NAME_____ PERIOD_____ DATE _____

LAB PARTNERS_____ LAB #10

COMPOSITION AND PHYSICAL WEATHERING

INTRODUCTION:
Abrasion is mechanical scraping of a rock surface by friction between rocks and moving particles during their transport in wind, glacier, waves, gravity or running water, after friction the moving particles dislodge loose and weak debris from the side of the rock.
The intensity of abrasion depends on the hardness, concentration, velocity and mass of moving particles.

OBJECTIVE:
Determine how composition and time affect the rate at which rocks abrade (physically weather) in water.

APPROXIMATE TIME 2 – 3 Periods

MATERIALS
6 – 12 Containers with screw on tops
Sieve/Strainer
Digital Balance
Presoaked Rocks or Minerals (Large 4 – 5 cm sized)
Stopwatch
Graph Paper
Colored Pencils

PROCEDURE: Calcite/Gypsum Chips

1. Weigh out 100 grams of presoaked calcite/gypsum chips which have been drained. This does not have to be exactly 100 grams but do measure to the nearest .1 gram and record the mass on Chart A.
2. Place the chips in the plastic container. Add 200 ml of water.
3. Tightly cap the container. Shake for 3 minutes at a steady tempo.
4. Placing a screen on the opening, pour the water into the bucket your teacher has provided for you. DO NOT DUMP THE WATER DOWN THE SINK DRAIN.
    a. Record the new mass remaining at weathering time (min.) 3 on Chart A.
5. Return the chips to the container and repeat the process 3 more times (shaking for 3 minutes, drying, reweighing and recording data) until the chips have been shaken a total of 12 minutes.
6. Use the equation:

% Remaining = (New Mass/Mass at Time 0) x 100

Calculate the percent of mass remaining after each 3 minute interval and record in on Chart A

7. On graph paper, plot the data from **percent mass remaining versus time**. Draw a line graph.

Chart A: Calcite/Gypsum Chips

Weathering time (min.)	Mass Remaining	% Mass Remaining
0		
3		
6		
9		
12		

PROCEDURE: Quartz Chips

1. Repeat the steps of Procedure A using quartz chips in place of calcite/gypsum. Record the data on Chart B.
2. Graph the data on the same graph that you used earlier, however use a different color than for Procedure A. Make a key.

Chart B: Quartz Chips

Weathering time (min.)	Mass Remaining	% Mass Remaining
0		
3		
6		
9		
12		

PROCEDURE: Halite Chips

1. Weigh approximately 100 grams of halite. Determine, by the above method, the percent mass remaining at the end of 3 minutes. Enter this on Chart C.

Chart C: Halite Chips

Weathering time (min.)	Mass Remaining	% Mass Remaining
0		
3		

Procedure D:

1. Compare and contrast the size and shape of abraded and unabraded particles of each rock type used in this lab.
2. Record your observations on Chart D of the report sheet.

Chart D: Compare and Contrast

Rock Type	Comparison of Unweathered vs. Weathered Rocks
Calcite/Gypsum	
Quartz	
Halite	

LABORATORY QUESTIONS:

1. What effect does increased time of abrasion have on the size of rock fragments?

2. What effect does increased time of abrasion have on the shape of rock fragments?

3. What percentage of quartz remained after three minutes?

4. What percentage of halite remained after three minutes?

5. What characteristic of halite is responsible for the results in procedure C?

6. What effect does hardness have on the rate at which a rock abrades?

7. In what climate does physical weathering occur most rapidly?

8. Why are streets and highways damaged so much more in the winter months than in the summer months in most of the United States?

9. Sandstones cemented by calcite weather much more rapidly than those cemented by quartz. Why?