

**Intermediate Science 7**  
**Unit 4: Earth Crust**  
**TOPIC 4: Weathering, Erosion and Soil**



Student Name \_\_\_\_\_

**Weathering** is the process of breaking or wearing down rocks.

There are TWO different types of weathering:

**Mechanical Weathering :** processes that break a rock or mineral into smaller pieces without altering its composition. There are three types of mechanical weathering:

1. Frost (Ice) Wedging: Process in which water freezes in the cracks of rock and wedges (pushes) it apart because water expands when it freezes. Occurs where there are frequent freezes and thaws.
2. Plants and Animals: Plant roots can split rock Also known as: “Root pry” or “Root action” Animals dig holes ,breaks up rocks .
3. Abrasion: The wearing away of rock material by grinding action Usually caused by sediment in Wind, Water, and Glaciers

**Chemical Weathering:** Chemical reactions occur with rocks that create new substances. Acid rain will chemically change rocks like salt, gypsum and limestone.

**Erosion:** is the wearing away and movement of weathered materials from place to place

There are 4 natural causes of erosion ( 2 G’s and 4 W’s):

- Gravity
- Glaciers
- Water
- Wind
- Waves

Please note that weathering and erosion are two different things. Many people mistakenly say erosion when they really mean weathering.

Weathering = breakdown.

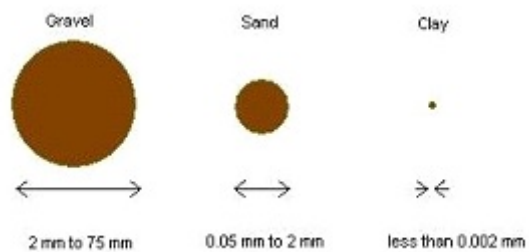
Erosion = transport



**Soil:**

- Soil includes loose weathered rock, and organic material in which plant roots can grow.
- The first step in soil formation is the weathering of parent rock into smaller pieces.
- Eventually, very small particles from parent rock are mixed in with organic matter to form soil.
- The type of sediment in soil depends on what rocks are in the area. This helps to explain why soils differ from place to place.
- Can take thousands of years to form
- Soil can be classified according to such characteristics as:

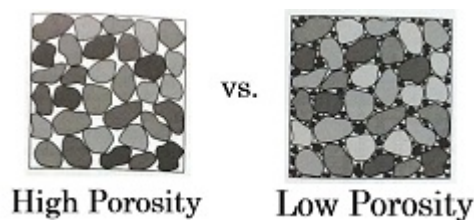
1. Size Of Particles



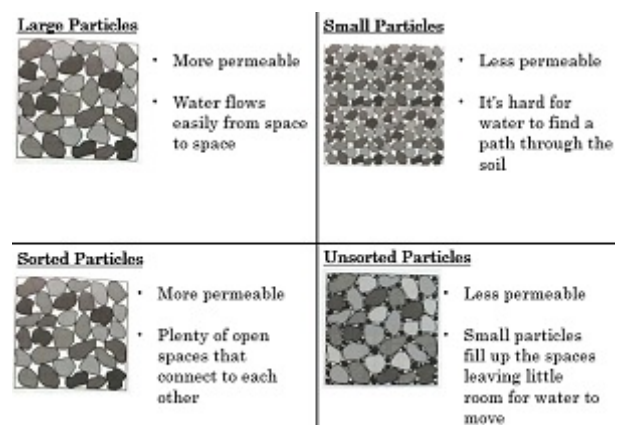
2. Texture indicates the relative content of particles of various sizes, such as sand, silt and clay in the soil. Soil texture can be classified as:

- Course Texture: These soils have a sandy/ gravelly texture. They feel gritty and can roll between your fingers. Grains can be seen with the naked eye.
- Medium Texture: Also called loam. Composed of sand, silt and clay in nearly equal proportions.
- Fine Texture: Made up of clay. Feel greasy or sticky. Have little texture when wet

