

Big Idea: In what ways do humans slow or prevent wind or water from changing the shape of the land?

Guiding Questions:

What evidence can we find to prove that Earth events can occur quickly or slowly?

In what ways do humans slow or prevent wind or water from changing the shape of the land?

21st Century Themes/Skills:

<i>DCI (Disciplinary Core Ideas)</i>	<i>Science and Engineering Practices</i>	<i>Cross Cutting Concepts</i>	<i>Student Learning Objectives</i>	<i>Differentiated Activities (Consider the 5 Es)</i>	<i>Resources/Technology</i>	<i>Formative Assessments</i>	<i>Benchmark Assessment</i>
ESS1.C: The History of Planet Earth Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1-1)	Constructing Explanations and Designing Solutions · Make observations from several sources to construct an evidence-based account for natural phenomena. (2-ESS1-1) · Compare multiple solutions to a problem. (2-ESS2-1)	Things may change slowly or rapidly. (2-ESS1-1) · Things may change slowly or rapidly. (2-ESS1-1) · Things may change slowly or rapidly. (2-ESS2-1)	<i>Define and describe weathering and erosion.</i> <i>Recognize ways that plants can help reduce erosion.</i> <i>Model erosion.</i>	ENGAGE 1: Start the lesson by asking students to visualize a sand pile on the playground. Give students a moment to visualize, then ask a volunteer draw the sand pile on the board. Label the drawing "Before." Ask students to imagine that a great storm, with wind and rain, occurs. Ask them to describe what they think will happen to the sand pile. Ask another volunteer to draw the "After" sand pile on the board. Explain that what happens to a sand pile in a rainstorm is an example of erosion. Say: Erosion is a process that shapes the surface of Earth. It is one of the processes you will learn about in this lesson. Read aloud as a class the section of Engage from the Core Interactive Text titled Getting to Know: Weathering and ENGAGE 2: Share a brief demonstration with the class. Have three large, clear plastic bins prepared at the front of the room, along with a full bucket of water. Direct your students' attention to the first bin, which contains a pile of brown dirt. Slowly pour water over the dirt, and allow students to witness what happens to the pile (it washes away). Direct their attention to the second bin, containing a medium-sized pile of sand. Pour water over the sand, and allow students to witness what happens to the sand. Repeat the procedure with the third bin, which contains a small pile of rocks or gravel. After all three materials have been exposed to "erosion," ask students to draw conclusions from the demonstration. Ask: What effect does water have on soil, sand, and rocks? This readies students to learn more about weathering and erosion. ENGAGE 3: Use the video segments Weathering and Erosion (1:32) and The Forces of Wind and Water: Weathering and Erosion (3:00) to introduce the processes of weathering and erosion. After students view the videos, ask volunteers to define or describe weathering and erosion. Have students explore these terms in the Interactive Glossary, and write a working definition of each term on the board. Have volunteers read aloud the reading passage Getting to Know: Weathering and Erosion. Point out that weathering and erosion can have creative and destructive effects. Explain that students will learn more about the creative and destructive effects of erosion and weathering. Post the Lesson Questions that constitute what students will be learning. Students may read them to themselves or you may wish to read the questions aloud together. What is weathering? What is erosion? How can plants help reduce erosion?	Unit 5 Resources	EVALUATE: Lesson Questions: What is weathering? What is erosion? How can plants help reduce erosion? Students use the Board Builder tool to create a board that shows what they know about the focus question. Emphasis should be placed on the evidence they have collected to support their findings.	

<i>ESS2.A: Earth Materials and Systems</i> <i>Wind and water can change the shape of the land. (2-ESS2-1)</i>	Asking Questions and Defining Problems - Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1) - Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)	- Things may change slowly or rapidly. (2-ESS2-1) - The shape and stability of structures of natural and designed objects are related to their function (s). (K-2-ETS1-2)
ETS1.A: Defining and Delimiting Engineering Problems A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) - Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1) - Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)	Developing and Using Models Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)	Influence of Engineering, Technology, and Science on Society and the Natural World Developing and using technology has impacts on the natural world. (2-ESS2-1)

