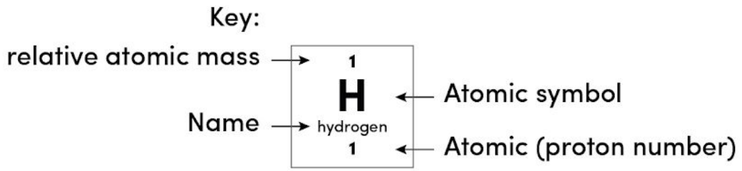
GCSE Chemistry - Chemistry - Key Stage 4

Organic chemistry

Review 3

Dr Patel

Periodic Table of Elements



Source of image: Oak

1 H hydrogen 1																	4 He helium 2
7 Li lithium 3	9 Be beryllium 4											11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
23 Na sodium 11	24 Mg magnesium 12											27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18
39 K potassium 19	40 Ca calcium 20	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36
85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	[97] Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
133 Cs caesium 55	137 Ba barium 56	139 La* lanthanum 57	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86
[223] Fr francium 87	[226] Ra radium 88	[227] Ac* actinium 89	[267] Rf rutherfordium 104	[270] Db dubnium 105	[269] Sg seaborgium 106	[270] Bh bohrium 107	[270] Hs hassium 108	[278] Mt meitnerium 109	[281] Ds darmstadtium 110	[281] Rg roentgenium 87	[285] Cn copemicium 112	[286] Nh nihonium 113	[289] Fl flerovium 114	[289] Mc moscovium 115	[293] Lv livermorium 116	[293] Ts tennessine 117	[294] Og organesson 118

Alkanes and alkenes

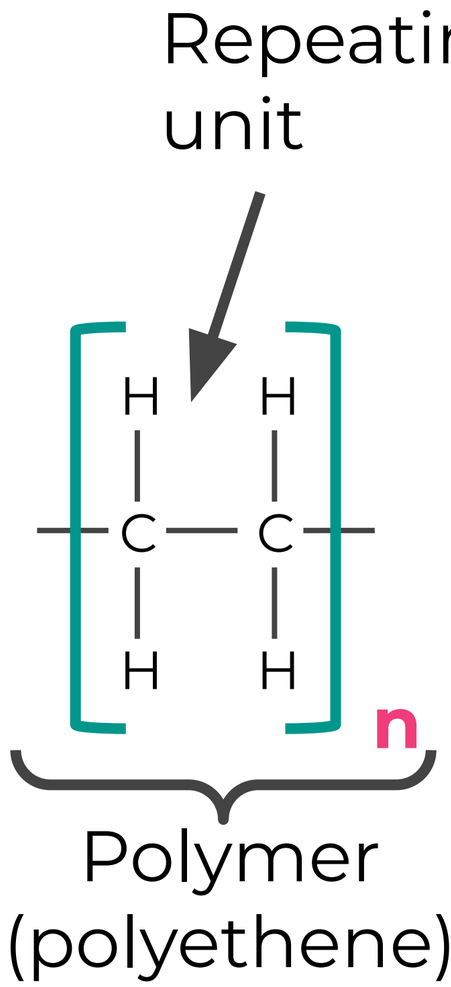
- Hydrocarbon - contains carbon and hydrogen only
- ‘Meth’ (1 carbon), ‘Eth’ (2 carbons) ‘Prop’ (3 carbons), ‘But’ (4 carbons)
- Homologous series - a family of molecules that contain the same functional group
- Functional group - a group of atoms or bonds that determine the chemical/reactive properties of a molecule
- Saturated - no double bonds
- Unsaturated - contains at least one double bond
- Alkanes: saturated, C_nH_{2n+2}
- Alkenes: unsaturated, C=C functional group, C_nH_{2n}

Alcohols and carboxylic acids

- Alcohols: solvents and fuels, OH functional group, name ends in -ol, $C_nH_{2n+1}OH$
- Sodium + alcohol → sodium ethoxide + hydrogen
- Carboxylic acids:
    - COOH functional group
    - Methanoic, ethanoic, propanoic and butanoic acid
    - Weak acids (partially ionise)
    - Metal carbonate + carboxylic acid → salt + water + carbon dioxide
    - Metal + carboxylic acid → salt + hydrogen
    - Alcohol + carboxylic acid → ester + water

