

Chemistry 12 Lab 18A

Factors Affecting Reaction Rate

NAME _____

PARTNER _____

BLOCK _____ DATE _____

Pre-Lab Questions:

1. What is necessary before potential reacting particles will produce a chemical reaction?

2. What three factors, that affect reaction rate, will be examined in this lab?

(A) _____

(B) _____

(C) _____

3. List three precautions that you should take when handling hydrochloric acid.

(A) _____

(B) _____

(C) _____

4. What should you do if you get hydrochloric acid on your skin?

5. Write the balanced molecular equation for the reaction we will be investigating in this lab.

6. How will you be able to recognize the completion of the reaction in each experiment?

PART 1: Effect of Concentration on Reaction Rate

Carefully follow the instructions for Part 1 on page 193 of your lab book. Complete the table below according to the experimental procedure.

Concentration of Acid	Reaction time (in seconds)	Reaction Rate (g of Mg / s)	Class Average Reaction time	Class Average Reaction Rate
0.5 M				
1.0 M				
3.0 M				
6.0 M				

Graph your data and the class average data on the following page. We will **assume** that the class average will be more accurate than your individual data. Plot the class averages as circled dots on the graph paper and draw the best straight line through the (0,0) point, including the majority of the points. Plot your individual data points as small "X"s on the same graph paper.

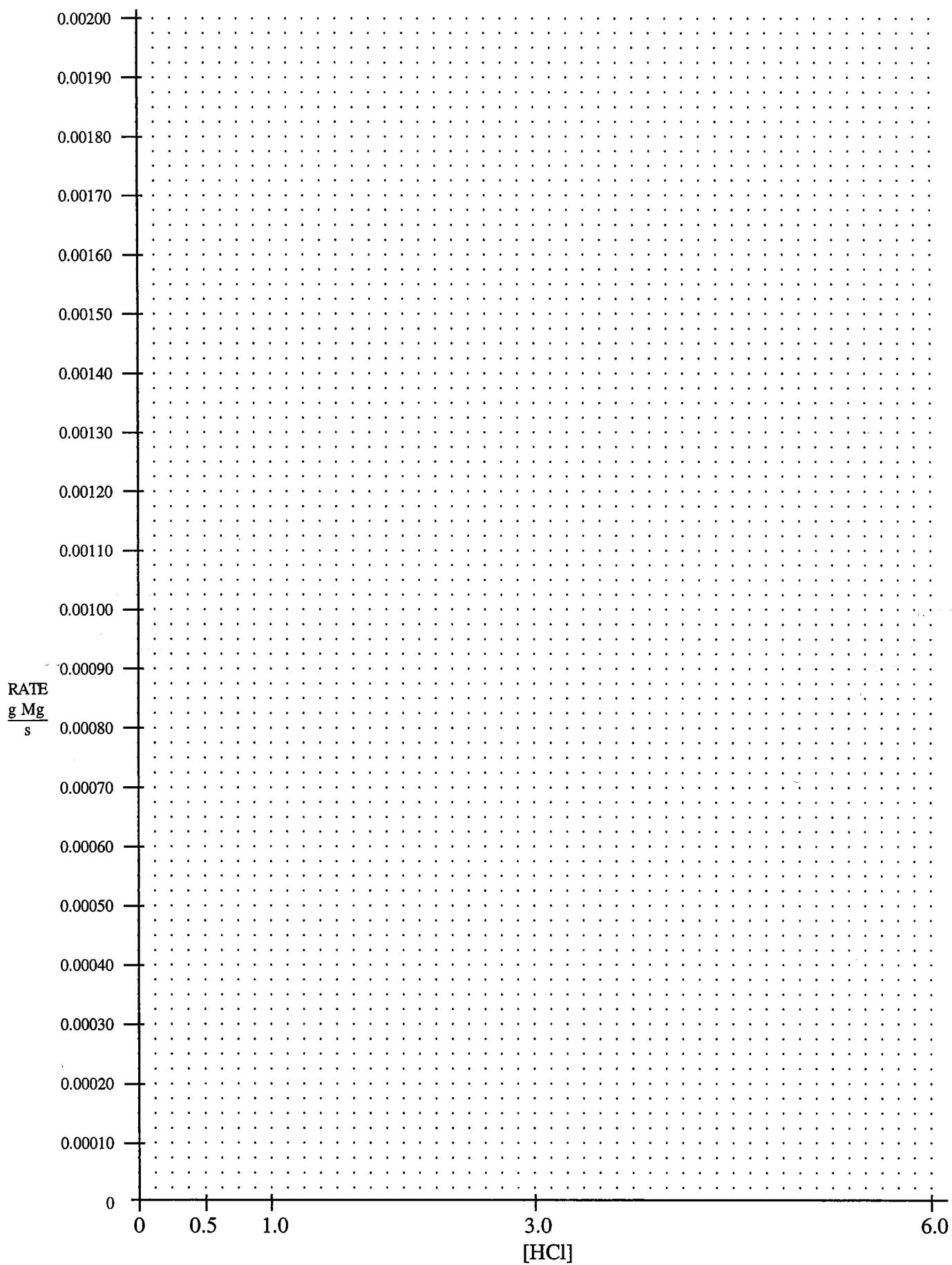
1. Make a general statement concerning the effect of concentration of HCl on the reaction rate in this experiment.

