

A Level Chemistry

Y11 into 12 Bridging tasks



City of Norwich School
Sixth Form
An Ormiston Academy

Name

The task is split into 5 sections, firstly, to enable you to better understand the demands of the A Level Chemistry course and secondly, to allow your teachers to better understand your needs. The 5 sections are as follows:

1. Independent study
2. Wider reading
3. Basic chemical competency (30 marks)
4. Numeracy (20 marks)
5. Practical skills (6 marks)

TOTAL % will be given

Each section will be based on a topic that you will be studying in the first few weeks of the A Level Chemistry course and will begin to build on the knowledge you have acquired from your GCSE studies.

Teacher/peer/self feedback on your completed task after submission:

Independent study

Past students have stated that the increased expectation of independent study as one of the biggest demands of studying A Level Chemistry. Roughly speaking, each hour of lesson should be supported by another hour of independent study. This means over a 2 week timetable, you should be doing 12 hours of independent study **on top of** any homework you are set per subject! We will help guide you in timetabling your study time if you struggle.

It can be difficult to know what exactly to do for independent study. Complete the following task as an introduction to using wider sources as an example.

1. Open this link:

<https://www.youtube.com/playlist?app=desktop&list=PLi6oabjl6coxUlfu8syK3K0iFXQljwDUM>

Watch some of the videos, they are designed as a transition to A level playlist. Choose one and produce a labelled and annotated A4 poster explaining the concept from the video. You should include a step-by-step guide that would help anyone struggling with this topic.

You can also reference other sources to help you, eg: www.chemguide.co.uk.

2. Log in to Seneca and complete this assignment. The class code **7ln00dvw8d**

<https://app.senecalearning.com/dashboard/class/7ln00dvw8d/assignments/assignment/fca88414-6821-4614-bbce-70034e38f1e8>

Independent study- assessed by the head of department

Wider reading

You are now studying only 3 subjects and (hopefully!) this is because you really enjoy them! Chemistry is a wide-reaching subject and you will find that your teachers have passions for particular aspects of it. These passions started by discovering information away from the course itself through wider reading.

Bring in a Chemistry based book / article / news story that you have read and found interesting to share with the class in your first Chemistry lesson in September. On the next page are some suggested websites and books that you might want to explore.

Wider reading- peer assessment

You will need to present this to the class in your first week back and will be given an opportunity to speak on it.

Basic chemistry

1. Balance the equations below.

1.C +O ₂	-->CO
2.Ba +H ₂ O	-->Ba(OH) ₂ +H ₂
3.C ₂ H ₆ +O ₂	-->CO ₂ +H ₂ O

4.HCl +Mg(OH) ₂	-->MgCl ₂ + H ₂ O
5.N ₂ +O ₂	-->NO
6.Fe ₂ O ₃ +C	-->Fe +CO ₂
7.CH ₃ CH ₂ OH +[O]	-->CH ₃ COOH +H ₂ O
8.HNO ₃ +CuO	-->Cu(NO ₃) ₂ + H ₂ O
9.Al ³⁺ +e ⁻	-->Al
10.[Fe(H ₂ O) ₆] ³⁺ +CO ₃ ²⁻	-->Fe(OH) ₃ (H ₂ O) ₃ +CO ₂ +H ₂ O

(10 marks)

For each of the following ionic salts, determine the cation and anion present and use these to construct the formula of the salt.

(5 marks)

- Magnesium oxide
- Sodium sulfate
- Calcium hydroxide
- Aluminium oxide
- Copper(I) oxide

- When an acid is added to water it dissociates to form H⁺ ions (which make it acidic) and an anion. These acidic hydrogen atoms can be used to determine the charge on the anion.

Deduce the charge on the anions in the following acids. The acidic H atoms, H⁺, have been underlined for you.

(5 marks)

- H₂SO₃
- HNO₃
- H₃PO₄
- HCOOH
- H₂CO₃

- The following questions contain a written description of a reaction. In some cases the products may be missing as you will be expected to predict the product using your prior knowledge.

For more advanced equations you may be given some of the formulae you need.

For each one, write a balanced symbol equation for the process.

