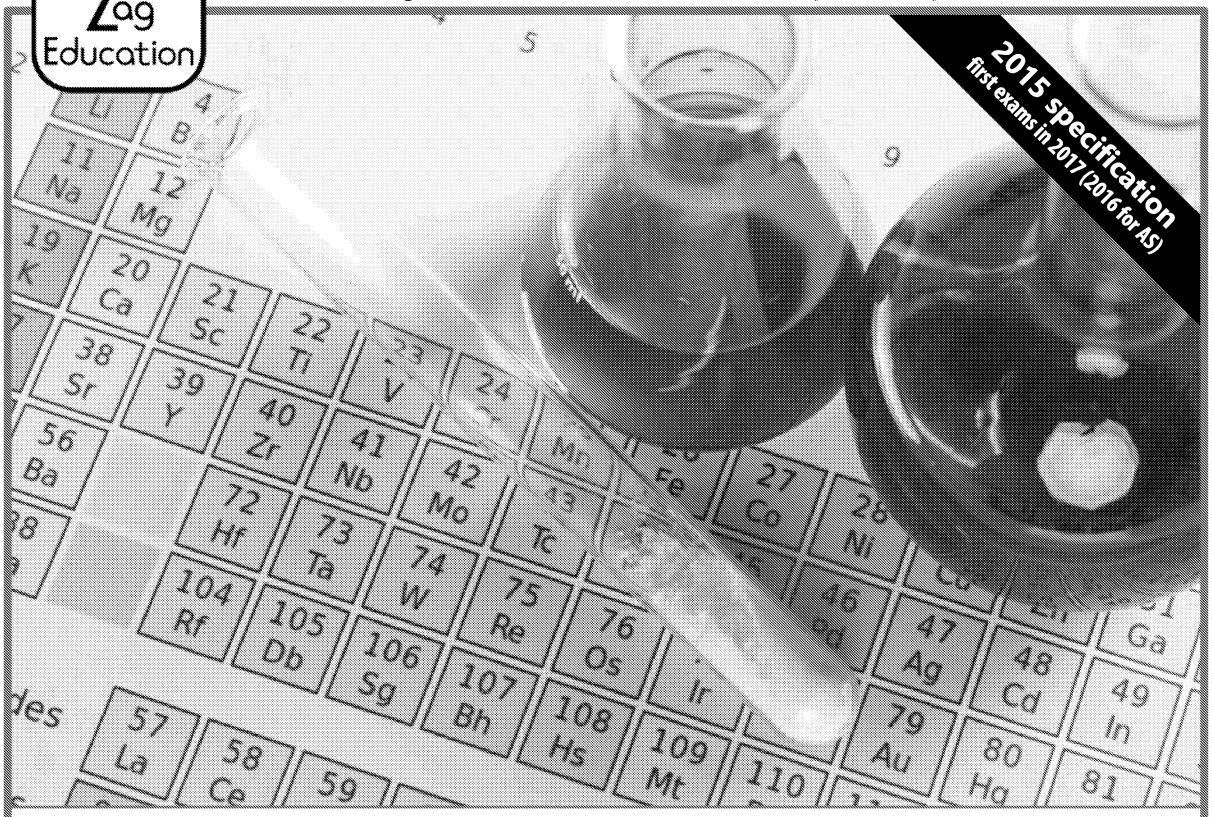
Zig Zag Education

Chemistry

AS/A Level | OCR | H032 & H432



Learning Grids for OCR AS and A Level Year 1 Chemistry A

Module 3: Periodic Table and Energy

Update v1.1, 02 November 2016

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Contents

Teacher's Introduction

These learning grids are a tool designed to help you deliver **AS and A level Year 1 OCR Chemistry A Module 3: Periodic Table and Energy** (for first teaching in September 2015). The concept is that your students are assigned a set of pages to read from their notes or a textbook, possibly for homework, and then asked to complete the relevant learning grids. These activities may be particularly useful for your weaker learners, who may benefit from both the requirement to read all the notes to find the information and the act of writing the answers down.

