

## Chapter: **Dynamic Earth**

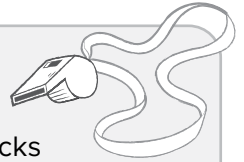
Read each question thoroughly. The Science Coach boxes will help you apply the skills and concepts you need to answer the questions.

1. Which scenario is NOT an example of physical weathering?

- (A) ice wedging creating cracks on a sidewalk
- (B) rusting of metal from oxidation
- (C) plant roots breaking up concrete
- (D) abrasion of rocks from blowing sand

### Science Coach Weathering

**processes** alter rocks and rock surfaces. **Physical weathering** naturally breaks rocks into smaller pieces. Which process causes more than just breaking rock into smaller pieces?



For questions 2 and 3, refer to the passage and table.

### Collecting Rain Samples

Rico and Mila noticed something odd was happening after it rained. Soil, rocks, and buildings were changing shape and color. Sometimes rust would form on metal objects. They learned that normal rain is slightly acidic because carbon dioxide in the air forms a weak acid when it reacts with rain. This weak acid can dissolve rocks. In addition, chemicals from natural and other sources, such as the burning of fossil fuels, produce acid rain. Rico and Mila decided to take the pH of four rain samples to see if the rain was causing the changes. They took the data and organized it into a table. They found the rain samples were all below the pH of normal rain.

Table 1: pH of Rain Samples

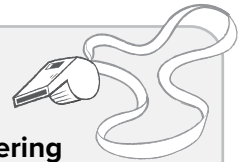
Rain Sample	pH
1	5.1
2	4.8
3	5.5
4	4.2

2. Which rain sample is **most likely** to cause the greatest amount of weathering?

- (F) Sample 1
- (G) Sample 2
- (H) Sample 3
- (I) Sample 4

#### Science Coach

Consider how pH affects the **weathering** of **Earth's surface** and other objects. Which type of rain increases **chemical weathering**?

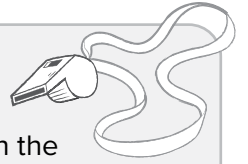


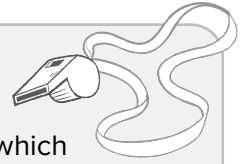
3. Which change could be made to reduce the amount of weathering caused by rain with a lower pH?

- (A) build groins along the shoreline
- (B) reduce pollutants in the air
- (C) clear the land of vegetation
- (D) increase the number of moraines

**Science Coach**

Consider where normal rain falls on the **pH scale** when carbon dioxide mixes with the air. What substances in the air would cause rain to have a lower pH?



**4. Sinkhole Formation****Science Coach**

Think about the conditions under which **sinkholes** form. Is **weathering, erosion, or deposition** involved? Does the type of landmass or rock affect their formation?

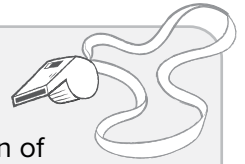
What causes sinkholes to form in Florida?

- (F) The bedrock is composed of limestone, which is easily dissolved in slightly acidic water.
- (G) Steep slopes are easily eroded by mass wasting, causing land to shift.
- (H) Melting glaciers that were formed during the ice age caused great amounts of outwash.
- (I) Climate change caused the evaporation of freshwater lakes, leaving large, empty holes.

5. The picture below is a landform found along the coastlines of Florida.

**Science Coach**

Consider the shape and location of this **landform**. Is it shaped from the **building up** or the **tearing down** of the **Earth's surface**? What body of water must be present?



Which explanation **best** describes this type of landform and how it is created?

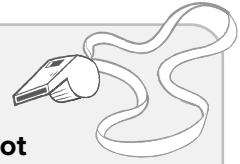
- (A) A loess is caused by coastal and groundwater erosion.
- (B) A talus is caused by erosion that occurs during mass wasting.
- (C) A delta is a large deposit of sediment that forms where streams enter a large body of water.
- (D) This fan-shaped feature is formed when a meander makes its way to the coastline.

6. How do mangroves help the Florida coastline?

- (F) They protect against longshore currents.
- (G) They keep groins from being chemically weathered.
- (H) They protect against wave erosion.
- (I) They cause deposition to occur.

