

Chemistry Revision Mind Map Unit 1– Reaction Rate 1

List 4 factors which will increase the rate of a chemical reaction.

How do you calculate average rate of reaction?

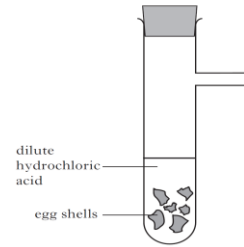
Calculate the average rate of reaction between 10 and 40 seconds, using the appropriate units.

time (s)	0	10	20	30	40	50	60	70	80	90	100	120
Mass (g)	100	95	91	87	85	83	82	82	82	82	82	82

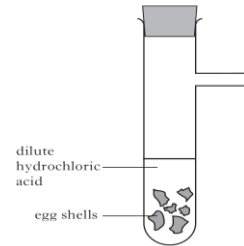
In a reaction the volume increased from **20cm³** to **80cm³** in **200 seconds**. What was the average rate of reaction in cm³s⁻¹?

Draw and label 2 pieces of apparatus which could be used to collect a gas in this reaction:

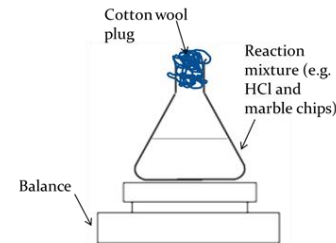
1.



2.

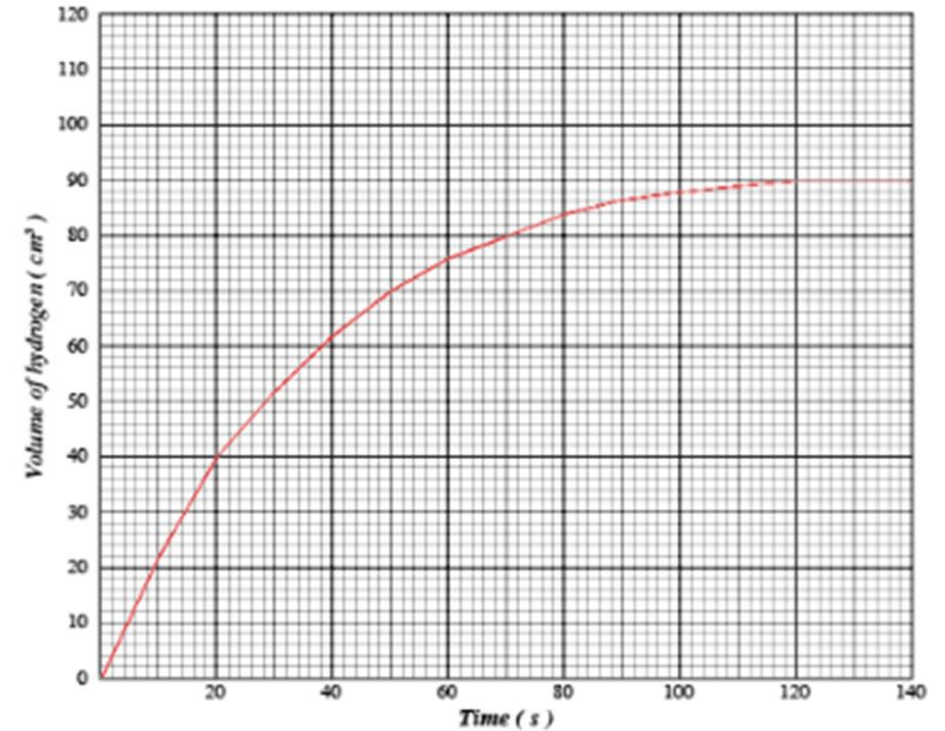


What will happen to the mass of this apparatus over time? Explain why?



The graph below shows the volume of hydrogen produced in the reaction of 1g of magnesium ribbon and 1 M hydrochloric acid.

1. Draw a green line on the graph to show using 1g of magnesium powder and 1 M hydrochloric acid.
2. Draw a blue line on the graph to show using 1g magnesium ribbon and 0.5M hydrochloric acid.
3. Draw a line to show when the reaction finished and state the time.



Reaction stopped:

The average rate of reaction in the first 40 seconds is:

Chemistry Revision Mind Map Unit 1– Atomic structure 2

Draw and label the structure of the atom.

State how you could calculate the mass number of an element.

