

## Weathering and Erosion Lesson Plan

<p><b>Subject:</b> Earth Science</p> <p><b>Unit:</b> Weathering, Erosion, &amp; Deposition</p> <p><b>Lesson/s:</b> Introducing Weathering and Erosion</p> <p><b>Dates:</b> 4/6</p> <p><b>Class:</b> 3<sup>rd</sup> period, Cardozo Growth Program, 22 students</p> <p><b>Length:</b> 50 minutes</p>	<p><b>Key Question/s:</b></p> <p>What are the different types of weathering?</p> <p>What is the difference between erosion and weathering?</p>
<p><b>Teaching Objectives:</b>  <i>Students will <b>know</b> ...</i>          that mechanical weathering and chemical weathering are the two types of weathering.</p> <p>that the natural agents of erosion are streams, glaciers, wave action, wind, and mass movement</p> <p><i>Students will <b>understand</b> ...</i>          that weathering involves breakdown and erosion involves transport.</p> <p>that weathering and erosion are examples of change over time as a gradual geological process in which different events take different amounts of time.</p> <p><i>Students will <b>be able to do</b> ...</i></p> <p>Work in groups to identify which type of weathering a photograph depicts.</p> <p>Work in groups to identify which agent of erosion a photo depicts.</p> <p>Define the two types of weathering, and provide an example of each.</p>	<p><b>NYS Learning Standards:</b></p> <ul style="list-style-type: none"> <li>• <b>Standard 6 – Interconnectedness</b> – systems thinking</li> <li>• <b>Standard 4 – Science</b> –</li> </ul> <p><i>Key Idea 2 –</i>          Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.</p> <p><i>Performance Indicator 2.1 -</i>          Use the concepts of density and heat energy to explain observations of weather patterns, seasonal changes, and the movements of Earth's plates.</p> <p><i>Major Understanding 2.1s -</i>          Weathering is the physical and chemical breakdown of rocks at or near Earth's surface. Soils are the result of weathering and biological activity over long periods of time.</p> <p>2.1t Natural agents of erosion, generally driven by gravity, remove, transport, and deposit weathered rock particles. Each agent of erosion produces distinctive changes in the material that it transports and creates characteristic surface features and landscapes.</p> <p>2.1u The natural agents of erosion include:          •Streams (running water),Glaciers (moving ice), Wave Action, Wind, Mass Movement:</p>
<p><b>Evidence of Achievement:</b> Application work w/ photos, exit slip, homework (due tomorrow)</p>	
<p><b>Resources/Materials:</b></p> <ul style="list-style-type: none"> <li>• Chalkboard</li> <li>• Chalk</li> <li>• Clear plastic container w/ red blocks inside</li> <li>• Two beakers w/ water</li> <li>• Sugar cubes, sugar sachets</li> <li>• Photos for groups</li> <li>• Homework handouts</li> </ul>	<p><b>Keywords:</b></p> <ul style="list-style-type: none"> <li>• abrasion</li> <li>• mass wasting</li> <li>• mass movement</li> <li>• mechanical weathering</li> <li>• chemical weathering</li> </ul>

**Do Now:** (3-4 minutes)

- Wind erosion experiment data analysis questions in pairs

**Introduction:** (3-4 minutes)

- Review answer to Do Now question. Note that their ability to answer the questions suggests they already know something about erosion, and are therefore primed for success in this lesson and unit.
- Note lesson objectives, relevant standards

**Information Lecture-Discussion:** (25 minutes)

Students take Cornell notes

Overview:

- Erosion vs. Weathering – weathering is the breakdown of rocks, erosion is the transport of rocks
- Weathering is the breakdown of rocks into smaller pieces by mechanical or chemical methods

Example #1 – Chalk example

- Rate of Weathering – determined by rock type and climate

Two different types of weathering:

- Mechanical Weathering – rocks broken apart by physical force – chemical makeup unchanged  
Examples of mechanical weathering – heat, cold, plants, animals (including humans), abrasion

Example #2 – Ice wedging - Red blocks example

Example #3– Sugar cubes, sugar sachets

- Chemical Weathering – chemical makes of rock changes  
Examples of chemical weathering – oxidation, plant acids (lichens), acid rain (sulfuric acid), carbonic acid (dissolves limestone)

Example #4 – Cleopatra's Obelisk (acid rain)

Example #5 – Carbonic Acid in soda

Erosion - as weathering occurs, erosion is the process of carrying away the smaller rock particles.

- Gravity is at work in many types of erosion
- Agents of erosion include:
  1. streams
  2. glaciers
  3. waves
  4. animals (note humans as examples of animals)
  5. wind
  6. mass movement

Students leave out Cornell notes to be checked by teacher as he circulates during the next task.

Teacher records completion of notes on classwork checklist.

**Application:** (10 minutes)

Students choose whether work individually or in teacher assigned groups (heterogeneous by achievement/gender/race) of three or four students. Students look at 6 photos of weathering, determine whether photo shows chemical or mechanical weathering. Once they have successfully done so, they will be given 6 more photos of erosion, and will have to label which agent of erosion is pictured. Additional erosion photos are available for those who finish early.

**Closure:** (7-9 minutes)

- Address any misunderstandings that were evident during application work
- Revisit lesson objectives
- Answer student questions
- Assign homework
- Exit slip – What are the two types of weathering? Give an example of each.  
What is the difference between weathering and erosion?

**Additional Support:**

Recommend to students who struggle w/ application work to look at additional weathering and erosion photos from earthscienceworld.org: [http://www.earthscienceworld.org/images/search/results.html?Category=\\$Category&Continent=\\$Continent&ImageID=\\$ImageID](http://www.earthscienceworld.org/images/search/results.html?Category=$Category&Continent=$Continent&ImageID=$ImageID)

Recommend to students who struggle w/ application work to take self-quiz on weathering at: [http://glencoe.mcgrawhill.com/sites/0078617529/student\\_view0/chapter2/section1/self-check\\_quiz\\_eng.html](http://glencoe.mcgrawhill.com/sites/0078617529/student_view0/chapter2/section1/self-check_quiz_eng.html)

Tell students who remain confused after self-quiz to come tomorrow at lunch for extra help.

**Extension Activities:**

Early finishers of the application activity can use the computer in the back of the room to play the Weathering and Erosion Game: <http://www.glencoe.com/sec/science/Science600/co/530.php?iRef=530&iChapter=16>

Reading excerpt from *Out of the Dust* by Karen Hesse

Cleopatra's Obelisk photo: <http://www.env.duke.edu/eos/geo41/wea2.htm>

**Homework –**

- Students will identify photos on handout as examples of different types of weathering, or as examples of different agents of erosion. Collected the next day and graded for accuracy.
- Students have checked out digital cameras from school, and will have one week to find and take pictures of examples of weathering and erosion in their community. Photos are due via e-mail attachment.
- Extra Credit: What is concentric weathering? Spheroidal weathering?

**Notes:** Michael was absent yesterday –get make-up work, ask why.  
Be sure they understand glaciers – some kids lack prior knowledge