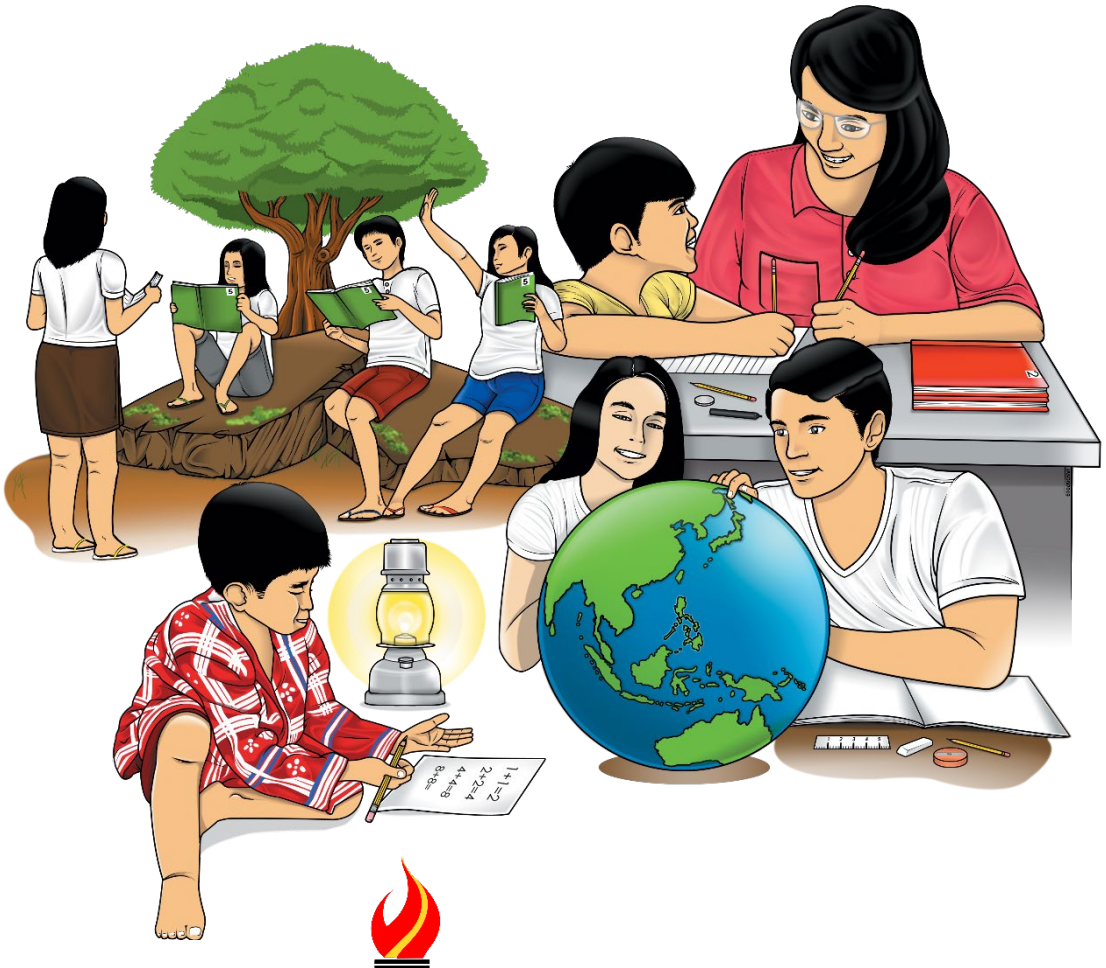
Senior High School

DepED
DEPARTMENT OF EDUCATION

Earth and Life Science

Quarter 1 – Module 3:
Minerals



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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

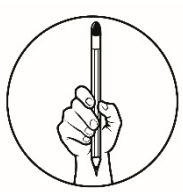
This module was designed and written with you in mind. It is here to help you master the properties of minerals. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow 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 is divided into two lessons, namely:

- Lesson 1 – Minerals and their Characteristics
  – Different Properties of Minerals

After going through this module, you are expected to:

1. identify the examples of minerals;
2. explain the different characteristics of minerals;
3. differentiate minerals based on their properties; and
4. develop awareness on the importance of minerals around us.



