The Ultimate Chemistry Revision Cheat Sheet

www.needachemistrytutor.co.uk

Hello!

I'm delighted you've downloaded my **Ultimate Chemistry Revision Cheat Sheet**. It's packed full of study hints and exam hacks to help you and your teenager get the most out of their Chemistry revision.

Following these insider tips should help your child pick up all those exam marks so many students lose.

Let me know how you get on.

Enjoy,

Mary

Dr. Mary McPhail

TOP TIPS FOR EFFECTIVE REVISION

MAKE A DATE

Agree with your teen to start studying early. Decide on the days and time for each session. Put it in the calendar, so no one forgets.

GET A STASH

Designate a study area and get all the materials your teen needs in one place.

USE A TIMER

Your teen should study in 20 - 30 minute blocks. Focussed revision with a 10-15 minute break in between.

CHUNK THE TOPIC

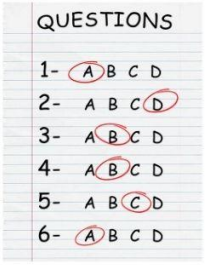
Each topic should be broken up into 3 or 4 learning outcomes per session.

TAKE A BREAK

Insist on proper breaks between sessions. Exercise or move around, but NO social media!

TEST YOURSELF

Regular self-testing is one of the most effective ways to revise. Your teen should use past papers.



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Exam Hack 1: The C-Rule

Ion-electron equations can be confusing, 😣 don't you think?

Trying to work out which way round to write them.
Knowing if they're oxidation or reduction.
😠 A real pain.

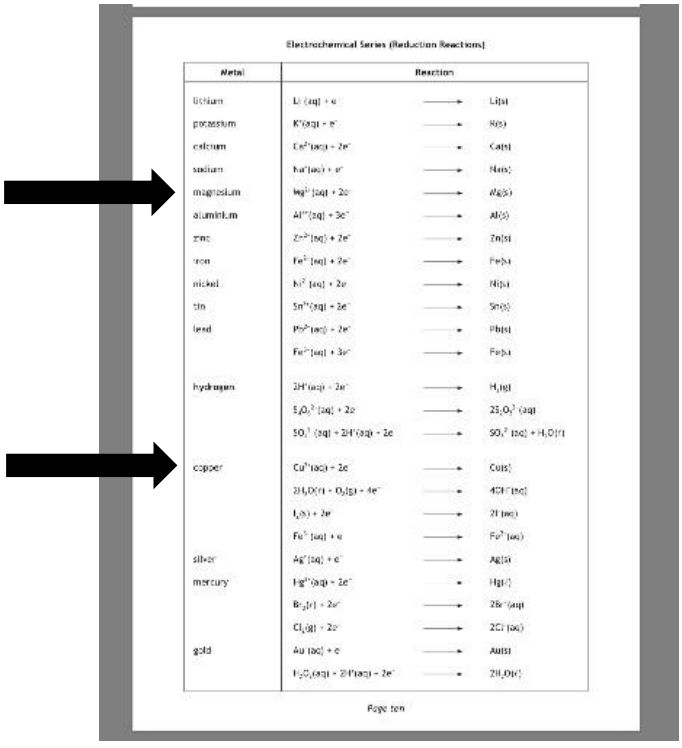
The C-Rule helps with all that! Let me tell you about it....

When you write the letter C, do you start at the top right-hand corner? Where the pencil points in the image above? Good!

You can use this on the electrochemical series in the data book to help you write your ion-electron equations the right way round!

For example: Say you're asked to write out the ion-electron equations when you add **magnesium** to **copper ions**.

#1: Find the two metals on the Electrochemical Series.



Electrochemical Series (Reduction Reactions)