(10 marks)

- The reaction between silicon and nitrogen to form silicon nitride Si₃N₄.
- The neutralisation of sulfuric acid with sodium hydroxide.
- The preparation of boron trichloride from its elements.
- The reaction of nitrogen and oxygen to form nitrogen monoxide.
- The combustion of ethanol (C₂H₅OH) to form carbon dioxide and water only.
- The formation of silicon tetrachloride (SiCl₄) from SiO₂ using chlorine gas and carbon.
- The extraction of iron from iron(III) oxide (Fe₂O₃) using carbon monoxide.

8. The complete combustion of methane.
9. The formation of one molecule of ClF_3 from chlorine and fluorine molecules.
10. The reaction of nitrogen dioxide with water and oxygen to form nitric acid.

- marks out of 30

Numeracy

20% of the written exam questions will require you to use level 2 mathematical skills. These include selecting and using appropriate equations, rearranging equations and converting units. Getting your own scientific calculator is a must, as you will need to know how to perform various calculations on it, and each model is slightly different.

Answer the following questions.

a) Convert the following:

i. 5.6 kilograms to grams (1)

ii. 40m^3 to cm^3 (1)

iii. 5600 litres into cubic decimetres (1)

b) A chemical processing plant can produce ethanol at a rate of 25 litres/sec.

i. What is the volume produced in cubic metres/sec? (1)

ii. How much ethanol is produced by the processing plant in one day? Give your answer in dm^3 . (1)

c) Round the following numbers:

i. 0.000456 to two decimal places (1)

ii. 4657.879 to three significant figures (1)

d) Complete the following table (to two decimal places):

Ordinary number	0.00909	46007		
Standard form			5.6×10^4	2.1×10^{-5}

(4)

- e) Rearrange the formulae below to change the subject to the one shown in brackets:
- i. Moles = mass/RFM (mass) (1)

 - ii. $C = m/V$ (V) (1)

 - iii. $Pv = nRT$ (T) (1)

 - iv. $-Q = mc\Delta T$ (m) (1)
- f) For these questions, you may need to research into what is meant by 'percentage error'. Calculate the error in:
- i. Measuring 1.00g on a 2 d.p. balance (1)

 - ii. Measuring 10cm³ in a 25cm³ measuring cylinder (grade B) (1)

 - iii. A burette with a 0.05 cm³ margin of error used to deliver 5.00 cm³ of solution. (1)
- g) Calculate the % composition of mass of:
- i. Na in NaCl (1)

 - ii. C in CO₂ (1)

- marks out of 20

Practical skills

As part of your A Level Chemistry studies, you will complete several practical investigations. These are not formally assessed but do combine to form a portfolio known as the Practical Endorsement. At the end of your course you will receive a pass or a fail in this which will go alongside your grade from the exams. There are also exam questions based on these practical's.

Look at the results table below. Answer the questions about the investigation.

Volume of ethanoic acid/ cm ³	Mass of calcium hydroxide/ g	pH (from universal indicator paper)
50	0.0	
50	0.5	
50	1.0	
50	1.5	
50	2.0	

a) What is the independent variable in this investigation? (1)

b) What is the dependent variable? (1)

c) Suggest a variable that would need to be controlled. (1)

d) One student suggested that a set of 3 repeats should be completed. Why is this a good suggestion? (1)

e) Identify a limitation with the experiment and suggest an alteration that would improve it. (2)

- marks out of 6

Books

The Pleasure of Finding Things Out - Richard Feynman

Periodic Tales - Hugh Aldersey-Williams

The Disappearing Spoon - Sam Kean

Uncle Tungsten - Oliver Sacks

The Shocking History of Phosphorus: A Biography of the Devil's Element - John Emsley

Magazine/Websites/videos

The Naked Scientists (University of Cambridge) - <http://www.thenakedscientists.com/HTML/articles/chemistry/>

New Scientist - <https://www.newscientist.com/>

The Mole - <http://www.rsc.org/eic/mole>

Institution of Chemical Engineers - www.icheme.org/

Chemistry world - <https://www.chemistryworld.com/podcasts>

General Chemistry Help - www.chemguide.co.uk/

Machemguy - <https://www.youtube.com/user/MaChemGuy>

Tyler deWitt - <https://www.youtube.com/user/tdewitt451>

Periodic Table of Videos by Martyn Poliakoff - <https://www.youtube.com/user/periodicvideos>