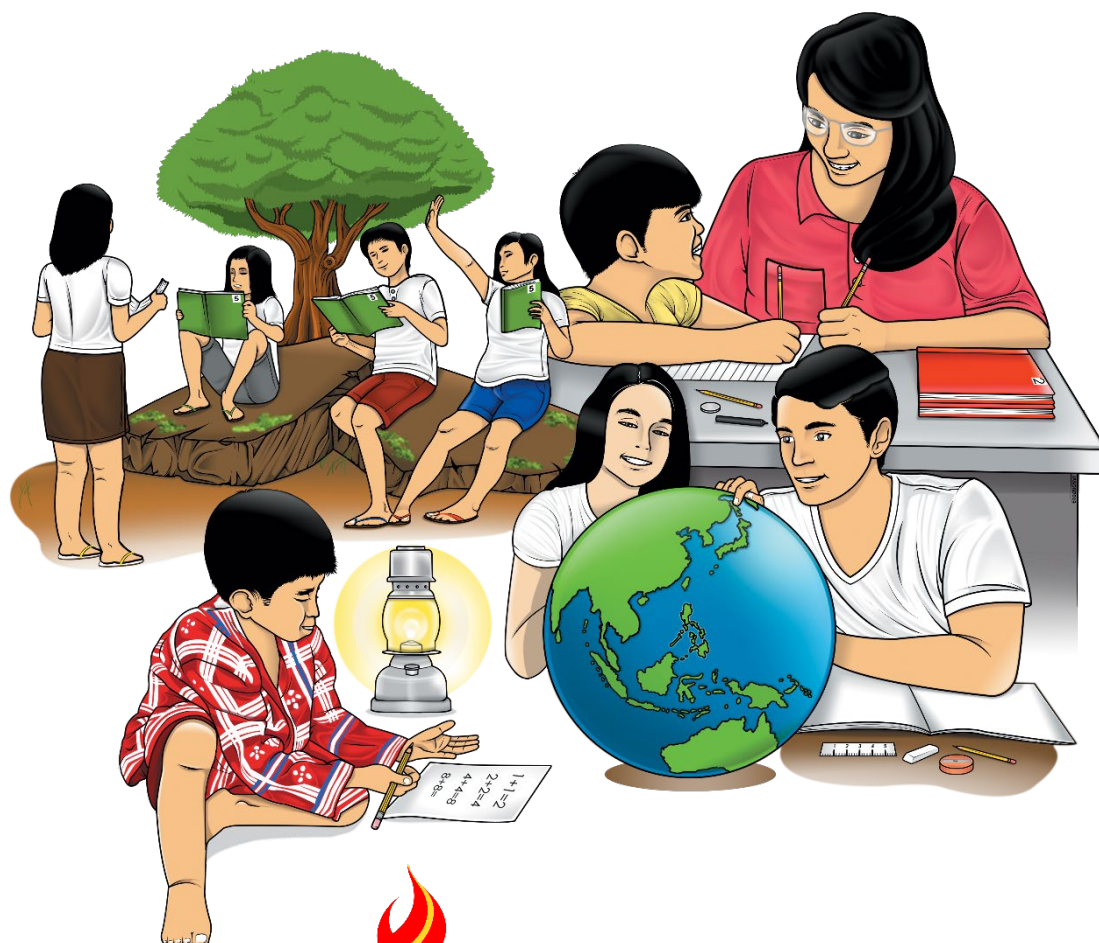


Earth and Life Science

Quarter 1 – Module 5:

Exogenic Processes



Earth and Life Science
Alternative Delivery Mode
Quarter 1 – Module 5: Exogenic Processes
First Edition, 2021

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Earth and Life Science

Quarter 1 – Module 5:

Exogenic Processes

Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



What I Need to Know

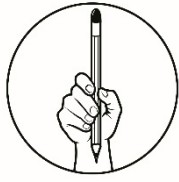
This module was designed and written with you in mind. It is here to help you master interaction and interdependence in the ecosystem. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

The module covers:

- Lesson 1 – Exogenic Processes

After going through this module, you are expected to:

1. describe how rocks undergo weathering;
2. identify the agents of erosion; and
3. explain how the products of weathering are carried away by erosion and deposited elsewhere.



