

Combined Science - Chemistry - Key Stage 4
Quantitative Chemistry

Review Lesson Foundation

Mrs Begum



OAK
NATIONAL
ACADEMY

Periodic Table of Elements

Key:

relative atomic mass → **1**

Name → hydrogen

Atomic symbol → **H**

Atomic (proton number) → 1

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 111	[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

* The lanthanides (atomic numbers 58 - 71) and the Actinides (atomic numbers 90 - 103) have been omitted.

Relative atomic masses for **Cu** and **Cl** have not been rounded to the nearest whole number.



Independent practice 1

Calculate the M_r of the following:

1. Sodium chloride (NaCl)
2. Calcium chloride (CaCl_2)
3. Sulphuric acid (H_2SO_4)
4. Calcium carbonate (CaCO_3)
5. Magnesium nitrate $\text{Mg}(\text{NO}_3)_2$

Relative atomic masses:

- H - 1
- Ca - 40
- Cl - 35.5
- Na - 23
- Mg - 24
- N - 14
- C - 12
- O - 16
- S - 32



Independent practice 2

1. What is the percentage of fluorine in tin fluoride (SnF_2)?
2. What is the percentage of magnesium in magnesium carbonate (MgCO_3)?
3. What is the percentage of oxygen in aluminium hydroxide $\text{Al}(\text{OH})_3$?
4. What percentage of nitrogen in magnesium nitrate $\text{Mg}(\text{NO}_3)_2$?

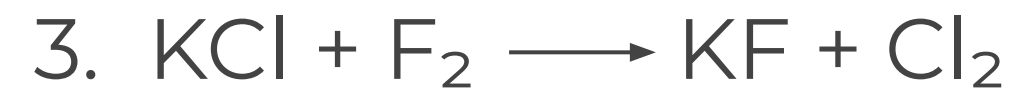
Relative atomic masses (A_r):

- H - 1
- Al - 27
- Mg - 24
- N - 14
- C - 12
- O - 16
- Sn - 119
- F - 19



Independent practice 3

Balance the following equations:



Independent practice 4

1. Zinc carbonate decomposes to produce zinc oxide and carbon dioxide. A student heated 15 g of zinc carbonate to produce 12.5 g of zinc oxide, what mass of carbon dioxide is produced?
2. 7 g of lithium reacts with 18 g of water to produce 2 g of hydrogen, what mass of lithium hydroxide is formed?



Independent practice 5

Convert the volumes below to dm^3 :

1. 20 cm^3
2. 600 cm^3
3. 100 cm^3
4. 0.07 cm^3
5. 370 cm^3

Convert the volumes below to cm^3 :

6. 2 dm^3
7. 50 dm^3
8. 38 dm^3
9. 0.8 dm^3
10. 6.4 dm^3



Independent practice 6

Calculate the concentration of the following in g/dm^3

- 30 g solute in 500cm^3
- 6 g solute in 20cm^3

Calculate the mass of the solute dissolved in the given volumes:

- 0.5 dm^3 of a 300 g/dm^3 solution
- 0.05 dm^3 of 150 g/dm^3 solution



Independent practice 1 answers

Calculate the M_r of the following:

1. Sodium chloride (NaCl) **58.5**
2. Calcium chloride (CaCl₂) **111**
3. Sulphuric acid (H₂SO₄) **98**
4. Calcium carbonate (CaCO₃) **100**
5. Magnesium nitrate Mg(NO₃)₂ **148**

Relative atomic masses:

- H - 1
- Ca - 40
- Cl - 35.5
- Na - 23
- Mg - 24
- N - 14
- C - 12
- O - 16
- S - 32



Independent practice 2 answers

1. What is the percentage of fluorine in tin fluoride (SnF_2)? **$38/157 \times 100\% = 24\%$**
2. What is the percentage of magnesium in magnesium carbonate (MgCO_3)? **$24/84 \times 100\% = 29\%$**
3. What is the percentage of oxygen in aluminium hydroxide $\text{Al}(\text{OH})_3$? **$48/73 \times 100\% = 66\%$**
4. What percentage of nitrogen in magnesium nitrate $\text{Mg}(\text{NO}_3)_2$? **$28/148 \times 100\% = 19\%$**

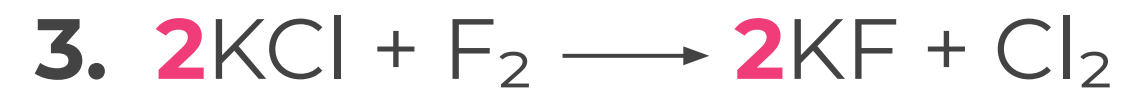
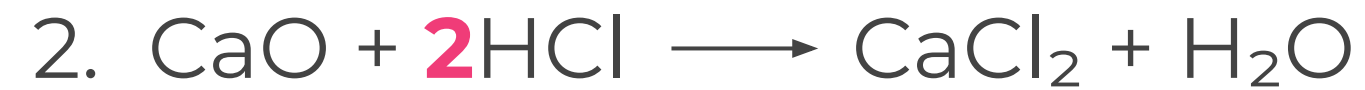
Relative atomic masses (A_r):

- H - 1
- Al - 27
- Mg - 24
- N - 14
- C - 12
- O - 16
- Sn - 119
- F - 19



Independent practice 3 answers

Balance the following equations:



Independent practice 4 answers

1. Zinc carbonate decomposes to produce zinc oxide and carbon dioxide. A student heated 15 g of zinc carbonate to produce 12.5 g of zinc oxide, what mass of carbon dioxide is produced? **2.5 g of carbon dioxide**
2. 7 g of lithium reacts with 18 g of water to produce 2g of hydrogen, what mass of lithium hydroxide is formed? **25 g of lithium hydroxide**



Independent practice 5 answers

Convert the volumes below to dm^3 :

1. 20 cm^3 **0.02 dm^3**
2. 600 cm^3 **0.6 dm^3**
3. 100 cm^3 **0.1 dm^3**
4. 0.07 cm^3 **0.00007 dm^3**
5. 370 cm^3 **0.37 dm^3**

Convert the volumes below to cm^3 :

6. 2 dm^3 **2000 cm^3**
7. 50 dm^3 **50000 cm^3**
8. 38 dm^3 **38000 cm^3**
9. 0.8 dm^3 **800 cm^3**
10. 6.4 dm^3 **6400 cm^3**



Independent practice 6 answers

Calculate the concentration of the following in g/dm^3

- 30 g solute in 500cm^3 . **$30 / (500/1000) = 60 \text{ g/dm}^3$**
- 6 g solute in 20cm^3 . **$6 / (20/1000) = 300 \text{ g/dm}^3$**

Calculate the mass of the solute dissolved in the given volumes:

- 0.5dm^3 of a 300 g/dm^3 solution. **$0.5 \times 300 = 150 \text{ g}$**
- 0.05dm^3 of 150 g/dm^3 solution. **$0.05 \times 150 = 7.5 \text{ g}$**