What I Know

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

1. Pyrite is a yellowish mineral that looks like gold and is commonly called fool's gold. What is the property of mineral exhibited by pyrite wherein it reflects light and with metallic look?
   A. Color
   B. Hardness
   C. Luster
   D. Streak
2. Quartz can break other than along planes of cleavage. What is the property of mineral that shows this characteristic?
   A. Cleavage
   B. Fracture
   C. Hardness
   D. Streak
3. Some minerals like mica has surfaces with planes of weak bonds in the crystals. Thus, its crystals can be peeled like layers of onion. What is the property exhibited by mica?
   A. Cleavage
   B. Fracture
   C. Hardness
   D. Tenacity
4. Which property refers to the resistance of minerals to scratching?
   A. Cleavage
   B. Fracture
   C. Hardness
   D. Luster
5. What are the building blocks of rocks and it is mostly found in the geosphere?
   A. elements
   B. minerals
   C. ore
   D. soil
6. In its powdered form, the mineral hematite is reddish. Which mineral property is described?
   A. color
   B. luster
   C. streak
   D. hardness
7. Which is not a property that can be used to identify a mineral?
   A. luster
   B. streak
   C. hardness
   D. opaque

8. What is the property of minerals that reflects light on its surface?
    A. Crystal structure
    B. color
    C. streak
    D. luster
9. Which refers to a naturally occurring, inorganic solid that has a definite crystalline structure and chemical composition?
    A. compound
    B. crystal
    C. mineral
    D. rocks
10. During the 1800's, miners can identify real gold from pyrite through biting the surface of the mineral. If a bite mark is exhibited, then the said mineral is considered real gold. What property is tested in this scenario?
    A. cleavage
    B. hardness
    C. luster
    D. streak color
11. What is a carbonate mineral that occurs in a different crystal form and is less common than either calcite or dolomite?
    A. aragonite
    B. calcite
    C. gypsum
    D. silica
12. What constitutes the size, shape and arrangement of mineral grains in a rock?
    A. permeable origin
    B. porosity
    C. cement
    D. texture
13. Which of the following is not a characteristic of a mineral?
    A. crystal structure
    B. naturally occurring
    C. organic
    D. solid
14. What refers to the tendency for a mineral to break along flat surfaces?
    A. cleavage
    B. hardness
    C. ductility
    D. tenacity
15. What is the solid form of a mineral produced by a repeating pattern of atoms?
    A. crystal
    B. density
    C. element
    D. fracture

Lesson 1 Minerals

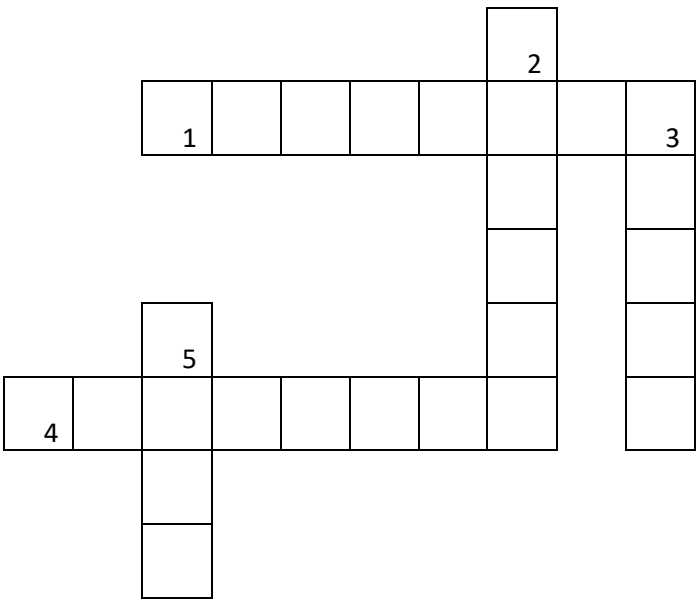
Minerals make up the rocks beneath your feet, the soil that supports plants, and the deep rock of Earth's mantle. Any thorough study of Earth must include an understanding of minerals. But it is not sufficient to study minerals isolated from the rest of the planet. Rather we can learn more by observing the ways that minerals interact with other Earth systems.

