Earth and Life Science
Quarter 1 – Module 5: Exogenic Processes
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Earth and Life Science
Quarter 1 – Module 5:
Exogenic Processes
Introductory Message

For the facilitator:

Welcome to the Earth and Life Science Grade 11 Alternative Delivery Mode (ADM) Module on Module 5: Exogenic Processes!

This module was collaboratively designed, developed, and reviewed by educators both from public and private institutions to assist you, the teacher or facilitator in helping the learners meet the standards set by the K to 12 Curriculum while overcoming their personal, social, and economic constraints in schooling.

This learning resource hopes to engage the learners into guided and independent learning activities at their own pace and time. Furthermore, this also aims to help learners acquire the needed 21st century skills while taking into consideration their needs and circumstances.

In addition to the material in the main text, you will also see this box in the body of the module:

Notes to the Teacher

This contains helpful tips or strategies that will help you in guiding the learners.

As a facilitator, you are expected to orient the learners on how to use this module. You also need to keep track of the learners’ progress while allowing them to manage their own learning. Furthermore, you are expected to encourage and assist the learners as they do the tasks included in the module.
For the learner:

Welcome to the Earth and Life Science Alternative Delivery Mode (ADM) Module on Exogenic Processes!

The hand is one of the most symbolized parts of the human body. It is often used to depict skill, action, and purpose. Through our hands, we may learn, create, and accomplish many things. Hence, the hand in this learning resource signifies that you, as a learner, are capable and empowered to successfully achieve the relevant competencies and skills at your own pace and time. Your academic success lies in your own hands!

This module was designed to provide you with fun and meaningful opportunities for guided and independent learning at your own pace and time. You will be enabled to process the contents of the learning resource while being an active learner.

This module has the following parts and corresponding icons:

- **What I Need to Know**: This will give you an idea of the skills or competencies you are expected to learn in the module.

- **What I Know**: This part includes an activity that aims to check what you already know about the lesson to take. If you get all the answers correct (100%), you may decide to skip this module.

- **What’s In**: This is a brief drill or review to help you link the current lesson with the previous one.

- **What’s New**: In this portion, the new lesson will be introduced to you in various ways such as a story, a song, a poem, a problem opener, an activity or a situation.

- **What is It**: This section provides a brief discussion of the lesson. This aims to help you discover and understand new concepts and skills.

- **What’s More**: This comprises activities for independent practice to solidify your understanding and skills of the topic. You may check the answers to the exercises using the Answer Key at the end of the module.

- **What I Have Learned**: This includes questions or blank sentence/paragraph to be filled in to process what you learned from the lesson.
What I Can Do
This section provides an activity which will help you transfer your new knowledge or skill into real life situations or concerns.

Assessment
This is a task which aims to evaluate your level of mastery in achieving the learning competency.

Additional Activities
In this portion, another activity will be given to you to enrich your knowledge or skill of the lesson learned. This also tends retention of learned concepts.

Answer Key
This contains answers to all activities in the module.

At the end of this module you will also find:

References
This is a list of all sources used in developing this module.

The following are some reminders in using this module:

1. Use the module with care. Do not put unnecessary mark/s on any part of the module. Use a separate sheet of paper in answering the exercises.
2. Don't forget to answer What I Know before moving on to the other activities included in the module.
3. Read the instructions carefully before doing each task.
4. Observe honesty and integrity in doing the tasks and checking your answers.
5. Finish the task at hand before proceeding to the next.
6. Return this module to your teacher/facilitator once you are through with it.

If you encounter any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator. Always bear in mind that you are not alone.

We hope that through this material, you will experience meaningful learning and gain deep understanding of the relevant competencies. You can do it!
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 5 – 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.
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
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.

- SKORC
- EIGNOSU
- EIMNDSETS
- NAIOTGDISINTER
- POICMONTSDSDE
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 is the process of disintegration (physical) and decomposition (chemical) of rocks. Weathering is a process of breaking down rocks into small particles such as sand, clay, gravel and other fragments. 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), observe, and record your answer.
4. Based on your observation, differentiate the changes after tearing and burning.

<table>
<thead>
<tr>
<th>Tearing of paper</th>
<th>Burning of paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>Before</td>
</tr>
<tr>
<td>After</td>
<td>After</td>
</tr>
</tbody>
</table>

Activity 3
Spot the difference/s.

What can you say about the image? Do you see any difference?
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.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure</td>
<td>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.</td>
</tr>
<tr>
<td>Temperature</td>
<td>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.</td>
</tr>
<tr>
<td>Frost Wedging</td>
<td>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.</td>
</tr>
<tr>
<td>Abrasion</td>
<td>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.</td>
</tr>
<tr>
<td>Organic Activity</td>
<td>The roots grow causing penetration into the crack, expand, and in the long run, break the rock.</td>
</tr>
<tr>
<td>Human Activities</td>
<td>Activities such as digging, quarrying, denuding forests and cultivating land contribute to physical weathering.</td>
</tr>
<tr>
<td>Burrowing Animals</td>
<td>Animals like rats, rabbits and squirrels excavate into the ground to create a space for habitation.</td>
</tr>
</tbody>
</table>

Activity 4

I. Identify the factors of physical weathering shown in each picture.

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

<table>
<thead>
<tr>
<th>Chemical Reactions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissolution</td>
<td>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.</td>
</tr>
<tr>
<td>Hydrolysis</td>
<td>Rock-forming minerals like amphibole, pyroxene, and feldspar react with water and form different kinds of clay minerals.</td>
</tr>
<tr>
<td>Oxidation</td>
<td>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.</td>
</tr>
</tbody>
</table>

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

4. ____________________________

5. ____________________________
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
Illustrate the agents of erosion and explain how each of them causes erosion.

The movement of sediments downslope under the influence of gravity is called mass wasting. The example 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
Define the type of mass movement.

1. Fall

________________________________________________________________________
________________________________________________________________________

2. Slide

________________________________________________________________________
________________________________________________________________________

3. Flow

________________________________________________________________________
________________________________________________________________________

4. Spread

________________________________________________________________________
________________________________________________________________________

5. Topple

________________________________________________________________________
________________________________________________________________________
Activity 8
Crossword puzzle: Identify 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.
Activity 9
Complete the concept map using the words below.

What I Have Learned

Water
Hydrolysis
Burrowing
Physical
Glacier

Organic Activity
Deposition
Dissolution
Weathering
Human Activities

Chemical
Wind
Abrasion
Erosion
Temperature

Frost wedging
Exogenic Process
Pressure
Oxidation
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

Soil is an essential component of the earth’s crust. It enabled life to exist and provides the services necessary for human survival. What is the effect of soil erosion? What will you do to protect the community?

__________________________________________________________________________________
__________________________________________________________________________________
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__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
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. hyrolysis
   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**

Draw and explain how the products of weathering are carried away by erosion and deposited elsewhere.

**Explanation:**
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
Answer Key

What I Know

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. D
15. B

What's in

Activity 1
Answer may vary among students' perceptions.

ROCKS
- Igneous
- Sediments
- Disintegration
- Decomposition

What's New

Activity 2
Answer may vary among students' perceptions.

Activity 3
Answer may vary among students' perceptions.

What is It

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

What's More

Activity 5
Answer may vary among students' perceptions.

Activity 6
Answer may vary among students.

Activity 7
Answer may vary among students.

What I Have Learned

Activity 8

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

What I Can Do

Activity 9

1. Weathering
2. Mass wasting
3. Erosion
4. Soil
5. Oxidation
6. Chemical weathering
7. Deposition
8. Mass wasting

Assessment

Activity 10

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

Books


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