



AS CHEMISTRY SUMMER TASKS

2025

Bideford College

- [Abstract](#)

- This booklet contains a set of tasks based on GCSE content. These concepts are still important at A Level and you need to return in September with a good knowledge of all of your GCSE Chemistry

- **OCR(A) Chemistry**

- nayre@bidefordcollege.org; nbentley@bidefordcollege.org

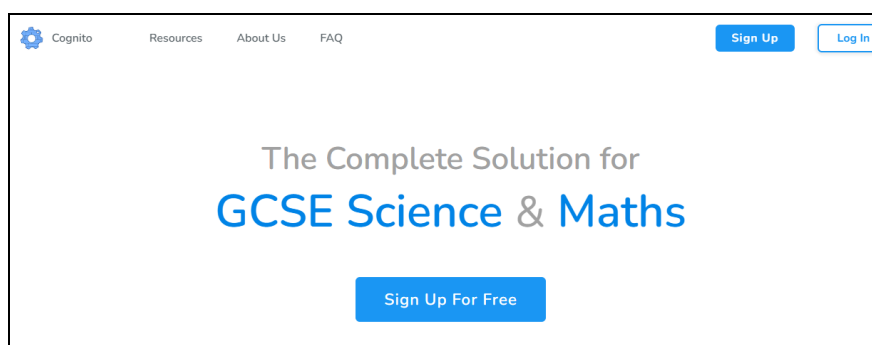
CHEMISTRY A AND CHEMISTRY B (SALTERS)

Learner Activity

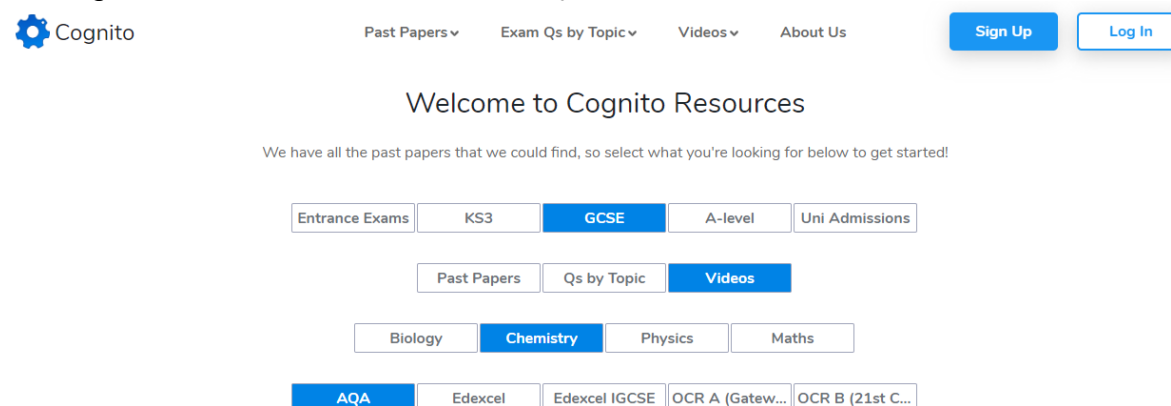
Dear Students –

Welcome to AS Chemistry! Chemistry continues to explore the reactions and world around us through the understanding of particles and sub-atomic particles. The summer tasks are designed to help you revise key GCSE content that directly links to the A level course.

Please go to the website cognito (<https://cognitoedu.org/home.html>) to access the resources (top left of screen).



Then go to **GCSE** → **Videos** → **Chemistry** → **AQA**



Finally, follow the instructions found in each section of this booklet to access appropriate videos to help you.

Attached is a copy of the worksheets that you are required to complete. The videos will help you do this by explaining the core content. All work should be handed in and will be checked on the first day of class for a completion grade.

If you have any questions that arise over the summer, please email me. See you in September!

Mr Ayre, Mr Saundry
Nayre@bidefordcollege.uk
asaundry@bidefordcollege.uk

Enthalpy changes

Learner Activity

VIDEO: 5 – Energy Changes → Exothermic and Endothermic Reactions

Exothermic reactions

1. Write a definition of an exothermic reaction.

2. Draw an enthalpy profile diagram for an exothermic reaction.
Label the axes, ΔH and the activation energy.



3. Give an example of an exothermic reaction.

Endothermic reactions

4. Write a definition of an endothermic reaction.

5. Draw an enthalpy profile diagram for an endothermic reaction.

Label the axes, ΔH and the activation energy.



6. Give an example of an endothermic reaction.

Bond enthalpy

VIDEO: 5 – Energy Changes → Bond Energies

7. Write a definition of bond enthalpy. (You might know this term as 'bond energy'.)

8. In a chemical reaction, bonds in the reactants are broken, and new bonds are formed to make the products. Complete the following sentences.

Energy is to break bonds.

Energy is when bonds are formed.

