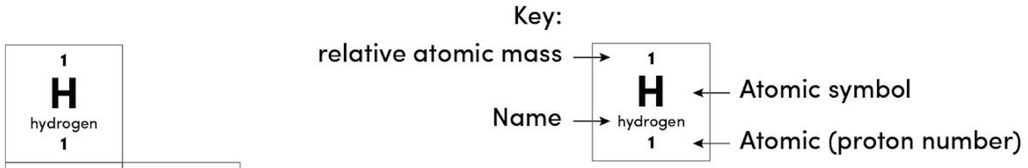
Combined Science - Chemistry - Key Stage 4

Acids, Alkalis and the pH Scale

Mr Campbell

Periodic Table of Elements



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 organesson 118

Source: Oak

Keywords

Acid	$H^+ + OH^- \rightarrow H_2O$
Alkali	Releases hydrogen ions (H^+) in solution
Neutralisation reaction	Releases hydroxide ions (OH^-) in solution
Ionic equation for neutralisation	Reaction between an acid and an alkali to produce salt and water

Independent task

Answer the questions below.

1. What is the definition of an acid?
2. What is the definition of an alkali?
3. What is the ionic equation for neutralisation?
4. What pH are acids?
5. What pH are alkalis?
6. What pH is neutral?

Independent task answers

Answer the questions below in full sentences.

1. Releases hydrogen ions/H^+ in solution
2. Releases hydroxide ions OH^- in solution
3. $H^+ + OH^- \rightarrow H_2O$
4. Below 7
5. Above 7
6. 7

Independent task

Describe how pH can be measured using universal indicator and a pH meter.

Add a few drops of Universal indicator to the solution. Record the colour change. Compare the colour to the indicator reference chart.

Clean the pH meter using distilled water. Place into the solution and record the pH. The pH meter will give a more accurate reading.

Independent task

Describe how pH can be measured using universal indicator and a pH meter.

Add a few drops of _____ _____ to the solution. Record the _____ change. Compare the colour to the indicator reference _____.

Clean the pH meter using _____ water. Place into the solution and record the pH. The pH meter will give a more _____ reading.

Working scientifically

A student record the pH of rain water at their local park. They took three readings from a sample, once with universal indicator and once with a pH meter. Their results are below.

	1	2	3	Mean	Uncertainty
Universal Indicator	5	6	5		
pH meter	5.8	5.9	6.1		

Calculate the mean and uncertainty for the universal indicator and pH meter results.

Working scientifically

	1	2	3	Mean	Uncertainty
Universal Indicator	5	6	5	5	0.5
pH meter	5.8	5.9	6.1	5.9	0.15

5.8 + 5.9 + 6.1 = 17.8

17.8/3 = 5.9

Range = 6.1-5.8 = 0.3

0.3/2 = 0.15