What I Know

Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. What is the process in which a plant grows into the base of a stone monument and creating a crack on it?
 - A. chemical weathering
 - B. freezing
 - C. mechanical weathering
 - D. thawing
2. What is the type of chemical weathering that rapidly dissolves crystals of halite or rock salt to form a solution?
 - A. abrasion
 - B. dissolution
 - C. hydrolysis
 - D. oxidation
3. What type of weathering occurs when stalactites and stalagmites on caves are formed?
 - A. chemical weathering
 - B. freezing and thawing
 - C. mechanical weathering
 - D. thermal and pressure change
4. What chemical reaction is exhibited when water reacts with one mineral to form a new mineral like feldspar?
 - A. abrasion
 - B. dissolution
 - C. hydrolysis
 - D. oxidation
5. What chemical reaction causes rust to form?
 - A. abrasion
 - B. dissolution
 - C. hydrolysis
 - D. oxidation
6. What factor causes the breakdown of rocks by friction and impact?
 - A. abrasion
 - B. burrowing
 - C. frost wedging
 - D. pressure
7. Which of the following human activities may NOT result to the movement of sediments from one place to another?
 - A. building a highway
 - B. washing the dishes
 - C. developing new athletic field
 - D. cultivating soil and gardening

8. Which of the following is NOT an agent of erosion?
- A. glacier
 - B. gravity
 - C. rocks
 - D. wind
9. Which of the following does NOT describe the advantage of wind barrier such as row of trees along the edge of field?
- A. conserve moisture
 - B. trap the blowing wind
 - C. increases the effects of wind erosion
 - D. protect crops from the effects of wind
10. Which process exhibits the breaking down of rocks on the earth's surface or cause changes in its composition?
- A. deposition
 - B. erosion
 - C. mass wasting
 - D. weathering
11. Which of the following processes does NOT cause physical weathering?
- A. burrowing of animals
 - B. freezing and thawing
 - C. oxidation
 - D. temperature and pressure
12. Which of the following processes does NOT cause chemical weathering?
- A. dissolution
 - B. hydrolysis
 - C. oxidation
 - D. temperature
13. Which of the following processes of chemical weathering occur in the formation of stalactites and stalagmites?
- A. dissolution
 - B. hydration
 - C. hydrolysis
 - D. oxidation
14. What statement is NOT correct about dissolution?
- A. It happens when elements react with atmospheric oxygen.
 - B. Rocks and minerals dissolve rapidly when water is either acidic or basic.
 - C. Limestone composed of calcite is weathered and develops caves through time.
 - D. The crystal of halite dissolves rapidly and completely in water to form a solution.
15. What is the composition of the soil?
- A. clay, dust, and sand
 - B. grains, organic matter, H₂O, and gas
 - C. rock, dust, sand, water, and gas
 - D. silt, dust, sand, and water

Lesson

1

Exogenic Processes

The earth's surface is composed of water and landmasses. The solid portion is made out of rocks and minerals that could experience changes either physically or chemically. The weathered materials are transported by different agents from one place to another and will settle down in a particular area. These progressions that happen are achieved by forms called exogenic processes. It includes weathering, erosion, and deposition.



What's In

Activity 1

Organize the disordered letters. Describe each term briefly.

