

## **E4. Weathering & Erosion**

### **Weathering & Erosion**

Have you ever wondered how the beautiful landscapes, mountains, and valleys on Earth were formed? Weathering and erosion are two powerful processes that shape the Earth's surface over millions of years. Let's explore how these processes work!

#### **What is Weathering?**

Weathering is the process of breaking down rocks and minerals on the Earth's surface into smaller pieces. This can happen through physical or chemical means.

#### **Physical Weathering**

Physical weathering occurs when rocks are broken down into smaller pieces without changing their chemical composition. One common cause of physical weathering is freezing and thawing. When water gets into the cracks of rocks and freezes, it expands and creates pressure, causing the rocks to crack and break apart.

#### **Chemical Weathering**

Chemical weathering happens when rocks are broken down through chemical reactions. For example, rainwater is naturally a little acidic. Over time, this slightly acidic rainwater can react with certain types of rocks, such as limestone, and dissolve them.

#### **What is Erosion?**

Erosion is the process of carrying away the smaller pieces of rocks and soil that have been weathered. Erosion is mainly caused by wind, water, and ice.

#### **Wind Erosion**

Wind can carry away loose soil and sand from one place to another. Have you ever seen sand dunes at the beach? Those are formed by the wind carrying sand and piling it up in one spot.

#### **Water Erosion**

Water is a powerful force of erosion. Rivers and streams can carry away soil and rocks from their original location and deposit them in a different place. This is how valleys and canyons are formed over time.

#### **Glacial Erosion**

Glaciers are huge masses of ice that move slowly over the land. As they move, they pick up rocks and soil and carry them along. Glaciers can create valleys and shape the landscape.

#### **How Weathering and Erosion Work Together**

Weathering and erosion often work hand in hand. Weathering breaks down rocks into smaller pieces, and then erosion carries those pieces away. For example, rainwater can

chemically weather rocks, making them weaker. Then, when a river flows through the area, it can easily erode the weakened rocks and carry them downstream.

1. What is weathering?
  - A) The process of breaking down rocks and minerals on the Earth's surface into smaller pieces.
  - B) The process of carrying away weathered rocks and soil.
  - C) The process of freezing and thawing rocks.
  - D) The process of creating sand dunes at the beach.
2. What causes physical weathering?
  - A) Freezing and thawing of water in cracks of rocks.
  - B) Acidic rainwater reacting with rocks.
  - C) Wind carrying away loose soil.
  - D) Glaciers moving over the land.
3. How does chemical weathering differ from physical weathering?
  - A) Chemical weathering changes the chemical composition of rocks, while physical weathering does not.
  - B) Physical weathering changes the chemical composition of rocks, while chemical weathering does not.
  - C) Chemical weathering only occurs with acidic rainwater, while physical weathering occurs with freezing and thawing.
  - D) Physical weathering only occurs with acidic rainwater, while chemical weathering occurs with freezing and thawing.
4. What is erosion?
  - A) The process of breaking down rocks and minerals on the Earth's surface.
  - B) The process of carrying away weathered rocks and soil.
  - C) The process of freezing and thawing rocks.
  - D) The process of creating sand dunes at the beach.
5. How does wind cause erosion?
  - A) By picking up rocks and soil and carrying them away.
  - B) By chemically breaking down rocks.
  - C) By freezing and thawing rocks.
  - D) By carrying away soil and rocks in rivers.
6. Which force of erosion is responsible for forming valleys and canyons?
  - A) Wind erosion
  - B) Water erosion
  - C) Glacial erosion
  - D) Chemical erosion
7. How do weathering and erosion work together?
  - A) Weathering carries away the smaller pieces of rocks and soil.
  - B) Erosion breaks down rocks into smaller pieces.

- C) Weathering and erosion are two completely separate processes.
- D) Weathering and erosion work hand in hand, with weathering breaking down rocks and erosion carrying the pieces away.

8. What can chemically weather rocks?

- A) Freezing and thawing of water in cracks of rocks.
- B) Acidic rainwater reacting with rocks.
- C) Wind carrying away loose soil.
- D) Glaciers moving over the land.

9. How do glaciers contribute to erosion?

- A) By picking up rocks and soil and carrying them away.
- B) By chemically breaking down rocks.
- C) By freezing and thawing rocks.
- D) By slowly moving over the land and carrying rocks and soil along.

10. What are sand dunes formed by?

- A) Wind erosion
- B) Water erosion
- C) Glacial erosion
- D) Chemical erosion

## ANSWERS & EXPLANATIONS

1. A - The process of breaking down rocks and minerals on the Earth's surface into smaller pieces.
  - Weathering is the process of breaking down rocks and minerals on the Earth's surface into smaller pieces.
2. A - Freezing and thawing of water in cracks of rocks.
  - Physical weathering occurs when rocks are broken down into smaller pieces without changing their chemical composition. Freezing and thawing of water in cracks of rocks is an example of physical weathering.
3. A - Chemical weathering changes the chemical composition of rocks, while physical weathering does not.
  - Chemical weathering happens when rocks are broken down through chemical reactions and changes the chemical composition of rocks. Physical weathering, on the other hand, does not change the chemical composition of rocks.
4. B - The process of carrying away weathered rocks and soil.
  - Erosion is the process of carrying away the smaller pieces of rocks and soil that have been weathered.
5. A - By picking up rocks and soil and carrying them away.
  - Wind can carry away loose soil and sand from one place to another.
6. B - Water erosion
  - Valleys and canyons are mainly formed by water erosion. Rivers and streams can carry away soil and rocks from their original location and deposit them in a different place, forming these features over time.
7. D - Weathering and erosion work hand in hand, with weathering breaking down rocks and erosion carrying the pieces away.
  - Weathering breaks down rocks into smaller pieces, and then erosion carries those pieces away. They often work together to shape the Earth's surface.
8. B - Acidic rainwater reacting with rocks.
  - Acidic rainwater can react with certain types of rocks, such as limestone, and dissolve them, which is an example of chemical weathering.
9. D - By slowly moving over the land and carrying rocks and soil along.
  - Glaciers are huge masses of ice that move slowly over the land. As they move, they pick up rocks and soil and carry them along, contributing to erosion.
10. A - Wind erosion

- Sand dunes are formed by wind erosion, where wind carries sand and piles it up in one spot, creating the dune.

