

The Effect of Surface Area on Weathering

Surface area is the measure of how much exposed area an object has.

Objectives:

- To model chemical weathering processes
- To predict what will happen when the model is modified

Materials:


- Scale
- Graduated Cylinder
- Plastic cup filled with water
- 2 empty plastic cups
- 1 Alka Seltzer Tablet
- Mortar & Pestle
- Stopwatch & Calculator
- Index Card



Procedure:

1. Measure the mass of the empty graduated cylinder (to the nearest tenth) (one decimal place).

Result= _____

2. Pour 100ml of water from the cup into the graduated cylinder.
(GO Slow! Be accurate!! Read the meniscus at eye  level!!)

Don't Forget **UNITS**
on everything!!!!
I **Will** take off
points!!!

3. Measure the mass of the graduated cylinder with the water (to the nearest tenth).

Result= _____

4. Calculate the mass of the water (to the nearest tenth).

Formula = Mass of graduated cylinder with water – mass of empty graduated cylinder

Result= _____

5. Calculate the density of the water to the nearest hundredth (two decimal places)!

SHOW WORK

$$D = \frac{M}{V} \quad \text{Result} = \underline{\hspace{2cm}}$$

6. Break the Alka Seltzer tablet in half

Place ONE half onto the index card and record the mass in the table below.

7. Take the OTHER half of the tablet and crush it by using the mortar and pestle.

Place the crushed tablet onto the index card and record the mass on the table below.

8. Pour 50 ml of water from the graduated cylinder into each of the plastic cups.

9. Place the full half tablet into one cup and measure the time for the tablet to **completely** dissolve. Record in the data table below.

10. Place the crushed half tablet into the opposite cup and measure the time for the tablet to **completely** dissolve. Record in the data table below.

Form	Mass (g)	Time to Dissolve (s)
Full half tablet		
Crushed half tablet		

QUESTIONS

11. What type of weathering is represented above? How do you know?

12. Which form of the Alka Seltzer dissolved more quickly?

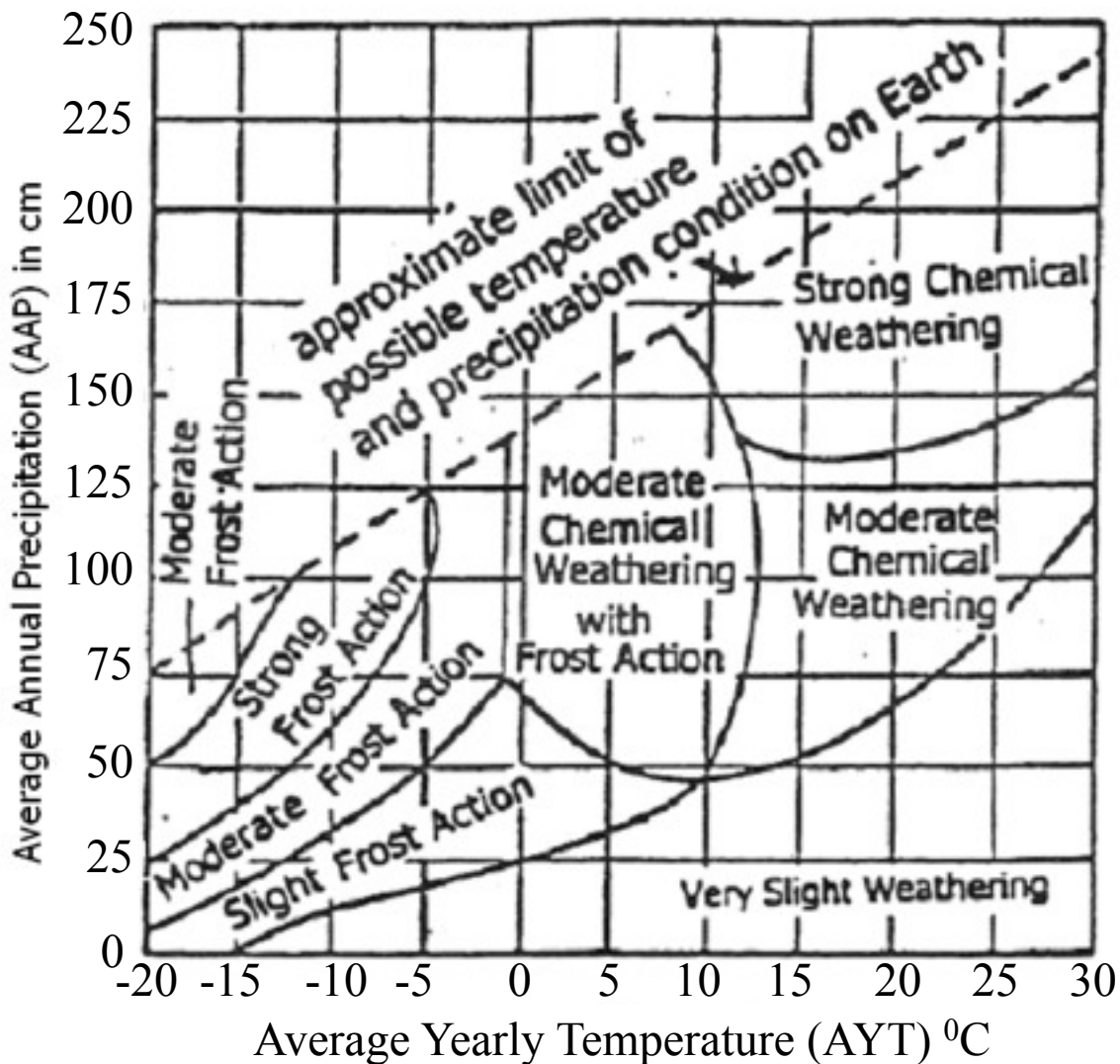
13. What effect did crushing the Alka Seltzer have on the surface area of the Alka Seltzer?

14. What effect does surface area have on the dissolving time?

15. Draw a simple line graph to show the relationship between surface area and dissolve time.



Expanding Physical & Chemical Weathering Further



1. Determine the major type of weathering that occurs in Washington, D.C. The AYT is 23°C and the AAP is 104 cm.
2. If the AYT of Washington D.C. dropped 26°C but the AAP stayed the same, what kind of weathering would dominate?
3. Phoenix, Arizona has an AYT of 20°C and an AYP of 20 cm. How would the climate of Phoenix need to change for moderate chemical weathering to dominate?
4. According to the graph, no frost action occurs at an AYT above 13°C. What is a possible reason?
5. In general, how does a climate with strong chemical weathering differ from a climate with strong mechanical weathering?