S	K	O	R	C
---	---	---	---	---

E	I	G	N	O	S	U
---	---	---	---	---	---	---

E	I	M	N	D	S	E	T	S
---	---	---	---	---	---	---	---	---

N	A	I	O	T	G	D	I	S	I	N	T	E	R
---	---	---	---	---	---	---	---	---	---	---	---	---	---

P	O	I	C	M	O	N	I	O	T	S	D	E
---	---	---	---	---	---	---	---	---	---	---	---	---



Notes to the Teacher

This module will help you understand the concepts about interaction and interdependence in the ecosystem. All parts are comprised of activities. Be guided with the instruction on how you will answer each. Expectedly, you will meet the target at the end of the module.



What's New

Activity 2

Weathering refers to the process of disintegration and decomposition of rocks. There are two types of weathering: mechanical weathering and chemical weathering. This activity will allow learners to differentiate physical changes from chemical changes.

Learners will follow the following instructions:

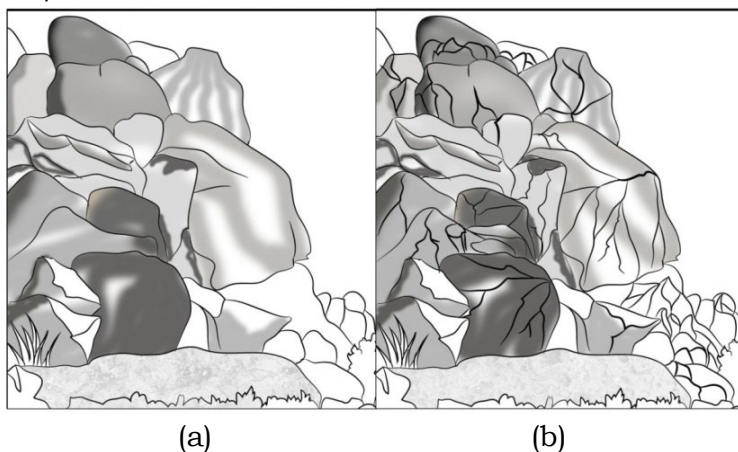
1. Prepare the needed materials: two pieces of paper and match.
2. Tear one paper, observe, and record your answer.
3. Burn the other paper (with teacher supervision), and observe.
4. Identify the changes that take place after tearing and burning of paper.

Tearing of paper	Burning of paper
Before:	Before:
After:	After:

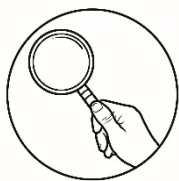
What is the difference between physical change and chemical change?

Activity 3

Spot the difference/s.



1. Do you see any similarities and differences shown in the illustration above?
Can you describe how illustration (a) is similar to illustration (b)?
2. How is illustration (a) different to illustration (b)?



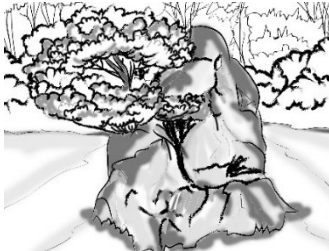
What is It

Mechanical weathering or physical weathering is the breakdown of rocks into pieces without any change in its composition. In this process, the size and shape of rocks changes and this occurs because of the following factors shown in the table below.

Factors	Description
Pressure	Due to tectonic forces, granite may rise to form mountain range. After the granite ascends and cools, the overlying rocks and sediments may erode. At the point when the pressure diminishes, the rock expands, cools, and became brittle and fractured.
Temperature	Rocks expand and are fractured when expose to high temperature. However, if the temperature drops to 0°C (freezing point of water), it also expands and causes fracture.
Frost Wedging	Generally, rocks have fracture in its surface and when water accumulates in the crack and at that point freezes, the ice expands and breaks the rock apart.
Abrasion	The breakdown of rocks is caused by impact and friction. This primarily occurs during collision of rocks, sand, and silt due to current or waves along a stream or seashore causing sharp edges and corners to wear off and become rounded.
Organic Activity	The roots grow causing penetration into the crack, expand, and in the long run, break the rock.
Human Activities	Activities such as digging, quarrying, denuding forests and cultivating land contribute to physical weathering.
Burrowing Animals	Animals like rats, rabbits and squirrels excavate into the ground to create a space for habitation.