Metal	Reaction
lithium	$Li^+(aq) + e^- \rightarrow Li(s)$
potassium	$K^+(aq) + e^- \rightarrow K(s)$
calcium	$Ca^{2+}(aq) + 2e^- \rightarrow Ca(s)$
sodium	$Na^+(aq) + e^- \rightarrow Na(s)$
magnesium	$Mg^{2+}(aq) + 2e^- \rightarrow Mg(s)$
aluminium	$Al^{3+}(aq) + 3e^- \rightarrow Al(s)$
zinc	$Zn^{2+}(aq) + 2e^- \rightarrow Zn(s)$
iron	$Fe^{2+}(aq) + 2e^- \rightarrow Fe(s)$
nickel	$Ni^{2+}(aq) + 2e^- \rightarrow Ni(s)$
tin	$Sn^{2+}(aq) + 2e^- \rightarrow Sn(s)$
lead	$Pb^{2+}(aq) + 2e^- \rightarrow Pb(s)$
	$Fe^{3+}(aq) + 3e^- \rightarrow Fe(s)$
hydrogen	$2H^+(aq) + 2e^- \rightarrow H_2(g)$
	$S_2O_3^{2-}(aq) + 2e^- \rightarrow 2S_2O_3^{2-}(aq)$
	$SO_4^{2-}(aq) + 2H^+(aq) + 2e^- \rightarrow SO_3^{2-}(aq) + H_2O(l)$
copper	$Cu^+(aq) + e^- \rightarrow Cu(s)$
	$2H_2O(l) + O_2(g) + 4e^- \rightarrow 4OH^-(aq)$
	$I_2(s) + 2e^- \rightarrow 2I^-(aq)$
	$Fe^{3+}(aq) + e^- \rightarrow Fe^{2+}(aq)$
silver	$Ag^+(aq) + e^- \rightarrow Ag(s)$
mercury	$Hg^{2+}(aq) + 2e^- \rightarrow Hg(l)$
	$Br_2(l) + 2e^- \rightarrow 2Br^-(aq)$
	$Cl_2(g) + 2e^- \rightarrow 2Cl^-(aq)$
gold	$Au^+(aq) + e^- \rightarrow Au(s)$
	$H_2O_2(aq) + 2H^+(aq) + 2e^- \rightarrow 2H_2O(l)$

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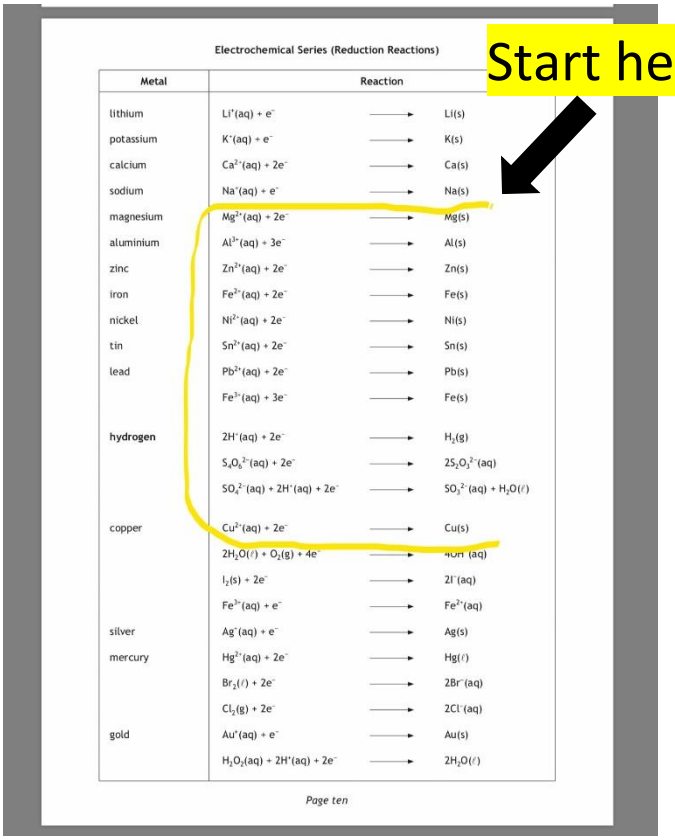
#2: Draw a 'C' from the top right hand side of the upper metal to the lower one (see on image).

All you do now is copy the equations as written, from the top right-hand of the 'C' and follow it round. This reverses the top equation and keeps the bottom one as it is.

I've used the N5 data book here, but it also works with the higher one.



So, the two equations will be:

$$Mg(s) \longrightarrow Mg^{2+}(aq) + 2e^- \quad \text{Oxidation}$$

$$Cu^{2+}(aq) + 2e^- \longrightarrow Cu(s) \quad \text{Reduction}$$

Easy!

Exam Hack 2: PVC for Titration Calculations

Titration calculations can be difficult, 😵 especially if you have to balance the equation first.

Using PVC makes life easier when you're dealing with a titration calculation of an acid and alkali.

