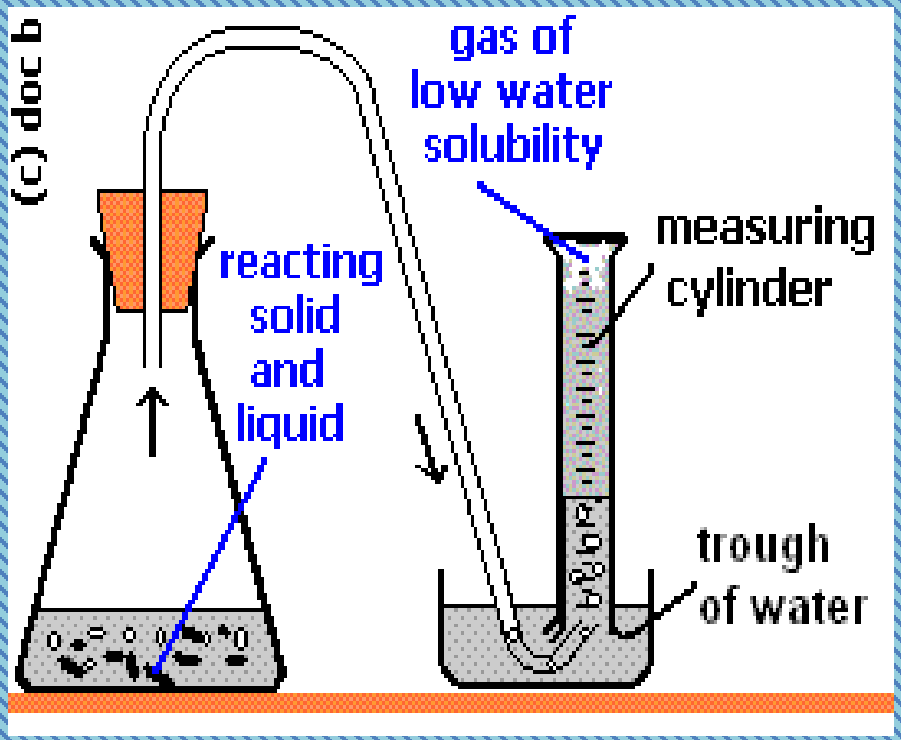
Why are some chemicals coloured when others are colourless?

Practical Investigation –
What is the unknown metal?

- Now you need to work out the identity of an unknown metal experimentally.

- **Here is your equipment, put it together how you think it should be used.**

This should be your set up



Quick Questions

1) Why is it important that your gas has low water solubility?

2) What gas have you encountered that is water soluble?

NOTE: You will not have been allowed to use this metal at GCSE.

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION
FIRE	Flammable. Many reactions may cause fire or explosion. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking. NO contact with water.
EXPLOSION	Risk of fire and explosion on contact with combustible substances and water.	
EXPOSURE		AVOID ALL CONTACT!
•**INHALATION**	Burning sensation. Cough. Laboured breathing. Shortness of breath. Sore throat. Symptoms may be delayed (see Notes).	Ventilation, local exhaust, or breathing protection.
•**SKIN**	Redness. Skin burns. Pain. Blisters.	Protective gloves. Protective clothing.
•**EYES**	Redness. Pain. Severe deep burns.	Safety goggles, or eye protection in combination with breathing protection.
•**INGESTION**	Abdominal cramps. Abdominal pain. Burning sensation. Nausea. Shock or collapse. Vomiting. Weakness.	Do not eat, drink, or smoke during work.

Once you've finished: The unknown metal, M, is from group 1. Use this information to write a balanced equation for the reaction of M with water.

1. Remove any excess oil and weigh between 0.05 g and 0.07 g of your unknown group 1 metal. Record the exact mass.
2. Measure 100 cm^3 of distilled water and decant it into the conical flask.
3. Record the initial volume of gas within the inverted 250 cm^3 measuring cylinder.
4. Add the metal to a conical flask and immediately replace the stopper.
5. Collect the gas produced and record the final volume of gas produced.

Deducing the Identity of the Group 1 Metal

You will need:

a) Your Mass of metal

b) Your volume of Hydrogen

c) A balanced symbol equation for the reaction of a group 1 metal with water (Use the symbol 'X' for the metal in your equation)

d) The two following equations:

$$Mole = \frac{Mass}{Mr}$$

$$Moles = \frac{Gas\ Volume}{24\,000}$$

The equation for the reaction is

$$2X + 2H_2O \rightarrow 2\,XOH + H_2$$

- ___V___ cm^3 of hydrogen was produced.

  Since at RTP 24 000 cm^3 of hydrogen contains 1 mole.

  ___V___ cm^3 = ___n___ moles of hydrogen

  24 000

- From the balanced equation, if there are ___n___ moles of hydrogen there are ___2 n___ moles of X.
- So ___2 n___ moles of X has a mass of ___m___ g (whatever you weighed out)
- Using **Moles = Mass/ Mr** we find that **Mr = Mass/ Moles**
- So your Mr = **m/ 2 n**

Practical Investigation Conclusion –
What was the unknown metal?

- The correct Group 1 metal was **Lithium!**
- A GCSE periodic table would quote the relative atomic mass of lithium as **7**.
- **How close were you?**

Summer Home learning

Over the summer you will need to get a copy of the CGP "*Head Start to A-level Chemistry*" workbook (ISBN 9781782942801).

You will need to work through this, making notes in the A4 exercise book provided, and completing **all** the questions at the bottom of each page.