Complete the following:

Atom Symbol	Atomic Number	Mass Number	Number of Protons	Number of Electrons	Number of Neutrons
${}^7_3\text{Li}$					
${}^{23}_{11}\text{Na}$					
${}^{16}_8\text{O}$					
${}^{40}_{19}\text{K}$					

What is an isotope:

Complete the table:

Particle	Mass (amu)	Charge	Where particle is found in atom
Proton			
Electron			
Neutron			

State how you could calculate the number of neutrons in an element.

How many electrons are able to go in the 1st, 2nd, 3rd shell.

1st:

2nd:

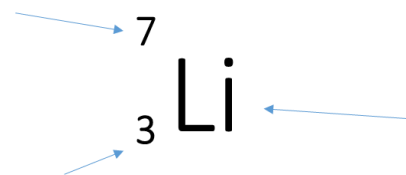
3rd:

Complete the following:

	${}^{12}_6\text{C}$	${}^{13}_6\text{C}$	${}^{14}_6\text{C}$
No. of protons			
No. of electrons			
No. of neutrons			

State why an atom is neutral.

Below shows you nucleotide notation of an element. Label what each arrow is showing



Draw an electron shell diagram for sodium and for oxygen add write the electron arrangement:

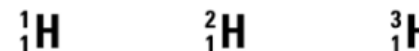
Sodium:



Oxygen:



Hydrogen has 3 isotopes, it has a relative atomic mass of 1.0, which isotope do you think is most abundant ?



What does the atomic number tell us

Write the nucleotide notation for Sodium which has a mass number of 23.

What charge is the nucleus of an atom.

Bromine has two isotopes, shown. The relative atomic mass of bromine is 80. What does this suggest about the percentage of each isotope?



Chemistry Revision Mind Map Unit 1– Periodic Table 3

State the name of group 1 elements.

Are group 1 elements reactive or unreactive? Why?

Describe how the reactivity changes as you go down group 1.

Explain why group 1 elements have similar chemical properties?

Explain why group 1 metals lose an electron.

State the name of Group 7 elements.

Explain why group 7 elements have similar chemical properties?

Explain why group 7 elements gain an electron?

State the name of group 8/0 elements.

Explain why the group 0/8 elements have similar chemical properties?

Are group 8 elements reactive or unreactive? Why?

Define the following:
Element:

Atom:

Ion:

Labels the groups, high-light the metals and non-metals and identify the atomic number on the below Periodic table.

Periodic Table of the Elements

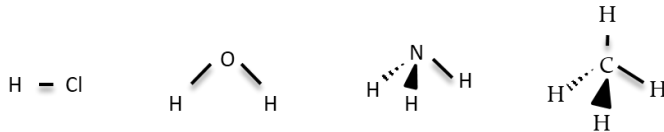
1 H Hydrogen 1.008																	2 He Helium 4.003
3 Li Lithium 6.941	4 Be Beryllium 9.012											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180
11 Na Sodium 22.990	12 Mg Magnesium 24.305											13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.064	17 Cl Chlorine 35.453	18 Ar Argon 39.948
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.631	33 As Arsenic 74.922	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 84.798
37 Rb Rubidium 84.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.711	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.904	54 Xe Xenon 131.29
55 Cs Cesium 132.905	56 Ba Barium 137.328	57-71 Lanthanides	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.217	78 Pt Platinum 195.085	79 Au Gold 196.967	80 Hg Mercury 200.592	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [209]	85 At Astatine 209.987	86 Rn Radon 222.018
87 Fr Francium 223.020	88 Ra Radium 226.025	89-103 Actinides	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Uut Ununtrium unknown	114 Fl Flerovium [289]	115 Uup Ununpentium unknown	116 Lv Livermorium [293]	117 Uus Ununseptium unknown	118 Uuo Ununoctium unknown
57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.243	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.500	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.055	71 Lu Lutetium 174.967			
89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.095	101 Md Mendelevium 258.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]			

Chemistry Revision Mind Map Unit 1– Bonding 4

What is a covalent bond

Draw a diagram showing outer electrons to show the bonding in HCl

What name is given to describe the shapes of the following molecules.



What is a molecule

What holds the electrons together in a covalent bond

What group in the periodic table are monatomic? What does this mean.

What elements are diatomic? What does this mean.

Draw a diagram showing outer electrons to show N₂

Draw a diagram showing outer electrons to show NH₃

What is an ionic bond

Why can ionic solutions conduct electricity when in solution but not when solid?:

Why do elements in an ionic bond transfer electrons?

Complete the table below:

Bonding and structure	Mpt and bpt (high/low)	Conduct electricity	Solid, liquid or gas
Covalent molecular			
Covalent network			
Ionic lattice			
Metallic lattice			

What is a compound

What is a metallic bond

Why can metallic substances conduct electricity.

