Blue Coat School SIXTH FORM

SUBJECT TRANSITION BOOK
2020-2021

CHEMISTRY

STUDENT NAME:

SCHOOL:

This booklet has been prepared by Chemistry staff for you to read and the work contained in it will ensure that you get off to the best possible start in this subject area. It is very important that you read this booklet carefully over the summer and have a thorough attempt to complete the work and submit it at the start of the year to your subject teacher in the very first lesson. This will be the first impression you create and is a real indicator of how seriously you are prepared to be in your studies.

A-Level Chemistry

This subject is taught at:

Blue Coat School

The key staff are:

Mr. A. Matibiri – Head of Chemistry teacher, Blue Coat School
Ms Z. Yasmeen - Head of Science, Blue Coat School
Mrs. C. Taylor – *Assistant Headteacher*

Course Details

Course Title: A-level Chemistry
Exam board: AQA
Exam Code: AS –7404 **A –level** – 7405

Exam Board web site: www.aqa.org.uk

Assessment method: The *Chemistry AS* qualification is a stand-alone qualification and is assessed by two written examinations based on content and practical work. The *Chemistry A level* is assessed by three written examinations. These examinations will assess content from both years of the course. Two of the examinations are based mainly on the content and one paper is based on practical work and some of the content.

Minimum requirement: Standard entry requirements of five A*-C grades including English language and mathematics. Students should have gained at least a grade B in GCSE Additional Science or GCSE Chemistry AND at least a grade B in GCSE Mathematics.

About the course

Chemistry allows you to develop a range of skills requested by both employers and universities. For instance, a successful GCE level chemist will be an effective problem-solver and be able to communicate efficiently both orally and with the written word. Handling data will be a key part of your work, allowing you to demonstrate information retrieval skills as well as use of numeracy and ICT. You will build up a range of practical skills that require creativity and accuracy as well as developing a firm understanding of health and safety issues. As chemistry is a subject in which much learning stems from experimental work it is likely that you will need to work effectively as part of a group, developing team participation and leadership skills. As you become more skilled you will take responsibility for selecting appropriate qualitative and quantitative methods, recording your observations and findings accurately and precisely as well as critically analysing and evaluating the methodology, results and impact of your own and others' experimental and investigative activities.

AS Chemistry: The AS is a separate qualification.

Paper 1 is 50% of AS and assesses ***Relevant Physical chemistry*** topics (Atomic structure, Amount of substance, Bonding, Energetics, Chemical equilibria, Le Chatelier's principle and *K*c, Oxidation, reduction and redox equations), ***Inorganic chemistry*** (Periodicity, Group 2, the alkaline earth metals, Group 7(17), the halogens) and ***Relevant practical skills***

Paper 2 is 50% of AS and assesses ***Relevant Physical chemistry topics*** (Amount of substance, Bonding, Energetics, Kinetics, Chemical equilibria, Le Chatelier's principle and *K*c), ***Organic chemistry*** (Introduction to organic chemistry, Alkanes, Halogenoalkanes, Alkenes, Alcohols, Organic analysis), ***Relevant practical skills***

A-level Chemistry:

Paper 1 is 35% of the A level and assesses ***Relevant Physical chemistry*** topics (Atomic structure, Amount of substance, Bonding, Energetics, Chemical equilibria, Le Chatelier's principle and *K*c, Oxidation, reduction and redox equations, Equilibrium constant *Kp* for homogeneous systems, Electrode potentials and electrochemical cells, Acids and bases), ***Inorganic chemistry*** (Periodicity, Group 2, the alkaline earth metals, Group 7(17), the halogens, Properties of Period 3 elements and their oxides, Transition metals, Reactions of ions in aqueous solution), ***Relevant practical skills.***

Paper 2 is 35% of the A level and assesses ***Relevant Physical chemistry*** topics (Amount of substance, Bonding, Energetics, Kinetics, Chemical equilibria, Le Chatelier's principle and *K*c, Rate equations), ***Organic chemistry*** (Introduction to organic chemistry, Alkanes, Halogenoalkanes, Alkenes, Alcohols, Organic analysis, Optical isomerism, Aldehydes and ketones, Carboxylic acids and derivatives, Aromatic chemistry, Amines, Polymers, Amino acids, proteins and DNA, Organic synthesis, Nuclear magnetic resonance spectroscopy, Chromatography), ***Relevant practical skills***

Paper 3 is 30% of the A level and assesses any content and any practical skills

Academic and Career Pathways

Chemistry is essential for students wishing to follow a career in medicine, dentistry, veterinary science, pharmacy and chemical engineering

What equipment will be needed for the subject?