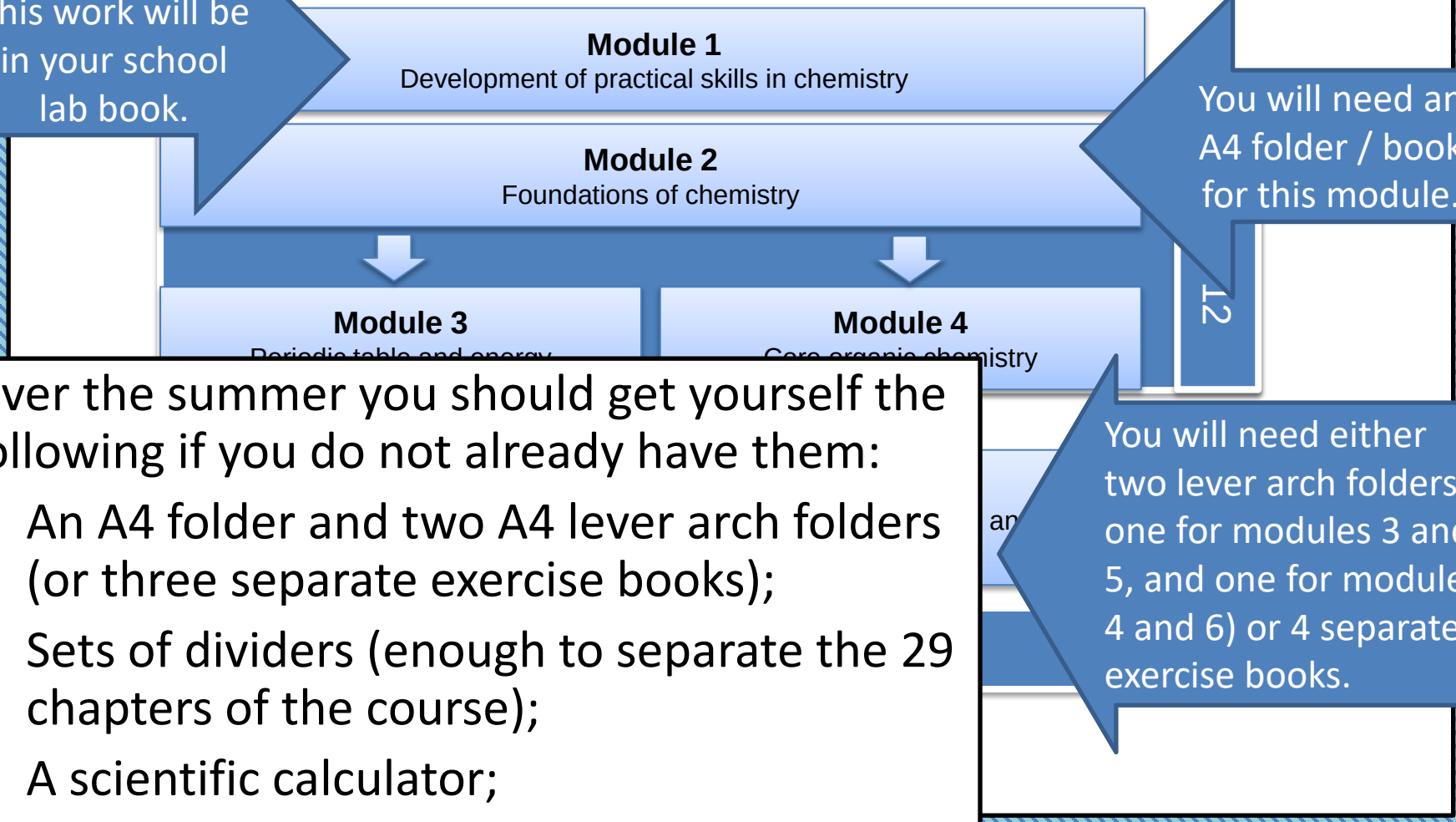
You should use the answers within the back of the workbook to self-mark and correct your work using a different coloured pen.

You will need to complete an entry assessment in September based upon this content, so you must ensure you are adequately prepared for this assessment upon your return to school.

Keep all this work safe, as your teachers will expect to see it, completed and self-marked, in September.

How to organise your studies

This work will be in your school lab book.



You will need an A4 folder / book for this module.

Over the summer you should get yourself the following if you do not already have them:

- An A4 folder and two A4 lever arch folders (or three separate exercise books);
- Sets of dividers (enough to separate the 29 chapters of the course);
- A scientific calculator;

You will need either two lever arch folders (one for modules 3 and 5, and one for modules 4 and 6) or 4 separate exercise books.

Our expectations of you:

- To arrive **on time** to your lesson, dressed in the correct **uniform**, and with the correct **equipment** (including a scientific calculator, periodic table, and textbook).
- To **complete all home learning** set to the best of your ability, including any **self-marking** you are asked to do.
- To be reflective learners, who are open and honest about any difficulties, and to **ask for help** when needed.
- To **attend after school Chemistry clinic** as needed bringing any problems or difficulties you are having with you.
- To **act upon any feedback** given and **complete next steps**.
- To **check your school email** account regularly and respond to any messages from your teachers.

What to expect from us:

- Plan and deliver **effective lessons** that cover the course;
- **Set home learning** every lesson and **check its completion**;
- Use **seating plans** to maximise your learning in class;
- **Accurate marking** of your assessments;
- Set you relevant **next steps** to improve after assessments;
- Use assessment data to monitor your **working at grade**;
- Run an after school **chemistry clinic**;
- **Contact your parents' and guardians'** as needed and keep them updated of your progress;
- Have the **highest possible expectations** of you, support you to achieve these, and never accept subpar work.