What's In

In this module, you are going to encounter activities that will enhance the teaching-learning process about minerals. You will deal with the characteristics of minerals and its exhibited properties. As you answer the questions, you will be expected to explore and understand the concepts about minerals, thus establishing awareness on the importance of minerals in the process.

CROSSWORD PUZZLE

Directions: Complete the crossword puzzle by identifying what is being described.



Across

1. It is solid inorganic substance of natural occurrence.

4. It is a mineral found in pencil.

Down

2. It is a mineral found in salt.

3. It has definite shape and volume.

5. It is also known as sodium chloride.

What's New

Identify the following objects below. Then using the Internet or other possible sources, determine what type of minerals are present in each of the presented objects in the table. Write your answers on a separate sheet of paper.

1. 	
2. 	
3. 	
4. 	
5. 	

We are using these products made from minerals daily. Graphite is the mineral used in wooden pencil. Halite is the mineral found in salt. Your cellphone is made up of different minerals. The cars that we drive, the roads that we travel, the building that we live in, are some examples of products derived from minerals.

Characteristics of Minerals

Arrange the jumbled letters to find the appropriate criteria to determine whether a material is classified as a mineral or not. Write your answers on a separate sheet of paper.

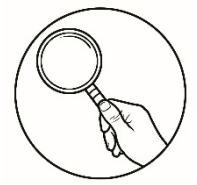
1. N L T L A U R Y N G O I R U C C
_____-a term which identifies minerals as part of Earth's natural processes.

2. C A I I R O G N
_____- means a substance is not a product of an organism but rather of Earth's physical processes.

3. S O U E N E G O M O H D I L O S
_____- have definite shape and volume.

4. E N I L L A T S Y R C E S R T R U C U T
_____- atoms are arranged in order of increasing pattern.

5. L M C E H A I N O I T O C M O P S I
_____- represented by chemical formula



What is It

What are Minerals?

Minerals are the building blocks of rocks. Mineralogists use the criteria to determine whether a material is classified as a mineral or not.

Characteristics of Minerals

1. naturally occurring- term which identifies mineral as part of earth's natural processes.
2. inorganic- means a substance is not a product of an organism.
3. homogeneous solid- minerals should have definite volume and rigid shape
4. definite chemical composition—represented by a chemical formula
5. orderly crystalline structure- atoms of minerals are arranged in an orderly and repeating pattern

Properties of Minerals

To identify minerals, mineralogists observe the following properties:

a. Color - mineral's color may change depending on the surface.
b. Streak - color of mineral in powdered form.
c. Hardness - minerals resistance to scratching

Mohs Scale of Hardness (Diamond is the Hardest with a scale of 10)

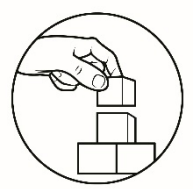
10 - Diamond
9 - Corundum
8 - Topaz
7 - Quartz
6 - Orthoclase
5 - Apatite
4 - Fluorite
3 - Calcite
2 - Gypsum
1 - Talc

d. Cleavage - mineral's resistance to being broken and fracture
e. Crystalline structure or habit
f. Diaphaneity/amount of transparency - ability to allow light to pass through it. This is affected by chemical makeup of the mineral sample.
g. Luster - how light is reflected off a surface
h. Tenacity- describes the minerals reaction to stress.
   - Brittleness- a mineral turns into powder
   - Malleability a mineral can be flattened by pounding with a hammer.
   - Ductility- A mineral can be stretched into wire.
   - Flexible but inelastic-Minerals are bent but they remain in the new position.
   - Flexible and elastic- Minerals are bent, and they bring back to their original position.
i. Sectility- ability of minerals to be sliced by a knife.