P[acid] x V[acid] x C[acid] = P[alkali] x V[alkali] x C[alkali]

P[acid]	=	how many H^+ ions are in the acid formula	P[alkali]	=	how many OH^- ions are in the alkali
V[acid]	=	volume of the acid	V[alkali]	=	volume of the alkali
C[acid]	=	concentration of the acid	C[alkali]	=	concentration of the alkali

An example:
Find the concentration of H_2SO_4 (in mol l^{-1}) when 30 cm^3 of it exactly neutralised 25 cm^3 of 0.5 mol l^{-1} NaOH.

#1: write down the values you have for P,V and C for the acid and alkali.

Acid H_2SO_4	Alkali NaOH
P = 2	P = 1
V = 30	V = 25
C = ?	C = 0.5

#2: put these values into the equation:

P[acid]	x	V[acid]	x	C[acid]	=	P[alkali]	x	V[alkali]	x	C[alkali]
2	x	30	x	C	=	1	x	25	x	0.5
		60	x	C	=	12.5				
				C	=	12.5	÷	60		
				C	=	0.21				

You can use this without having a balanced equation!
Even if you want to use the formula in your data book instead, you can use the PVC method to check it.👍

Exam Hack 3: Open-ended Questions

You know those open-ended questions that everyone hates? You know, they always end with: using your knowledge of chemistry....?

There are mainly 2 types:

Type 1 **HOW** Questions	Type 2 **COMMENT ON** Questions
You'll recognise them by: • Suggest HOW • Describe HOW • Comment on HOW	You'll recognise them by: • COMMENT ON whether • COMMENT ON the chemistry
How to answer?	How to answer?
Describe an EXPERIMENT!	Write everything you know ABOUT THE SUBJECT!
Which one?	What do I talk about?
Learn how to describe these 2 experiments	Concentrate on these 3 areas
Collecting /measuring gas over water or in a gas syringe A titration	Its structure or functional groups The bonding within it How it reacts with water, acid, etc.

Exam Hack 4: The easy way to identify the type of chemical reaction

In chemical equations, the reactants are on the left-hand side (LHS) of the arrow and the products on the right-hand side (RHS).

So, if you're asked what kind of reaction this is:

Reactants → Products

$H_2SO_4 + CaCO_3 \rightarrow CaSO_4 + CO_2 + H_2O$

Look at what's on each side. Use the following table to help you identify the type of reaction.

Reactant Side (LHS)	Product Side (RHS)	Type	Level
• O_2 gas		Combustion	N5, H
C=C Double bond	Only C-C single bonds	Addition	N5, H
All (aq) states	(s) solid state	Precipitation	N5, H
• Electron (e)		Reduction	N5, H
	• Electron (e)	Oxidation	N5, H
Several molecules each with a C=C double bond	Long chain with only C-C single bonds	Addition polymerisation	N5, H
Alcohol (R-OH)	Alkene (C=C) + water (H_2O)	Dehydration	N5, H
Long chain alkane	Alkane + Alkene	Cracking	N5, H
Acid	Water	Neutralisation	N5
2 Molecules with 1 functional group each	Bigger molecule + small molecule (e.g. H_2O)	Condensation	H
Monomers with 2 functional groups each	Long chain with C and O in backbone.	Condensation Polymerisation	H

$H_2SO_4 + CaCO_3 \rightarrow CaSO_4 + CO_2 + H_2O$

On the LHS there is acid, H_2SO_4, on the RHS there is water, H_2O.

So, using the table, this is a neutralisation reaction.

Useful Websites

http://www.chemistry-teaching-resources.com/PastPapers.html

This website has past papers from even before I sat my exams! A terrific Chemistry resource because teachers get exam questions from old papers!

http://www.new.chemistry-teaching-resources.com/CfENewHigherChemistry.html

This page is written by the same author as the one above (a teacher at Kelso High School). It has a number of Higher Chemistry Study Guides for each part of the course.

https://www.sqa.org.uk/sqa/45861.html

This is the Chemistry page of the SQA. From here you can access:

- **all Chemistry course levels**
- **past papers with mark schemes**
- **arrangement documents**
- **course information**
- **examples of how the SQA marks candidate answers (Understanding Standards)**

https://www.bbc.co.uk/bitesize/subjects/zmf3cdm

BBCBitesize has access to N5 and Higher Chemistry resources from this page.