2. If you double the concentration of the HCl in this experiment, what is the effect on the reaction rate? Explain your answer.

3. Using your graph, predict the reaction rate of a 1 cm piece of Mg placed into a 4.0 M solution of HCl.

_____ g of Mg / s

Lab 18A - Graph of Reaction Rate (g Mg / s) vrs. [HCl]



Part 2: Effect of Surface Area on Reaction Rate

Follow the procedure as given on page 193 of the lab book. **Only perform the experiment on the flat piece of Mg and the piece cut into tiny slivers - the rolled Mg tends to break and therefore doesn't work.**

Shape of Mg strip	Reaction time (in seconds)	Reaction Rate (g of Mg / s)
flat		
slivers		

1. Make a general statement concerning the effect of surface area on reaction rate.

2. Explain why you will be more successful in lighting a fire made from kindling wood than in lighting a log directly.

Part 3: The Effect of Temperature on Reaction Rate

You will be assigned five temperature baths to perform this experiment. As you sit facing the front of the room, if you and your partner are on the left side of the room, your temperatures will be 20°, 40°, 60°, 80°, and 100°C. If you and your partner are on the right side of the room, your temperatures will be 10°, 30°, 50°, 70°, and 90°C.

- Place approximately 10 mL samples of 1.0 M HCl into five separate test tubes and place the tubes into a 600 mL beaker partially filled with cool tap water.
- Place a thermometer into one of the tubes and adjust the temperature with ice or a low Bunsen burner flame until you have reached your first temperature.
- Add a 1.0 cm strip of Mg to one of the test tubes and record the time it takes for the Mg sample to dissolve completely.
- Discard this sample, place the thermometer to another test tube and apply heat from a low Bunsen burner until the temperature is a couple of degrees below the next temperature.
- Repeat the above steps, each time adding a 1.0 cm strip of Mg and recording the time it takes to dissolve.

Complete the following table with your data and the class averages. Place a dash in the boxes not tested by your group.

Water bath Temperature	Reaction Time (in seconds)	Reaction Rate (g of Mg / s)	Class Average Reaction Time	Class Average Reaction Rate
10°C				
20°C				
30°C				
40°C				
50°C				
60°C				
70°C				
80°C				
90°C				
100°C				

Follow the same instructions as in Part 1 to graph your results for this experiment.

NOTE: Your graph does NOT have to pass through (0,0).

1. Make a general statement regarding the effect of temperature on reaction rate.

2. Using your graph, predict the reaction rate which would be observed at 65°C.

_____ g of Mg / s

Lab 18A - Graph of Reaction Rate (g Mg / s) vrs. Temperature (°C)

