

Arthur Mellows Village College

A level Chemistry Induction Course
and Summer Task



Name:

Chemistry Teachers:

Induction Session:

Calculating the Relative Atomic Mass of Lithium

	Mass / g
Lithium and glass jar	
Empty glass jar	
Mass of Lithium used	

Volume of Hydrogen gas produced = _____cm³

Lithium + Water → Lithium Hydroxide + Hydrogen

1. Write a balanced symbol equation for the reaction between Lithium and water
2. 1 mole of gas = 24 000cm³

Calculate the number of moles of hydrogen gas produced in this reaction

3. Calculate the number of moles of Lithium you reacted using the ratio in the equation in Q1

4. Remember $\text{moles} = \frac{\text{mass}}{A_r}$

Rearrange this equation so that you can calculate the A_r of Lithium

5. Calculate the A_r of Lithium

6. Look up the actual A_r of Lithium in the periodic table.

- i) Calculate the % accuracy of your experiment
- ii) Suggest two sources of error the experiment which meant you could not be 100% accurate

Summer Task – PART 1 - THE BASICS – Please hand this part in for marking in September. It may seem easy but this is key information we will build on in your first few lessons and test you on in the initial 3 week test!

1. Draw a diagram of an atom, labelling the protons, neutrons and electrons.

2. Complete this table about the sub-atomic particles that make up an atom

Sub-atomic particle	Relative Mass	Relative Charge	Location in the atom
Proton			
Neutron			
Electron			

3. Draw the GCSE electron configuration of the following atoms:

(To find out the number of electrons they have, look them up in the periodic table, the lower of the two numbers in their box is the number of electrons)

(a) Helium

(b) Carbon

(c) Sodium

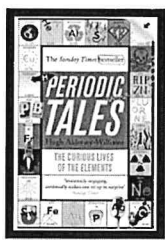
(d) Calcium

4. Draw a diagram to show how an atom of sodium and an atom of chlorine react together by ionic bonding to produce sodium chloride.
5. Draw a diagram to show how one atom of carbon and four atoms of hydrogen react by covalent bonding to form a molecule of methane (CH_4)

6. What is meant by an 'isotope'?
7. What is meant by 'one mole' in Chemistry?
8. Work out the formula of the following compounds: (This means writing how many of each atom, for example water is H_2O which means 2 hydrogen atoms and 1 oxygen atom. For ionic compounds, you should use the charges on the ions to work out what the formula is.)
- (a) Magnesium oxide
 - (b) Calcium chloride
 - (c) Sodium fluoride
 - (d) Lithium oxide
 - (e) Aluminium chloride
 - (f) Aluminium oxide

PART 2 – EXTENSION – THIS DOES NOT NEED TO BE HANDED IN.

Book Recommendations



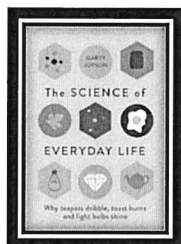
Periodic Tales: The Curious Lives of the Elements (Paperback) Hugh Aldersey-Williams

ISBN-10: 0141041455

<http://bit.ly/pixlchembook1>

This book covers the chemical elements, where they come from and how they are used. There are loads of fascinating insights into uses for chemicals you would have never even thought about.

The Science of Everyday Life: Why Teapots Dribble, Toast Burns and Light Bulbs Shine (Hardback) Marty Jopson

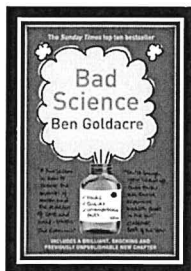


ISBN-10: 1782434186

<http://bit.ly/pixlchembook2>

The title says it all really, lots of interesting stuff about the things around you home!

Bad Science (Paperback) Ben Goldacre

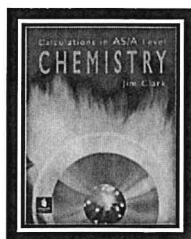


ISBN-10: 000728487X

<http://bit.ly/pixlchembook3>

Here Ben Goldacre takes apart anyone who published bad / misleading or dodgy science – this book will make you think about everything the advertising industry tries to sell you by making it sound 'scieny'.

