A Level Chemistry

Mrs Tjandra-Ilesley & Mrs Pettit

Y11 → Y12 Bridging Work

Name:

Welcome

Welcome to A Level Chemistry! At HRS we study the OCR Advanced Level Chemistry Course, Option A. This course requires a good understanding of all aspects that you have encountered of chemistry at GCSE. You will use all of the calculations you met during GCSE and more, as we develop and build upon your GCSE knowledge throughout this course.

This is course is designed for folks who are naturally inquisitive, who like understanding why things happen, and love problem solving. All of these are key skills and traits that universities and employers look for.

Throughout the year we make use of the OCR A level chemistry textbook by Rob Ritchie and Dave Gent. Please ensure you have this textbook available to you for use at home and for independent study.

Once you have received your HRS email in year 12 you will receive access to the KS5 chemistry website, a bespoke website with access to all of the lesson resources.

In addition to the bridging work I have included a suggested reading and watch list so you can read around the subject.

Please bring your completed booklet to the **first** chemistry lesson, and hand in to your teacher.

Let me know if you have any further questions, and I look forward to seeing you in September!

Mrs Tjandra-Ilesley

The Periodic Table of the Elements

(1)	(2)											(3)	(4)	(5)	(6)	(7)	(0)
1																	**18**
1 **H** hydrogen 1.0	**2**	**Key** atomic number **Symbol** name relative atomic mass										**13**	**14**	**15**	**16**	**17**	2 **He** helium 4.0
3 **Li** lithium 6.9	4 **Be** beryllium 9.0											5 **B** boron 10.8	6 **C** carbon 12.0	7 **N** nitrogen 14.0	8 **O** oxygen 16.0	9 **F** fluorine 19.0	10 **Ne** neon 20.2
11 **Na** sodium 23.0	12 **Mg** magnesium 24.3	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	13 **Al** aluminium 27.0	14 **Si** silicon 28.1	15 **P** phosphorus 31.0	16 **S** sulfur 32.1	17 **Cl** chlorine 35.5	18 **Ar** argon 39.9
19 **K** potassium 39.1	20 **Ca** calcium 40.1	21 **Sc** scandium 45.0	22 **Ti** titanium 47.9	23 **V** vanadium 50.9	24 **Cr** chromium 52.0	25 **Mn** manganese 54.9	26 **Fe** iron 55.8	27 **Co** cobalt 58.9	28 **Ni** nickel 58.7	29 **Cu** copper 63.5	30 **Zn** zinc 65.4	31 **Ga** gallium 69.7	32 **Ge** germanium 72.6	33 **As** arsenic 74.9	34 **Se** selenium 79.0	35 **Br** bromine 79.9	36 **Kr** krypton 83.8
37 **Rb** rubidium 85.5	38 **Sr** strontium 87.6	39 **Y** yttrium 88.9	40 **Zr** zirconium 91.2	41 **Nb** niobium 92.9	42 **Mo** molybdenum 95.9	43 **Tc** technetium	44 **Ru** ruthenium 101.1	45 **Rh** rhodium 102.9	46 **Pd** palladium 106.4	47 **Ag** silver 107.9	48 **Cd** cadmium 112.4	49 **In** indium 114.8	50 **Sn** tin 118.7	51 **Sb** antimony 121.8	52 **Te** tellurium 127.6	53 **I** iodine 126.9	54 **Xe** xenon 131.3
55 **Cs** caesium 132.9	56 **Ba** barium 137.3	57–71 lanthanoids	72 **Hf** hafnium 178.5	73 **Ta** tantalum 180.9	74 **W** tungsten 183.8	75 **Re** rhenium 186.2	76 **Os** osmium 190.2	77 **Ir** iridium 192.2	78 **Pt** platinum 195.1	79 **Au** gold 197.0	80 **Hg** mercury 200.6	81 **Tl** thallium 204.4	82 **Pb** lead 207.2	83 **Bi** bismuth 209.0	84 **Po** polonium	85 **At** astatine	86 **Rn** radon
87 **Fr** francium	88 **Ra** radium	89–103 actinoids	104 **Rf** rutherfordium	105 **Db** dubnium	106 **Sg** seaborgium	107 **Bh** bohrium	108 **Hs** hassium	109 **Mt** meitnerium	110 **Ds** darmstadtium	111 **Rg** roentgenium	112 **Cn** copernicium		114 **Fl** flerovium		116 **Lv** livermorium		