Chemistry Revision Mind Map Unit 1– Writing formula 5

Write the chemical formula for the following:

(swap and drop method)

1) Magnesium hydride

2) Carbon iodide

3) Silicon oxide

4) Beryllium sulphide

Write the chemical formula for the following:

(prefix method)

1) Carbon dioxide

2) Dinitrogen tetraoxide

3) Nitrogen trihydride

4) Dihydrogen dioxide

Write the chemical formula for the following:

(swap and drop using roman numerals method)

1) Copper(II) oxide

2) Nickel(II) chloride

3) Vanadium(V) oxide

Write the chemical formula for the following:
(swap and drop using complex ions, p8 of data book)

1) Magnesium phosphate

2) Copper(II) nitrate

3) Ammonium carbonate

Write the ionic formula for the following: (remember metals have a positive charge, non-metals have a negative charge)

1) Aluminium Sulfide

2) Copper (II) Nitrate

3) Aluminium hydroxide

Chemistry Revision Mind Map Unit 1– Calculations 6

Draw the two calculations triangles you use in chemistry with the appropriate units

Calculate the mass of:

- 1) 3 moles of K_2SO_4
- 2) 0.025 moles of $\text{Mg}(\text{NO}_3)_2$

Calculate the concentration of 0.05 moles of 25cm^3 HCl

Calculate the volume of 0.04 moles of 0.1 mol L^{-1} of H_2SO_4

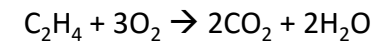
Calculate the gram formula mass for the following:

- 1) CO_2
- 2) K_2SO_4
- 3) $\text{Mg}(\text{NO}_3)_2$

Calculate the number of moles of:

- 1) 15g of K_2SO_4
- 2) 0.04g of $\text{Mg}(\text{NO}_3)_2$

Calculate the mass of CO_2 produced from 5g of ethene (C_2H_4)



Chemistry Revision Mind Map Unit 1– Acids and Bases 7

Describe the concentration of H^+ and OH^- ions in a neutral solution.

Describe the concentration of H^+ and OH^- ions in an acidic solution.

Describe the concentration of H^+ and OH^- ions in an alkali solution.

Which type of oxides dissolve in water to form an acidic solution?

Which type of oxides dissolve in water to form an alkali solution?

Which type of oxides dissolve in water to form a neutral solution?

Name three metal bases:

Complete the word equation for the following:

Metal oxide + acid $\rightarrow$

Metal hydroxide + acid $\rightarrow$

Metal carbonate + acid $\rightarrow$

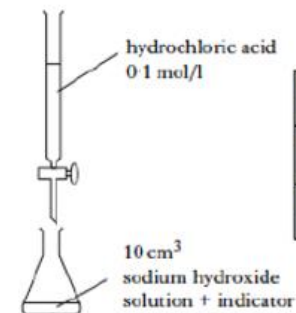
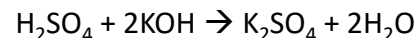
Sodium oxide + hydrochloric acid $\rightarrow$

Potassium hydroxide + sulphuric acid $\rightarrow$

Calcium carbonate + nitric acid $\rightarrow$

What are spectator ions?

30 cm^3 of 1 mol l^{-1} potassium hydroxide solution was neutralised by 50 cm^3 of sulphuric acid. Calculate the concentration of the sulphuric acid.



	Rough titre	1st titre	2nd titre
Initial burette reading/ cm^3	0.3	0.2	0.5
Final burette reading/ cm^3	26.6	25.3	25.4
Volume used/ cm^3	26.3	25.1	24.9

The following titration was carried out:
Why is an indicator used?

Calculate the average volume of hydrochloric acid used in the titration.

Why is the rough titre not used?

What does concordant results mean?

What two pieces of equipment are used in titrations to measure accurate volumes?

Chemistry Revision Mind Map Unit 2– Homologous series 1

What is a homologous series?

What is the trend in boiling and melting points within a homologous series as molecular size increases?

Explain the above trend.

What are hydrocarbons?

What are saturated hydrocarbons?

What are unsaturated hydrocarbons?

Describe the test to distinguish between unsaturated and saturated compounds.

What are the prefixes for carbon compounds?

