

Name

Lab
Check

Key

Date

3/22/18

Period

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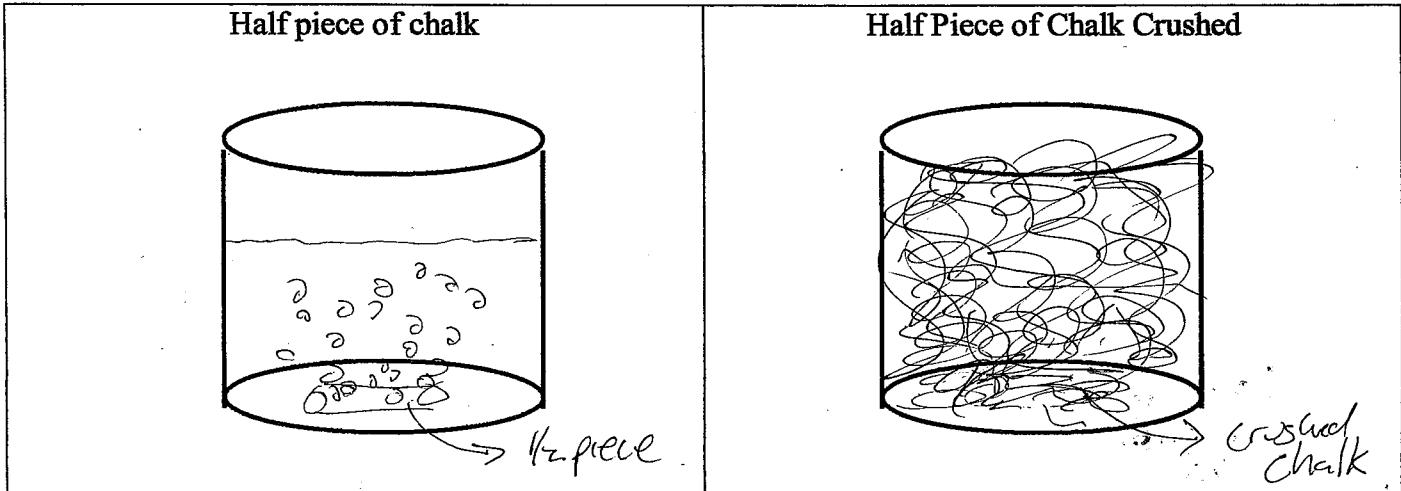
Lab #15 - Chemical Weathering Rates

Hand in

Part I - Effect of particle size on Rate of Weathering

by 4/9

Watch the demonstration using chalk and Hydrochloric Acid (HCl). Record your observations as drawings in the boxes provided below

**Questions**

1. Which piece of chalk reacted faster?

The crush chalk reacted faster.

2. What happens to the surface area of the chalk when it is crushed?

The surface area increases when the chalk is crushed.

3. Which would react faster, 100 grams of silt sized chalk or 100 grams of chalk pebbles?

100g runs of silt sized chalk would react faster.
(more surface area)

4. What type of relationship exists between particle size and rate of weathering?

As particle size increases, ~~reactor~~ rate of weathering will decrease. (Indirect relationship).

Smaller particles react faster than larger particles.

Part II - Effect of Temperature on Rate of Weathering

Materials

Alka-Seltzer Tablets
Thermometer

Triple beam balance
Stopwatch

400 ml beaker

Watch the demonstration of the procedure using room temperature water. Record the collected data on the table on the back. Repeat the experiment using warm tap water and then ice water.

Data Table

(Hand to Teeth)

Water Temperature (°C)	Mass (mg)	Weathering Time (seconds)	Rate of Weathering (mg/sec)
Cold Water 5 °C	3,250	109 sec	
Room Temp 20 °C	3,250	49 sec	
Warm Water 35 °C	3,250	26 sec	

Questions

1. What type of relationship exists between the water temperature and the time needed for weathering?

As Temperature increases the time decreases.
This is an indirect relationship.

2. What type of relationship exists between water temperature and the rate of weathering?

As Temperature increases the rate of reaction increases.
This is an indirect relationship.

