

Weathering, Erosion, and Deposition

Teacher Facilitation Notes

In General . . .

- Project the slide deck in edit mode—do not show it as a slideshow.
- Hide the speaker notes before projecting. (View/Show Speaker Notes)
- Hide the toolbar. (Click on the up arrow at the right end of the tool bar.)
- Call on students to read the various content shown on slides.
- For each investigation, assemble the needed materials for each group and place in a central location for ease of distribution.
- Duplicate copies of the data sheets for each student.

Materials Needed:

Explore—Weathering: Breaking Up is Hard to Do! (Per Group)

Sugar cubes, 6-10	Eye Dropper or Pipette	Water
Black construction paper	Petri dish or small bowl	Paper towels
Paper plate	Ice cubes	

Explore—Erosion: Slip, Sliding Away (Per Group)

Small, plastic paint tray*	Sand	Small rocks or pebbles
Straws, cut in half	Foam cup	Water
Ice cubes	Paper towels	Goggles, 1 per student
Baggie, quart-size	Beaker, 500 mL	

Explore—Deposition: We Will Rock You! (Per Group)

Baggie, quart-size	Paint tray	Sand
Potting soil	Gravel	Rocks
Water	Paper towels	Beaker, 500 mL

Elaborate—Greatest Show on Earth (Per Group)

Chart paper or large sheets of construction paper	
Markers	Tape

*Small plastic paint trays can be purchased at discount stores, such as DOLLAR TREE (in store or online).

Other Materials

Student Recording Sheets	Pencils	Student Evaluations
Science Notebooks	Nail	
Large tub or container for disposing of wet sand and rocks		

Weathering, Erosion, and Deposition

Teacher Facilitation Notes, p. 2

Engage: Slow Changes to Earth's Surface (See, Think, Wonder)*

- Engage students by asking them to carefully observe a video. Don't mention weathering, erosion, or deposition yet. Just tell them to watch for changes as water is being dripped slowly on a block of salt called a salt lick.
- After watching the video, give time for the students to record their observations in their science notebooks.
- Facilitate a class discussion of what the students observed.
 - What did you observe in the video?
 - What happened to the salt lick over time?
 - What caused those changes? What makes you say that?
 - Do you know the science term for what is happening to the salt lick in the video?
 - What do you think would happen if the person kept dripping water on the salt lick for a very long time?
- Tell the students that they observed weathering and erosion of the salt lick in the video. Ask, *What did you see in the video that makes you wonder about weathering and erosion?*
- Discuss as desired.

Explore: WED

Weathering—Breaking Up is Hard to Do!

- Have students look at the picture of the Grand Canyon. Call on volunteers to make observations about how the canyon looks and inferences about what caused the canyon to look this way.
- Have all of the materials for the investigation in a central location for ease of distribution.
- Depending on students' ability levels, have the groups complete the investigation independently or work together as a class with each group performing the procedures simultaneously.
- After Step 6, be sure students understand that rubbing the two "rocks" together is like wind picking up sediments and banging them against rocky surfaces.
- Once the students have completed the investigation, facilitate a class discussion on how wind, water, and ice affect the weathering of rocks on the Earth's surface.

Weathering, Erosion, and Deposition

Teacher Facilitation Notes, p. 3

Explore: WED, continued

Erosion–Slip, Sliding Away

- Before this part of the lesson, take a nail (or a drawing compass) and poke a hole in the bottom of a foam cup for each group.
- Fill a quart-size baggie or container with sand and a 500 mL beaker with water for each group.
- Emphasize lab rules with students, particularly:
 - Do not eat or drink anything without teacher permission.
 - Wear your goggles at all times during the investigation.
 - No horseplay (especially when blowing the sand with the straws!).
- Depending on students' ability levels, have the groups complete the investigation independently or work together as a class with each group performing the procedures simultaneously.
- Once the students have completed the investigation, facilitate a class discussion on how wind, water, and ice affect the weathering of rocks on the Earth's surface.

Deposition–We Will Rock You!

- For each group, fill a quart-size baggie or container with a mixture of sand, soil, gravel, and rocks. Fill a 500 mL beaker with water.
- Emphasize lab rules with students, particularly:
 - Do not eat or drink anything without teacher permission.
 - Wear your goggles at all times during the investigation.
 - No horseplay (especially when blowing the sand with the straws!).
- Depending on students' ability levels, have the groups complete the investigation independently or work together as a class with each group performing the procedures simultaneously.
- Once the students have completed the investigation, facilitate a class discussion on how wind, water, and ice affect the weathering of rocks on the Earth's surface.
- Discuss as desired.

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Teacher Facilitation Notes, p. 3

Explain: Rock Around the Clock

- After studying the photograph on the opening slide, call on volunteers to identify evidence of weathering, erosion, and deposition in the photo. Have students infer what caused the changes (wind, water, or ice).
- Watch the video. Then read and discuss the remainder of the slides.
- Make sure students understand that WED is a continuous process and is caused by wind, water, and ice.

