Name_____ E-S #_____ Due Date _____ Imperial (GHS)

Lab # __ Alka-Seltzer Lab

Part I: Surface Area/Particle Size and Weathering Rate

Materials – 2 beakers or cups, 2 Alka-Seltzer tablets, tap water, mortar & pestle

Write a hypothesis:_____

_____

Procedure:

1. Put equal volumes of equal temperature water in each beaker.

2. Drop one tablet into one beaker. Record detailed observations and record the time of the reaction until it has fully stopped. Record on Data Table.

3. Crush the other tablet into small pieces – use mortal & pestle– and add it to the other beaker. Record detailed observations and record the time of the reaction until it has fully stopped. Record on data table.

Whole	**Crushed**
time = _____seconds	time = _____seconds
Observations:	Observations:

PART I QUESTIONS

A) What differences in reaction rates did you observe between the two samples?

B) Which tablet had the greatest surface area exposed to the water?

C) What is the relationship between surface area and reaction rate?

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

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

F) Why is it necessary to have two separate beakers for this experiment and use the same beaker (and water) for procedure steps 2 & 3?

**Conclusion: Can you accept or reject your hypothesis? Why or why not?

Part II: Temperature and Weathering Rate:

Materials: 2 cleaned beakers, 2 Alka-Seltzer tablet, thermometer, cold water, hot water

Hypothesis:_____

_____

Procedure:

1. Measure out equal volumes of hot water and cold water into two separate beakers.

2. Record the temperatures and approximate volumes of the waters. Use ESRT for conversions.

3. Drop the whole tablet into the hot water and record complete dissolution time and record your observations.

4. Repeat step #3 with the cold water

HOT WATER	**COLD WATER**
Volume: _____ mL	Volume: _____mL
Temperature: _____ ^{0}C _____ ^{0}F	Temperature: _____ ^{0}C _____ ^{0}F
time = _____seconds	time = _____seconds
Observations:	Observations:

PART II QUESTIONS

A) In which beaker did the reaction occur most slowly? In which beaker did the reaction occur most rapidly?

B) From the lab, what is the relationship between temperature and reaction/weathering rate (in the beakers) ?

C) How would your data change if the tablets were crushed prior to dropping them in the water? Explain the difference that would be seen in both the cold and warm water.

D) Using an atlas, locate Rio de Janeiro in South America and Seattle in North America. Note that both locales have abundant precipitation, but have different temperatures patterns.

1) Compare the weathering rates of the limestone in Rio de Janiero with that of Seattle. Is there a difference? **Justify your answer.**

2) Which of the two locations is likely to have thicker soils? How do you know?

E) Now locate Barrow, Alaska on the map. Note that this area is both cold & dry.

1) What would be limestone's weathering rate here? **Justify your answer.**

2) Why the difference from your answers to D1?

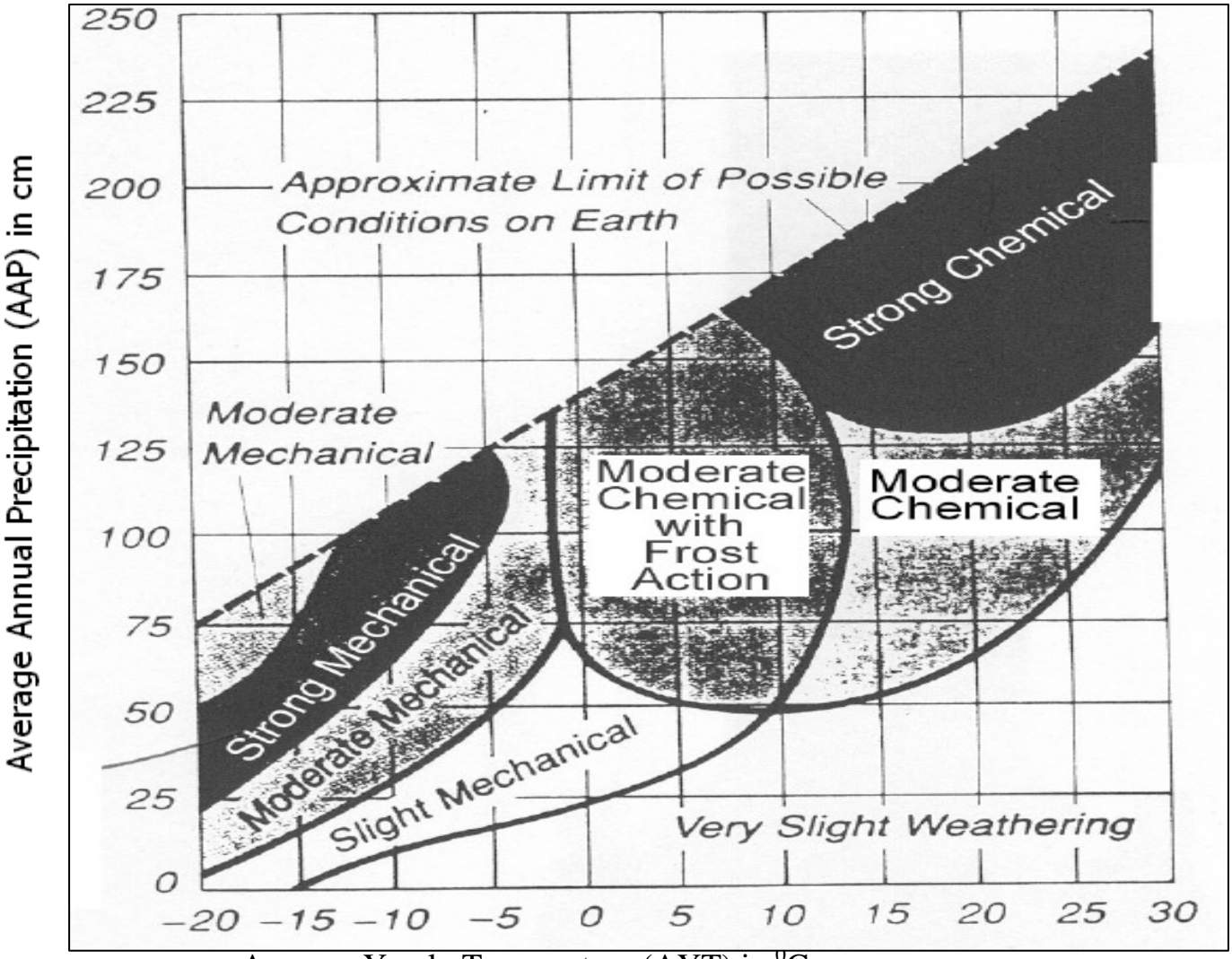
**Conclusion: Can you accept or reject your hypothesis? Why or why not?

Additional Lab Questions:

F) Why are marble-faced buildings made with marble that has been polished?

G) What affect would a decreased pH level (more acidic) have on the weathering rates seen? Where in nature could we encounter lower pH's?

Use the graph for H - K:



H) Determine the major type of weathering that occurs in Washington, D.C: AYT is 23^0C , AAP is 104 cm.

I) If the AYT of Washington D.C. dropped 26^0C but the AAP stayed the same, what kind of weathering would dominate?

J) Phoenix, Arizona has an AYT of 20^0C and an AAP of 20 cm. How would the climate of Phoenix need to change for moderate chemical weathering to dominate?

K) According to the graph, no frost action occurs at an AYT above 13^0C. What is a possible reason?

Portions of this lab modified from labs by C. Snyder, Guildlerland H.S., Guilderland Center, NY, B. Marrazo, Stimson Middle School, Huntington Station , NY & N Spaulding, Elmira Free Academy