

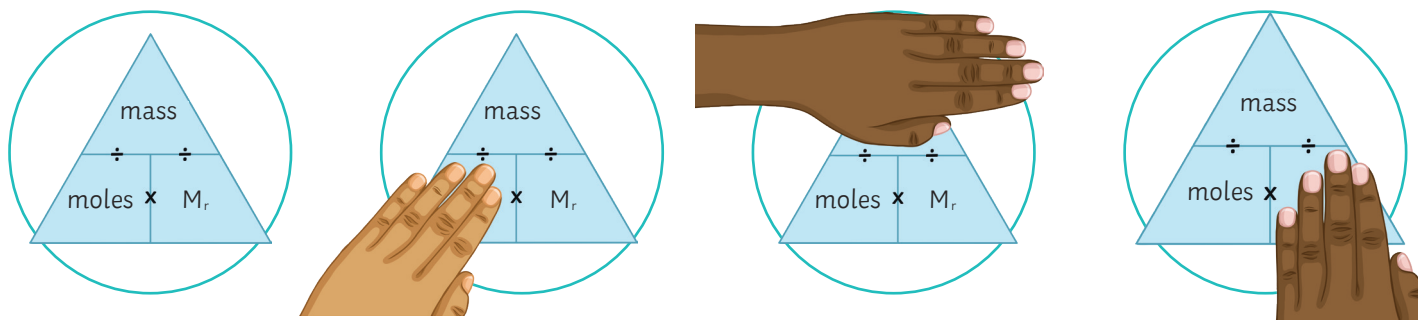
# Calculating Moles, Mass and $M_r$

Bronze



A **mole** is just a word for the number 602000000000000000000000 or  $6.02 \times 10^{23}$ . You are able to hold a mole of LiCl in your hands because molecules and atoms are so small.

To calculate the number of moles, the mass or the relative formula mass ( $M_r$ ) of a compound you need to use a formula triangle.



For example, calculate the number of moles in 26g of LiF.

Firstly, find the  $M_r$  for LiF.  $7 + 19 = 26$

We know the mass of the compound as this is stated in the question.

$$\text{moles} = \text{mass} \div M_r$$

$$26 \div 26 = \mathbf{1 \text{ mole}}$$

Have a go at calculating the moles, mass or  $M_r$  for each of the compounds below. You will need a periodic table to help you. Remember when calculating the  $M_r$ , you need to use the **mass number** for each element.

		The $M_r$ of the Compound	Use this space to show your working out.	Write your answer in the box below.
1	Calculate the number of moles in 220g of $\text{CO}_2$ .	44	$\text{moles} = \text{mass} \div M_r$ $\text{moles} = 220 \div 44$ $\text{moles} = 5$	5 moles
2	Calculate the number of moles in 168g of CO.	28	$\text{moles} = \text{mass} \div M_r$	
3	Calculate the number of moles in 234g of NaCl.	58.5	$\text{moles} = \text{mass} \div M_r$	



4	Calculate the number of moles in 26g of LiF.	26	$\text{moles} = \text{mass} \div M_r$	
5	Calculate the number of moles in 128g of $\text{SO}_2$ .	64	$\text{moles} = \text{mass} \div M_r$	
6	Calculate the number of moles in 368g of $\text{C}_2\text{H}_6\text{O}$ .	46	$\text{moles} = \text{mass} \div M_r$	
7	Calculate the number of moles in 51g of $\text{NH}_3$ .	17	$\text{moles} = \text{mass} \div M_r$	
8	Calculate the number of moles in 290g of $\text{C}_2\text{H}_5$ .	29	$\text{moles} = \text{mass} \div M_r$	
9	Calculate the number of moles in 204g of $\text{Al}_2\text{O}_3$ .	102	$\text{moles} = \text{mass} \div M_r$	
10	Calculate the number of moles in 801g of $\text{AlCl}_3$ .	133.5	$\text{moles} = \text{mass} \div M_r$	
11	Calculate the <b>mass</b> of 0.5 moles of $\text{NH}_4\text{Cl}$ .	53.5	$\text{mass} = \text{moles} \times M_r$ $\text{mass} = 0.5 \times 53.5$ $\text{mass} =$	
12	Calculate the mass of 3 moles of $\text{NH}_4\text{OH}$ .	35	$\text{mass} = \text{moles} \times M_r$	
13	Calculate the mass of 5 moles of $\text{SbF}_5$ .	217	$\text{mass} = \text{moles} \times M_r$	
14	Calculate the mass of 0.2 moles $\text{BaCl}_2$ .	208	$\text{mass} = \text{moles} \times M_r$	



15	Calculate the mass of 0.8 moles of $\text{BaF}_2$ .	175	$\text{mass} = \text{moles} \times M_r$	
16	Calculate the mass of 0.9 moles of $\text{BaO}$ .	153	$\text{mass} = \text{moles} \times M_r$	
17	Calculate the mass of 3.5 moles of $\text{BeH}_2$ .	11	$\text{mass} = \text{moles} \times M_r$	
18	Calculate the mass of 4.6 moles of $\text{BrCl}$ .	115.5	$\text{mass} = \text{moles} \times M_r$	
19	Calculate the mass of 5.3 moles of $\text{CsF}$ .	152	$\text{mass} = \text{moles} \times M_r$	
20	Calculate the mass of 0.3 moles of $\text{CuCl}_2$ .	134.5	$\text{mass} = \text{moles} \times M_r$	



