

Independent Study Programme

Year 12 Chemistry

The ability to work independently is a core skill of the successful student. This framework should help you structure your Chemistry independent study. The aim is to allow you to **consolidate and extend the work done in class** and to **self-assess your progress so that you can ask your teachers for help** in areas that you still find challenging. If you can work independently then you are a STUDENT if you can't you are still a pupil!

The work should be done in your ORANGE Independent Study books. These will be checked periodically to ensure you are doing it!

YEAR 12 MODULE 2 FOUNDATIONS	Spec Reference	Activity/resources	Self Assess P3-27 WORKBOOK QUESTIONS
Atomic Structure	2.1	https://www.youtube.com/watch?v=EOHYT5q5lhQ https://www.youtube.com/watch?v=FSyAehMdpYl https://www.youtube.com/watch?v=jTI-ZkrVvE4	How have models of atomic structure changed? Describe spd orbitals What is the Aufbau principle?
Formulae and Equations	2.1.2	https://www.youtube.com/watch?v=bSlqA8nedGQ https://www.youtube.com/watch?v=0HaUz8gt1Oo	Work through the activities in your text book and the extension materials your teacher may give you.
Moles and Amount of Substance	2.1.3	https://www.youtube.com/watch?v=yjoaLNx00Ps https://www.youtube.com/watch?v=cYsYrFJaSr4 https://www.youtube.com/watch?v=WScwPIPqZa0 https://www.youtube.com/watch?v=erjMiErRgSQ https://www.youtube.com/watch?v=robEY-idcLU https://www.youtube.com/watch?v=RI14t0R1wMY	Why do chemists count in moles? Explain the Ideal Gas Equation
Acids	2.1.4	Draw a spider chart of all the reactions of Acids. Write balanced symbol equations.	What is an Acid?
REDOX	2.1.5	https://www.youtube.com/watch?v=IQ6FBA1HM3s https://www.youtube.com/watch?v=M7PnxSQedkM	What is REDOX? Explain OILRIG What are oxidation numbers (states)?
Bonding and Structure	2.2.2	Draw a revision mat that incorporates all the bonding types include suitable examples	How do particles stick together?
Shapes of Molecules	2.2.2	Explain and Summarise the electron pair repulsion theory	Explain the shapes of NH ₃ and NH ₄ ⁺

Intermolecular Forces	2.2.2	https://www.youtube.com/watch?v=jrdeloDpbAc https://www.youtube.com/watch?v=PVL24HAesnc	Why does ice float?
YEAR 12 MODULE 3: PERIODIC TABLE and ENERGY	Spec Reference	Activity/resources	Self Assessment P28-49 WORKBOOK QUESTIONS
Periodicity	3.1.1	Draw a sketch graph of the periodic trends across Period 3 of 1 st ionisation energy and melting point https://www.youtube.com/watch?v=ZSLJVpE8dCo https://www.youtube.com/watch?v=dyRm4RbbhWY	Draw a revision mat to show all the Periodic trends across periods and within groups.
Group 2	3.1.2	https://www.youtube.com/watch?v=o4ZirhYykGA	Summarise the reactions of Group 2 elements
Group 7 The Halogens	3.1.3	https://www.youtube.com/watch?v=JuU7U8UggKs https://www.youtube.com/watch?v=Tn0apJTZAiw	Summarise the reactions of the halogens. Make sure you include REDOX reactions.
Qualitative Analysis	3.1.4	https://www.youtube.com/watch?v=fhlyeLqTHqo https://www.youtube.com/watch?v=8xvI0FMh8gA	Why is the sequence of tests carbonate, sulfate then halide? Describe how to identify an “unknown” as ammonium chloride
Enthalpy Changes	3.2.1	https://www.youtube.com/watch?v=Fq9mqz1TbSw Practice questions from your text book on Hess Law calculations. Draw a diagram of the simple apparatus used to find the enthalpy of combustion of a fuel. Explain how a simple apparatus can be improved.	Define enthalpies of formation, combustion and neutralisation. What does $q=mc \Delta T$ mean?
Reaction Rates	3.2.2	https://www.youtube.com/watch?v=Am5rO-U3ZTQ	Use the Boltzmann distribution to explain the effect on reaction rates of temperature and catalysts.
Equilibria	3.2.3	https://www.youtube.com/watch?v=cqaWciw5zdA https://www.youtube.com/watch?v=o1_D4FscMnU Research the life of Fritz Haber	Define and use Le Chatalier’s principle. Explain the conditions used to make ammonia in the Haber Process.

YEAR 12 MODULE 4: CORE ORGANIC CHEMISTRY	Spec Reference	Activity/resources	Self Assessment P50 to 69 WORKBOOK QUESTIONS
Basic Concepts	4.1.1	https://www.youtube.com/watch?v= ZdHISf0yO4 Draw an organic pathways map to link all the functional groups together. Don't forget reactants and conditions! Make sure you can turn chemical A into chemical B and then into chemical C and so on...	Learn your functional groups, alkanes, alkenes, alcohols, ketones, aldehydes, carboxylic acids. Draw their displayed formulae and skeletal formula
Alkanes	4.1.2	Draw and name the first 10 alkanes. Explain why their mp or bp increase Draw out some free radical substitutions https://www.youtube.com/watch?v=BK6yu3MqYR4	How many isotopes does hexane have? Is there such a thing as a hydrogen free radical?
Alkenes	4.1.3	Addition reactions - Practise your curly arrows. GET THEM RIGHT! Who was Markownikoff? https://www.youtube.com/watch?v=PMhWMxebGJs https://www.youtube.com/watch?v=2b43Cjxwun8	Write out the rules for Cahn Ingold Prelog (CIP) rules for EZ isomerism. Write the mechanism for the reaction of hydrogen bromide with but-1-ene and but-2-ene
Alcohols	4.2.1	Describe the practical procedure (including chemicals and conditions) to make propanal, propanone and propanoic acid. Draw the apparatus. https://www.youtube.com/watch?v=hgxqpeAuT7Y https://www.youtube.com/watch?v=L4SJ-ERAEXo https://www.youtube.com/watch?v=VwEiuNPkm3g	Describe how to make a pure sample of pentanoic acid. What is your starting point? What apparatus, reagents and conditions will you use? How will you ensure it is pure?
Haloalkanes and Organic Synthesis	4.2.2 and 4.2.3	https://www.youtube.com/watch?v=gJZJ714Orw0 https://www.youtube.com/watch?v=Z9Jh-Q59xso https://www.youtube.com/watch?v=qhqpZ4SX98s https://www.youtube.com/watch?v=NjiURZMrjX4	Revise PAG7 What is ozone depletion? Write the equations. What is more significant in the rate of haloalkane hydrolysis? Bond strength or bond polarity?
Analytical Techniques	4.2.4	https://www.youtube.com/watch?v= TmevMf-Zgs https://www.youtube.com/watch?v=mZ-U7Qpkz8Y https://www.youtube.com/watch?v= xx8CaHVYm8 https://www.youtube.com/watch?v=XRhLkcXSqfA	What are the applications of IR and mass spectroscopy outside a laboratory?