Activity 4

Identify the factors of physical weathering shown in each picture.



Reference: <https://www.abovetopsecret.com/forum/thread 1048245/pg1>

1. _____



Reference: <https://www.indiamart.com/venusdiamondinfra/mining-crusher.html>

2. _____



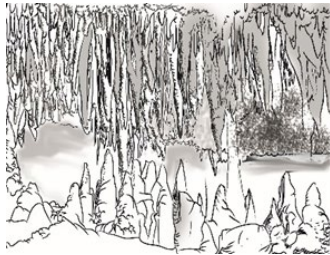
Reference: <https://pl.pinterest.com/pin/435371488970476513/>

3. _____

In chemical weathering, there are changes in the composition of rocks due to the chemical reactions presented below.

Chemical Reactions	Description
Dissolution	It occurs in specific minerals which are dissolved in water. Examples of these minerals are Halite (NaCl) and Calcite (CaCO ₃). The formation of stalactites and stalagmites in caves are brought about by this chemical reaction.
Hydrolysis	Rock-forming minerals like amphibole, pyroxene, and feldspar react with water and form different kinds of clay minerals.
Oxidation	It is the response of oxygen with minerals. If the iron oxidizes, the mineral in rocks decomposes. Rusting is an example of this chemical reaction.

Analyze each picture. Identify the chemical reaction that causes chemical weathering.



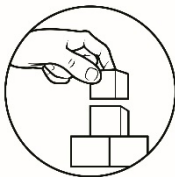
Reference: <http://portalgeograf.blogspot.com/2019/11/>

4. _____



Reference: <https://www.pinterest.ph/allaboutthegard/garden-statues/>

5. _____



What's More

Weathering is an important process in the formation of soil. Soil is a mixture of grains, organic matter, H₂O, and gas.

Erosion is the separation and removal of weathered rocks due to different agents like water, wind, and glacier that causes transportation of the material to where they are deposited. Plants, animals, and humans play an important role in the erosional process.

Activity 5

Answer the following questions:

1. How do animals cause erosion?

2. How do human activities affect the rate of erosion?

Activity 6

Draw or cut and paste pictures of the agents of erosion. Explain how each of them causes erosion.

A. _____ _____ _____ _____ _____ _____ _____	B. _____ _____ _____ _____ _____ _____ _____	C. _____ _____ _____ _____ _____ _____ _____

The movement of sediments downslope under the influence of gravity is called mass wasting. The examples of this are fall, slide, avalanche, and flow. On the other hand, deposition is the process in which the weathered materials carried out by erosion settle down in a particular location.

Activity 7

Search for the definition of the following types of mass movement.

