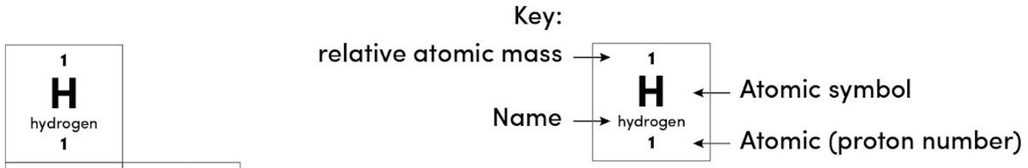
Combined Science - Chemistry - Key Stage 4

Reactivity and Acid Base Reactions Review

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

Knowledge quiz

1. Which salts are produced by:
   i) hydrochloric acid
   ii) sulfuric acid
   iii) nitric acid

1. Which ion makes solutions acidic?
2. How is a soluble salt obtained from solution?
3. Complete this equation: acid + metal carbonate ➜
4. What is meant by the terms oxidation and reduction?
5. Which element is used to extract some metals from their ore?
6. Which gas is formed when a metal reacts with an acid?
7. Complete the ionic equation for neutralisation $H^+ +$ _____ ➜ H_2O
8. What colour and pH is universal indicator in a neutral solution?
9. What salt would form from the reaction between copper oxide and sulfuric acid?

1. Which salts are produced by
   i) hydrochloric acid chloride
   ii) sulfuric acid sulfate
   iii) nitric acid nitrate
1. Which ion makes solutions acidic? H^+
2. How is a soluble salt obtained from solution? crystallisation
3. Complete this equation
   acid + metal carbonate ➜ salt + water + carbon dioxide
1. What is meant by the terms oxidation and reduction? Oxidation is gaining oxygen, reduction is removing oxygen
2. Which element is used to extract some metals from their ore? carbon
3. What gas is formed when a metal reacts with an acid? Hydrogen
4. Complete the ionic equation for neutralisation $H^+ + OH^- \rightarrow H_2O$
5. What colour and pH is universal indicator in a neutral solution? Green pH7
6. What salt would form from the reaction between copper oxide and sulfuric acid? Copper sulfate

	Universal Indicator	pH meter
Accuracy	To the nearest 1 pH value	To the nearest 0.1 pH value
Cost	£2.50	£10.00
Range of pH tested	1-11	1-14
Ease of use	pH read by comparing to colour chart	Needs to be calibrated with a solution of a known pH

Compare the use of universal indicator and a pH meter to measure pH.

- Similarities
- Differences
- Use comparative language
- Use data to illustrate

Similarities

- Both measure pH

Differences

- The pH meter costs **more**, four times or £7.50.
- The pH meter is more accurate, x10 more accurate or reads to 0.1 pH compared to 1 pH
- The pH meter has to be calibrated before use whereas the universal indicator you just need the colour chart.

	Universal Indicator	pH meter
Accuracy	To the nearest 1 pH value	To the nearest 0.1 pH value
Cost	£2.50	£10.00
Range of pH tested	1-11	0-14
Ease of use	pH read by comparing to colour chart	Needs to be calibrated with a solution of a known pH

Evaluate the two methods of measuring pH, using data from the table and your own knowledge.

- Positives
- Negatives
- Add value to the information you have been given, don't just repeat it
- Overall opinion

Universal indicator

Positives

- It’s cheaper (x4), it is easier to use as there is no need to calibrate it.

Negatives

- It doesn’t cover the full range of the pH scale so if your solution has a pH above 11 it won’t identify this.
- It could be misread if the colour is interpreted differently by different people.
- It is less accurate compared to the pH meter so won’t pick up small differences (0.1) in pH between different solutions.

pH meter

Positives

- Covers the full range of the pH scale so will be able to identify the pH of all solutions.
- It is more accurate so is useful to detect small differences in pH.
- The digital display is easy to read so can not be misinterpreted.

Negatives

- It is more expensive than using universal indicator.
- It is more complicated to use, if not calibrated correctly the reading will give errors

Overall opinion - I think the pH meter is the best to use as it covers the full pH range and is the most accurate so you can be more confident in the pH you read from it.