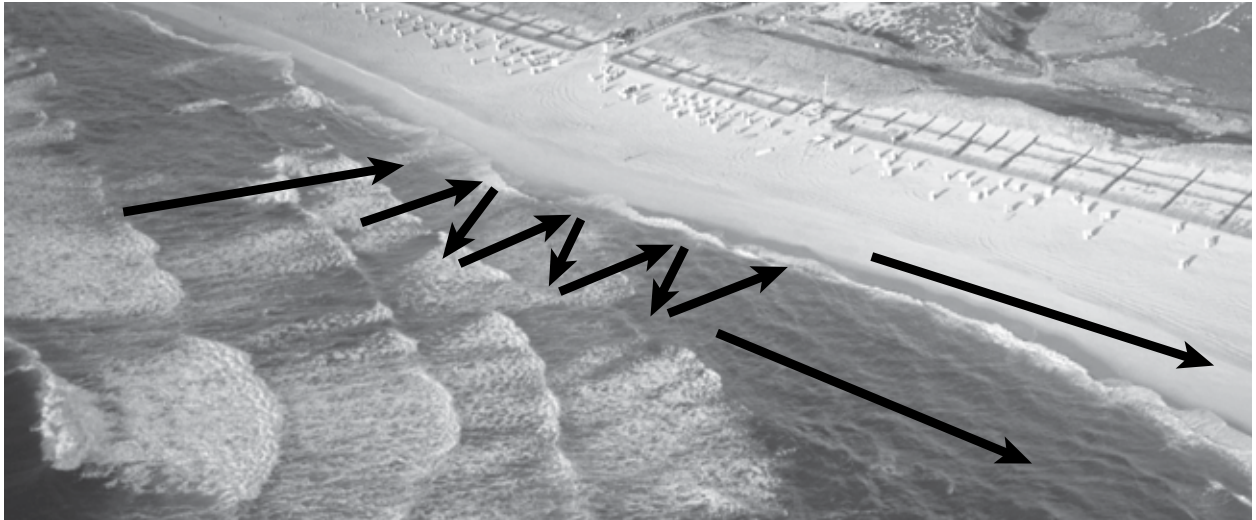
**Science Coach**

Consider the structure of the **root system** of the mangrove trees. How does this feature keep the **coastline** from being **torn down**?



For questions 7 and 8, refer to the image below.

7. The picture below shows ocean water as it approaches the shore. Look at the two arrows that are parallel.

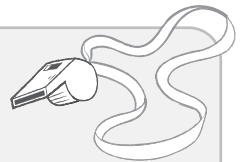


What do the parallel arrows in the illustration represent?

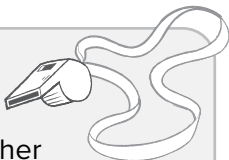
- (A) wind erosion
- (B) a longshore current
- (C) beach abrasion
- (D) the rounding and sorting of sand

**Science Coach**

Think about how water and waves approach **coastlines**. Is there a **pattern** to the flow of water?



8. If Florida did not have a program to restore beaches, what would **most likely** happen to the coastline?
- Ⓕ The shoreline would incur drastic changes due to severe erosion.
  - Ⓖ An abundance of barrier islands would be created.
  - Ⓗ Deltas would form as sand and sediment would be deposited where rivers meet the ocean.
  - Ⓘ The wetlands would be completely eroded.

**Science Coach****Physical**

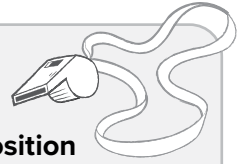
**weathering** and other processes cause **Earth's surface** to be **built up** and **torn down**. What would be the effect on shorelines if they weren't protected?



## 9. How do Florida's caverns form?

- (A) When vegetation such as mangrove trees is removed, the rock is eroded. This forms holes in the ground.
- (B) The repeated freezing and thawing of ice wedging breaks the rocks apart. Then water washes away the sediment.
- (C) Wind and rain physically weathered the rock into the sediment. As a result of mass wasting, caverns were formed.
- (D) Acidic groundwater seeps through rock. It dissolves and washes away the limestone.

**Science Coach**  
**Weathering,**  
**erosion, and deposition**



produce caverns. **Caverns** contain **landforms** that are formed from minerals deposited by water over a long period of time. Think about what caverns are and where they are located.

## Chapter: **Dynamic Earth**

Answer the questions that follow.

1. Which feature is NOT associated with an increase in chemical weathering?

- Ⓐ oxidation
- Ⓑ abrasion
- Ⓒ acidic rain
- Ⓓ warm climate

For questions 2, 3, and 4, refer to the following passage and illustration.

In this group of questions, you will use your knowledge about mangroves and the processes that change Earth's surface to answer three questions.

