

## Weathering and Erosion

**Grade Level:** 5 – 6

**Purpose:** To introduce various types of weathering and erosion.

**Suggested Goals:** Students will discover the effects and processes that may occur with each type of weathering and erosion.

**Targeted Objectives:** As a result of this lesson Student will be able to:  
Identify various types of weathering and erosion.  
Discover the effects that occur with each type of weathering and erosion.

**Background:** **Weathering** refers to the group of destructive forces that change the physical and chemical character of rock near the earth's surface. **Mechanical** weathering (or physical disintegration) is the breaking down of rocks into smaller pieces. The change in the rock is physical with little or no chemical change. **Chemical** weathering is the decomposition of rock from exposure to water and atmospheric gases (principally carbon dioxide, oxygen, and water vapor). As rock is decomposed by these agents, new chemical compounds form. Examples of mechanical weathering include: frost action, abrasion, and pressure release. Examples of chemical weathering include: rusting, acid breakdown, and solution weathering.

**Erosion** is the picking up or physical removal of rock particles by an agent such as streams or glaciers. Weathering helps break down a solid rock into loose particles that are easily eroded. Most eroded rock particles are at least partially weathered, but rock can be eroded before it has weathered at all. A stream can erode weathered or unweathered rock fragments.

**Materials/Preparation:** Preparation for this is general lab preparation. This can be done as a series of stations.

Access to a freezer is needed, but it doesn't have to be in the room.  
Internet access and a computer are needed.

Materials needed include:

carbonated water	overhead markers	ziplock bags
tap water	pennies	sugar cubes
baby food jars (6 per group)	vinegar	shallow pan
rock samples	antacid tablets	ice cubes
plastic glasses	mortar and pestle	sand
chalk	steel wool	gravel

### **Part I Procedure: Weathering Stations**

Introduce and review types of weathering. Discuss the differences between the weathering. Showing pictures is helpful. Also showing pictures of each process and effect is helpful. [Web sites listed have pictures.]

Perform weathering lab stations. In the weathering stations the following activities are used. One station for each activity. Lab sheets for each station are attached at the end of the lesson.

Station 1. Test rock samples in carbonated water vs. tap water. Observations are taken initially, at 20 minutes, and after 24 hours.

Station 2. Test to show that water expands as it freezes. Mark on a cup the water level before freezing and after freezing.

Station 3. Test the effects of vinegar (acid rain) on copper (pennies). Here you should record observations initially and then after 5 minutes.

Station 4. Compare and record the reaction of antacid tablets in water. The comparison is a whole tablet vs. crushed tablet.

Station 5. Compare and record the reactions of chalk (limestone) in water and vinegar.

Station 6. Test and record the effect of water on steel wool.

Station 7. Test and record the effects of sugar cubes and gravel shaken together in a jar.

Discuss lab and effects of each process. Reinforce the processes and make connections to Illinois with pictures.

### **Discussion Questions:**

How does weathering and erosion occur?

What is the result of each type of weathering?

Where on earth or where in Illinois does this happen?

### **Part II Procedure: Erosion Stations**

Introduce and review types of erosion. Discuss the differences between erosion and weathering. Showing pictures is helpful. Also showing pictures of each process and effect is helpful. [Web sites listed have pictures.]

Perform erosion stations. In the erosion stations the following activities are used. One station for each activity.

Station 1. Demonstrates beach erosion. Using a pan, make a sand pile at one end and pour water at the other end. Slide the pan back and forth to create wave movement. Record observations.

Station 2: Place an ice cube in a plastic cup of warm water. See what the effect is. Record observations.

Station 3: Freeze ice cubes with sand in them and then move the sand ice cubes over different surfaces, sand, water, dirt, etc. Record observations.

Station 4: Place sand in a small bowl and then use a hair dryer to move the sand. Note if different speeds are possible. Record observations.

Station 5: Place a pile of ice cubes on a mound of dirt. Observe and record what happens as it melts.

**Discussion Questions:**

How does erosion occur?

What is the result of each type of erosion?

Where on earth or where in Illinois does this happen?

**Extensions:**

1. Rock Cycle Game – in a separate lesson
2. Students could create a presentation of various types of erosion and weathering in the United States or Illinois.