The overall energy change of a reaction is the

Calculations

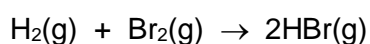
Remember:

enthalpy change = energy required to break bonds – energy released in making bonds

or

$\Delta_r H = \Sigma(\text{bond enthalpies in reactants}) - \Sigma(\text{bond enthalpies in products})$

9. Use bond enthalpies to calculate the enthalpy change for the following reaction.



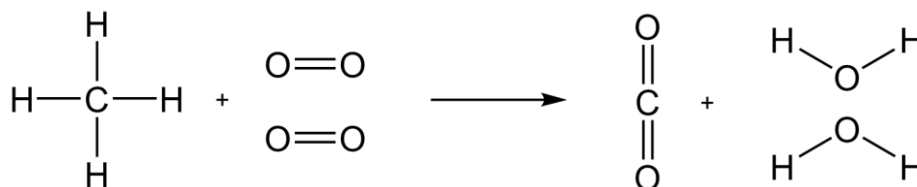
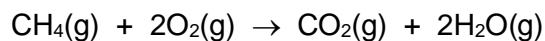
Bond	H–H	Br–Br	H–Br
Bond enthalpy / kJ mol^{-1}	438	193	366

Energy required to break bonds:

Energy released in forming new bonds:

Enthalpy change:

10. Use bond enthalpies to calculate the enthalpy change for the combustion of methane.



Bond	C-H	C-C	O-H	C=O	O=O
Bond enthalpy / kJ mol⁻¹	413	347	464	805	498

Energy required to break bonds:

Energy released in forming new bonds:

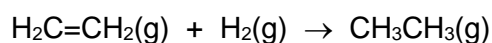
Enthalpy change:

11.

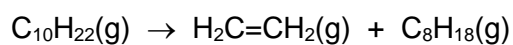
Bond	C–H	C–C	H–H	C=C
Bond enthalpy / kJ mol ⁻¹	413	347	436	612

Use the bond energies above to calculate

a) the enthalpy change for the hydrogenation of ethene



b) the enthalpy change for the cracking of decane



12. Explain in terms of bond breaking and bond formation why combustion reactions are exothermic but cracking reactions are endothermic.

Bonding and structure

Student Activity

Introduction

In your study of Bonding and Structure at A Level, you will be building a lot on ideas that you have already covered previously. Because bonding is a complex subject that is often simplified at GCSE, many learners can have unclear ideas or misconceptions about the topic. This activity will encourage you to explore what you already understand about chemical bonding, and to identify those areas that you still struggle with or require refinement at A Level.

Task 1

Here are twenty statements about chemical bonding. Each is “Always True” or “Normally True”. Decide which is which!











Task 2

For the statements that you think are not always true, try to think up some exceptions to the rule. You could use an equation or example element or compound to illustrate the ‘exception to the rule’. Feel free to consult textbooks or other resources to help you with this.

Extension











If you have confidently identified all of the ‘rules of thumb’ and provided each with an exception to the rule, now see if you can think of any other parts of chemistry where we use ‘rules of thumb’, analogies or simplifications that are not strictly true. Some topics you could think about include atomic structure, reactivity, solubility, or acid–base theory.

Statements for use in activity

<p>A. The atoms of Group 2 elements have two electrons in their outer shell.</p> 	<p>B. Noble gases do not form any types of bonds because they have full outer shells.</p> 
<p>C. Ionic substances have higher melting points than covalent substances.</p> 	<p>D. Oppositely charged ions attract.</p> 
<p>E. Delocalised electrons are more stable than electrons in fixed atomic orbitals.</p> 	<p>F. Energy is released when ionic bonds form.</p> 
<p>G. In an ionic compound, ions are combined in proportions which balance out the electrical charges.</p> 	<p>H. Energy is needed to break covalent bonds.</p> 
<p>I. Energy is required to form positive ions from atoms.</p> 	<p>J. Energy is released when negative ions are formed from atoms.</p> 

CHEMISTRY A AND CHEMISTRY B (SALTERS)**Learner Activity**

Statements for use in activity

<p>K. Bonding within compounds is either ionic or covalent.</p> 	<p>L. Electrons shared between atoms (in molecular orbitals) are more stable than electrons in atomic orbitals.</p> 
<p>M. Electrons that are closer to the nucleus experience less shielding and are more strongly attracted than electrons further away.</p> 	<p>N. A covalent bond is formed from a shared pair of electrons; one electron comes from each atom within the bond.</p> 
<p>O. Compounds are more stable than elements.</p> 	<p>P. Elements always react to form ions with noble gas electron configurations.</p> 
<p>Q. Ionic compounds are formed when metals react with non-metals.</p> 	<p>R. Covalent compounds are formed when non-metals react with other non-metals.</p> 
<p>S. Hydrogen atoms form ions by losing one electron and becoming H⁺.</p> 	<p>T. Within a covalent compound, all elements except hydrogen have eight electrons in their outer shells.</p> 

CHEMISTRY A AND CHEMISTRY B (SALTERS)

Learner Activity

Supporting/further information

If you would like to go further, the Royal Society of Chemistry has produced some excellent classroom resources to help identify and address learner misconceptions about bonding and ion formation; the three resources most pertinent to the checkpoint task are given below.

Stability and reactivity:

<http://www.rsc.org/learn-chemistry/resource/res00001103/stability-and-reactivity>

This resource gets learners to think in further detail about the relative stability of atoms and ions as well as elements vs compounds.

Why do atoms form ions?:

<http://www.rsc.org/learn-chemistry/resource/res00000111/afl-why-do-atoms-form-ions>

This ties in very well with the resource above and can help learners think about ion formation and ionic bond formation in the context of energy changes and electrostatic attractions.

Ionisation energy:

<http://www.rsc.org/learn-chemistry/resource/res00001101/ionisation-energy>

This is a fairly challenging true/false exercise which learners can use to test their understanding of ion formation, again in terms of energy changes and electrostatic attractions rather than the octet rule.