57 **La** lanthanum 138.9	58 **Ce** cerium 140.1	59 **Pr** praseodymium 140.9	60 **Nd** neodymium 144.2	61 **Pm** promethium 144.9	62 **Sm** samarium 150.4	63 **Eu** europium 152.0	64 **Gd** gadolinium 157.2	65 **Tb** terbium 158.9	66 **Dy** dysprosium 162.5	67 **Ho** holmium 164.9	68 **Er** erbium 167.3	69 **Tm** thulium 168.9	70 **Yb** ytterbium 173.0	71 **Lu** lutetium 175.0
89 **Ac** actinium	90 **Th** thorium 232.0	91 **Pa** protactinium	92 **U** uranium 238.1	93 **Np** neptunium	94 **Pu** plutonium	95 **Am** americium	96 **Cm** curium	97 **Bk** berkelium	98 **Cf** californium	99 **Es** einsteinium	100 **Fm** fermium	101 **Md** mendelevium	102 **No** nobelium	103 **Lr** lawrencium

Task 1: Draw the dot cross diagrams for the following substances.

a. Chlorine

b. Carbon dioxide (CO_2)

c. Ammonia (NH_3)

d. Magnesium Chloride ($MgCl_2$)

Task 2: Write the formulae for the following compounds

a) Hydrogen sulfide
b) Propane
c) Ethene
d) Ethanol
e) Silicon hydride
f) Aluminium nitrate
g) Barium carbonate
h) Sodium sulfate
i) Nitrogen fluoride
j) Aluminium chloride

Task 3: Use the data in the type to identify the types of structure

Substance	Melting point (°C)	Boiling Point (°C)	Electrical conductivity as solid	Electrical conductivity as liquid	Electrical conductivity as a solution	Type of Structure (simple or giant) & Bonding (covalent, ionic or metallic)
A	54	120	poor	poor	poor	
B	403	567	good	good	not soluble	
C	-210	-196	poor	poor	poor	
D	1610	2230	poor	poor	not soluble	
E	615	876	poor	good	good	
F	3727	4827	good	-	not soluble	
G	56	342	good	good	good	
H	934	1568	poor	good	insoluble	
I	-105	-45	poor	poor	good	

Task 4: Explain, with reference to the strength of bonds and types of forces each substance interacts with, why...

a) Simple molecules have low melting and boiling points

b) Giant covalent lattices have high melting and boiling points

c) Metals have high melting and boiling points (except mercury and gallium)

d) Giant ionic lattices have high melting and boiling points

Task 5: Balance the following equations

1. $Ca + O_2 \rightarrow CaO$
2. $Cl_2 + KBr \rightarrow Br_2 + KCl$
3. $CaCO_3 + HCl \rightarrow CaCl_2 + CO_2 + H_2O$
4. $C_4H_{10} + O_2 \rightarrow CO_2 + H_2O$
5. $Ca(OH)_2 + H_2SO_4 \rightarrow CaSO_4 + H_2O$
6. $Mg(OH)_2 + HNO_3 \rightarrow Mg(NO_3)_2 + H_2O$
7. $Na + O_2 \rightarrow NaO$
8. $O_3 \rightarrow O_2$
9. Burning aluminium
10. Reaction of lithium with water
11. Thermal decomposition of lithium carbonate
12. Reaction of potassium hydroxide with sulfuric acid

Task 6: Memorise the following formulae and ions

Look	Cover	Write	Check
HCl hydrochloric acid H_2SO_4 sulfuric acid HNO_3 nitric acid H_3PO_4 phosphoric acid NO_3^- nitrate SO_4^{2-} sulfate CO_3^{2-} carbonate HCO_3^- hydrogencarbonate OH^- hydroxide H^- hydride PO_4^{3-} phosphate SO_2 sulfur dioxide SO_3 sulfur trioxide NH_3 ammonia CH_4 methane H_2S hydrogen sulfide			

Task 7: Rearrange the following equations to find the subject

Equation	
$n = m/M_r$	$M_r =$
$n = cV$	$c =$
$pV = nRT$	$n =$
$q = mc\Delta T$	$c =$
$K_c = \dfrac{[H_2]^3\,[N_2]}{[NH_3]^2}$	$[N_2] =$
$K_a = \dfrac{[H^+]\,[CH_3COO^-]}{[CH_3COOH]}$	$[H^+] =$

Reading and Watching List for Reading Around the Subject

Reading List

- Mark Miodownik - Stuff Matters: The Strange Stories of the Marvellous Materials that Shape Our Man-Made World
- Sam Kean - Caesar's Last Breath: The Epic Story of the Air Around Us
- Penny Le Couteur, Jay Burreson - Napolean's Buttons: How 17 Molecules Changes History
- Sam Kean - The Disappearing Spoon
- Peter Atkins - What Is Chemistry

Watch List

- Andrew Szydlo – Explosive Chemistry
- MaChemGuy – Prep for A Level Chemistry
- Hunting the Elements

Helpful Websites

- Save My Exams
- OCR Chemistry
- Chemistry KS5 Website (only accessible with a HRS email address)