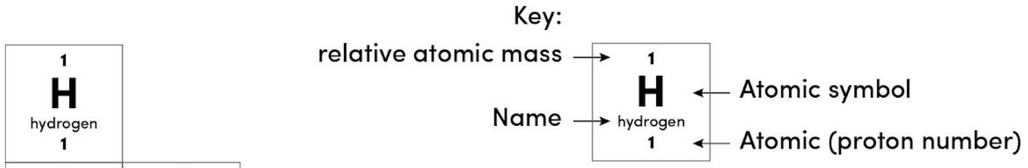
Combined Science - Chemistry - Key Stage 4

# Acid Base Ionic Equations Higher Tier

Mr Campbell

# Periodic Table of Elements

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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

# General equations

## Complete the general equations below

acid + metal ➜

acid + metal oxide ➜

acid + metal hydroxide ➜

acid + metal carbonate ➜

# General equations answers

**Complete the general equations below**

acid + metal ➜ salt + hydrogen

acid + metal oxide ➜ salt + water

acid + metal hydroxide ➜ salt + water

acid + metal carbonate ➜ salt + water + carbon dioxide

# Independent task

Balance the equations below

1. $MgCO_3 + HNO_3 \rightarrow Mg(NO_3)_2 + H_2O + CO_2$
2. $KOH + H_2SO_4 \rightarrow K_2SO_4 + H_2O$
3. $Ca(OH)_2 + HNO_3 \rightarrow Ca(NO_3)_2 + H_2O$

# Independent task answers

Balance the equations below

1. $MgCO_3 + 2HNO_3 \rightarrow Mg(NO_3)_2 + H_2O + CO_2$
2. $2KOH + H_2SO_4 \rightarrow K_2SO_4 + 2H_2O$
3. $Ca(OH)_2 + 2HNO_3 \rightarrow Ca(NO_3)_2 + 2H_2O$

# Independent task

Construct balanced equations for the reactions below.

1. Zinc reacts with sulfuric acid to produce zinc sulfate, $ZnSO_4$, and hydrogen

2. Sodium carbonate, $Na_2CO_3$, reacts with hydrochloric acid to produce sodium chloride, water and carbon dioxide.

# Independent task answers

Construct balanced equations for the reactions below.

1. $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$

2. $Na_2CO_3 + 2HCl \rightarrow 2NaCl + H_2O + CO_2$

# Independent task

Rules

- Anything that does not contain (free) ions stays the same.
- Ions on both sides of the equation cancel out

Construct ionic equations for the reactions below

1. $CaO\ (s) + H_2SO_4\ (aq) \rightarrow CaSO_4\ (aq) + H_2O\ (l)$
2. $NaOH\ (aq) + HCl\ (aq) \rightarrow NaCl\ (aq) + H_2O\ (l)$

# Independent task answers

1. $CaO\ (s) + 2H^{+}\ (aq) \rightarrow Ca^{2+}\ (aq) + H_2O\ (l)$
2. $OH^{-}\ (aq) + H^{+}(aq) \rightarrow H_2O\ (l)$