Elaborate: Greatest Show on Earth!

- Divide the class into 5 groups. Each group will be responsible for creating an anchor chart on one aspect of this lesson:
 - A. Weathering by Wind
 - B. Weathering by Water
 - C. Weathering by Ice
 - D. Erosion by Wind
 - E. Erosion by Water
 - F. Erosion by Ice
 - G. Deposition by Wind
 - H. Deposition by Water
 - I. Deposition by Ice
- Go over the slide showing the directions and tips for making these anchor charts. Give students time to create and present their charts.
- Display the charts around the classroom or in nearby hallway.
- Discuss as desired.

Evaluate

- Let students complete the quiz independently.
- Discuss evaluation as desired.

NOTE: A river canyon can be changed by both weathering and erosion. Accept either answer if students can justify their choice.

Weathering, Erosion, and Deposition

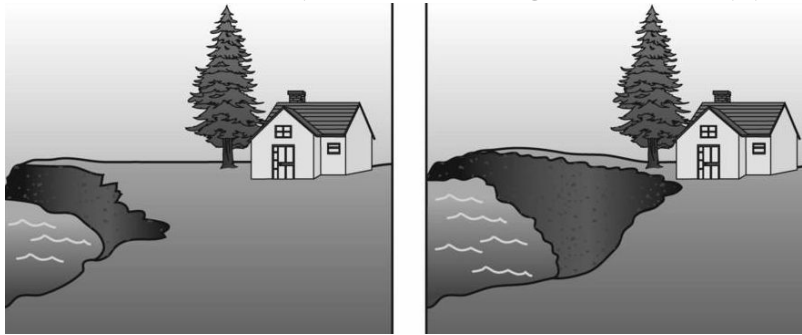
Name: KEY

Evaluation

Directions : Match each term to its definition. Write the letter of the definition on the correct lines.

- B Weathering A. The movement of sediments
- A Erosion B. The breaking down of rock on Earth's surface
- D Deposition C. Soil and small pieces of weathered rocks
- C Sediments D. The dropping of sediments in a new location

5. The illustrations show how a cliff by an ocean changed over thirty years.



What most likely caused the changes in the cliff?

- A The people living in the house dug deep holes in the ground.
 - B Ocean waves weathered and eroded the soil.
 - C A glacier picked up rocks and soil and deposited them near the house.
 - D Strong winds blew the soil into the ocean.
6. Which of the following are examples of erosion? Mark all that apply.
- F Gravity pulling rocks down a hillside
 - G Clouds forming above a mountain peak
 - H Wind blowing sand to form dunes
 - J Waves washing sand off the beach
 - K Water freezing in the cracks of large rocks
 - L Tree roots breaking large rocks into smaller pieces

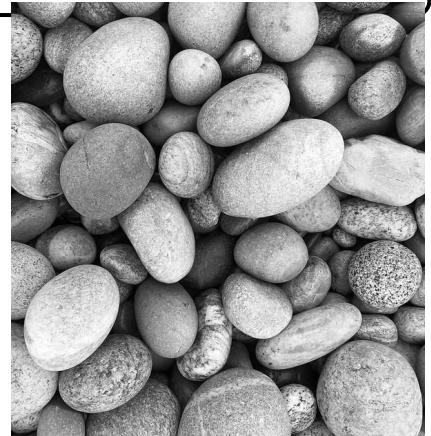
Weathering, Erosion, and Deposition

Name: **KEY**

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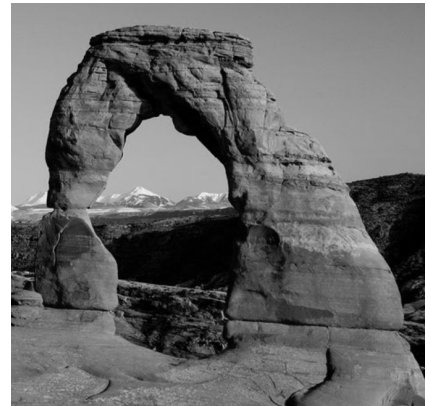
7. What most likely caused the edges of these rocks to become rounded and smoother?

- A** Bumping and scraping together in a flowing river
- B** Being hit over and over by wind-blown sand
- C** Falling downhill on a steep mountainside
- D** Being scraped as a glacier passed over them



8. What most likely caused the shape of this rock formation?

- F** Water eroding sediments
- G** Water freezing in cracks
- H** Humans walking on trails
- J** Wind blowing sand and rocks



9. Study each picture. Identify what most likely caused the changes to the Earth's surface. The first one is done for you.

<p style="text-align: center;">Sand dunes</p> <p style="text-align: center;">Deposition By Wind</p>	<p style="text-align: center;">River Canyon</p> <p style="text-align: center;">Erosion/Weathering by Water</p>	<p style="text-align: center;">Sea Arch</p> <p style="text-align: center;">Weathering By Water</p>	<p style="text-align: center;">Glacier Valley</p> <p style="text-align: center;">Weathering by Ice</p>

Weathering, Erosion, and Deposition

Name: _____

Explore: WED-Weathering, Breaking Up is Hard to Do

Question

What causes weathering (the breaking up of rocks) on the Earth's surface?

