Balancing equations

There are three simple steps to balancing equations.

Step 1: Write the word equation.

Step 2: Write the **F**ormula **F**irst for each substance. *Use your ions table resource sheet.*

Step 3: **B**alance the equation using **B**ig numbers.

There MUST be the SAME number of particles/atoms/ions on the left side (reactants) of the equations as there are on the right side (products).

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**Worked example one**

Step 1: Word equation

sulfuric acid + sodium hydroxide 🡪 sodium sulfate + water

Step 2: Ionic formula

H2SO4 + NaOH 🡪 Na2SO4 + H2O

Rough notes

Na+ OH-

Step 3: Balance

H2SO4 + 2NaOH 🡪 Na2SO4 + 2H2O

Na+ SO42-

 Na+

|  |  |
| --- | --- |
| Reactant particlesH NaH OS HOO NaO OO H |  Product particles Na H Na H S O O O H O O O O |

**Worked example two**

Step 1: Word equation

nitric acid + calcium carbonate 🡪 calcium nitrate + water + carbon dioxide

Step 2: Ionic formula

Rough notes

HCl + CaCO3 🡪 CaCl2  + H2O + CO2

Ca2+ CO32-

Step 3: Balance

Ca2+ Cl-

 Cl-

2HCl + CaCO3 🡪 CaCl2 + H2O + CO2

**Worked example three**

Step 1: Word equation

iron(III) oxide + nitric acid 🡪 iron(III)nitrate + water

Rough notes

Fe3+ O2-

Fe3+ O2-

 O2-

Step 2: Ionic formula

Fe2O3 + HNO3 🡪 Fe(NO3)3 + H2O

Fe3+ NO3-

 NO3-

 NO3-

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Step 3: Balance

Fe2O3 + 6HNO3 🡪 2Fe(NO3)3 + 3H2O