An A4 ring binder.

Dividers

Lined paper

Pens, pencils, rulers

A scientific calculator.

Please complete the following assignments on separate sheets of paper over summer ready to hand in on the very first lesson in this subject. Make sure you show all working out for the calculations

Activity 1 – What do atoms look like?

No one as yet has been able to look inside atoms to see what they are really like. The picture of an atom we have in our mind is neither 'the truth' nor 'the right answer', but a good working **model** which helps explain many phenomena.

Much evidence has been gathered to support the present model of an atom. As more evidence comes to light, the model may change, and it is very likely to become more detailed.

We can sometimes explain things using only a simplified model of the atom. Thinking of atoms as tiny spheres is sufficient to explain states of matter, but this model is not detailed enough to explain why metals tend to react with non-metals. Models can be simple or elaborate, depending on the job they do. Keep this in mind as your ideas and understanding of Chemistry develop.

How has the current model of the atom developed?

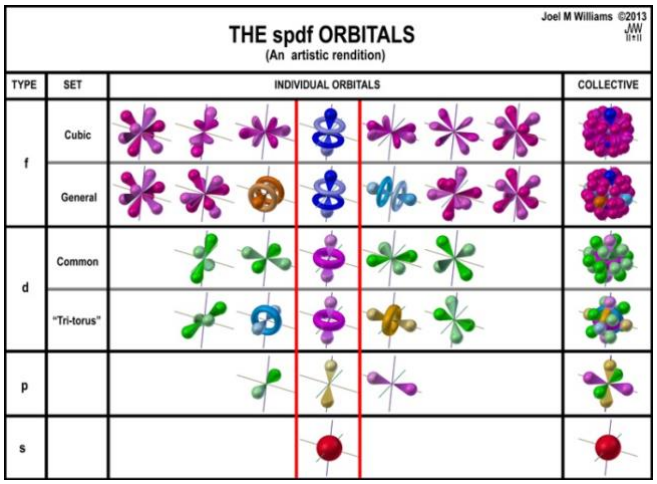
A number of scientists collected evidence, which when put together, contributed to the current model of the atom. Prepare a report (PowerPoint, leaflet, essay, poster etc.) on the work of **two** scientists from the list below.

Use textbooks, internet to help you find out the relevant information.

Remember to reference your work- you will need to quote the book name and publisher or full website of your source.

The scientists are:

1. Leucippus (of Miletus c490 BCE) and Democritus (of Abdera c470-380 BCE)
2. Robert Boyle (1627-1691)
3. John Dalton (1766-1844)
4. Joseph J. Thompson
5. Ernest Rutherford
6. James Chadwick
7. Neils Bohr



Using your report answer these questions:

1. List your sources; remember that to work at a higher level it is vital to put the information in your own words.
2. What experiments were carried out?
3. What was found out?
4. What conclusions were drawn from the results?
5. Compare the theories of your two scientists. In what ways are they similar? In what ways are they different?
6. Over time the theories have changed. What reasons could there be for this?

Activity 2: Mathematical techniques essential for A-level Chemistry

Complete all the questions on this page as they are some of the essential mathematical techniques needed when studying A-level Chemistry. ***These are the most commonly used techniques but, they are NOT the only mathematical skills that you will need when studying Chemistry. Answer questions on a separate sheet of paper. Show all your working when answering these questions.***

1. Convert the following quantities:

   (a) 0.5kg to g (b) 100cm^3 to dm^3 (c) 101000Pa to kPa (d) 37minutes to seconds

2. Write down the following masses in standard form:

   (a) 0.0053g (b) 740g (c) 0.238g (d) 0.0904g

3. If a = 9 x 10^{-6} and b = 1.34 x 10^{-3} Calculate a + b, a – b, ab, and a /b giving your answers in standard form.

4. Write down the number of significant figures in each of the following masses:

   (a) 1.0023g (b) 740g (c) 0.0000238g (d) 0.0904g

5. Write down each of the following quantities to 3 significant figures:

   (a) 9.5685cm^3 (b) 0.0057739$moldm^{-3}$ (c) 37659dm^3 (d) 56.036g

6. Round off the following quantities to 2 decimal places:

   (a) 0.5634g (b) 23.166cm^3 (c) 0.0072dm^3 (d) 0.0782$moldm^{-3}$

7. If a = 3, b = 7, c = 5, and d = 2 calculate 2a(c + b) , (d + c)/3a, 0.5c + 2b/a, and 0.6a x 3.5b/d. Give all your answer to 2 significant figures.

