# N5 Chemistry: Unit 1 – Chemical Changes and Structure REVISION

## Lesson 20 – Rates of Reaction II

### Learning Outcomes

By the end of this lesson, you should have revised:

1. How to carry out an experiment to monitor the progress of a reaction
2. How to read a graph showing the course of a reaction
3. How to compare graphs showing factors affecting the rate of a reaction.

### Success Criteria

You will have been successful in this lesson if you:

1. Watch the links provided
2. Complete revision questions provided
3. Complete and submit homework assigned

There is also a further reading section to help you gain more depth of understanding for this section.

If you have any questions about the content of this lesson, you should ask your class teacher either through your class MS team or via email. MS Teams will be monitored throughout the week by a chemistry teacher. If you need help or clarification with either the task or the content of the lesson, just ask.

### Links to Prior Knowledge

You may wish to revise the following to help you understand this lesson:

- N5 Unit 1: Rates of Reaction

*You do not need to copy any notes as this is all revision, but you should complete all questions and tasks as outlined in this document.*

# Watch the video first:

## Lesson 20: Rates of Reaction II -
## https://youtu.be/O28jHfVYRCY

You should also consult your Unit 1 Notes and printed notes to help further consolidate your knowledge. A digital copy of the printed notes can be found on the S4 Chemistry Team.

### Further Reading

To learn more about rates of reaction, try the following online resources:

**BBC Bitesize:** https://www.bbc.co.uk/bitesize/guides/zct4fcw/revision/7

https://www.bbc.co.uk/bitesize/guides/zct4fcw/revision/8

**Scholar:** Log in through GLOW

*National 5 Chemistry → Chemical Changes and Structure → Rates of reaction → try 1.6-1.7*

**Evans2 chem web:** https://www.evans2chemweb.co.uk/

Username: snhs password: giffnock

*Select any teacher → revision → National 5 → Unit 1 → Rates of Reaction*

***Extension Questions:***

*Yellow/Purple book Rates of Reaction page 1-6*

*Complete the following questions in your class work jotter. The answers will be posted on Teams on Wednesday for you to self-assess.*

**Practice Questions – Rates of Reaction II**

1. Copy and complete the table below to show your understanding of the units used to describe rates of reaction.

| Units of Changed Variable | Units of Time | Units of Rate |
|---|---|---|
| $cm^3$ | s | $cm^3\ s^{-1}$ |
| g | s | |
| | ms | $kg\ ms^{-1}$ |
| $mol\ l^{-1}$ | | $mol\ l^{-1}\ s^{-1}$ |

(3)

2. During the first 20 seconds of a chemical reaction, 5.0 $cm^3$ of gas was given off. What was the average rate of the reaction during the first 20 seconds?

Include units in your answer.

(3)

**(questions continue on the next page)**

3. A student recorded the following results in an experiment investigating the reaction between zinc and sulfuric acid.

| **Time (s)** | **Volume of hydrogen gas produced ($cm^3$)** |
|---|---|
| 0 | 0 |
| 1 | 16 |
| 2 | 30 |
| 3 | 43 |
| 4 | 55 |
| 5 | 66 |
| 6 | 75 |
| 7 | 82 |
| 8 | 86 |
| 9 | 89 |
| 10 | 89 |

a. Calculate the average rate of reaction, in $cm^3\ s^{-1}$, in the first five seconds of the reaction.

(2)

b. Calculate the average rate of reaction, in $cm^3\ s^{-1}$ between 6 and 8 seconds.

(2)

**Total: 10 marks**

**Past-Paper Questions – Rates of Reaction II**

Questions 1 and 2 refer to an experiment to investigate the rate of a reaction.
The volume of gas collected in 2 minutes was 5 $cm^3$.

1. What was the average rate of reaction over this time?

   A 0.2
   B 0.4
   C 2.5
   D 5.0 (1)

2. The unit for the average rate of this reaction is

   A $cm^3/min^{-1}$
   B $cm^3\ min^{-1}$
   C $min/cm^3$
   D $min\ cm^{-3}$ (1)

3. The table shows the times taken of 0.5 g of magnesium to react completely with acid under different conditions.

| *Acid concentration* (mol $l^{-1}$) | *Temperature* (°C) | *Reaction time* (s) |
|---|---|---|
| 0·1 | 20 | 80 |
| 0·1 | 25 | 60 |
| 0·2 | 30 | 20 |
| 0·2 | 40 | 10 |

The time for 0.5 g of magnesium to react completely with 0.2 mol $l^{-1}$ acid at 25 °C will be

A less than 10 s
B between 10 s and 20 s
C between 20 s and 60 s
D more than 80 s (1)

4. In a reaction, the mass lost in 30 seconds was 2 g.
   What is the average rate of reaction, in g $s^{-1}$, over this time?