### The Mighty Mangrove Protectors

Florida has laws to protect mangroves. Julio doesn't understand why they should be protected. He says the thick mangrove forests block beautiful ocean views. Julio feels that these forests do not serve any purpose and should be cut down.



One day, a strong hurricane eroded part of the shoreline. Many homes were destroyed by huge waves. Animal habitats were also destroyed. However, the areas with mangroves were not damaged by the hurricane as badly as other areas. Julio realized that mangrove forests are important as they not only protect the coastline, but they also provide homes and other basic needs for many types of organisms

2. What **most likely** caused the damage to the shoreline and the homes?

- (F) moraines
- (G) levees
- (H) surges
- (I) longshore currents

3. What is one reason mangrove trees can protect shorelines from hurricanes?

- Ⓐ Mangroves are not susceptible to erosion.
- Ⓑ Mangroves provide complete protection from flooding.
- Ⓒ The low-growing roots slow the flow of incoming waves.
- Ⓓ Their root system helps anchor the soil, reducing erosion.

4. Look at the structure of the root system of the mangroves. What other benefits do they provide?
- Ⓕ If mangroves are present, groins do not need to be built.
  - Ⓖ They offer nutrients and shelter to many species.
  - Ⓗ They are not affected by climate change.
  - Ⓘ They protect against chemical weathering.

5. Which two landforms have the most attributes in common?

- Ⓐ sink holes and caves
- Ⓑ wetlands and glaciers
- Ⓒ hoodoos and stalagmites
- Ⓓ deltas and barrier islands

6. Deposition can cause many types of landforms.



What is the name of the landform in Figure A, and how is it formed?

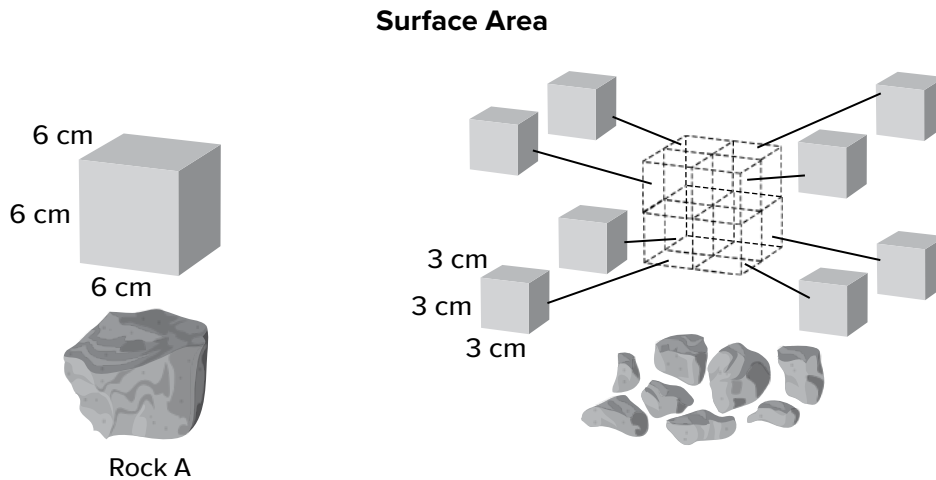
- Ⓕ This is an outwash, which is formed from the mass wasting of a glacier.
- Ⓖ This is a till, which is formed when a glacier melts.
- Ⓗ This is a moraine, which is formed when till piles up in front of a glacier.
- Ⓘ This is a sand dune, which is formed when the wind blows till into piles.

For questions 7 and 8, refer to the information and illustration below.

To calculate the area (A) of a rectangle, use the following formula:  $A = L \times W$ .

The surface area (SA) is the sum of the areas of all 6 sides.  $SA = A \times 6$

A rock broken into 8 pieces has a total of 48 sides.



7. If Rock A broke into 8 pieces, what would be the total surface area (SA)?

- (A) 36 cm<sup>2</sup>.
- (B) 54 cm<sup>2</sup>.
- (C) 216 cm<sup>2</sup>.
- (D) 432 cm<sup>2</sup>.



8. If Rock A were to break into a different number of pieces, which number of pieces would **most likely** weather the fastest?
- Ⓕ 16 pieces
  - Ⓖ 12 pieces
  - Ⓗ 8 pieces
  - Ⓘ 4 pieces

9.

## ROCK RESHAPING



What **most likely** caused the rocks in the pictures to change appearance?

- (A) wind erosion
- (B) mass wasting
- (C) sorting
- (D) rounding