

**Subject:** Chemistry

**Topic:** Rate of chemical reactions

**Level:** S.4

**Learning Objectives**

1. Content:

Students should be able to:

describe the relationship between the rate of chemical reaction and time from a graph plotted from an experiment

2. Language:

Students should be able to:

1. use the following language pattern and vocabulary to describe the relationship between the rate of chemical reaction and time:

*This implies that...*

2. give a title to a graph plotted to represent experimental results

**S.4 Chemistry**  
**Rate of Reactions**  
**Worksheet 1**

Name: \_\_\_\_\_ No.: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

**Activity 1**



**Individual work**

**A. Pre-lesson**

1. Do this part before the lesson.
2. Refer to your textbook Chapter 9 to complete this part.
3. Consider the chemical reaction between zinc and dilute hydrochloric acid (Include all physical states in the equations):

Word equation:	Zinc + hydrochloric acid →
Chemical equation:	
Ionic equation:	

4. From the ionic equation, we know that we can measure the reaction rate by measuring:
  - a. the amount of zinc used up per minute, or
  - b. the amount of dilute hydrochloric acid used up per minute, or
  - c. the amount of hydrogen produced per minute, or
  - d. the amount of zinc ion produced per minute.
  
5. Which of the above amounts are measurable?

\_\_\_\_\_

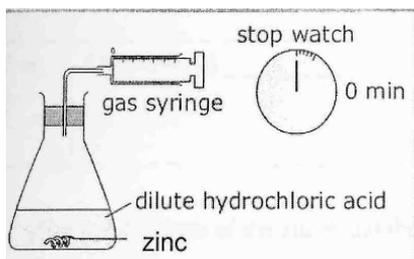
6. How can we measure them?

\_\_\_\_\_

\_\_\_\_\_

## B. A typical graph on the rate of reaction

Experimental set-up:

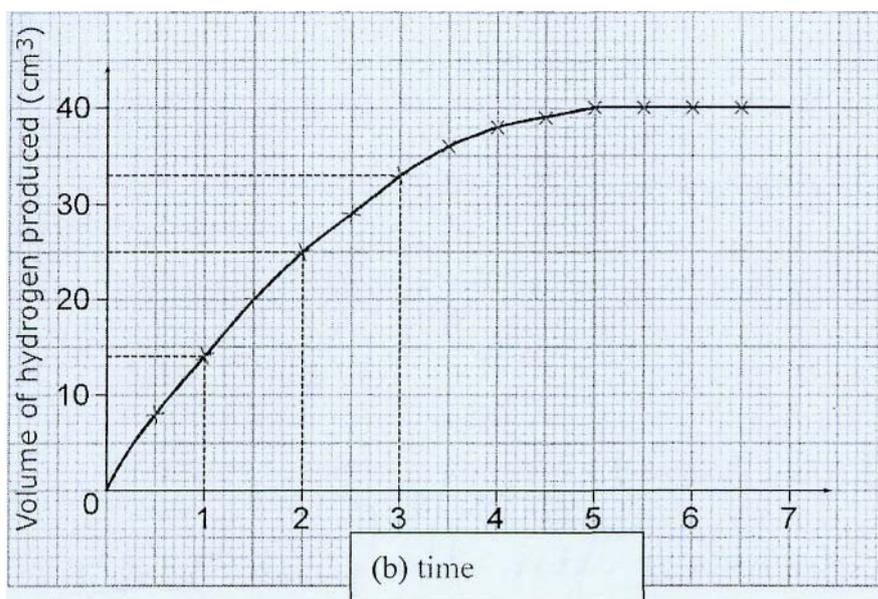


From this experiment, we can measure

\_\_\_\_\_ with \_\_\_\_\_.

If you plot the experimental result on a graph paper, you can describe the graph in this way:

Title of graph:



### Tips:

How do we give a title to this kind of graph?

**A graph showing**  
(quantity which the y  
axis represents)  
**against** (quantity  
which the x axis  
represents) **for the**

Vocabulary tips:

**Steep (adj):** having a sharp slope or incline.

"**This implies that**" is usually followed by the deduction from the previous sentence.

**Flat (adj):** parallel to the ground. (Note that this word has multiple meaning

Region	Description	Interpretation
t=0 to t=1	The slope of the curve is _____ at the first minute.	This implies that _____.
t=1 to t=2	The slope of this curve is _____ at the first minute than at the third minute.	This implies that _____.
t=5 to t=7	The curve _____.	This implies that _____.

How are the slope of the curve and the rate of reaction related to each other?

\_\_\_\_\_

Tips:

To describe the relationship, you may use the following sentence structure:

**When** (description of the curve), (interpretation).

We should use **simple present tense** as they are general