

GCSE Chemistry - Chemistry - Key Stage 4

Organic chemistry

Carboxylic acids

Dr Patel



Periodic Table of Elements

Key:

relative atomic mass →

Name →

Atomic symbol ←

Atomic (proton number) ←

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 copernicium 112	[286] Nh nihonium 113	[289] Fl flerovium 114	[289] Mc moscovium 115	[293] Lv livermorium 116	[293] Ts tennessine 117	[294] Og oganesson 118					



Independent practice

1. What is the common name for ethanoic acid?
2. What is the functional group found in carboxylic acids?
3. Name the first 4 carboxylic acids in order.
4. What do the names of all carboxylic acids end in?

Challenge:

A carboxylic acid has 10 carbon atoms. State its name.



Independent practice

Draw the displayed formula for propanoic acid and butanoic acid.

Support:

1. Draw your COOH group
 - Draw the C
 - Attach an O to the C using a double bond
 - Attach the OH group to C, by the O, with a single bond
 -
2. Draw the rest of the hydrocarbon
 - Remaining carbon atoms
 - 4 bonds from each carbon atom
 - Draw in your hydrogen atoms



Pause point

1. Are carboxylic acids soluble or insoluble in water?
2. What colour does universal indicator turn when added to carboxylic acids?
3. What is the rough pH range of carboxylic acids?
4. What is the general word equation for the reaction between a carboxylic acid and a metal carbonate?
5. What gas is produced when a metal carbonate reacts with acid?

Challenge: Write a word equation for the reaction between sodium carbonate and ethanoic acid.



Independent practice

1. Why does hydrochloric acid have a lower pH than ethanoic acid?
2. If the pH of ethanoic acid is 5 and hydrochloric acid is 2, what is the difference in hydrogen ion content?
3. How many orders of magnitude is this?



Independent task

1. What are the two products when an alcohol reacts with a carboxylic acid?
2. What small molecule is released when an alcohol reacts with a carboxylic acid?
3. Complete the following equations.

Methanol + ethanoic acid →

Propanol + methanoic acid →

Butanol + propanoic acid →