1. Fall

2. Slide

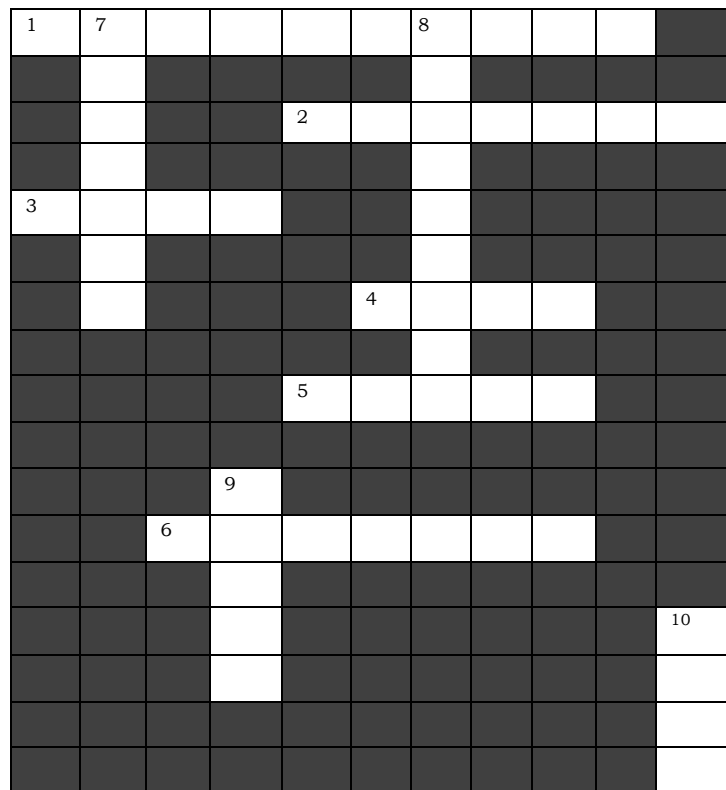
3. Flow

4. Spread

5. Topple

Activity 8. Crossword puzzle

Complete the puzzle by identifying the terms being described across and down that refer to the agents of exogenic processes.



ACROSS

1. It refers to the aggregation or accumulation of weathered sediments to create different landforms.
2. It is associated with many agents because it pulls the materials downslope.
3. It is a major erosional agent on areas on Earth's surface that experience both limited precipitation and high temperature.
4. It is one of the components of lithosphere.
5. It has the power to move large particles of weathered material than wind does.
6. It has the capacity to carry huge rocks and piles of debris over great distances.

DOWNWARD

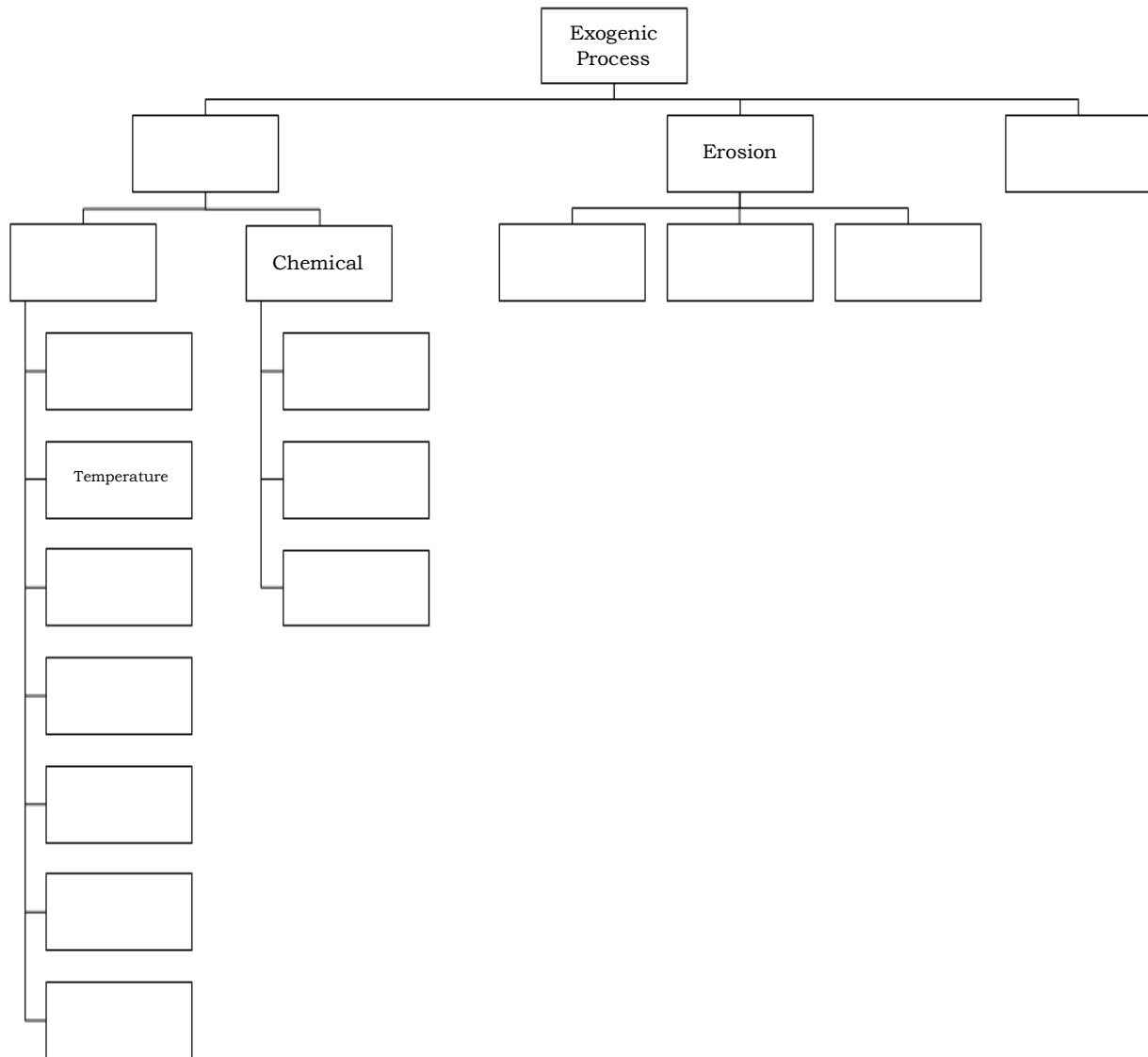
7. It is the process that transports Earth's materials from one place to another.
8. It is the process wherein materials are carried away.
9. It refers to the downslope movement of weathered materials along a well-defined surface.
10. It refers to the movement of saturated materials downslope like liquid.