3. Porosity: The amount of empty space in a soil or rock.



4. Permeability: A measure of the ease with which liquids and gases pass through a soil or rock.



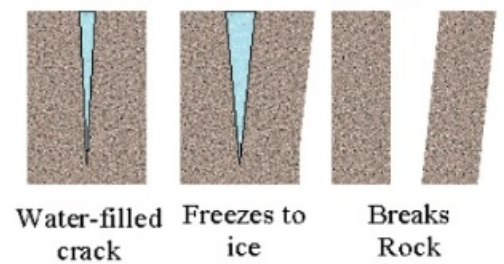
## PART A: MULTIPLE CHOICE

*Instructions: Shade the letter of the correct answer on the computer scorable answer sheet provided.*

1. Which of the following is true for weathering?
- (A) Picking up of rock fragments.
  - (B) Movement of rock fragments.
  - (C) Mechanical and chemical breakup of rocks.
  - (D) Formation of rocks by the action of weather.

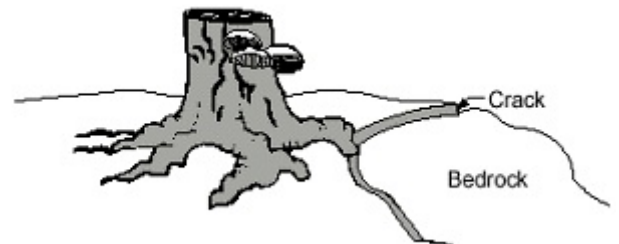
2. What is shown in the picture below?

- (A) Abrasion
- (B) Action of plants and animals
- (C) Chemical weathering
- (D) Ice/Frost Wedge



3. What is shown in the picture below?

- (A) Abrasion
- (B) Action of plants and animals
- (C) Chemical weathering
- (D) Ice/Frost Wedge



4. What weathering process involves the wearing away of rock material by grinding action caused by sediments in wind, water, and glaciers

- (A) Abrasion
- (B) Action of plants and animals
- (C) Chemical weathering
- (D) Ice/Frost Wedge

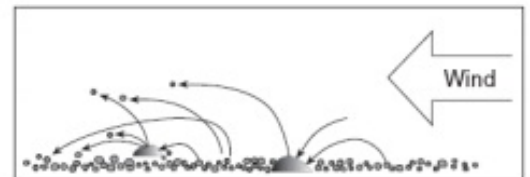
5. Which of these is not a cause of mechanical weathering?

- (A) Ice
- (B) Moss
- (C) Tree roots
- (D) Water

6. Which one of these things is not a cause of weathering?

- (A) Glacier
- (B) Soil
- (C) Water
- (D) Wind

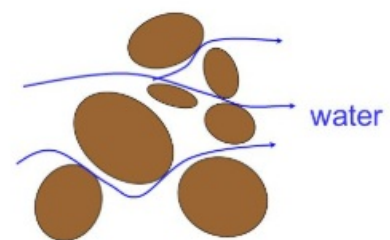
7. After chemical weathering , what happens to the chemical makeup of the weathered rock?
- (A) The rock stays the same
  - (B) The rock changes form
  - (C) The rock gets larger
  - (D) The rock disappears
8. What is the difference between mechanical and chemical weathering
- (A) The length of time each takes to break up a rock
  - (B) That each occurs only in certain parts of the world
  - (C) The way they affect the composition of a rock
  - (D) That only chemical weathering involves water
9. Which of the following is example of chemical weathering?
- (A) Grinding away of rock particles by wind or water
  - (B) Lichens produce acids that break rocks down
  - (C) Roots of a tree breaks a rock apart
  - (D) Water freezing in a rock craves
10. What term describes the process by which small pieces of rocks and soil are carried away to new locations?
- (A) Erosion
  - (B) Permeability
  - (C) Porosity
  - (D) Weathering
11. The diagram below shows sand particles being moved by wind. What word would you use to describe this?
- (A) Erosion
  - (B) Permeability
  - (C) Porosity
  - (D) Weathering



