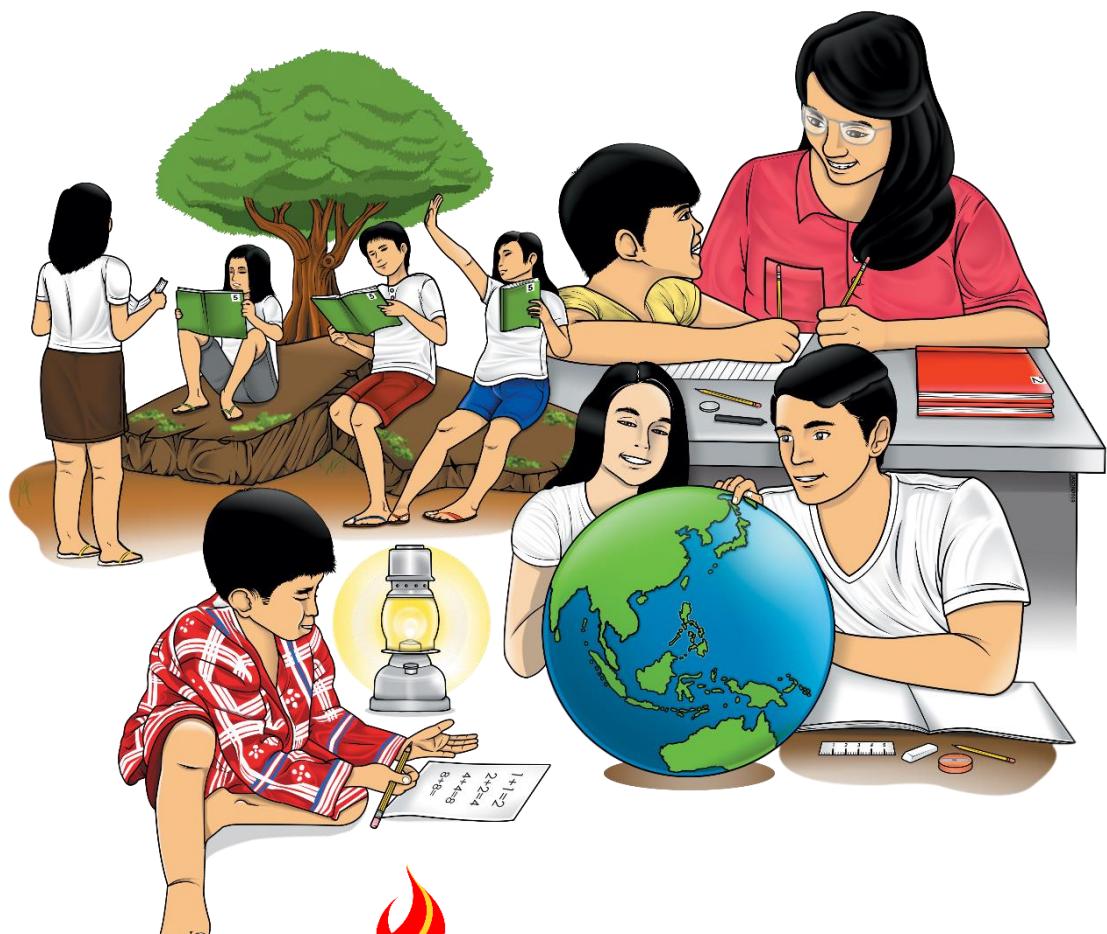


# Earth Science for Stem

## Quarter 1 – Module 5:

### Important Minerals to Society



**Earth Science for STEM  
Alternative Delivery Mode  
Quarter 1 – Module 5: Important Minerals to Society  
First Edition, 2021**

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**Senior High School**

# **Earth Science for STEM**

## **Quarter 1 – Module 5:**

### **Important Minerals to Society**

# **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.

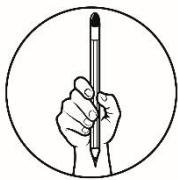


## ***What I Need to Know***

This module was designed and written with you in mind. It is here to help you master the nature of Biology. 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.

After going through this module, you are expected to:

1. identify the minerals important to society; and
2. explain the uses of the minerals that are important to society.