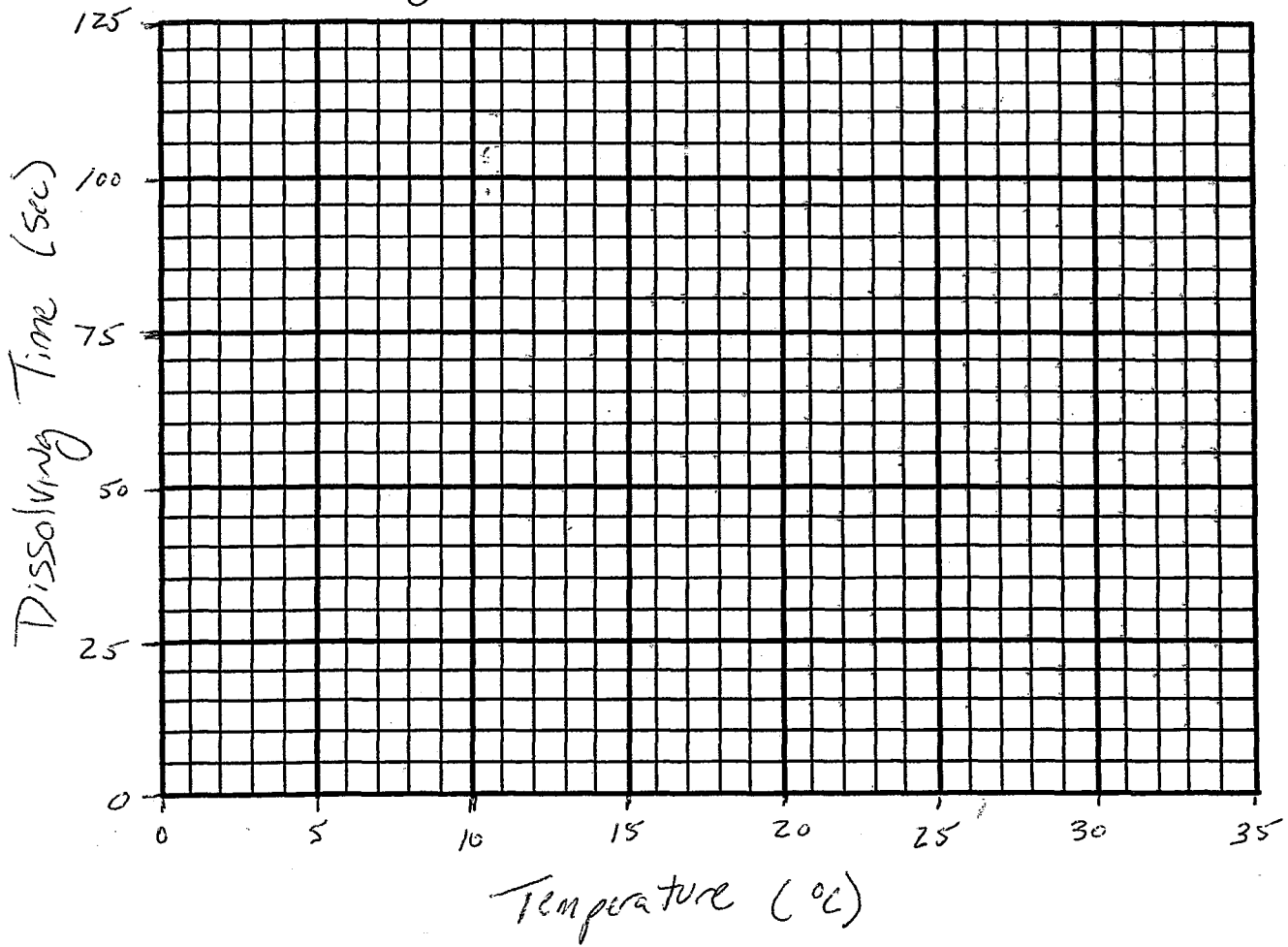
3. Considering these relationships, how much chemical weathering occurs to rocks near the poles?

Rocks near the Poles experience very little chemical weathering.

4. The rate of chemical weathering is greatly increased by the presence of water. In an arid climate very little chemical weathering can occur. Predict what would happen when Cleopatra's Needle, a monument made out of limestone, was moved from Egypt to New York City. Describe what would happen to the rate of weathering of the hieroglyphics on the surface of Cleopatra's Needle.

