

SCIENCE



WORKSHEET

FACTORS AFFECT RATES OF REACTION

NAME :

.....

CLASS :

.....





LEARNING OBJECTIVES

Conduct an experiment on the effect of surface area, temperature, and concentration on the rate of reaction.

INSTRUCTION

1. Write your identity in the identity column
2. Complete the worksheet individually
3. Do an experiment based on the topic given in the group
4. Analyze the data obtained during the experiment
5. Present the result of the experiment in the next meeting.

LEARNING REFERENCE

Jones, M., Freeman, D.F., & Smyth, M. 2020. Cambridge Lower Secondary Science Learner's Book 9. Cambridge University Press.





SURFACE AREA

Problem Formulation

1. How does surface area affect the reaction rate?
2. How does the reaction rate graph compare with different surface areas?

Objective

1. Analyze the effect of surface area on reaction rate.
2. Analyze the difference in reaction rate graphs with different surface areas.

Hypothesis

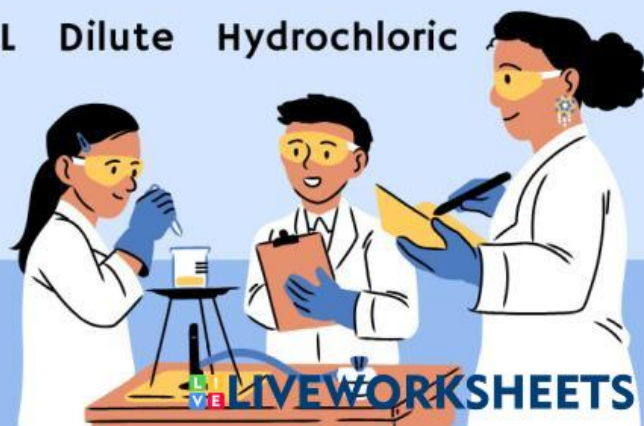
State the hypothesis for this experiment!

Tools

- 2 Conical flasks
- 2 Stopwatches
- 2 Balloons
- Measuring cylinder
10 mL
- Tissue

Materials

- 2 grams Calcium carbonate powder
- 2 grams Calcium carbonate chips
- 10 mL Dilute Hydrochloric acid





Steps for attempt 1

1. Prepare tools and materials
2. Put the 2 grams calcium carbonate chips in the beaker glass
3. Measure 5 mL hydrochloric acid using measuring cylinder
4. Pour 5 mL of Hydrochloric acid into the beaker glass
5. Start the stopwatch and stop when the solution doesn't produce bubbles anymore
6. Record the time taken until the solution doesn't produce bubbles anymore



Steps for attempt 2

1. Prepare tools and materials
2. Put the 2 grams of calcium carbonate powder in the beaker glass
3. Measure 5 mL hydrochloric acid using measuring cylinder
4. Pour 5 mL of Hydrochloric acid into the beaker glass
5. Start the stopwatch and stop when the solution doesn't produce bubbles anymore
6. Record the time taken until the solution doesn't produce bubbles anymore



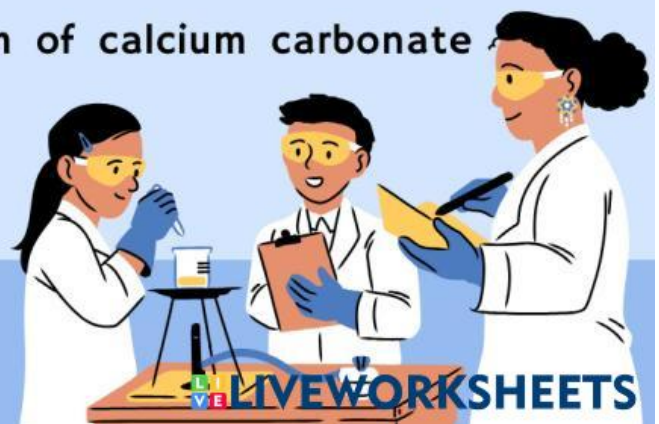


Diagram Experiment

Draw diagram for the steps of the experiment!

Variables

- **Manipulated Variable** : the surface area of calcium carbonate
- **Response Variable** : the time taken until the balloon is filled with gas
- **Controlled Variable** : the volum of calcium carbonate and HCl





Data

Table I. Rates of reactions result data

No.	Types of Calcium Carbonate	Time (s)
1		
2		

Analysis

Explain the data obtained and the factors that influence these results





Graph

Plot a graph of the surface area versus time!



Conclusion

Conclude your experiment!

