Science 3-5: Physical Weathering

Intended Audience: Students with significant cognitive disabilities

# **Standards:**

SC.3.N.1.1 Raise questions about the natural world, investigate them individually and in teams through free exploration with systematic investigations, and generate appropriate explanations based on those explorations.

SC.4.E.6.4 Describe the basic differences between physical weathering (breaking down of rock by wind, water, ice, temperature changes and plants) and erosion (movement of rock by gravity, wind, water and ice).

SC.4.N.1.1 Raise questions about the natural world, investigate them individually and in teams through free exploration with systematic investigations, and generate appropriate explanations based on those explorations.

SC.5.E.7.4 Distinguish among the various forms of precipitation (rain, snow, sleet, and hail) making connections to the weather in a particular place and time.

# **Learning Objectives:**

1. Students will identify examples of physical weathering in their environment.
2. Students will collaborate with peers and share their observation

# **Vocabulary:**

1. weathering: the breaking of rock into smaller and smaller pieces
2. organic (also known as biological) weathering: the breaking of rock into smaller pieces by plants and their roots
3. erosion: the process of wearing away by water, wind and ice

**Materials:**

* Prior to instruction view: [Images of Physical Weathering](https://www.google.com/search?rlz=1C1GCEB_enUS848US848&biw=1094&bih=472&tbm=isch&sa=1&ei=AacCXb2QDYqd5wL_rongBQ&q=physical+weathering+and+plants&oq=physical+weathering+and+plants&gs_l=img.3...10925.12467..12726...0.0..0.87.745.11......0....1..gws-wiz-img.......0j0i67j0i8i30j0i24.CvUzPKQwSRg)
* Online article with visual supports: [One Geology: Weathering](http://www.onegeology.org/extra/kids/earthprocesses/weathering.html)
* Access to outdoor space on school campus
* Ipad, camera or other device to take photos
* Prepare prior to instruction: images and visual supports for academic content

# **Essential/Guiding Questions:**

1. Why are plants able to grow in cracks in the concrete?
2. How are rocks and other organic materials affected by plants?

**Lesson Presentation:**

**Activating Prior Knowledge:**

1. As students are returning from an outdoor activity (recess, PE), stop and notice a weed growing through the cracks in the sidewalk. Have a wondering: “How can a plant grow out of the concrete?” Pose this question to students. Responses will vary.

**Modeled instruction:**

1. Show students images of physical (organic) weathering.

2 Introduce vocabulary in conjunction with the article, [One Geology: Weathering](http://www.onegeology.org/extra/kids/earthprocesses/weathering.html), and images.

3. Tell students that there are examples of organic weathering right here at school.

**Supported/Guided instruction:**

1. Divide students into two groups with at least one adult per group. (If this is not possible, complete observations and explorations in whole group.)

2. Each group should have a device on which to take photos.

3. Walk through the outside spaces on the school campus, find examples of organic weathering and take photos. Examples include weeds in the sidewalks, plants growing amongst rocks, etc.

4. After returning to the classroom, upload photos to computer.

5. Show photos taken to students and discuss: How is this an example of weathering? What happened to the sidewalk? How do you think the plant will affect the rock? What will happen to the rock if the plant continues to grow? (Questions will vary based on environment.)

**Independent Work:**

1. Students work in pairs with examples and non-examples of organic weathering.

2. Partners will discuss features of organic weathering in certain images.

3. Partners will group images in to examples and non-examples.

**Small group suggestions:**

1. Students can read additional passages on organic weathering.

2. Students can investigate other types of weathering (Chemical and mechanical)

3. Students can discuss how weathering affects the erosion process.

4. Students can find additional examples of organic weathering at home, at the bus stop, or other outside locations.

**Assessment:**

1. Students will identify examples of organic weathering on school campus and in photos and images.

2. Teachers should utilize district created rubrics to score student work.

**UDL:**

**Multiple means of representation:**

1. Students can point to an example of organic weathering.

2. Students can work with typical peers for additional support.

3. Students can draw a picture of organic weathering.

4. Students can match images of organic weathering.

5. Students can work individually, in pairs, or in a small group.

6. Students can work independently with peer or adult supports.

**Multiple means of expression:**

1. All students should have access to expressive language/technology that is appropriate for their specific need.

2. Expression may come in the form of verbal responses, signed responses, pointing/gestures, eye gaze, or through the use of a low or high tech device.

3. Text to speech options are available for computers on the Word app, iPads and other hand held devices. Google Chrome offers free extensions, such as Selection Reader and Select and Speak-Text to Speech, and apps, such as Text to Speech, Text to Speech with Google Drive, and TTS Reader- Unlimited Text-to-Speech.

4. Speech to text options are also available from Google. Extensions include Voice Note II-Speech to Text, Online speech recognition, and Co: Writer Universal. Voice Note II is also available as an app; Speech notes-Speech to Text Notepad is available as well. Microsoft Word also has speech to text options.

5. Additional information about text to speech and speech to text options are available through your district Assistive Technology Department.

**Multiple means of engagement:**

1. Provide students with support in accessing the outside environment.

2. Encourage collaboration with peers in partners or small groups.

3. Allow students to work independently.

4. Allow students to be positioned for maximum learning engagement.

5. Allow students to use technology to take photos.

6. Provide supervision for safety when outside.

**Assistive Technology Recommendations:**

1. All students should have a means of expressive communication and a way to be actively engaged in learning.

2. Response modes may include, but are not limited to: eye gaze, gesturing or pointing to pictures/words/phrases, signing, low tech devices (GoTalks, etc.), or dynamic devices (iPad, etc.)

3. Lesson vocabulary, photos/pictures and graphic representations should be created and/or printed prior to the lesson to provide all students with an opportunity to be engaged in discussion.

4. When possible, provide students with text to speech options. Articles and passages from Readworks.org have this option.

5. If students are writing in response to text or writing as a means of sharing information, provide students with alternates to pencils. Speech to text and alternative pencils should be considered. Find more information about alternative pencils here: [Alternative Pencils](http://alternativepencils.weebly.com/)

**Technology Needed:**

* Smartboard, ipad or camera (or other device to take photos outside)

**Additional Resources:**

* From readworks.org: [Weathering and Erosion](https://www.readworks.org/article/Weathering-and-Erosion/766786c1-2b0c-4b35-b630-a7b2b16b6a8b#!articleTab:content/)
* From kids.kiddle.co: [Weathering for Kids](https://kids.kiddle.co/Weathering)
* From sciencing.com: [Four Types of Physical Weathering](https://sciencing.com/four-types-physical-weathering-6456598.html)
* District-provided science materials