

Name _____

: Factors affecting Weathering Rates

Introduction: As you recall there are two types of weathering; physical and chemical. Physical weathering breaks down rocks into smaller pieces, fragments, without changing the mineral composition. Chemical weathering changes the rocks mineral composition, and usually dissolves the rock.

Procedure: In this lab you will rotate to different lab stations. At each station you will follow the directions carefully and record your data in the corresponding data table. Be aware of the time, as you will only have 6 minutes at each station.

Objective: Describe how different factors, such as temperature, climate and surface area affect the rate at which rocks are weathered.

Station #1: CRUSHED



Directions:

1. Your group has TWO Alka Seltzer tablets (you only get 2, be careful!!)
2. Fill up each cup with about 100ml of tap water
3. Using your pen/pencil carefully CRUSH ONE of the tablets, leave the other tablet WHOLE.
4. Clear your stop watches and have two people ready to start/stop their timers.
5. One person should gently drop the CRUSHED tablet into the water; timer should start the stop watch as soon as the tablet touches the water. Stop the timer when the entire tablet is dissolved.
6. Another person should gently drop the WHOLE tablet into the water; timer should start his/her stop watch as soon as the WHOLE tablet touches the water. Stop the timer when the entire tablet is dissolved.
7. Record your data in the table below.
8. Empty the cups and rinse them under tap water.
9. Return the cleaned cups to the Station clean up your mess and wipe down any water on the desk.
10. Answer the questions below:

WHOLE tablet	CRUSHED tablet
Time: _____	Time: _____

1. Which tablet had the slowest rate of weathering? _____
2. Why did that tablet weather at a slower rate? _____
3. It is a very hot day here on Long Island. You buy a cup of kool aid and are asked if you would like WHOLE ice cubes or CRUSHED ice cubes. Which ice cubes would you choose? Justify your answer:

Station #2: THIS IS WHY, THIS IS WHY, THIS IS WHY I'M HOT!

Directions:

1. Your group has TWO Alka Seltzer tablets (you only get 2, be careful!!)
2. Fill one cup with about 100ml of WARM tap water.
3. Fill the other cup with 100ml of COLD water.
4. Clear your stop watches and have two people ready to start/stop their timers.
5. One person should gently drop ONE WHOLE tablet into the water, timer should start the stop watch as soon as the tablet touches the water. Stop the timer when the entire tablet is dissolved.
6. Another person should gently drop the other WHOLE tablet into the water; timer should start his/her stop watch as soon as the tablet touches the water. Stop the timer when the entire tablet is dissolved.
7. Record your data in the table below.
8. Empty the cups and rinse them under tap water.
9. Return the cleaned cups to the Station, clean up your mess and wipe down any water on the desk.
10. Answer the questions below:

HOT water	COLD water
Time:	Time:

1. Which temperature of water dissolved the tablets the fastest? _____
2. What type of weathering is happening (physical/chemical)? How do you know? _____
3. What would happen to an Egyptian Mummy if we moved it from the desert into a rain forest? _____

Station #3: A PICTURE IS WORTH A THOUSAND WORDS

Directions:

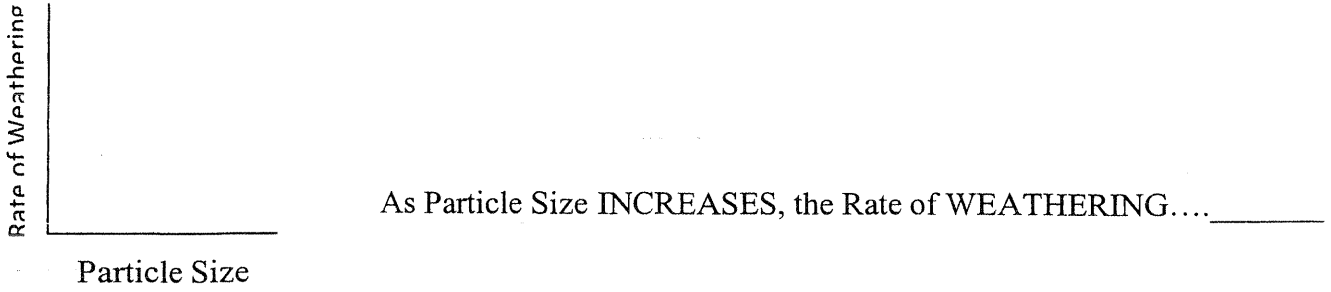
1. Look carefully at the photographs in front of you and answer the questions below.

QUESTIONS	PHOTO # 1	PHOTO # 2
1. What is this a picture of?		
2. What type of weathering occurred?		
3. What type of climate was this object found in? (Hot/Cold; Wet/Dry)		

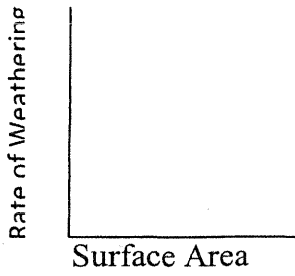
Conclusion:

Draw in the graphic relationships below and explain the relationship in a sentence.

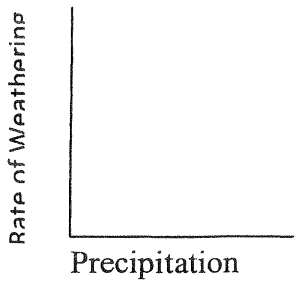
1.