Did you know?
The Mohs scale (pronounced MOZE) was introduced in 1822. It originated when Friedrich Mohs chose ten minerals and assigned numbers to them based on the relative ease or difficulty in which stone can be scratched by another.

Prepare a list of minerals based on the Mohs Scale of Hardness and identify some products that make use of these minerals. Do this on a separate sheet

Minerals	***Products that contain the Mineral.***
1. Diamond	
2.Corundum	
3.Topaz	
4.Quartz	
5.Orthoclase	
6 Apatite	
7.Fluorite	
8.Calcite	
9. Gypsum	
10. Talc	



What's More

Understanding Science Words

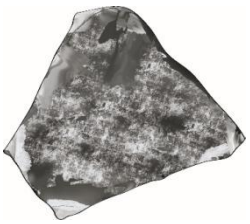
The pictures below show the common minerals and their properties or uses.

Identify other properties exhibited by the minerals. Choose your answer from the given choices.

BRITTLENESS	MALLEABILITY	DUCTILITY	LUSTER	SECTILITY

1. All true minerals can be drawn into wires

_____



2. Over all sheen of mineral

_____

3. A mineral can be hammered /flattened

_____

4. A mineral can be cut by a knife

_____

5. A mineral can be turned into powder

_____

What I Have Learned

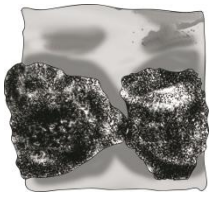
Fill in the Blanks

Identify the prominent properties exhibited by the following minerals. Fill in the blanks to form the appropriate term that best fits the described mineral property.

1. L __ __ T __ R
   a manner by which mineral reflects light.

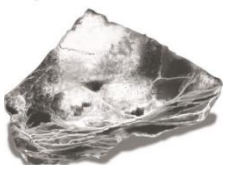
Pyrite - a. k a. fool's gold

2. S __ R __ __ K
   color of mineral in powdered form.



Hematite- both types leave the same powder

3. __ L __ __V __ G __
   tendency of mineral to break along flat surfaces



Mica crystal can be peel like layers of onion

4. __ R __ C __U __ __
the manner breaks other than along planes of cleavage.

Quartz creates smooth, curved surfaces

5. H __R __ __ __S__
resistance of mineral to scratching and it is the most commonly used property for identifying minerals.

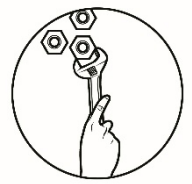
Diamond has a scale of 10

HARDNESS	FARCATURE	CLEAVAGE	STREAK	LUSTER

Matching Type

Match the properties of minerals in column A with the description of mineral properties in column B.

Column A	Column B
_____1. Mohs hardness scale	A. describes the mineral reaction to stress
_____2. Sectility	B. true color of mineral
_____3. Streak	C. a ranking of mineral from softest hardest
_____4. Crystal	D. ability of mineral to be cut by knife
_____5. Tenacity	E. repeating pattern in minerals in solid



What I Can Do

List some of the uses of minerals around us.

Minerals	***Uses***
1.Halite	Mineral found in table salt; as preservatives
2	
3	
4	
5.	

Reflect Upon

Upon knowing the value of minerals in our everyday life, as a student, how can you help in conserving and preserving the natural sources of these minerals? (For example, graphite is a mineral found in pencil). Write your answer on a separate sheet of paper.

_____
_____
_____
_____

Assessment

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

1. Pyrite is a yellowish mineral that looks like gold and is commonly called fool's gold. What is the property of mineral exhibited by pyrite wherein it reflects light and with metallic look?
    A. Color
    B. Hardness
    C. Luster
    D. Streak

2. Quartz can break other than along planes of cleavage. What is the property of mineral that show this characteristic?
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    B. Fracture
    C. Hardness
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3. Some minerals like mica has surfaces with planes of weak bonds in the crystals. Thus, its crystals can be peeled like layers of onion. What is the property exhibited by mica?
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    B. Fracture
    C. Hardness
    D. Tenacity

4. Which property refers to the resistance of mineral to scratching?
    A. Cleavage
    B. Fracture
    C. Hardness
    D. Luster

5.What are the building blocks of rocks and it is mostly found in the geosphere?