The grids are designed to ask questions in sufficient detail that your students are able to study the relevant sections and find the correct answers. Completed grids are provided so that your students' answers can be marked or checked. It may also be useful to hand them out to students during their revision to assist them with answers they cannot find.

This edition supports students using and is cross-referenced to:

- *A Level Chemistry A for OCR Year 1 and AS Student Book; Ritchie and Gent; Oxford University Press, 2015; ISBN 978-0198351962*
- *OCR AS/A Level Year 1 Chemistry A; Holyman, Scott and Stutt; Pearson Education Limited, 2015; ISBN 978 1447990789*

Advantages of using these learning grids are:

- Some students will find this method of studying of great value, particularly if they find it difficult to absorb information in class.
- Resulting grids contain a bullet-point summary that may be useful for revision.
- They are an easy-to-set yet valuable homework.
- They are a useful catch-up tool to help students who have missed a lesson.
- They can be used as a basis for cover lessons that require minimal preparation and no interaction from the cover teacher.
- They are an independent learning resource.

You may want to photocopy the sheets onto A3 paper, particularly for students with reading or writing difficulties.

Some questions will require use of a calculator.

Remember!

Always check the exam board website for new information, including changes to the specification and sample assessment material.

Word + PDF

Note that there is the option to pay an additional 30% to get this resource in PDF format or an additional 50% to get this resource in Word format. The latter allows you to edit the resource to adapt it for your students, and also to put it on your intranet or VLE so students can fill in the grids electronically.

For all formats the licence terms are that the purchasing institution can make unlimited copies on a single site, for students and teachers officially registered at that site.

We hope you find these grids useful during your teaching.

Update v1.1, 02 November 2016
Changes have been made to the significant figures used within questions and answers on pages 11, 12, 15, 18 and 23.

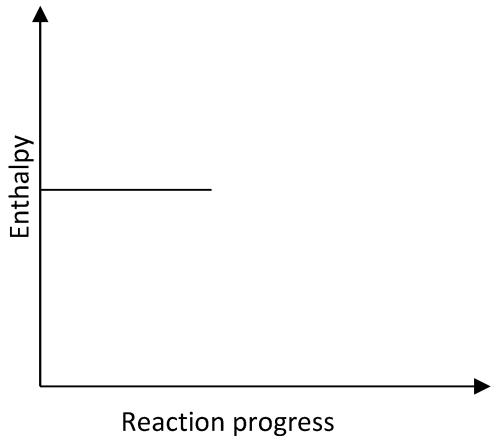
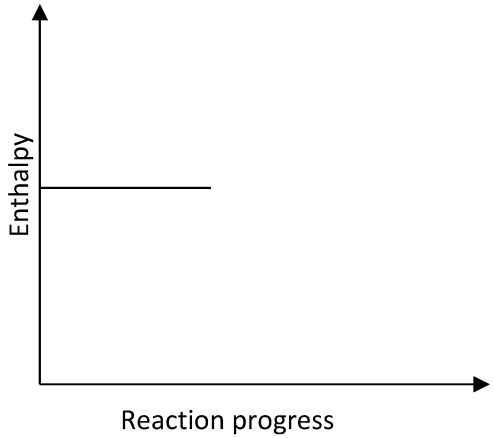
Selected Question and Answer Pages

For demonstration only, the sample answer pages immediately
follow their corresponding question pages

