

Name: \_\_\_\_\_  
Lab # \_\_\_\_\_

Date: \_\_\_\_\_  
Period \_\_\_\_\_

## Surface Area and Weathering Rates

**Question:** How does the amount of surface area affect the rate at which a particle will weather?

Hypothesis: \_\_\_\_\_

Vocabulary:  
Weathering: \_\_\_\_\_

Physical Weathering: \_\_\_\_\_

Formula for Area: \_\_\_\_\_

Materials: 2 wood blocks, held together by a rubber band, 2 pieces of candy, metric ruler, calculator

### Procedure:

#### Part A.

1. Measure and record the surface area of both blocks when they are held together by the rubber band (assume they are just one block).
2. Measure and calculate the area for each side of the block.
3. Add the area of all the sides together to get the surface area of the block.

| Area side 1 | Side 2 | Side 3 | Side 4 | Side 5 | Side 6 | Surface Area |
|-------------|--------|--------|--------|--------|--------|--------------|
|             |        |        |        |        |        |              |

Imagine the block is undergoing physical weathering and has now been broken into 2 separate, smaller blocks (remove the rubber band to accomplish this). Now, measure and record the surface area of each individual smaller block. Find the sum of the surface area for the 2 separate blocks and record your answers. Show your measurements.

| Block 1<br>Area side 1 | Side 2 | Side 3 | Side 4 | Side 5 | Side 6 | Surface Area<br>Block 1 |
|------------------------|--------|--------|--------|--------|--------|-------------------------|
|                        |        |        |        |        |        |                         |

| Block 2<br>Area side 1   | Side 2 | Side 3 | Side 4 | Side 5 | Side 6 | Surface Area<br>Block 2 |
|--------------------------|--------|--------|--------|--------|--------|-------------------------|
|                          |        |        |        |        |        |                         |
| Total for<br>both blocks |        |        |        |        |        |                         |

Compare the surface area of the “un-weathered” (rubber banded) block with the **sum** of the surface area for the 2 “weathered” (separate) blocks. Which one has more surface area? \_\_\_\_\_

**Part B:**

Keeping in mind that the blocks were physically weathered (when the rubber band was removed), now we will physically weather the candy by chewing one.

1. Place one candy in your mouth and do not chew. Using the clock or stop watch, determine how long it takes to dissolve in your mouth. \_\_\_\_\_
2. Place one piece of candy in your mouth and chew it (you are now physically weathering the candy). Again, time how long it takes to disappear in your mouth. \_\_\_\_\_

**Results:**

1. When the two blocks were separated (physically weathered), what happened to the total surface area?  
\_\_\_\_\_
2. How much more surface area is there when the blocks were in smaller pieces?  
\_\_\_\_\_
3. Based on what you learned in results 1 and 2, when you physically weathered (chewed) the candy, what do you expect happened to the amount of surface area? \_\_\_\_\_
4. Which candy (unchewed or chewed) had the faster rate of weathering? \_\_\_\_\_
5. Which candy had the greatest surface area? \_\_\_\_\_

**Conclusions:**

6. Using specific examples and details from your results, describe what happens to the amount of surface area exposed when a particle is broken down into smaller and smaller pieces.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. Using the candy results, explain what happens to the rate of weathering if more surface area is exposed.  
\_\_\_\_\_  
\_\_\_\_\_

8. Draw a simple graph below to show the relationship between surface area and weathering.  
\_\_\_\_\_  
\_\_\_\_\_