   A $\frac{1}{30}$

   B $\frac{30}{2}$

   C $\frac{1}{2}$

   D $\frac{2}{30}$

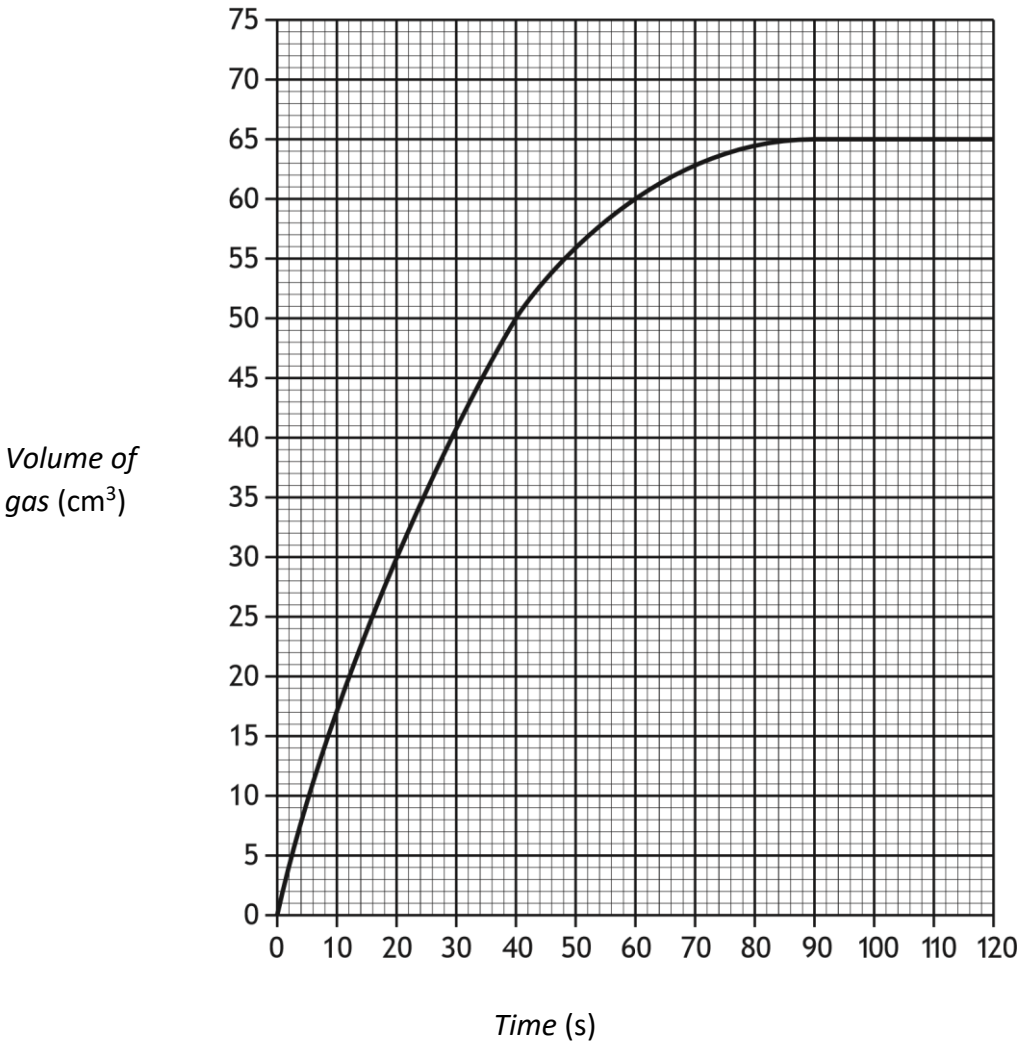
   (1)

5. The table shows the results obtained in an experiment carried out to measure the volume of ethyne gas produced.

| *Time* (s) | 0 | 30 | 60 | 90 | 120 | 150 | 180 | 210 |
|---|---|---|---|---|---|---|---|---|
| *Volume of ethyne* ($cm^3$) | 0 | 60 | 96 | 120 | 140 | 148 | 152 | 152 |

   Calculate the average rate of reaction between 60 and 90 seconds.
   Your answer must include the appropriate unit. (3)
   **Show your working clearly.**

6. The graph shows the volume of gas produced in an experiment over a period of time.




Calculate the average rate of reaction for the first 20 seconds.
Your answer must include the appropriate unit. (3)

**Show your working clearly.**

**Total: 10 marks**

*Now complete the '1.10 End of Topic Test: Rates of Reaction' on Scholar.*