Name: _____ Date: _____ Class: _____

LAB 8: Alka-Seltzer Lab

Part 1 – Effect of Surface Area on Weathering Rate

Materials

2 Beakers
3 Alka-Seltzer tablets
Room temperature water
Timing device
Sheet of paper

Procedure

1. Pour 200ml of tap water into a beaker

2. Drop 1 whole tablet into the beaker and start the timer. Stop the time when the entire tablet has dissolved. **DO NOT WAIT FOR THE BUBBLES TO STOP. ONCE THE TABLET IS GONE, TIME IS UP.**

3. Record your data on the chart on the next page.

4. Empty the beaker into the sink and rinse it out to remove any residue from the tablet.

5. Pour 200ml of tap water into the same beaker.

6. Take another tablet and break it into 4 pieces on the sheet of paper. Try to make the pieces equal in size.

7. Slide the four pieces off the paper into the beaker and start the timer. Stop the time when all four pieces have dissolved. **DO NOT WAIT FOR THE BUBBLES TO STOP. ONCE THE TABLET IS GONE, TIME IS UP.**

8. Record your data on the chart on the next page.

9. Empty the beaker in the sink and rinse it out to remove any residue from the tablet.

10. Pour 200ml of tap water into the same beaker.

11. Take your third tablet and crush it on the piece of paper. Try to get it broken down into the smallest pieces you can – the more powdery you can get it the better! Be sure to keep all the particles on the paper so you don't lose any. Once you have crushed your tablet, pour the pieces into the **SECOND BEAKER**. **Make sure that beaker is completely dry.**

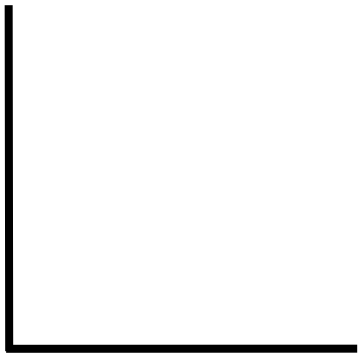
12. Once you have all the powder in the dry beaker carefully pour the water from the first beaker into the second beaker and start the timer. Stop the time when all pieces/powder have dissolved. **DO NOT WAIT FOR THE BUBBLES TO STOP. ONCE THE TABLET IS GONE, TIME IS UP.**

13. Record your data on the chart on the next page.

DATA

Tablet Size	Time (seconds)
Whole tablet	
4 pieces	
Crushed	

Create a simple line graph showing the relationship between surface area (**crushed has more surface area because more of the material is exposed to weathering**) and the rate of weathering. Be sure to properly label your axes. Remember that the independent variable goes on the x-axis.



QUESTIONS

1. What is the relationship between surface area and weathering rate?

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2. What type of weathering (physical/chemical) does crushing the tablet represent? **Explain your answer.**

_____

_____

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3. What type of weathering (physical/chemical) does adding the tablets to the water represent? **Explain your answer.**

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Part 2 – Effect of Temperature on Weathering Rate

Materials

2 Beakers
Thermometer
Hot water
Room temperature water
3 Alka-Seltzer tablets
Timing device

Procedure

1. Pour 200 ml of room temperature water into a beaker.

2. Using your thermometer, find the temperature of the water. Record your data on the chart on the next page.

3. Drop 1 whole tablet into the beaker and start the timer. Stop the time when the entire tablet has dissolved. **DO NOT WAIT FOR THE BUBBLES TO STOP. ONCE THE TABLET IS GONE, TIME IS UP.**

4. Record your data on the chart on the next page.

5. Call your teacher over and he/she will pour approximately 200ml of hot water into your second beaker.

6. Using your thermometer, find the temperature of the water. Record your data on the chart on the next page.

7. Drop 1 whole tablet into the beaker and start the timer. Stop the time when the entire tablet has dissolved. **DO NOT WAIT FOR THE BUBBLES TO STOP. ONCE THE TABLET IS GONE, TIME IS UP.**

8. Record your data on the chart on the next page.

9. Pour out the water from your beakers and do your best to remove any residue from the tablet. Fill a beaker with 100ml of room temperature water. The call your teacher over and he/she will pour in approximately 100ml of hot water to the same beaker. Stir the water for 10 seconds.

10. Using your thermometer, find the temperature of the water. Record your data on the chart below.

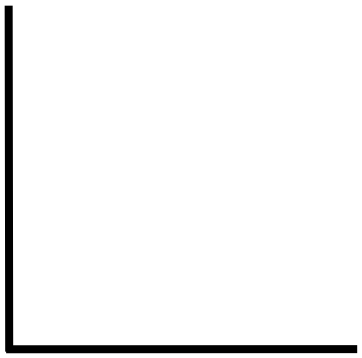
11. Drop 1 whole tablet into the beaker and start the timer. Stop the time when the entire tablet has dissolved. **DO NOT WAIT FOR THE BUBBLES TO STOP. ONCE THE TABLET IS GONE, TIME IS UP.**

12. Record your data on the chart on the next page.

DATA

Water Temperature (^{o}C)	Time (seconds)

Create a simple line graph showing the relationship between temperature and the rate of weathering. Be sure to properly label your axes. Remember that the independent variable goes on the x-axis.