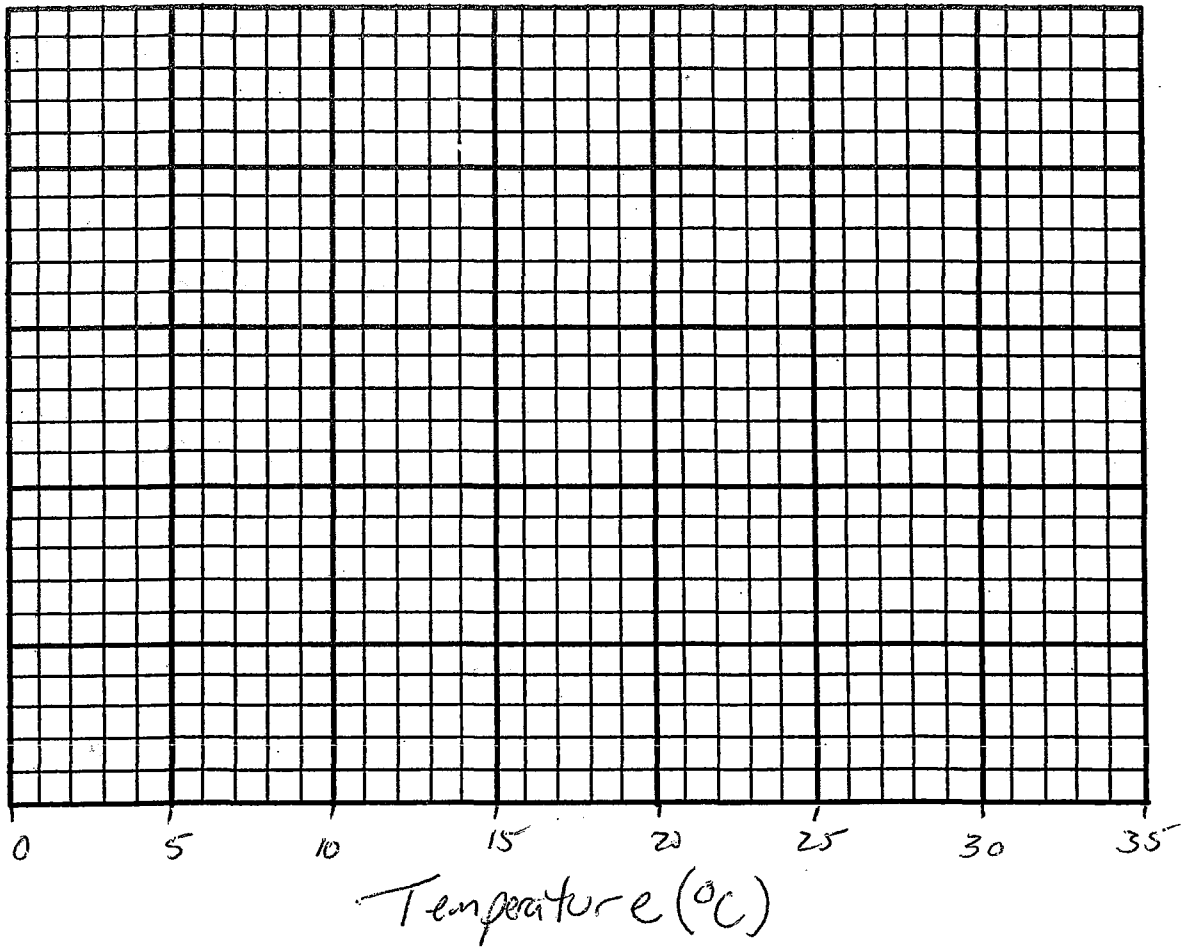
When Cleopatra's Needle was moved from Egypt to New York the Rate of chemical weathering increased. The hieroglyphics on the surface have been weathered away.

Reacting Alka-Seltzer in Different Temperatures



Rate of Reaction for Alka-Seltzer @ Different Temperatures

Rate of Weathering (mg/s)



Lab #33 - Lab Check

Questions

1. How did the size and the shape of the cubes change during the experiment?

The samples became smaller and rounder as they were abraded.

2. What happened to the rate of percentage of mass lost during the experiment? What caused this change in rate?

Most of the mass was lost in the first 3 minutes. The rate became the least for the last 3 minutes.

3. How would your results have changed if you used rock material instead of sugar during the experiment?

Actual rocks would have taken longer to physically weather.

4. If sugar spheres were used instead of sugar cubes, how would the results of the experiment have differed? Make sure you discuss how the percentage of mass lost, size, and shape would have been altered.

Sphere would abrade at a slower rate because there are no edges to break off during collisions. The mass lost would be lower, the shape would stay rounded, and the size would have decreased by less.

5. If you conducted this experiment with 200 ml of water in the container, how do you think your results would have changed? What property of the sugar would be responsible for the changes you predict?

If water was added, the experiment would have finished faster. Sugar is soluble in water so the cubes would have dissolved and nothing would remain.

6. What physical properties of a mineral sample would determine the rate at which a sample becomes abraded?

The Hardness (Resistance) of a sample would determine the rate at which it abrades.

Shaking Time (min)	Mass of Sugar Sample (g)	% of Mass Lost
0	22.2g	
3	10.9g	
6	9.4g	
9	7.6g	
12	5.1g	
15	4.3g	