1 Carbon-

2 Carbons-

3 Carbons-

4 Carbons-

5 Carbons-

6 Carbons-

7 Carbons-

8 Carbons-

Describe how to identify an alkane from

1. their structure

2. their name

Describe how to identify an alkene from

1. their structure

2. their name

Describe how to identify an cycloalkane from

1. their structure

2. their name

Describe the steps required to name a carbon compound.

What is the general formula of:

1. alkanes

2. alkenes

3. cycloalkanes

Draw 2-methylpentane

Draw 2-methylbut-2-ene

Chemistry Revision Mind Map Unit 2–Homologous series 2

What are isomers?

Draw hex-1-ene and one of its isomers

What is meant by hydration?

Draw butane and one of its isomers

Draw the product made when water reacts with propene

Draw propene and one of its isomers

What is an addition reaction?

What is meant by halogenation?

What is meant by hydrogenation?

Draw the product made when hydrogen reacts with ethene

Draw the product made when bromine reacts with but-1-ene.

Chemistry Revision Mind Map Unit 2– Everyday consumer products 3

Describe how to identify an alcohol (alkanol) from

1. their structure

2. their name

What is name is given to the functional group of alcohols (alkanols)?

What is the general formula of alcohols(alkanols)?

What happens to the solubility of (alkanols) as their size increases?

Explain why as alcohols (alkanols) increase in size their melting and boiling points increase

Describe how to identify an carboxylic acid (alkanoic acid) from

1. their structure

2. their name

What is name is given to the functional group of carboxylic acids (alkanoic acids) ?

Which carboxylic acids (alkanoic acids) is the main component of vinegar?

What happens to the solubility of carboxylic acid (alkanoic acid) as their size increases?

Explain why as carboxylic acid (alkanoic acid) increase in size their melting and boiling points increase

Draw the full structural formula of butan-2-ol

Draw the shortened structural formula of hexan-3-ol

Draw the molecular formula of propan-1-ol

Draw the full structural formula of heptanoic acid.

Draw the shortened structural formula of pentanoic acid.

Draw the molecular formula of methanoic acid.

Chemistry Revision Mind Map Unit 2– Energy from fuels 4

What word is used to describe a reaction or process that releases heat energy?

What word is used to describe a reaction or process that takes in heat energy?

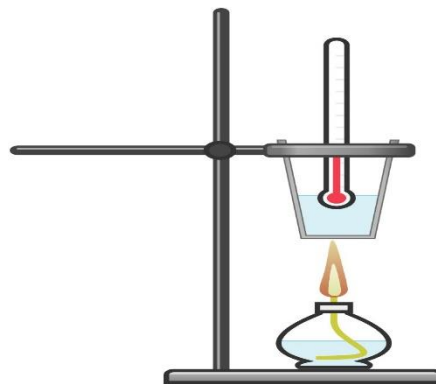
What is a fuel?

What happens during a combustion reaction?

What is produced when a hydrocarbon or alcohol burns in a plentiful supply of oxygen (complete combustion)?

What is produced when a hydrocarbon or alcohol burns in a limited supply of oxygen (incomplete combustion)?

Write a word equation, chemical equation and balanced chemical equation for when propane reacts completely oxygen.



Using this apparatus which measurements would need to be taken to allow the energy released to be calculated?

Give examples of possible sources of error within this experiment. Include a way of preventing the error.

Which formula allows the energy released when a fuel burns to be calculated?

What are the units for each term in the above equation?

Calculate the energy released when 50cm³ of water is heated from 10.3°C to 28.4°C. Include the correct units for your answer.

Calculate the temperature rise when 100g of water absorbs 26.7 kJ of energy. Include the correct units for your answer.

Calculate the specific heat capacity of the sodium chloride solution which requires 15.6kJ of energy to heat 100g of solution by 24°C. Include the correct units for your answer

Chemistry Revision Mind Map Unit 3 – Metals 1

What is metallic bonding?

Draw the structure of a metallic lattice

Why can metals conduct electricity?

If a metal is found uncombined in the Earth's crust, what does this suggest about its reactivity?

What is the name given to a naturally occurring rock that contains metal compounds?

Metals can be extracted from their ore. Metal ions from metal atoms, what is this reaction called?

What are the three methods of extracting metals from ores and what metals would be extracted using each method?

- 1.
- 2.
- 3.

Why is a D.C supply used in electrolysis?

Complete the word equation for the following:

Metal + oxygen →

Metal + water →

Metal + dilute acid →

Zinc + oxygen →

Lithium + water →

Magnesium + hydrochloric acid →

What is an oxidation reaction in terms of electrons?

What is a reduction reaction in terms of electrons?