Calculations in AS/A Level Chemistry (Paperback) Jim Clark



ISBN-10: 0582411270

<http://bit.ly/pixlchembook4>

If you struggle with the calculations side of chemistry, this is the book for you. Covers all the possible calculations you are ever likely to come across. Brought to you by the same guy who wrote the excellent chemguide.co.uk website.

Salters' Advanced Chemistry: Chemical Storylines

Do not feel you need to buy the latest edition. You can pick up an old edition for a few pounds on ebay, gives you a real insight into how chemistry is used to solve everyday problems from global pollution through feeding to world to making new medicines to treat disease.

Videos to watch online

Rough science – the Open University – 34 episodes available

Real scientists are 'stranded' on an island and are given scientific problems to solve using only what they can find on the island.

Great fun if you like to see how science is used in solving problems.

There are six series in total

<http://bit.ly/pixlchemvid1a>

http://www.dailymotion.com/playlist/x2igjq_Rough-Science_rough-science-full-series/1#video=xxw6pr

or

<http://bit.ly/pixlchemvid1b>

<https://www.youtube.com/watch?v=UoDWAAt259I>

A thread of quicksilver – The Open University

A brilliant history of the most mysterious of elements – mercury. This program shows you how a single substance led to empires and war, as well as showing you some of the cooler properties of mercury.

<http://bit.ly/pixlchemvid2>

<https://www.youtube.com/watch?v=t46lvTxHHTA>

10 weird and wonderful chemical reactions

10 good demonstration reactions, can you work out the chemistry of any... of them?

<http://bit.ly/pixlchemvid3>

<https://www.youtube.com/watch?v=0Bt6RPP2ANI>

Chemistry in the Movies

Dantes Peak 1997: Volcano disaster movie.

Use the link to look at the Science of acids and how this links to the movie.

<http://www.open.edu/openlearn/science-maths-technology/science/chemistry/dantes-peak>

<http://www.flickclip.com/flicks/dantespeak1.html>

<http://www.flickclip.com/flicks/dantespeak5.html>

Fantastic 4 2005 & 2015: Superhero movie

Michio Kaku explains the "real" science behind fantastic four <http://nerdist.com/michio-kaku-explains-the-real-science-behind-fantastic-four/>

<http://www.flickclip.com/flicks/fantastic4.html>

Research activities

Use your online searching abilities to see if you can find out as much about the topic as you can. Remember if you are a prospective A level chemist, you should aim to push **your** knowledge.

You can make a 1-page summary for each one you research using Cornell notes:

<http://coe.jmu.edu/learningtoolbox/cornellnotes.html>

Task 1: The chemistry of fireworks

What are the component parts of fireworks? What chemical compounds cause fireworks to explode?
What chemical compounds are responsible for the colour of fireworks?

Task 2: Why is copper sulfate blue?

Copper compounds like many of the transition metal compounds have got vivid and distinctive colours – but why?

Task 3: Aspirin

What was the history of the discovery of aspirin, how do we manufacture aspirin in a modern chemical process?

Task 4: The hole in the ozone layer

Why did we get a hole in the ozone layer? What chemicals were responsible for it? Why were we producing so many of these chemicals? What is the chemistry behind the ozone destruction?

Task 5: ITO and the future of touch screen devices

ITO – indium tin oxide is the main component of touch screen in phones and tablets. The element indium is a rare element and we are rapidly running out of it. Chemists are desperately trying to find a more readily available replacement for it. What advances have chemists made in finding a replacement for it?

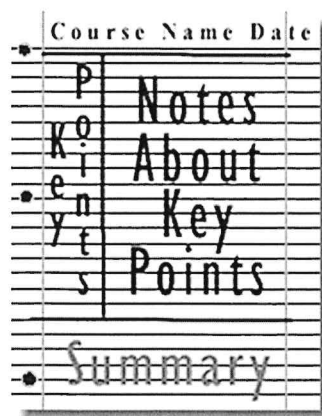


Figure 1: <http://coe.jmu.edu/learningtoolbox/images/noteb4.gif>