What I Have Learned

Activity 9

Complete the concept map using the words below.



Water
Hydrolysis
Burrowing
Physical

Organic Activity
Deposition
Dissolution
Human Activities

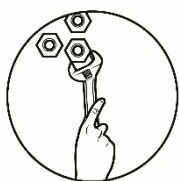
Weathering
Wind
Abrasion
Oxidation

Frost wedging
Glacier
Pressure

Activity 10

Fill in the blanks with the correct answer.

1. The process of breaking down rocks either physically or chemically is called _____.
2. _____ is the breakdown of rocks into pieces without any change in its composition.
3. _____ is the response of oxygen with minerals.
4. _____ is a mixture of grains, organic matter, H₂O, and gas.
5. _____ is the breakdown of rocks that is caused by impact and friction.
6. The change in the composition of rocks is called _____.
7. The separation and removal of weathered rocks due to different agents like water, wind, and glacier is called _____.
8. The movement of sediments downslope under the influence of gravity is _____.
9. The process in which the weathered materials carried out by erosion and gravity settle down in a particular location is called _____.
10. _____ is a chemical reaction wherein rock forming minerals react with water and form different kinds of clay minerals.



What I Can Do

Activity 11

Answer the following questions.

1. Why soil is an essential component of the earth's crust?

2. What is the effect of soil erosion?

3. How will you protect your community against soil erosion?



Assessment

Multiple Choice

Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Which of the following process does NOT alter the composition of material?
 - A. chemical weathering
 - B. dissolution
 - C. hydrolysis
 - D. mechanical weathering
2. What type of weathering is exhibited when the rocks are fractured, cracked, and broken down into small pieces?
 - A. chemical weathering
 - B. oxidation
 - C. physical weathering
 - D. pressure change
3. Which of the following is an example of oxidation?
 - A. rusting of iron
 - B. halite dissolves in water
 - C. feldspar decomposes to form clay
 - D. stalactites and stalagmites formation
4. Which activity does NOT facilitate erosion?
 - A. kaingin
 - B. loss of plant cover
 - C. planting
 - D. steepening of slope
5. Which diagram exhibits the most ideal arrangement for exogenic processes?
 - A. erosion – sediments – weathering – transport- deposition
 - B. sediments – erosion – weathering – transport
 - C. sediments – transport – erosion – weathering
 - D. weathering – erosion – transport-deposition
6. What term refers to the removal and transport of weathered material from one place to another?
 - A. deposition
 - B. erosion
 - C. sublimation
 - D. weathering
7. Which of the following is NOT an agent of erosion?
 - A. glacier
 - B. rocks
 - C. water
 - D. wind