**Assessment:**

Slide presentation on Internet

Grading of lab sheets

Evaluate presentations of erosion and weathering examples.

**Lesson Specifics:**

Skills-Students will need to use observation, inference, data collection skills to complete the lab stations. Also, the students will need to use the Internet and a computer to access the assessment.

Duration- 2 to 3 days

Group size: Project may be completed individually or in groups of 3 or 4

Setting: Classroom and computer lab with Internet access

**Illinois State Board of Education Goals and Standards:**

**12.E.3b:** Describe interactions between solid earth, oceans, atmosphere and organisms that have resulted in ongoing changes of Earth.

**17.B.3a:** Explain how physical processes including climate, plate tectonics, erosion, soil formation, water cycle, and circulation patterns in the ocean shape patterns in the environment and influence availability and quality of natural resources.

**Web Resources:**

Types of Erosion

[http://abe.www.ecn.purdue.edu/~agen521/epadir/erosion/types\\_erosion.html](http://abe.www.ecn.purdue.edu/~agen521/epadir/erosion/types_erosion.html)

Weathering

<http://www.main-vision.com/richard/weatheri.html>

Erosion Slides

[http://pasture.ecn.purdue.edu/AGEN521/epadir/slides/erosion\\_slides.html](http://pasture.ecn.purdue.edu/AGEN521/epadir/slides/erosion_slides.html)

Erasing Erosion

<http://www.mmhschool.com/student/science/mhscience/3/ngsm/ngsm.php3?unit=5&topic=2>

Weathering and It's Effects

<http://www.prairiehill.org/archpg/Kids/7th/earth/WEATHER.HTM>

**Lab Sheet – 1**  
Effects of Water on Rock

Name \_\_\_\_\_

Amount of water used \_\_\_\_\_

Type of rocks \_\_\_\_\_

Observations

<b>Water Type</b>	<b>After 20 Minutes</b>	<b>After 24 Hours</b>
Tap water		
Carbonated water		

Conclusions: \_\_\_\_\_

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**Lab Sheet – 2**  
**Effects of Freezing on Water**

Name \_\_\_\_\_

Amount of water used \_\_\_\_\_

Size of beaker \_\_\_\_\_

Observations

<b>Water Level Before Freezing</b>	<b>After Freezing</b>
Record level and mark outside of beaker	Record level

Conclusions: \_\_\_\_\_

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**Lab Sheet – 3**  
**Effects of Vinegar on Copper Pennies**

Name \_\_\_\_\_

Amount of vinegar used \_\_\_\_\_

Observations

Type of Vinegar	Immediate Reaction	After 5 Minutes

Conclusions: \_\_\_\_\_

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**Lab Sheet – 4**  
**Effects of Water on Antacid Tablets**

Name \_\_\_\_\_

Amount of water used \_\_\_\_\_

Type of antacid tablets \_\_\_\_\_

Observations

<b>Tablet Composition</b>	<b>Immediate Reaction</b>	<b>After 10 Minutes</b>
Whole		
Crushed		

Conclusions: \_\_\_\_\_

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**Lab Sheet – 5**  
Effects of Water/Vinegar on Limestone

Name \_\_\_\_\_

Amount of water/vinegar used \_\_\_\_\_

Type of limestone (chalk; rock) \_\_\_\_\_

Observations

<b>Solution</b>	<b>Immediate Reaction</b>	<b>After 10 Minutes</b>
Water		
Vinegar		

Conclusions: \_\_\_\_\_

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**Lab Sheet – 6**  
**Effects of Water on Steel Wool**

Name \_\_\_\_\_

Amount of water used \_\_\_\_\_

Observations

<b>Immediate Reaction</b>	<b>After 1 Hour</b>	<b>After 24 Hours</b>

Conclusions: \_\_\_\_\_

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**Lab Sheet – 7**  
**Effects of Gravel on Sugar Cubes**

Name \_\_\_\_\_

Number of sugar cubes used \_\_\_\_\_

Amount of gravel used \_\_\_\_\_

Observations

<b>Reaction After 2 Minutes</b>	<b>Reaction After 5 Minutes</b>	<b>Reaction After 8 Minutes</b>

Conclusions: \_\_\_\_\_

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