# Calculating Moles, Mass and $M_r$ Answers

		The $M_r$ of the Compound	Use this space to show your working out.	Write your answer in the box below.
1	Calculate the number of moles in 220g of $\text{CO}_2$ .	44	$\text{moles} = \text{mass} \div M_r$ $\text{moles} = 220 \div 44$ $\text{moles} = 5$	<b>5 moles</b>
2	Calculate the number of moles in 168g of CO.	28	$\text{moles} = \text{mass} \div M_r$ <b><math>\text{moles} = 168\text{g} \div 28 = 6 \text{ moles}</math></b>	<b>6 moles</b>
3	Calculate the number of moles in 234g of NaCl.	58.5	$\text{moles} = \text{mass} \div M_r$ <b><math>\text{moles} = 234\text{g} \div 58.5 = 4 \text{ moles}</math></b>	<b>4 moles</b>
4	Calculate the number of moles in 26g of LiF.	26	$\text{moles} = \text{mass} \div M_r$ <b><math>\text{moles} = 26\text{g} \div 26 = 1 \text{ mole}</math></b>	<b>1 mole</b>
5	Calculate the number of moles in 128g of $\text{SO}_2$ .	64	$\text{moles} = \text{mass} \div M_r$ <b><math>\text{moles} = 128\text{g} \div 64 = 2 \text{ moles}</math></b>	<b>2 moles</b>
6	Calculate the number of moles in 368g of $\text{C}_2\text{H}_6\text{O}$ .	46	$\text{moles} = \text{mass} \div M_r$ <b><math>\text{moles} = 368\text{g} \div 46 = 8 \text{ moles}</math></b>	<b>8 moles</b>
7	Calculate the number of moles in 51g of $\text{NH}_3$ .	17	$\text{moles} = \text{mass} \div M_r$ <b><math>\text{moles} = 51\text{g} \div 17 = 3 \text{ moles}</math></b>	<b>3 moles</b>
8	Calculate the number of moles in 290g of $\text{C}_2\text{H}_5$ .	29	$\text{moles} = \text{mass} \div M_r$ <b><math>\text{moles} = 290\text{g} \div 29 = 10 \text{ moles}</math></b>	<b>10 moles</b>
9	Calculate the number of moles in 204g of $\text{Al}_2\text{O}_3$ .	102	$\text{moles} = \text{mass} \div M_r$ <b><math>\text{moles} = 204\text{g} \div 102 = 2 \text{ moles}</math></b>	<b>2 moles</b>
10	Calculate the number of moles in 801g of $\text{AlCl}_3$ .	133.5	$\text{moles} = \text{mass} \div M_r$ <b><math>\text{moles} = 801\text{g} \div 133.5 = 6 \text{ moles}</math></b>	<b>6 moles</b>



11	Calculate the mass of 0.5 moles of $\text{NH}_4\text{Cl}$ .	53.5	$\text{mass} = \text{moles} \times M_r$ $\text{mass} = 0.5 \times 53.5$ $\text{mass} = \mathbf{26.75g}$	<b>26.75g</b>
12	Calculate the mass of 3 moles of $\text{NH}_4\text{OH}$ .	35	$\text{mass} = \text{moles} \times M_r$ $\text{mass} = \mathbf{3 \times 35 = 105g}$	<b>105g</b>
13	Calculate the mass of 5 moles of $\text{SbF}_5$ .	217	$\text{mass} = \text{moles} \times M_r$ $\text{mass} = \mathbf{5 \times 217 = 1085g}$	<b>1085g or 1.085 kg</b>
14	Calculate the mass of 0.2 moles $\text{BaCl}_2$ .	208	$\text{mass} = \text{moles} \times M_r$ $\text{mass} = \mathbf{0.2 \times 208 = 41.6g}$	<b>41.60g</b>
15	Calculate the mass of 0.8 moles of $\text{BaF}_2$ .	175	$\text{mass} = \text{moles} \times M_r$ $\text{mass} = \mathbf{0.8 \times 175 = 140g}$	<b>140g</b>
16	Calculate the mass of 0.9 moles of $\text{BaO}$ .	153	$\text{mass} = \text{moles} \times M_r$ $\text{mass} = \mathbf{0.9 \times 153 = 137.7g}$	<b>137.70g</b>
17	Calculate the mass of 3.5 moles of $\text{BeH}_2$ .	11	$\text{mass} = \text{moles} \times M_r$ $\text{mass} = \mathbf{3.5 \times 11 = 38.5g}$	<b>38.50g</b>
18	Calculate the mass of 4.6 moles of $\text{BrCl}$ .	115.5	$\text{mass} = \text{moles} \times M_r$ $\text{mass} = \mathbf{4.6 \times 115.5 = 531.3g}$	<b>531.30g</b>
19	Calculate the mass of 5.3 moles of $\text{CsF}$ .	152	$\text{mass} = \text{moles} \times M_r$ $\text{mass} = \mathbf{5.3 \times 152 = 805.6g}$	<b>805.60g</b>
20	Calculate the mass of 0.3 moles of $\text{CuCl}_2$ .	134.5	$\text{mass} = \text{moles} \times M_r$ $\text{mass} = \mathbf{0.3 \times 134.5 = 40.35g}$	<b>40.35g</b>

