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A student investigated the rate of reaction by measuring the mass lost during the reaction.

Table 3 shows the results from the reaction.

Table 3

Mass lost when the reaction was complete	8.30 g
Time taken to complete the reaction	2 minutes 30 seconds

Calculate the mean rate of the reaction using **Table 3** and the equation:

$$\text{mean rate of reaction} = \frac{\text{mass lost in g}}{\text{time taken in s}}$$

Show your working below and give your answer to two decimal places.

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Mean rate of reaction = g / s **[2 marks]**

0	1	.	2
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The student measured the change in mass of the reactants.

Describe another method, other than measuring the change in mass of the reactions, that the student could have used to find the rate of the reaction between marble chips and hydrochloric acid. **[2 marks]**

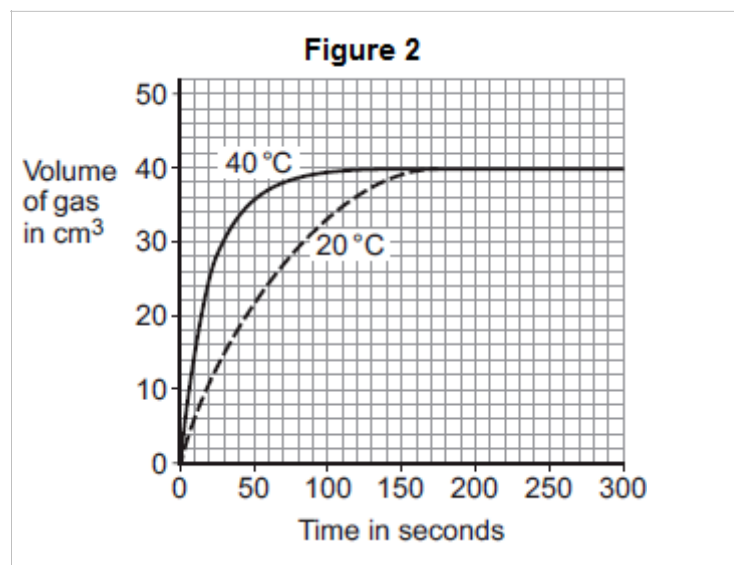
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The next question continues on the next page.

0 2

Another student investigated the effect of temperature on the reaction between hydrochloric acid and calcium carbonate.

She plotted the results for the hydrochloric acid at 20 °C and 40 °C on a graph. **Figure 2** shows the student's graph.



0 2

1

Use information from **Figure 2** to answer these questions.

State **one** conclusion the student could make about the effect of temperature on the rate of the reaction. **[1 mark]**

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0 2

2

Give **one** reason why the student could make this conclusion. **[1 mark]**

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0 2

3

For the hydrochloric acid at 60 °C the student had collected 30 cm³ after 15 seconds.

Calculate the average rate of reaction from 0 to 15 seconds. **[1 mark]**

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Rate of reaction = cm³ per second

End