EXPLORE 1: Lesson Questions: What is weathering? What is erosion? Present students with the Lesson Questions and have them complete the first section of the Scientific Explanations Student Sheet using these questions. Students may type their responses directly into the digital resource, or they may write or draw their responses on a printed copy of the resource. The digital resource includes a link to a PDF version of the Student Sheet. Guide students to think about what they already know about each question and record their prior knowledge in the Prior Knowledge section. Encourage students to think about and record how they know what they do (evidence and reasoning). Introduce the Evidence section, explaining to students that they will fill this in as they go through the rest of the lesson. Have students begin the Evidence section with information gathered during Engage. EXPLORE 2: Explain to students that weathering and erosion are not the same thing, but they are related and often happen at the same time. Write the words weathering and erosion as headings of a T-chart on the board. Have students copy this T-chart into their notebooks, labeling one column Weathering and the other column Erosion. Explain to students that they will use these T-charts to take notes as they learn about weathering and erosion. Ask a volunteer to define the words. Clarify that weathering occurs when rocks break into smaller rocks. In contrast, erosion occurs when wind and water move rocks, sand, and soil. Have students review the Interactive Glossary term weathering, and write a similar definition in their own words in the Weathering column of their T-charts. Read aloud as a class the section of Explore from the Core Interactive Text titled What is Weathering? Based on this text, students should take additional notes in the Weathering column of their T-charts about what weathering is, as well as what causes it. Read aloud as a class the reading passage Break It Down! Based on this text, students should take additional notes in the Weathering column of their T-charts about what weathering is, as well as the causes and effects of weathering. When students have finished, have them work with a partner and use their notes to complete a Cause/Event/Effect Chart detailing the causes and effects of weathering (weathering would be the event in this chart). EXPLORE 3: Remind students that weathering and erosion are not the same thing, but they are related and often happen at the same time. Explain to students that they will continue to use their T-charts to take notes as they learn more about weathering and erosion. Ask a volunteer to define the words. Clarify that weathering occurs when rocks break into smaller rocks. Erosion occurs when wind and water move rocks, sand, and soil. Have students review the Interactive Glossary term erosion, and write a similar definition in their own words in the Erosion column of their T-charts. Read aloud as a class the section of Explore from the Core Interactive Text titled What is Erosion? Based on this text, students should take additional notes in the Erosion column of their T-charts about what erosion is, as well as what causes it. Have students view the video segment Erosion (6:42). Based on this video, students should take additional notes in the Erosion column of their T-charts about what erosion is, as well as the causes and effects of erosion. Read aloud as a class the reading passage The Changing Shape of Beaches, and discuss the causes and effects of beach erosion. When students have finished, have them work with a partner and use their notes to complete a Cause/Event/Effect Chart detailing the causes and effects of erosion (erosion would be the event in this chart)	Video Segment: Weathering and Erosion
EXPLAIN 1: Lesson Questions: What is weathering? What is erosion? Have students use the evidence that they collected in the Explore sessions to complete the sections of the Scientific Explanations Student Sheet titled "Claim" and "My claim is true because ..." for the two Lesson Questions. Students may type their responses directly into the digital resource, or they may write or draw their responses on a printed copy of the resource. The digital resource includes a link to a PDF version of the Student Sheet. Have groups of two to four students share their explanations with each other. Students should then revise or enhance their explanations based on group discussion.	Video Segment: Forces of Wind and Water: Weathering and Erosion