8. Find the simplest whole number ratio for each of the following. The numbers come from experiments so there will be some small random errors which mean that you can round the numbers a little bit.

   a) 1.5 : 1 b) 1 : 1.98 c) 4.97 : 1 d) 1 : 2.52

9. Find the percentage of carbon in each of the following compounds:

   (a) CH_4 (b) $CaCO_3$ (c) $C_6H_{12}O_6$ (d) CH_3COOH

10. Temperature can be converted from degrees Celsius (^{0}C) to Kelvins (K) using the formula

    $T_K = T_C + 273$ where T_K represents temperature in Kelvins and T_C represents temperature in degrees Celsius. Use this formula to convert the following temperatures:

    (a) 25^{0}C to K (b) -20^{0}C to K (c) 373K to ^{0}C (d) 150K to ^{0}C

11. Draw a graph for the data given in the table below:

Concentration of nitric acid ($moldm^{-3}$)	0	0.1	0.2	0.3	0.4	0.5	0.6
Volume of carbon dioxide collected (cm^3)	0	10	25	39	61	62	84

(a) From the information in the table and on the graph what is your conclusion about what happened during this experiment?

(b) Are there any anomalous results in this set of data? What would you do with the anomalous results when drawing your graph?

12. Ali dissolved 1.35g of $CuSO_4$ in $25cm^3$ of water. Ali poured the solution into a volumetric flask and he poured more water to make up the volume of the solution to $250cm^3$.

(a) How many moles of $CuSO_4$ did Ali dissolve to make this solution?

(b) What is the concentration of the solution in the volumetric flask?

Reading List

Textbooks

AS and A2 Chemistry from Oxford University Press

Maths Skills for Chemistry (Nelson Thornes, ISBN 978-1-4085-2119-9)

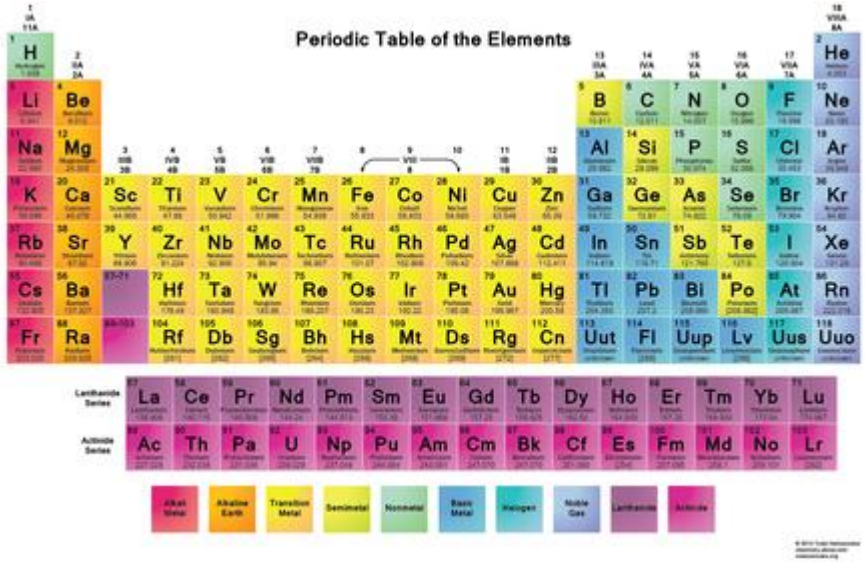
AS and A2 Chemistry from Nelson-Thornes

AS and A2 Chemistry from Collins

Any A-level chemistry book

New Scientist

Chemistry Review



Web-sites

www.chemguide.co.uk

www.rsc.org

www.royalsociety.org

www.a-levelchemistry.co.uk

www.mp-docker.demon.co.uk

www.**docbrown**.**info/**

www.chemsheets.co.uk

Current affairs

On interview for any Science related subject at University level you will be expected to be familiar with Science issues that are in the news. It is a good idea to read a quality newspaper (a weekend one is usually best) and watch the news and current affairs programmes.