## **What I Know**

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

1. Which of the following demonstrates importance of minerals in construction?
  - a. Water is used in curing works that strengthen concrete.
  - b. Builders use wood materials like plywood in construction.
  - c. Concrete which contains minerals is used to lay down foundation in construction
  - d. All the above
2. How does society utilize quartz as one of the important minerals?
  - a. Medical practitioners use quartz in cancer diagnosis and treatment.
  - b. In agriculture, quartz is the most important components of fertilizer.
  - c. In constructions, engineers use glass made of quartz as window or wall panels.
  - d. In mining, quartz is used as cutting tool for other mineral extractions.
3. Why is Titanium an important mineral in medical industry?
  - a. It is non-allergenic metal which makes it suitable for prosthetics.
  - b. Its durability and weight make it an effective choice for surgical instruments.
  - c. Titanium's biocompatibility makes it safe for dental implants.
  - d. All of the above
4. How does toothpaste help in fighting tooth decay?
  - a. It contains calcium which is the building blocks of strong teeth.
  - b. Calcium carbonate found in toothpaste helps in removing plaque and stains.
  - c. Its active ingredient, Fluoride, protects teeth from acids that are formed in the mouth.
  - d. Sodium in Sodium lauryl sulfate which is also found in toothpaste protects teeth from gum disease.
5. In cosmetic products, colored mineral is very important. Which mineral is usually used for red lipstick?
  - a. Aluminite
  - b. Bauxite
  - c. Galena
  - d. Hematite
6. Desert rose is very important in making cement because:
  - a. It contains mineral gypsum.
  - b. It contains mineral limestone.
  - c. It contains carbonates mineral.
  - d. All the above

7. Why is chromium an important mineral in structural manufacturing industry?
- Compound of chromium is used in making pigments for paintings.
  - Chromium produces compound that is used in making plastics and textiles.
  - When mixed with iron, the alloy produced forms stainless steel that is resistant to rust.
  - All of the above
8. Zinc oxide is best barrier against ultraviolet rays. In which product is it most likely used?
- Antifungal cream
  - Lotion
  - Swimming pool water
  - Textile making
9. Which of the following elemental mineral is used by nuclear plant to generate electricity?
- Cobalt-200
  - Neptunium-180
  - Thorium-238
  - Uranium-235
10. Which of the following metals are mainly needed for aircraft components because they are light and durable?
- Aluminum
  - Chromium
  - Nickel
  - Steel
11. Which of the following are the uses of minerals?
- I. Development of industrial plants and machinery
  - II. Construction and housing settlements
  - III. Energy generation
  - IV. Medicinal system
- I and II
  - II and III
  - III and IV
  - I, II, III, and IV
12. Silicon is not a metal but is a good conductor. In which products do you expect Silicon to be used with this property?
- Fiber glass
  - Electric circuits
  - LCD displays
  - Rubber
13. Overtime soil loses its fertility due to farming activities. To maintain the productivity of farming lands, nutrients are replenished by adding fertilizer made primarily of:
- aluminum, iron and copper
  - potassium, nitrogen, and carbon
  - calcium, magnesium and potassium
  - potassium, phosphorus, and nitrogen

14. Silver is more conductive than copper. In spite of this, why do you think copper is commonly used as electrical wirings than silver?
- Copper is harder than silver.
  - Copper is cheaper than silver.
  - Copper is more malleable than silver.
  - Copper is more abundant than silver.
15. Daniel, a 40-year-old factory worker, recently learned that zinc is a common mineral that is essential to keep a healthy human body. He then decided to take supplements with zinc. How does Zinc help Daniel in keeping his body healthy?
- It keeps the skin healthy and radiant.
  - It is essential for the immune system to properly work.
  - It regulates cell division and tissue repair in wounds.
  - It is important in building tissue for growth and development.

**Lesson  
5**

## **Important Minerals to Society**

This lesson contains significant activities in which you will be able to identify the different minerals important to society. At the end of this lesson, you can identify these common minerals and their uses.



### **What's In**

In the previous module, you learned the different types of rocks such as igneous rock, sedimentary rock, and metamorphic rock. Found within the rocks, deep under the Earth, are minerals that people extract for everyday use. These minerals are very vital for our everyday living and for our nation building.