2.



4.



Continue answering the multiple choice questions on the back of this page. #5-12. Be sure your answers are clearly marked!

5. Which type of climate has the greatest amount of rock weathering caused by frost action?

- (1) a wet climate in which temperatures remain below freezing
- (2) a wet climate in which temperatures alternate from below freezing to above freezing
- (3) a dry climate in which temperatures remain below freezing
- (4) a dry climate in which temperatures alternate from below freezing to above freezing

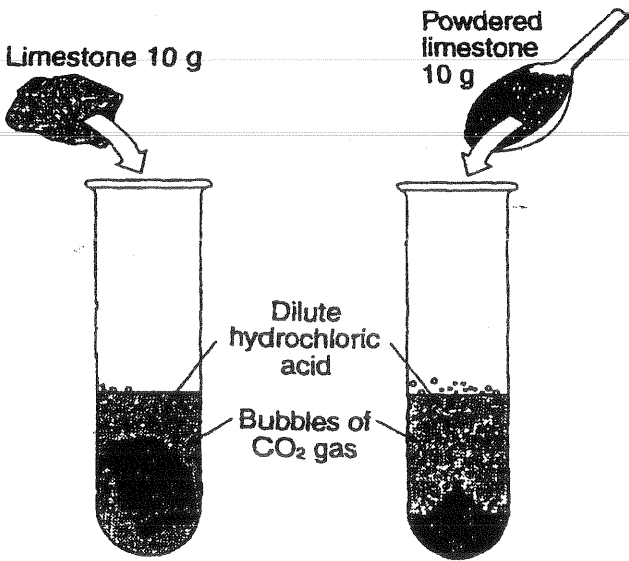
6. Which geologic feature is caused primarily by chemical weathering?

- (1) large caves in limestone bedrock
- (2) a pattern of parallel cracks in a granite mountain
- (3) blocks of basalt at the base of a steep slope
- (4) the smooth, polished surface of a rock in a dry, sandy area

7. Which type of climate causes the fastest chemical weathering?

- (1) cold and dry
- (2) cold and humid
- (3) hot and dry
- (4) hot and humid

8. The demonstration shown in the diagram below indicates that powdered limestone reacts faster than a single large piece of limestone of equal mass when both are placed in acid.



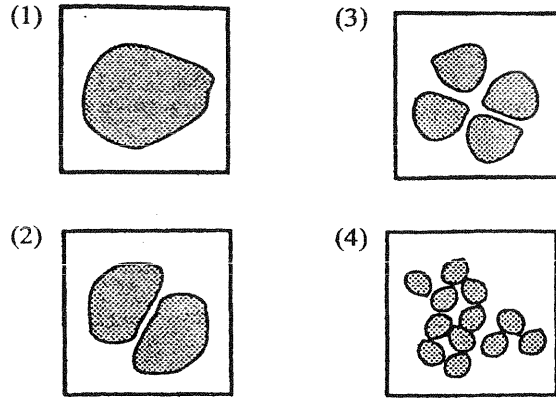
The most likely reason powdered limestone reacts faster is that it has

- (1) less total volume
- (2) more chemical bonds
- (3) more total surface area
- (4) lower density

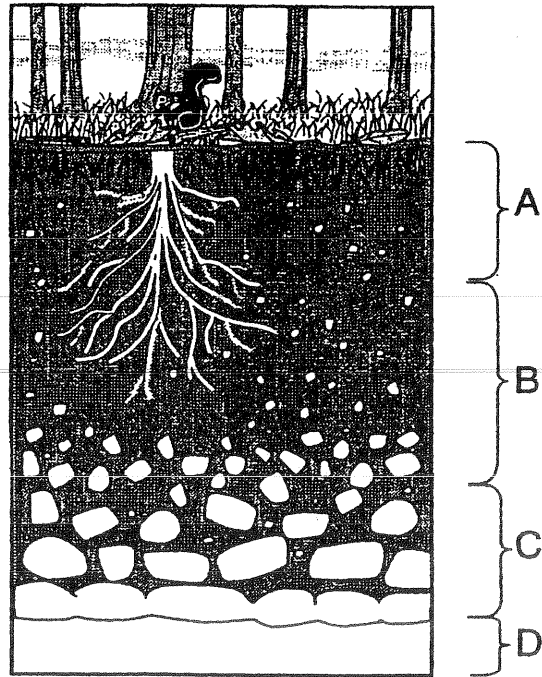
9. When minerals are dissolved, how are the resulting ions carried by rivers?

- (1) by precipitation
- (2) by tumbling and rolling
- (3) in suspension
- (4) in solution

10. The four limestone samples illustrated below have the same composition, mass, and volume. Under the same climatic conditions, which sample will weather fastest?



11. The diagram below shows a soil profile formed in an area of granite bedrock. Four different soil horizons, A, B, C, and D, are shown.



Which soil horizon contains the greatest amount of material formed by biological activity?

- (1) A
- (2) B
- (3) C
- (4) D

12. Most of the surface materials in New York State are classified as

- (1) residual soils
- (2) transported soils
- (3) volcanic ash
- (4) coastal plain deposits