8. Which of the following cannot be considered as a role of gravity in erosion?
- A. It moves glaciers down slope.
 - B. It loosens the land materials.
 - C. In mountains, it moves down large slabs of rocks.
 - D. It acts as agents of mass wasting like landslides, fall, mudflows, and avalanches.
9. What term refers to the process wherein rocks break down into pieces?
- A. deposition
 - B. erosion
 - C. mass wasting
 - D. weathering
10. What process of chemical weathering is involved when water reacts with one mineral to form a new mineral like feldspar into clay?
- A. dissolution
 - B. hydrolysis
 - C. oxidation
 - D. pressure
11. What type of mechanical weathering occurs when freezing of water and repeated thawing in cracks of rocks?
- A. abrasion
 - B. frost wedging
 - C. oxidation
 - D. solution
12. Which of the following does NOT cause chemical changes in the composition of rocks?
- A. abrasion
 - B. dissolution
 - C. hydrolysis
 - D. oxidation
13. What chemical reaction takes place during rusting of iron?
- A. abrasion
 - B. dissolution
 - C. hydrolysis
 - D. oxidation
14. Which of the following processes cannot be considered as exogenic?
- A. deposition
 - B. erosion
 - C. eruption
 - D. weathering
15. What is the process by which sediments settle down in a particular area?
- A. deformation
 - B. deposition
 - C. transport
 - D. weathering

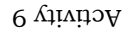


Additional Activities

Compose a poem/song that will describe how the products of weathering are carried away by erosion and deposited elsewhere. Refer to the table below for the rubrics.

Rubrics:

Criteria	Exemplary 4	Accomplished 3	Developing 2	Beginning 1	Score
Creativity Originality	Output is creative and original. It is evident that the learners put thought and uniquely conveyed their ideas and emotions.	Output is thoughtful and creative. Ideas may be revisited, but the overall product is carefully conceptualized.	Output is creative, but appears to be rushed.	Output appears to be thoughtless or rushed. Work is very repetitive, and ideas are unoriginal.	
Content	Output maintains a consistent idea that clearly and effectively communicates the learner's attitude toward the subject.	Output maintains a consistent idea that usually communicates the learner's attitude toward the subject.	Output maintains a consistent idea but does not effectively communicate the learner's attitude toward the subject.	Output does not maintain a consistent or clear idea.	
Organization	Output has a strong and clear organization.	Output has a clear organization.	Output has minimal organization.	Output has confusing organization.	



Activity 8

Activity	Answer may vary among students.
Activity 6	Answer may vary among students.
Activity 7	Answer may vary among students.

1. Weathering
2. Mechanical weathering
3. Oxidation
4. Soil
5. Abrasion
6. Chemical weathering
7. Erosion
8. Mass wasting
9. Deposition
10. hydrolysis

pa

Activity 11

Answer may vary among students' perceptions.

1. D
2. C
3. A
4. C
5. D
6. B
7. B
8. B
9. D
10. B
11. B
12. A
13. D
14. C
15. B

1.	C
2.	B
3.	A
4.	C
5.	D
6.	A
7.	B
8.	C
9.	C
10.	D
11.	C
12.	D
13.	A
14.	A
15.	B

Activity 1

Answer may vary among students' perceptions.

Activity 2
Answer may vary among students' perceptions.

Answer may vary among students' perceptions.

Activity 4

1. organic activity
2. human activity
3. burrowing of animals
- II-Chemical weathering
4. dissolution
5. hydrolysis

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