In this lesson, you will recognize some common minerals that are vital to society.



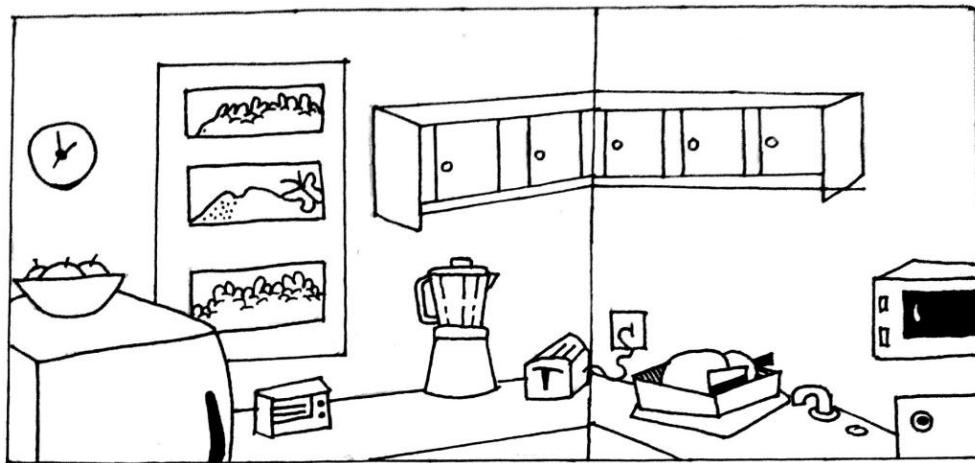
#### **Notes to the Teacher**

Hello dear teachers, this module may be used by learners with minimal supervision. The activities included are suitable for their level and capacity. As pre-requisite to this module, make sure that the learners had finished the previous two modules on minerals and rocks. Thank you.



## What's New

Based on the picture, can you identify the minerals present in the kitchen? List down as many minerals as you can.



Kitchen Object	Mineral/s Present
1.	
2.	
3.	
4.	
5.	

*Guide Questions:*

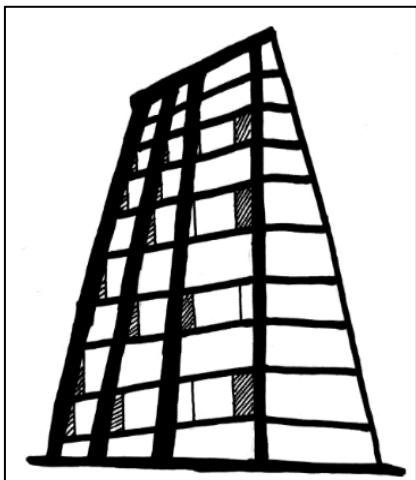
1. What minerals do you think are common in this kitchen?
2. Can you possibly think of alternative materials other than minerals to make up all the equipment and wares in this kitchen?
3. Do you think minerals are really important to society? Why?



## What is It

Minerals are important to society. In small scale, let's think of some ways that will help you to realize that you are actually using them every day.

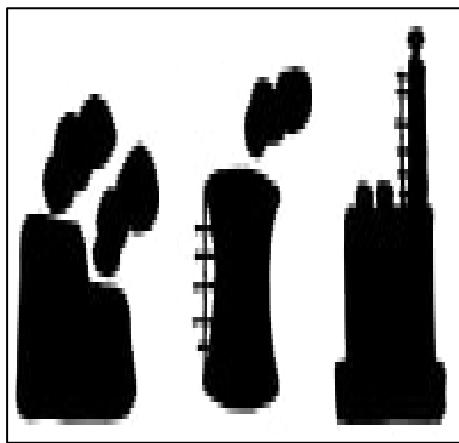
In households, we use toothpaste that contains fluoride from **fluorite** mineral. It prevents tooth decay by protecting teeth from acids in the mouth. Face powder contains **talc** – the softest mineral. In the kitchen, **salts** are commonly used to enhance the flavor of our food. Stainless kitchen wares that are less reactive to food, durable and non-corrosive, contain mostly of alloy of **iron** and **chromium** while other kitchen wares like casserole are made of **aluminum** – a durable metal, corrosion resistant and a better conductor of heat and lighter than stainless steel. Moreover, minerals such as **silicon**, **silver**, and **gold** are used as components of gadgets like cellphones and computers. **Copper** is the mostly used electrical wiring because it is less expensive.