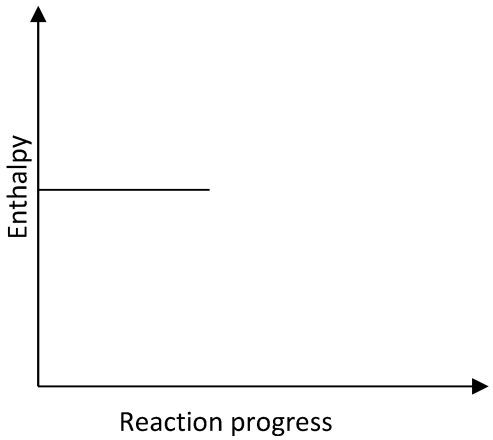
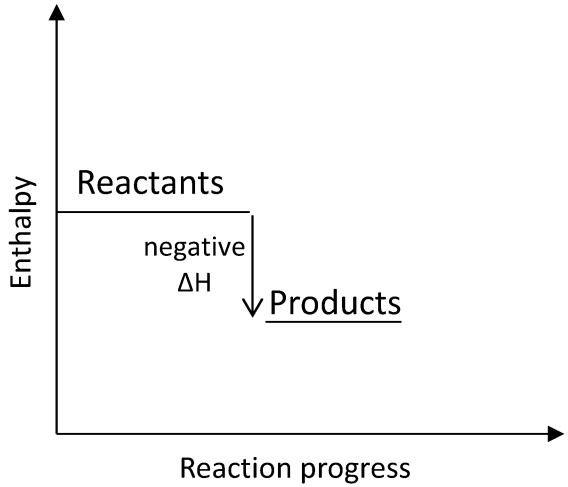
	Question	Answer
Continued	**How can successive ionisation energies be used to prove the existence of electron subshells?**	
	Which group has the highest first ionisation energies?	
Periodic Trend in Bonding, Structure and Melting Point (Oxford: 99–103, Pearson: 116–119)	**What trend in bonding is observed from left to right across the periodic table?**	
	Which metal is the only metal not to be a solid at room temperature?	
	Describe what is meant by metallic bonding.	
	State three properties of most metals.	
	What type of structure is exhibited by carbon and silicon?	
	What shape is the structure of diamond based on?	
	Why do giant covalent lattices have high melting and boiling points?	
	You are walking on a beach. Why is it important that SiO_2 is insoluble in water?	

	Question	Answer
Continued	**How can successive ionisation energies be used to prove the existence of electron subshells?**	*Large increases in ionisation energies are observed between changes in energy level and decreases are observed between paired and unpaired electrons, i.e. there is an increase in ionisation energy between removing the $3s^1$ electron and the $2p^6$ electron and there is a decrease between removing the $3p^3$ and $3p^4$ electrons due to spin and electron pairing.*
	Which group has the highest first ionisation energies?	*Group 8 (18) / the noble gases*
Periodic Trend in Bonding, Structure and Melting Point (Oxford: 99–103, Pearson: 116–119)	**What trend in bonding is observed from left to right across the periodic table?**	*Bonding changes from metallic to non-metallic.*
	Which metal is the only metal not to be a solid at room temperature?	*Mercury*
	Describe what is meant by metallic bonding.	*An array of positively charged ions with a sea of delocalised electrons. OR Strong electrostatic attraction between positive ions and delocalised electrons.*
	State three properties of most metals.	*Good electrical conductors, strong metallic bonds, high melting and boiling points*
	What type of structure is exhibited by carbon and silicon?	*Giant covalent lattices*
	What shape is the structure of diamond based on?	*A tetrahedral structure*
	Why do giant covalent lattices have high melting and boiling points?	*Melting and boiling these structures requires covalent bo bonds are very strong so a large amount of energy is req*
	You are walking on a beach. Why is it important that SiO_2 is insoluble in water?	*Because SiO_2 makes up sand! Beaches would disappear.*

5 3.2.1 Enthalpy Changes

	Question	Answer
Enthalpy Changes (Oxford: 122–132, Pearson: 134–141)	**Define enthalpy change, ΔH, in terms of enthalpy of products and enthalpy of reactants.**	
	What is the law of conservation of energy?	
	What is meant by an exothermic enthalpy change?	
	An endothermic reaction has a ΔH with what sign?	
	Complete the enthalpy profile diagram for an exothermic reaction. 	
	What is meant by 'activation energy'?	