			EXPLORE 4: Present students with the third Lesson Question (“How can plants help reduce erosion?”), and have them complete the first section of the Scientific Explanations Student Sheet using this question. Students may type their responses directly into the digital resource, or they may write or draw their responses on a printed copy of the resource. The digital resource includes a link to a PDF version of the Student Sheet. Guide students to think about what they already know about this question and record their prior knowledge in the Prior Knowledge section. Encourage students to think about and record how they know what they do (evidence and reasoning). Remind students that they will complete the Evidence section as they go through the rest of the lesson. In addition, students should continue to look for evidence to answer the Lesson Question “What is erosion?” Have students begin the Evidence section for the new Lesson Question with information gathered previously in the lesson. EXPLORE 5: Have students return to their weathering and erosion T-charts, as well as their Cause/Event/Effect Chart detailing the causes and effects of erosion. Remind students that erosion occurs when wind and water move rocks, sand, and soil. Read aloud as a class the reading passage Erosion. Based on this text, students should take additional notes in the Erosion column of their T-charts about what erosion is and what causes it. When students have finished, have them work with a partner and use their notes to add to their Cause/Event/Effect Chart detailing the causes and effects of erosion (erosion would be the event in this chart). EXPLORE 6:Begin by viewing the video segment Plants Help Us (1:17) to introduce the Lesson Question How do plants help reduce erosion? Ask questions to help students summarize the main ideas in the segment: What part of a plant is most helpful in reducing erosion? (roots) What might happen to an area if it had no plants? (It might erode away.) Read aloud as a class the section of Explore from the Core Interactive Text titled How Can Plants Help Reduce Erosion? and the reading passage Plants and Erosion. Discuss further as a class the answers to the above questions, as well as how plants help reduce erosion EXPLORE 7:Explain to students that they will continue to use their T-charts to take notes as they learn more about weathering and erosion. Clarify that erosion occurs when wind and water move rocks, sand, and soil. Explain to students that they will now focus on how water (including frozen water) causes erosion. Read aloud as a class the section of Explore from the Core Interactive Text titled How does water erosion shape the land? and have students view the Interactive Glossary terms surface and glacier. Students should also view the video segment Erosion: Wind, Water, and Ice (3:33). Based on these resources, students should take additional notes in the Erosion column of their T-charts about what erosion is and how water causes it. When students have finished, have them work with a partner and use their notes to add to their Cause/Event/Effect Chart detailing the causes and effects of erosion (erosion would be the event in this chart), focusing specifically on the causes and effects of erosion by water and ice. EXPLORE 8:Have the students complete the Hands-On Activity: Let It Rain. In this Hands-On Activity, students will design and construct a model of riverbank erosion. Students will predict what will happen when rain falls on the soil near the river and then use a watering can to test their predictions. Students will modify the model to include plants and observe the results. EXPLORE 9:Explain to students that they will continue to use their T-charts to take notes as they learn more about weathering and erosion. Clarify that erosion occurs when wind and water move rocks, sand, and soil. Explain to students that they will now focus on how wind causes erosion. Read aloud as a class the section of Explore from the Core Interactive Text titled How does wind erosion shape the land? Students should view the video segment Wind Erosion in the Desert (2:47). Based on these resources, students should take additional notes in the Erosion column of their T-charts about what erosion is and how wind causes it. When students have finished, have them work with a partner and use their notes to add to their Cause/Event/Effect Chart detailing the causes and effects of erosion (erosion would be the event in this chart), focusing specifically on the causes and effects of erosion by wind.	Video Segment: Erosion		
			EXPLAIN 2: Lesson Questions: What is erosion? How can plants help reduce erosion? Have students use the evidence that they collected in the Explore sessions to complete the sections of the Scientific Explanations Student Sheet titled “My Claim” and “My claim is true because ...” for the two Lesson Questions. Students may type their responses directly into the digital resource, or they may write or draw their responses on a printed copy of the resource. The digital resource includes a link to a PDF version of the Student Sheet. Have groups of two to four students share their explanations with each other. Students should then revise or enhance their explanations based on group discussion.	Video Segment: Erosion: Wind, Water, Ice		
			ELABORATE: Lesson Questions: What is weathering? What is erosion? How can plants help reduce erosion? Have the students complete the Virtual Lab: Erosion – Here Today, Gone Tomorrow. Erosion – Here Today, Gone Tomorrow asks students to find ways to decrease soil erosion. In Level 1, students explore how three variables impact amounts of erosion. In Level 2, students test three variables, but compare how these variables affect the erosion of sandy soil, silty soil, and a sand/silt combination soil. ELABORATE 2: (PROJECT) Have students investigate how weathering and erosion affect different landforms. For example, students can look at photographs of landforms from the Discovery Education website or their own photographs, and discuss how each is formed, broken down, or otherwise changed by weathering and erosion. Once students have completed a good set of notes and explanations for a variety of landforms, they should choose the landform they think they have described best. Students should then use their ideas to make posters about how weathering and erosion have affected their chosen landform, and present these to the class. Students can alternatively use Board Builder to present their ideas to their classmates.	Video Segment: Plants Help Us		

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