In construction, skyscrapers that tower up to 50 stories high use durable materials like iron steel – a combination of **iron** and **carbon** and concrete that contains **limestone**, **lime**, and **chalk** that make them strong and stand still against strong wind and earthquake. They also use glass made of **silica** or **quartz**. Floors are made up of **granite** and **marbles**. **Aluminum** is used in window and door panels.

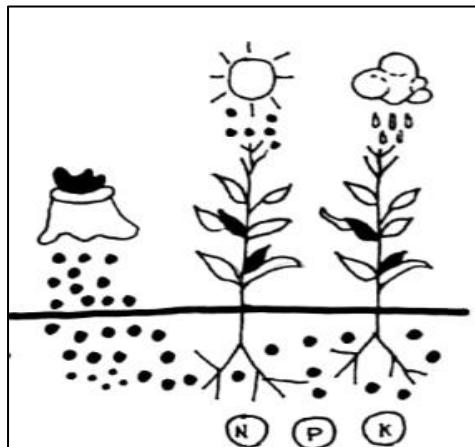


**Titanium** is a strong but very light metal and is used in making medical and dental tools. It is also known for its biocompatibility which makes it important in prosthetics and in dental implants. In taking care of our dental health, dentists use many tools appropriate for a purpose. There are also lots of other minerals that they use for cleaning and surgery. Examples are **gypsum** in plaster cast, and alloys like stainless steel that is primarily composed of **iron**, **chromium**, and **carbon** in their tools.



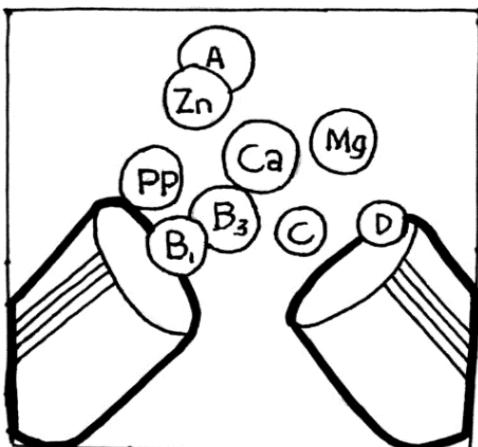
Minerals are also important for generation of power and electricity.

In nuclear power plant, radioactive minerals like **Uranium** are used as source of heat to run a nuclear reactor and generate electricity. On the hand, batteries for electric cars need minerals like **lithium**, **cobalt**, and **nickel**. In producing dry cell batteries, **zinc** and **carbon** are used on its electrodes while **cadmium**, **carbon**, **lead**, and **nickel** are also used to manufacture different dry cell.



In agriculture, NPK Fertilizers contain vital minerals for the plant to grow healthy. These minerals include **nitrogen**, **phosphorous**, and **potassium**.

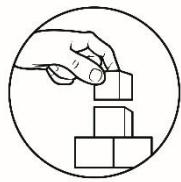
Moreover, minerals like lime are also used to lower the acidity of the soil.



For our health, the pharmaceutical industry manufactures supplements that contain many essential minerals that keep us strong and healthy like **Calcium** that helps body in developing strong and healthy bones, **Magnesium** and **Zinc** that are essential in improving health by helping our immune system to function properly.

Other minerals that are used by the society are the following:

Mineral Name	Description/Property	Uses
Kaolinite	<ul style="list-style-type: none"> <li>also known as “China clay”</li> <li>Soft and white</li> </ul>	<ul style="list-style-type: none"> <li>important material in the manufacture of porcelain, paper, rubber, and paint</li> </ul>
Hematite	<ul style="list-style-type: none"> <li>Red iron ore with high iron content</li> </ul>	<ul style="list-style-type: none"> <li>as pigmenting agent</li> <li>used in preparations for heavy media separation, radiation shielding, ballast, and as a minor gemstone.</li> </ul>
Mica	<ul style="list-style-type: none"> <li>flat, translucent and elastic mineral</li> <li>contains high amount of silica</li> </ul>	<ul style="list-style-type: none"> <li>ingredient in makeup and various cosmetics.</li> </ul>
Lapis lazuli (rock)	<ul style="list-style-type: none"> <li>semiprecious stone with deep blue color</li> <li>contains <b>lazurite</b> mineral</li> </ul>	<ul style="list-style-type: none"> <li>widely used as gemstone</li> </ul>
Calcite	<ul style="list-style-type: none"> <li>natural form of Calcium carbonate</li> <li>constitutes the sedimentary rock Limestone</li> </ul>	<ul style="list-style-type: none"> <li>used as ingredient in manufacture of cement</li> <li>used as flux in metallurgical processes</li> </ul>
Garnet	<ul style="list-style-type: none"> <li>translucent and has a vitreous to resinous lusters</li> </ul>	<ul style="list-style-type: none"> <li>used as gemstone</li> <li>used widely as an abrasive</li> </ul>
Serpentine	<ul style="list-style-type: none"> <li>has patterned appearance, slippery and colored green</li> </ul>	<ul style="list-style-type: none"> <li>used as gemstone</li> <li>as stone decoration in architecture</li> </ul>
Opal	<ul style="list-style-type: none"> <li>a silica mineral with variety of colors from the yellows and reds due to impurities.</li> </ul>	<ul style="list-style-type: none"> <li>used as gemstone and as abrasives, insulation media, fillers, and ceramic ingredients.</li> </ul>
Ruby (gemstone)	<ul style="list-style-type: none"> <li>composed of transparent red <b>corundum</b> mineral</li> <li>with deep cochineal to pale rose red color</li> </ul>	<ul style="list-style-type: none"> <li>used as gemstone in any kind of jewelry</li> </ul>
Emerald (gemstone)	<ul style="list-style-type: none"> <li>variety of <b>beryl</b> mineral with grass-green color</li> </ul>	<ul style="list-style-type: none"> <li>used as gemstone in any kind of jewelry</li> </ul>

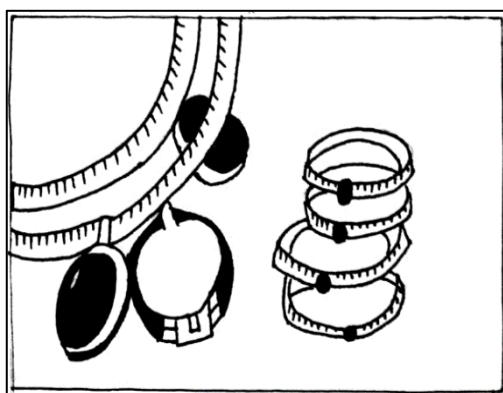


## What's More

### Mineral Hunting!

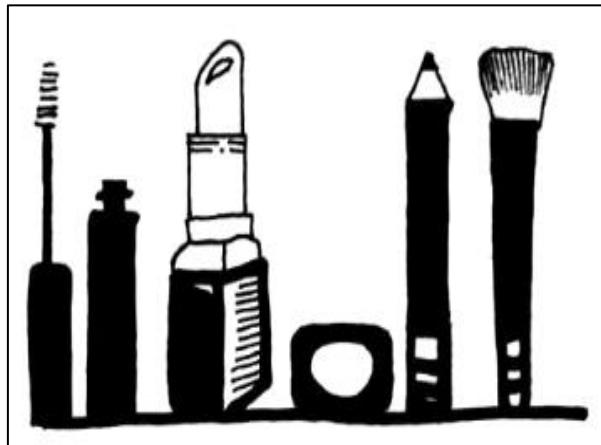
Find 10 minerals hidden in the puzzle that are used in the following objects shown in the pictures. Write your answers on your answer sheet. (Note: For minerals that are not presented in the discussion above, you may refer to internet.)

