

## ***Weathering Rocks*** **Teacher Resource**

**Grade Level**      **K-12**  
**Objectives**

1. The student will investigate the mechanical and chemical weathering of rocks.
2. The student will demonstrate the use of 21<sup>st</sup> century technology with a document camera.

### **National Standards**

<a href="#">NS.K-4.1</a> ; <a href="#">NS.5-8.1</a> ; <a href="#">NS.9-12.1</a>	Science as Inquiry
<a href="#">NS.K-4.4</a> ; <a href="#">NS.5-8.4</a> ; <a href="#">NS.9-12.4</a>	Earth and Space Science
<a href="#">NS.K-4.5</a> ; <a href="#">NS.5-8.5</a> ; <a href="#">NS.9-12.5</a>	Science & Technology
<a href="#">NT.K-12.1</a>	Basic Operations and Concepts
<a href="#">NT.K-12.3</a>	Technology Productivity Tools
<a href="#">NT.K-12.6</a>	Technology Problem-Solving & Decision-Making Tools

### **Teacher Background Information**

In this lab, the student will investigate the weathering of rocks, both physically and chemically. Mechanical weathering is also known as physical weathering, which is a process where rocks break down due to natural causes. Physical weathering can be caused by many factors such as wind, water, ice, thermal processes, other rocks, and plant roots. Chemical weathering is a process where rocks are decomposed, dissolved, or loosened by chemical processes to form residual products. Chemical weathering can be caused by many factors such as acid rain, carbonation, salt deposition, oxidation, and mineral hydration on the rocks. The students should have an introductory lesson on how rocks go through changes. The students should also understand the difference between a physical and chemical change.

## MATERIALS

Document Camera  
Personal Computer  
Interactive White Board/Projector  
10 Sugar Cubes  
Jar with a Lid  
10 pieces of gravel  
2 Small Pieces of Steel Wool  
Forceps or Tongs  
2 Small Plastic Bags  
8 x 10 white paper

## PROCEDURE

### Set Up

1. Teacher will provide pictures of mountains from various locations around the world. *Google 'mountain ranges' 'talus' 'scree' 'alluvium' to display on the interactive white board.*
2. Have a discussion with the students on the formation of small rocks that occur around mountain ranges. Allow students to discuss their ideas.

### Activity 1 **Steel Wool**

1. Label one small plastic bag 'Dry' and the other plastic bag 'Wet.'
2. Place a clump of dry steel wool into the 'Dry' plastic bag.
3. Place a clump of wet steel wool into the 'Wet' plastic bag.
4. Seal both bags.
5. Set up a document camera so both bags are in focus on the computer.
6. Set a time-lapse recording to take an image every 15 minutes for 3 days.
7. The student should answer the following questions to prompt them into making a scientific hypothesis about the steel wool.

- a. What is the independent variable?
  - b. What are the dependent variables?
  - c. What are the constants?
  - d. How are the bags the same? Differ?
  - e. What do you think will happen to the 'Dry' steel wool after 3 days?
  - f. What do you think will happen to the 'Wet' steel wool after 3 days?
8. After 3 days, students should return to their two bags and stop the time-lapse recording.
  9. Have students review their film/images and remove the steel wool from each bag.
  10. Record your observations about the appearance of the 'Dry' and 'Wet' steel wool.
  11. With safety gloves and goggles on, pull apart the 'Dry' steel wool with the forceps over a plain white piece of paper.
  12. Record what has fallen on the piece of paper.
    - a. Is this an example of mechanical or chemical weathering?
  13. Make a drawing or take a picture with the document camera of what you have observed.
  14. Repeat steps 11-13 for the 'Wet' steel wool

## **Activity 2**                      ***Sugar Cubes***

1. Record observations on the sugar cubes appearance.
2. Take a picture or draw one of the sugar cubes.
3. Place the sugar cubes in the jar.
4. State a hypothesis on what you think will happen to the sugar cubes when shaken 20 times in the jar.
5. Shake the sugar cubes 20 times and record your observations.
6. Pour the sugar cubes and contents onto a white piece of paper. Record your observations.
  - a. Are the changes due to chemical or mechanical weathering?
7. Place the sugar cubes back in the jar and shake 20 more times.

8. Repeat step 6.

## QUESTIONS

### Activity 1

1. In what ways are the contents of the bags the same? Differ?
2. Was it easy or hard to pull apart the 'Dry' wool? 'Wet'?
3. What caused the changes of the 'Wet' wool?
4. Is this considered, mechanical or chemical weathering?
5. Apply what you have learned in this lab, on how this weathering can happen to a rock?

### Activity 2

1. What changes do you notice in the image taken of the sugar cubes after weathering had occurred?
2. After the second shaking, are the sugar cube crumbs greater, the same, or less than the first shaking?
3. Is this chemical or mechanical weathering? Explain your answer.

### Final Questions

1. What is the major difference between mechanical and chemical weathering?
2. How are these forces changing the Earth?
3. Provide examples of how these changes are affecting the area in where you live.

## PRESENTATION

Have students prepare a lab report including the data, images, and video to give a presentation on the interactive white board or projector for the class.

## EXTENSION

- ✓ Have students walk around the inside and outside of the school making notes of 3 mechanical weathering and 3 chemical weathering examples that are present.