QUESTIONS

1. Based on your observations, what is the relationship between the temperature and the rate of chemical weathering?

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2. Using a map, locate Rio de Janeiro in South America and Seattle in North America. Note that both locales have abundant precipitation, but have different temperature patterns. Compare the weathering rates of limestone in Rio with that in Seattle. **Justify your answer.**

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3. Now find Barrow, Alaska on a map. Note that this area is both cold and dry. What would limestone's weathering rate be here? **Justify your answer.**

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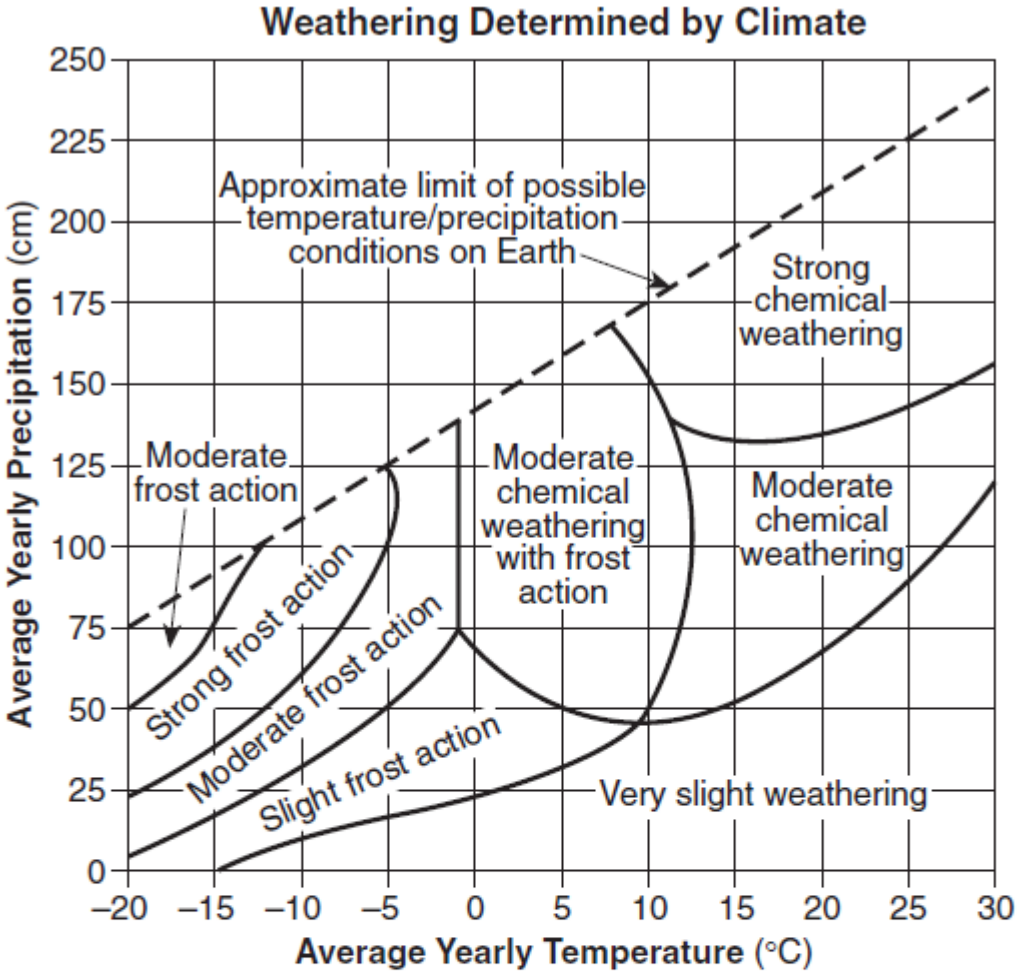
MEETING STANDARDS

_____1. Which characteristic would most likely remain constant when a limestone cobble is subjected to extensive abrasion?

(1) shape
(2) mass
(3) volume
(4) composition



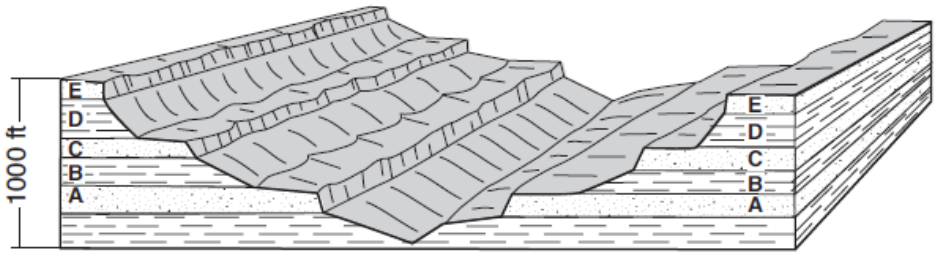
_____ 2. Which type of weathering is most common where the average yearly temperature is 5°C and the average yearly precipitation is 45 cm?

(1) moderate chemical weathering
(2) very slight weathering
(3) moderate chemical weathering with frost action
(4) slight frost action

_____ 3. The amount of chemical weathering will increase if

(1) air temperature decreases and precipitation decreases
(2) air temperature decreases and precipitation increases
(3) air temperature increases and precipitation decreases
(4) air temperature increases and precipitation increases

_____ 4. The block diagram below shows a cross section of a landscape. Letters *A*, *B*, *C*, *D*, and *E* represent different rock layers.



Which rock layers appear to be most resistant to weathering?

(1) *A* and *B*
(2) *B* and *D*
(3) *C*, *D*, and *E*
(4) *A*, *C*, and *E*

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

(a) a wet climate in which temperatures remain below freezing
(b) a wet climate in which temperatures alternate from below freezing to above freezing
(c) a dry climate in which temperatures remain above freezing
(d) a dry climate in which temperatures alternate from below freezing to above freezing

EXCEEDING STANDARDS

1. Why are marble-faced buildings made with marble that has been polished?

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2. What affect would a decreased pH level (more acidic) have on the weathering rates of an area? Where in nature could we encounter lower pH's?

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