**At-Home Virtual learning:**

Each of the mini-labs below represent either a type of weathering, erosion, sorting, or it affects it in some way. In class, each would have been a station, however, we are not in class. Each mini-lab has been adapted to be done at home. To get full credit, you must complete 3 weathering labs. Complete each table and answer questions as needed for the lab. If the lab was done at home, include at least one picture per lab done at home.

Table of Contents

[Weathering: Ice (Frost) wedging 2](#_Toc153793389)

[Weathering: Acid precipitation 3](#_Toc153793390)

[Weathering: Abrasion 4](#_Toc153793391)

[Weathering: Surface Area 5](#_Toc153793392)

[Weathering: Carbonation 6](#_Toc153793393)

[Weathering: Oxidation 7](#_Toc153793394)

[Weathering: Climate Factors 8](#_Toc153793395)

# Weathering: Ice (Frost) wedging

**Materials:**

**Plastic soda bottle or clear cup (not glass)**

**Freezer**

1. Fill a container (plastic soda bottle preferred) about 2/3 with water, use a marker to mark where the level is.
2. Put the container into the freezer and wait overnight for the water to freeze. Remove container containing the now ice.

**Questions:**

1. What happened? Is the ice at the same level as the water? Did anything happen to the container? Type your observations below and, if you can, upload an image.
2. What effect would freezing have on rocks that have cracks? Explain your answer.
3. Which category of Weathering is demonstrated during this mini-lab?

# Weathering: Acid precipitation

**Materials:**

**2 clear cups**

**Salt**

**Vinegar**

**2 pennies (not new)**

1. Grab two containers. Fill both about half way with water. In one container, mix in a little salt and vinegar. This will represent the acid rain, while the normal water will be normal rain. Put a penny in each container. If you are short on containers or pennies, you may do it one at a time, but start with the normal rain.
2. Describe what the penny looks like in the observations table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Observations | Rain | |  | Acid Rain | |
| Right away |  |  | Right away |  |
| After 10 mins |  |  | After 10 mins |  |
| Day 2 |  |  | Day 2 |  |

**Questions:**

1. What is the difference between acid rain and regular rain? What effects does each type of rain have on rocks?
2. Which category of Weathering is demonstrated during this mini-lab?

# Weathering: Abrasion

**Materials:**

**Large sealable bag**

**½ Cup of Salt (a lot)**

**Colored Chalk**

1. Take a piece of colored chalk and observe its shape and any markings on it. This is just to compare what happens.
2. Place the chalk into the bag with enough salt to easily cover the chalk. Shake the bag for 1 minute.
3. Write your observations as to what happened to the chalk.

**Questions:**

1. What process in nature might cause this type of change?
2. What category of weathering is demonstrated in this mini-lab?

# Weathering: Surface Area

**2 cups of water**

**2 equal sized spoons**

**Fine grained sugar**

**Coarse grained sugar**

**Somebody to race with**

1. Fill each cup about 2/3 with water
2. Assign 1 person to the coarse sugar and 1 person to the fine sugar. You can use a sugar cube as your coarse grain and normal sugar packets as fine, or normal sugar packets as coarse and powdered sugar as fine.
3. Have both people put 1 equally sized spoonful of sugar in a beaker at the same time.
4. Gently stir each beaker until the sugar dissolves.

**Questions:**

1. Did the sugar dissolve at the same rate in both containers? Explain why you think this is so.
2. Which do you think would wear away faster- a large rock or small rock? Explain your answer.
3. What category of weathering is demonstrated in this mini-lab?

# Weathering: Carbonation

**Materials:**

**2 clear glasses**

**2 pieces of WHITE blackboard chalk (or substitute limestone landscaping rocks)**

**Water**

**Vinegar**

**NOTE:** Most white chalk is made from Calcium Carbonate which is what we want. Colored chalk and sidewalk chalk is made from Calcium Sulfate, which we do not want.

1. Take the two glasses. Put a piece of chalk in each glass. The two cups and pieces of chalk should be as close to the same size as possible but don't stress too much if they aren't.
2. Get ready to take observations. It is going to be fast.
3. Fill one cup about halfway with water, the other with vinegar.
4. Write your observations below.

|  |  |
| --- | --- |
| Water | Vinegar (Acid Rain) |
|  |  |

**Questions**

1. What conclusion can you draw about how weak acid (vinegar) affects the rate of weathering as compared to the nearly neutral water?
2. As humans burn more fossil fuels, more CO2 is released into the atmosphere causing the rain to be more acidic. Do you see an issue with this, and why?
3. What category of weathering is demonstrated in this mini-lab?

# Weathering: Oxidation

**Materials:**

**Piece of steel wool**

**Cup of water**

1. Observe Steel Wool
2. Place Steel Wool into water for 10 minutes. Observe.
3. Leave overnight. Observe

|  |  |  |  |
| --- | --- | --- | --- |
| Observations | Before water | After 10 minutes | Day 2 |
|  |  |  |

**Questions**

1. What conclusion can you draw about the effect of water on steel (iron)?
2. Look up the chemical reaction you observed in a web search engine. Why did the change occur and what is the resulting material called, scientifically?
3. What category of weathering is demonstrated in this mini-lab?

# Weathering: Climate Factors

**Materials:**

**Two (2) clear cups or glasses**

**Cold Water**

**No less than 10 grams of Epsom salt, regular salt or sugar (may use packets)**

**Stir stick or spoon**

**Stopwatch or timing device**

1. Fill each cup with the same quantity of water (100ml should work)
2. Measure out 2 equal amounts (about 5 grams or one packet each) of the salt or sugar.
3. Prepare to time the next steps with the stopwatch
4. Prepare the first cup/glass containing room temperature water (about 100ml)
5. Start the timer as you drop the first measure of sugar/salt into the glass and time how long it takes to dissolve ALL the sugar or salt into the water.
6. Record the time
7. Repeat steps 3-6, but this time with HOT water (use the microwave or some other device to warm up the water).

NOTE: If it takes more than 2 minutes to dissolve, restart the experiment with less sugar/salt.

|  |  |  |
| --- | --- | --- |
| Time to Dissolve | Room Temperature water | Hot water |
|  |  |

**Questions**

1. What conclusion can you draw about how fast the same amount of sugar/salt was dissolved in the room temperature versus the hot water?
2. What conclusion can you draw from this experiment related to how climate (specifically temperature) affects the chemical weathering process of dissolution?
3. Make a statement relating the speed, severity and impact of dissolution on limestone caves in Florida versus the limestone caves of northern New York State.