5 3.2.1 Enthalpy Changes

	Question	Answer
Enthalpy Changes (Oxford: 122–132, Pearson: 134–141)	**Define enthalpy change, ΔH, in terms of enthalpy of products and enthalpy of reactants.**	*Enthalpy change is the enthalpy of the products of a reaction minus the enthalpy of the reactants. ΔH = H(products) – H(reactants)*
	What is the law of conservation of energy?	*Energy cannot be created or destroyed, only converted from one form to another.*
	What is meant by an exothermic enthalpy change?	*An enthalpy change where energy is transferred from the chemical reaction to the surroundings (as heat energy).*
	An endothermic reaction has a ΔH with what sign?	*+ve ΔH*
	Complete the enthalpy profile diagram for an exothermic reaction. 	
	What is meant by 'activation energy'?	*The minimum energy required for a reaction to take plac*

Additional Selected Question Pages

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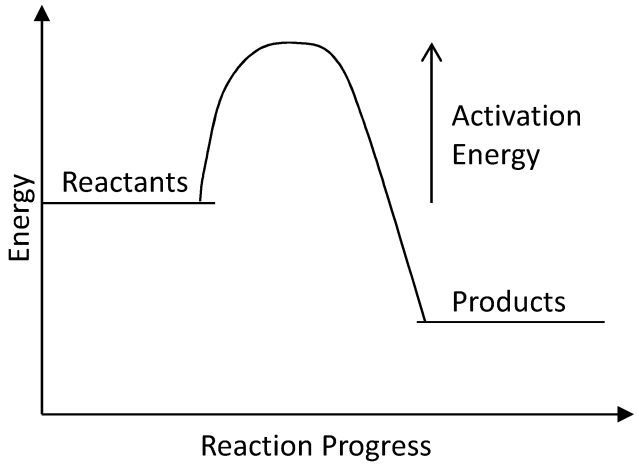
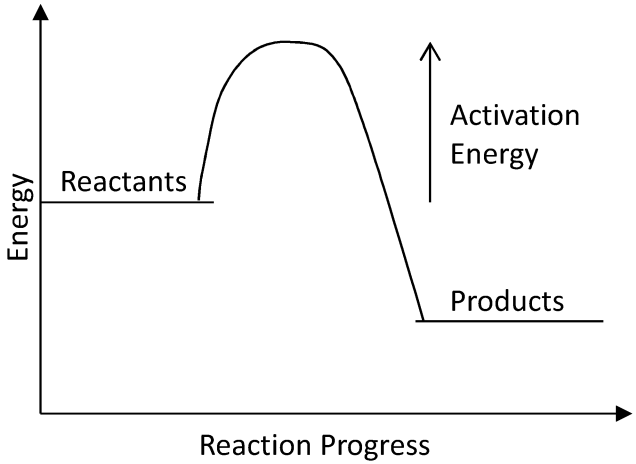
3.2.2 Reaction Rates

	Question	Answer
Collision Theory and Reaction Rates (Oxford: 142–146, Pearson 146–147)	**Define rate of reaction using an equation.**	
	Why is the rate of a reaction always fastest at the start?	
	What two factors are required for a collision between two particles to be successful in causing a reaction?	
	Why does increasing the concentration of an aqueous reactant or decreasing the volume of a gaseous reactant generally increase the rate of the reaction?	
	Describe a method to monitor the rate of reaction using collection of gases.	

	Question	Answer
Continued	**How can the results of this reaction be used to calculate the reaction rate?**	
	Describe a different method of calculating the rate of a reaction.	
	A student carries out a reaction and measures the change in concentration of a reactant during the experiment. The concentration of the reactant started at 0.50 mol dm^{-3}. After three minutes, the concentration of the reactant had decreased to 0.15 mol dm^{-3}. Use this information to calculate the rate of the reaction in mol dm^{-3} s^{-1}.	
	What is a catalyst?	

	Question	Answer
Catalysts (Oxford: 147–149, Pearson: 148–149)	**How does a catalyst affect the rate of reaction?**	
	The diagram below shows the position of the activation energy for a reaction. Draw a line on the diagram to the right to show the activation energy for this reaction if a catalyst is used.  	
	What is a homogenous catalyst?	
	What is a heterogeneous catalyst?	
	How does a solid catalyst work in a reaction where the reactants are solutions?	
	Why is the use of catalysts considered to be good for the environment?	