12. What is the main cause of erosion on Earth?
- (A) Living organisms
  - (B) Gravity
  - (C) Water
  - (D) Wind
13. What do we call large ice formations that move slowly and form valleys and shape mountains through erosion?
- (A) Glaciers
  - (B) Gravities
  - (C) Icebergs
  - (D) Waves
14. What is soil made of?
- (A) Mineral fragments
  - (B) Organic matter
  - (C) Weathered rock
  - (D) All of these

15. What is the first step in making soil
- (A) Erosion
  - (B) Rain
  - (C) Gravity
  - (D) Weathering of parent rock
16. Which of the following is the largest particles in soil
- (A) Clay
  - (B) Gravel
  - (C) Pebbles
  - (D) Sand
17. Which of the following refers to the relative content of particles of various sizes, such as sand, silt and clay in the soil?
- (A) Particle size
  - (B) Permeability
  - (C) Porosity
  - (D) Texture
18. Which of the following refers to the amount of empty space in a soil or rock?
- (A) Particle size
  - (B) Permeability
  - (C) Porosity
  - (D) Texture
19. Which of the following is the measure of the ease with which liquids and gases pass through a soil or rock.
- (A) Particle size
  - (B) Permeability
  - (C) Porosity
  - (D) Texture
20. What is shown in the picture below?

- (A) Particle size
- (B) Permeability
- (C) Porosity
- (D) Texture



**PART B : MATCHING****[5]**

Match each thermometer on the left with the best Descriptor on the right. Each Descriptor may be used only once. Place your answer on the scantron

Term	Descriptor
21. ___ Weathering	A. A measure of the ease with which liquids and gases pass through soil or rock
22. ___ Erosion	B. A mixture of weathered rock, organic matter, mineral fragments, water and air
23. ___ Soil	C. The process in which rocks are broken down and sediment is formed by mechanical and chemical forms
24. ___ Porosity	D. The process of moving soil and rocks from one place to another.
25. ___ Permeability	E. The amount of empty space on soil or rock

Tell whether each example is Chemical (A), Mechanical (B) weathering.

26. \_\_\_\_\_ Baseball-sized hail began to smash against the hillside breaking apart the soil.
27. \_\_\_\_\_ Salt water enters a rock, water dries, salt crystals grow and wedge the rock apart.
28. \_\_\_\_\_ Minerals in rocks dissolve forming stalactites/stalagmites in a cave.
29. \_\_\_\_\_ The tree roots are causing the concrete slabs of a sidewalk to break apart.
30. \_\_\_\_\_ The wind and rain has caused damage to the tombstones in a cemetery.
31. \_\_\_\_\_ A seed has found its way into a rock and a plant is beginning to split the small stone.
32. \_\_\_\_\_ The pollution has recently been high, and acid rain is destroying some monuments.
33. \_\_\_\_\_ A combination of fungi and algae grow upon the surface of a rock slowly “eating it away”.
34. \_\_\_\_\_ Flooding has caused a landslide and part of the hillside has been affected
35. \_\_\_\_\_ The salty water of the ocean is eating away the concrete support posts of the pier.

**PART C: WRITTEN RESPONSE**

1. Can you tell the difference between weathering and erosion? Place a check mark (✓) in the one that you think is correct. (Some could be both)

Example	Weathering	Erosion
The Sun's heat cracking a rock		
Wind blowing sand from the beach		
Acid rain dissolving marble statues		
Avalanche!!!!		
Skateboarders wearing away tracks on cement walls		
The expansion of ice on a cold night breaking up a road surface		
A storm at sea carrying away the beach		
A river changing its course and cutting into a field		

3. What are three causes of mechanical weathering?

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4. What are three causes of chemical weathering?

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5. What is the most powerful agent of erosion?

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6. How do plants contribute to  
(a) mechanical weathering?

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- (b) chemical weathering?

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7. A hard candy dissolves much faster in your mouth if you first break it into pieces. How is this process like

(a) mechanical weathering?

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(b) chemical weathering?

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8. What are the main components of soil?

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9. What is porosity?

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10. What is permeability?

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11. Which rock sediment has the smallest particle size?

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