Write the ion-electron equation for iron (II) ions forming iron (III) ions. What is this reaction called?

This is a simple cell:

What is the purpose of the electrolyte?

Why is the electrolyte an ionic solution?

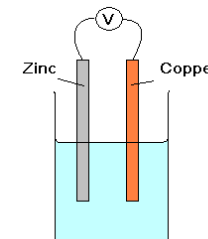
Write the reduction, oxidation and redox reaction for the cell above:

Reduction:

Oxidation:

Redox:

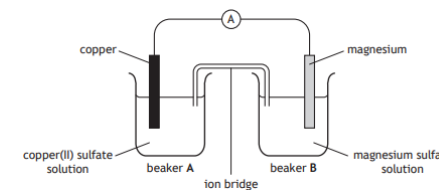
Show on the diagram the path of electron flow.



This is a half cell:

What is the purpose of the ion bridge?

Show the path of electron flow.



What non-metal can be used as electrodes in half-cells?

Electrons flow from the metal _____ in the electrochemical series to the metal _____ in the electrochemical series.

The further apart metals are in an electrochemical series, the _____ the voltage.

When copper is connected to copper in an electrochemical cell the voltage is _____.

Chemistry Revision Mind Map Unit 3 – Plastics 2

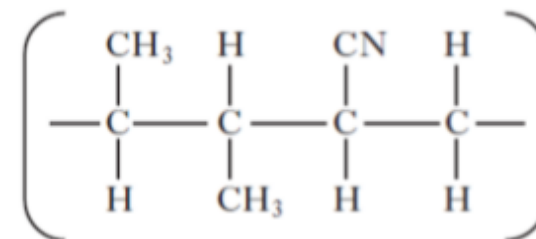
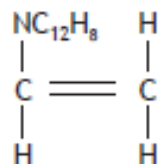
Plastics are materials known as:

Is a monomer saturated or unsaturated? What does this mean?

From the following co-polymer, draw the two monomers used to make it.

Polymers are long chain molecules formed by joining what together?

Draw a section of a polymer showing three of the following monomers joined together:



What is the name of the reaction called forming a polymer?

Name the monomers used to make the following:

1. Polystyrene
2. Polyethene
3. Polyvinylchloride

Name the polymer made from the following monomers:

1. Propene
2. Styrene
3. Tetraflouroethene

Draw the repeating unit for the above polymer you have drawn.

Chemistry Revision Mind Map Unit 3 – Fertilisers 3

The three elements required for plant growth are:	What are the two reactants for the Haber process?	What is the catalyst used in this process?
What is the purpose of fertilisers?	Write a balanced chemical equation to show the production of ammonia.	Complete the following equations: Ammonia + Nitric acid → Potassium hydroxide + Nitric acid → Circle the salts produced above. Give two reasons why these salts would be good fertilisers.
Why do fertilisers need to be soluble?	The production of ammonia is a reversible reaction, draw the arrows used to represent this.	What is the name given to the reactions above?
What is the formula for ammonia?	What catalyst is used in the Haber process?	Calculate the percentage of nitrogen in the fertiliser ammonium nitrate (NH_4NO_3)?
When ammonia dissolves in water, what colour would pH paper turn? Why?	What is the purpose of adding a catalyst?	
What is the name of the process used to make ammonia?	What is the name of the process used to make Nitric acid?	
	What are the three starting materials in this process?	

Chemistry Revision Mind Map Unit 3 – Nuclear Chemistry 4

Where does radioactive decay occur in an atom?

Unstable nuclei become more stable by giving out which three forms of radiation?

- 1.
- 2.
- 3.

Alpha particles are stopped by:

Beta particles are stopped by:

Gamma particles are stopped by:

Alpha particles are attracted to a _____ plate

Beta particles are attracted to a _____ plate.

Gamma particles are not deflected by an electric field.

An alpha particle can be represented as:

A beta particle can be represented as:

A proton can be represented as:

A neutron can be represented as:

Complete the following equations and decide whether the isotope is undergoing alpha or beta decay.

1. ${}^{242}_{94}\text{Pu} \longrightarrow ? + {}^4_2\text{He}$
2. ${}^{234}_{90}\text{Th} \longrightarrow ? + {}^0_{-1}\text{e}$

What does the term half-life mean?

What affect would increasing the temperature have on the half-life of an isotope?

16 g of a radioisotope has a half-life of 20 days. What mass of the original isotope will still be left after 60 days?

A luminous watch dial containing a material with a half life of 2.5 years has only 1/8th of its original glow. How old is the watch?