1. What did you do to break up the "rock"? What happened to the "rock"?
2. What happened when you rubbed the two sugar cubes together over the black paper? Why do you think this happened?
3. Were you able to round the edges of your "rock"? Explain.
4. What natural forces might cause a rock to break apart or become smooth over a long period of time?
5. What happened when you dropped 100 drops of water on the "rock"?
6. What happened when the ice cube ground against the "rock" in your hand?

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Explore: Erosion—Slip, Sliding Away!

Question

How does erosion cause slow changes to Earth's surface?

1. Record your observations about how the "hillside" changes when the wind blows across it.
2. What happens as the water falls on the hill and flows down to the bottom of the paint tray?
3. How did the "glacier" change the hillside?
4. What do you notice on the bottom of the ice cube after it moved down the hill? How might this further affect the Earth's surface?



What conclusions can you make about how wind, water, and ice erode the Earth's surface?

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Explore: Deposition–We Will Rock You!

Question

How does the deposition of sediments affect Earth's surface?

1. Record your observations about how the “hillside” changes when the water flows down it.
2. What do you notice about the sediments that were deposited at the bottom of the paint tray?
3. What evidence of deposition did you see in the 3 photographs?



What conclusions can you make about how wind, water, and ice can deposit sediments on the Earth's surface?

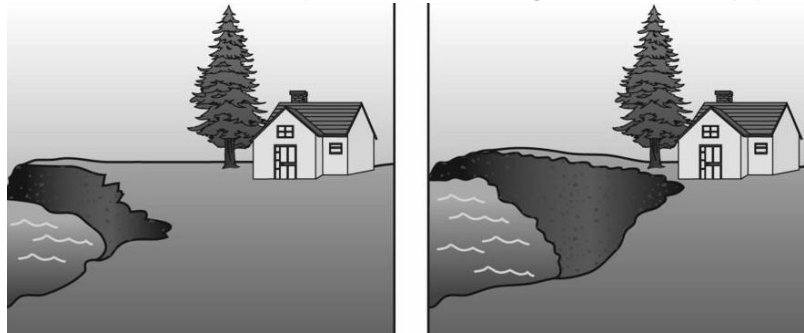
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Directions : Match each term to its definition. Write the letter of the definition on the correct lines.

1. _____ Weathering
 2. _____ Erosion
 3. _____ Deposition
 4. _____ Sediments
- A. The movement of sediments
 - B. The breaking down of rock on Earth's surface
 - C. Soil and small pieces of weathered rocks
 - D. The dropping of sediments in a new location
5. The illustrations show how a cliff by an ocean changed over thirty years.



What most likely caused the changes in the cliff?

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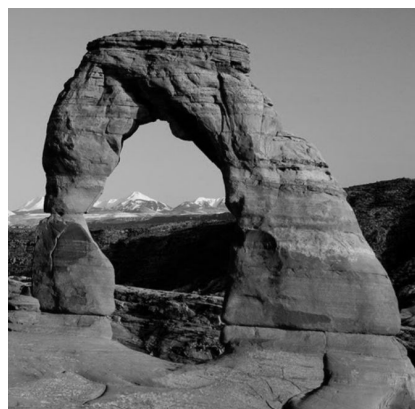
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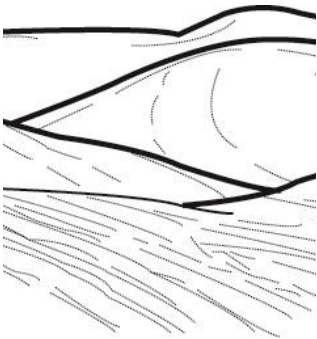
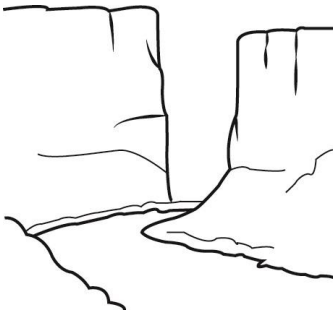

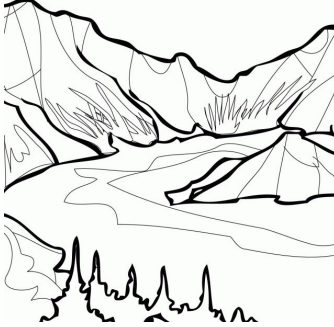


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 <p data-bbox="175 1772 344 1810">Sand dunes</p>	 <p data-bbox="522 1772 717 1810">River Canyon</p>	 <p data-bbox="912 1772 1042 1810">Sea Arch</p>	 <p data-bbox="1237 1772 1432 1810">Glacier Valley</p>
<p data-bbox="175 1864 344 1948">Deposition By Wind</p>			