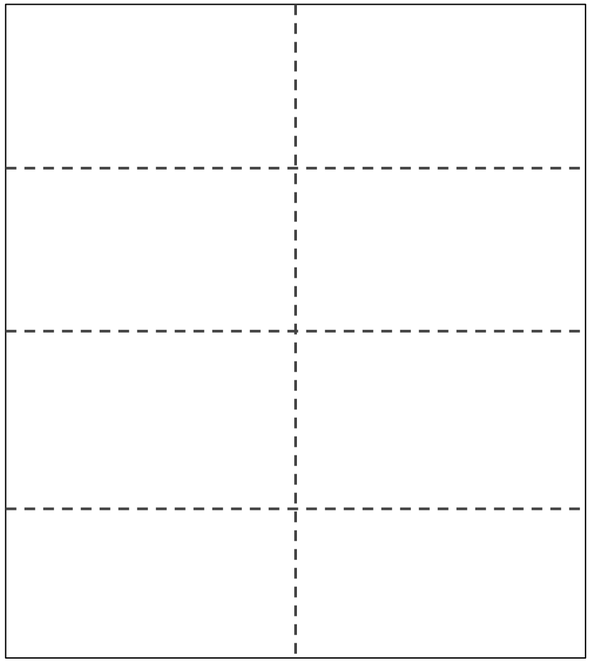
Polymers

- Monomer - a small molecule that can react with another to form a long chained polymer
- Polymerisation - many monomers join together to form a long chain
- Addition polymerisation - monomers are alkenes (C=C), one product, no double bond in repeating unit.
- Condensation polymerisation - monomers contain two functional groups, small molecule released (e.g. water of HCl).



Independent task

Create at least 5 flashcards using the key facts shown at the start of today's lesson. You must choose 5 facts you'd forgotten or find it difficult to remember.



Do:

- Start with the key facts you don't know!
- Use images
- Use colour
- Use keywords
- Keep it concise
- Be precise
- Make them neat
- Use them!

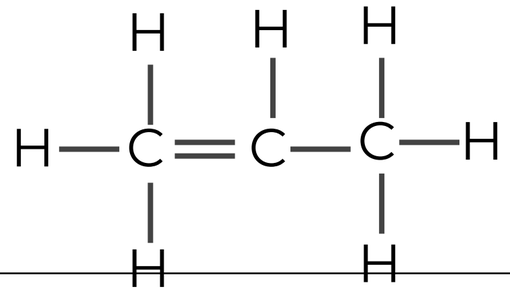
Don't

- Use full sentences
- Rush

Independent practice

Incorrect statement	Correct statement
Amino acids are the monomers that make up DNA.	
When a metal carbonate reacts with a carboxylic acid, hydrogen gas is produced.	
When a carboxylic acid and an alcohol react, they produce salt and water.	

Independent practice

Poor statement	Correct statement
	
When a group 1 metal reacts with water, it produces salt and water	
Carboxylic acids are weak acids because they turn universal indicator yellow-orange	

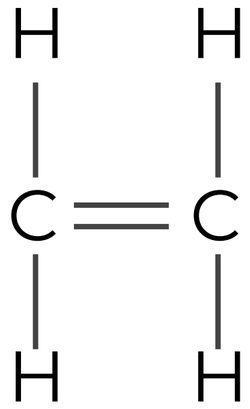
Write each statement next to the correct command word

State	Give a scientific reason as you why something occurs
Describe	Describe the similarities and differences between things
Explain	Consider evidence for and against and make a judgement
Compare	Give a simple answer. No explanation needed.
Evaluate	Recall some facts, events or process in an accurate way

Independent Practice

1. **State** the functional group that is present in all carboxylic acids

1. **Describe** the structure of ethene (see diagram)



1. **Explain** why carbon monoxide is produced during the incomplete combustion of alkanes.

Alcohol	Both	Water

Independent Practice

Compare the reaction of sodium with ethanol and water.