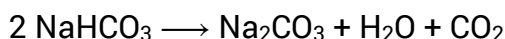


0	1
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A solid called sodium hydrogencarbonate is heated in an oven. It forms carbon dioxide gas as shown by the equation below.



A spoonful of baking soda contains a mass of 22 g of sodium hydrogencarbonate.

0	1	.	1
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Calculate the mass of carbon dioxide that could be made from 22 g of sodium hydrogencarbonate.

Show clearly how you work out your final answer.

Relative atomic masses: H = 1; C = 12; O = 16; Na = 23

[3 marks]

RFM $\text{NaHCO}_3 = 84$ $\text{CO}_2 = 44$

Moles = Mass/RFM	$\text{NaHCO}_3 = 22/84$	= 0.262	[1]
Moles $\text{CO}_2 = \text{Moles NaHCO}_3 \div 2$	$\text{CO}_2 = 0.262 / 2$	= 0.131	[1]
Mass = moles x RFM	$\text{CO}_2 = 0.131 \times 44$	= 5.76	[1]

Alternative working:

168 (NaHCO_3)	→	44 (CO_2)	[1]
1g	→	44/168	[1]
22g	→	5.76g	[1]

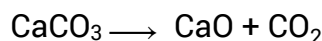
Mass of carbon dioxide = 5.76 g [3]

TOP TIP :

You can use the method from the video, or another method that you have learnt as long as it works for you!

0	2
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Limestone (CaCO_3) is a raw material. On strong heating it is converted to calcium oxide which is a very useful substance.



0	2	.	1
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Calculate the formula mass (Mr) of calcium carbonate.

[2 marks]

$40 + 12 + 48$ [1]

Mr of calcium carbonate = 100 [2]

0	2	.	2
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Calculate the mass of calcium carbonate needed to make 30 tonnes of calcium oxide.

[3 marks]

RFM	$\text{CaCO}_3 = 100$	→	$\text{CaO} = 56$	[1]
Mass ÷ RFM	$= 30 \text{ tonnes} / 56$		$= 0.5357$	[1]
Moles x RFM	$= 0.5357 \times 100$			[1]

Mass of calcium carbonate needed = 53.57 tonnes [3]

(Total 8 marks)

End of Question