A. minerals
B. soil
C. ore
D. elements

6.In its powdered form, the mineral hematite is reddish. Which mineral property is best described?

A. color
B. luster
C. Streak
D. hardness

7. Which is not a property that can be used to identify a mineral?

A. luster
B. streak
C. hardness
D. opaque

8. What is the property of mineral that reflects light on its surface?

A. Crystal structure
B. color
C. streak
D. luster

9. What is a naturally occurring, inorganic solid that has a definite crystalline structure and chemical composition?

A. compound
B. crystal
C. mineral
D. rocks

10. During the 1800's, miners can identify real gold from pyrite through biting the surface of the mineral. If a bite mark is exhibited, then the said mineral is considered real gold. What property is tested in this scenario?

A. cleavage
B. luster
C. hardness
D. streak color

11. What is a carbonate mineral that occurs in a different crystal form and is less common than either calcite or dolomite?

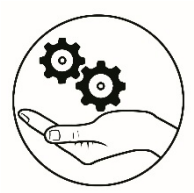
A. aragonite
B. gypsum
C. calcite
D. silica

12. What constitutes the size, shape and arrangement of mineral grains in a rock?
    A. permeable origin
    B. porosity
    C. cement
    D. texture

13. Which of the following is not a characteristic of a mineral?
    A. naturally occurring
    B. solid
    C. Organic
    D. crystal structure

14. What do you call tendency for a mineral to break along flat surfaces?
    A. cleavage
    B. hardness
    C. ductility
    D. tenacity

15. What is the solid form of a mineral produced by a repeating pattern of atoms?
    A. crystal
    B. density
    C. element
    D. fracture



Additional Activities

Putting together

Directions: Complete the concept map below.

PROPERTIES — MINERALS

1. Shows the true color
2. Resistance to scratching
3. Can be flatten into thin sheets
4. Show how light is reflected on the surface
5. Can be drawn into wires

Brainstorming

Assume you are a mineralogist that discovered a new type of mineral. To inform not only the academe but also the common people, you are then tasked to make an infographic that will state its characteristics, properties, and significance (whether economic, health and scientific). Present these important data through a concept map. Do this on a separate sheet of paper.

Finding the Perfect Match

Take at least 5 photos of minerals that are found in our day to day living. Identify the said minerals and state their unique characteristics and significance. A sample template is provided below. Do this on a clean sheet of bond paper.

Name: _____	Name: _____
Characteristics: _____	Characteristics: _____
_____	_____
Significance: _____	Significance: _____
_____	_____

Answer Key

What I Have Learned

1. Luster
2. Streak
3. Cleavage
4. Fracture
5. Hardness

Matching Type

1. C
2. D
3. B
4. E
5. A

What's More

1. Ductility
2. Luster
3. Malleability
4. Sectility
5. brittleness

Pre Test/Post test

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

What's New

A.1. Pencil
2.Table salt
3.Cellphone
4.Car
5.Bridge

B 1 Naturally occurring
2.Inorganic
3.Homogeneous solid
4.crystalline structure
5. chemical composition

Additional activities

1. Streak
2. Hardness
3. Malleability
4. Luster
5. Ductility

Post Test

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

What I can do

1. Answer may vary.

References

Thompson G.R. and Turk J. (2012).Introduction to Earth Science. Cengage Learning Asia PTE Ltd.(Philippine Branch)

Religioso, T. F. and Vengco, L. G.(2016) You and the Natural World: Earth and Life Science. Phoenix Publishing House

Olivar II, J.S., Rodolfo, R.S. and Cabria, H.B. (2016) Exploring Life Through Science Series: Earth Sence. Phoenix Publishing House

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