Picture 1



X	K	O	Z	Z	Q	M	K	L	R	S	L	C	T	T
I	L	C	D	H	O	D	Y	E	G	E	H	R	Y	J
D	N	O	M	A	I	D	P	S	G	R	P	J	W	O
L	L	I	U	I	H	P	L	S	O	P	W	G	P	D
R	C	A	M	B	O	W	U	M	R	E	G	A	W	O
U	N	P	R	C	V	F	I	L	E	N	L	O	M	D
B	I	C	P	E	S	U	C	Q	V	T	W	V	L	K
Y	U	D	U	G	M	H	V	R	L	I	E	B	F	D
M	Z	G	A	R	N	E	T	E	I	N	Q	L	X	O
K	M	R	K	J	I	H	N	K	S	E	G	N	A	L

Picture 2



E	E	E	G	F	B	U	N	M	O	B	A	G	G	O
T	F	C	T	T	E	D	U	M	H	P	M	Z	T	M
I	K	T	C	I	R	I	I	G	D	Q	I	S	G	W
T	G	G	X	R	N	C	T	O	C	L	A	T	B	N
A	Q	T	S	A	A	I	U	L	C	O	B	T	E	S
M	Y	M	T	I	G	A	L	D	T	N	Y	G	R	W
E	Q	I	H	I	L	U	Z	A	L	S	I	P	A	L
H	T	C	A	L	C	I	T	E	O	R	B	Z	V	Q
Z	F	L	Y	W	I	X	C	E	L	K	X	L	C	N
I	J	W	S	S	Z	P	V	A	N	G	P	L	B	N



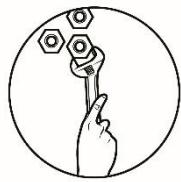
## ***What I Have Learned***

A. Complete the table below.

<b>GIVE ME</b>		<b>Sector</b>	
<b>1</b>	Mineral used in	Energy	1.
<b>2</b>	Mineral used in	Medicine	1.
			2.
<b>3</b>	Mineral used in	Agriculture	1.
			2.
			3.
<b>4</b>	Mineral used in	Construction	1.
			2.
			3.
			4.
<b>5</b>	Mineral used in	Household	1.
			2.
			3.
			4.
			5.

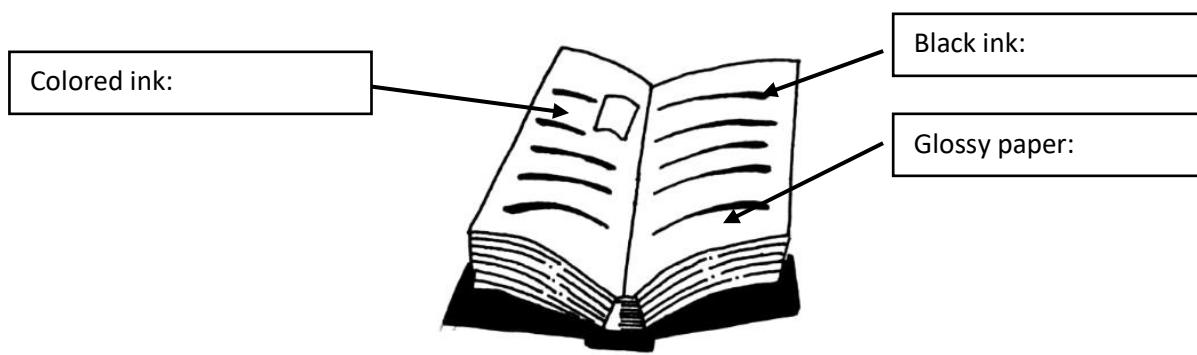
B. Give the uses of the following minerals in the society.

<b>Mineral</b>	<b>Uses/Importance</b>
Halite (Salt)	
Granite	
Quartz	
Gold	
Aluminum	



## **What I Can Do**

A book like in the picture below contains writings and pictures made by black or colored ink. The paper itself and the ink are made from different minerals. Can you name some minerals that are used to complete this book? Write the answers on your answer sheet.



1. Colored Ink

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2. Black Ink

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4. Glossy Paper

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## Assessment

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

1. Which of the following are the uses of minerals?
    - I. Power generation
    - II. Construction and buildings
    - III. Medicine and Dentistry
    - IV. Agriculture
    - a. I and II
    - b. II and III
    - c. III and IV
    - d. I, II, III, and IV
  2. Over time, different types of batteries are developed, produced, and used by society. Minerals below are extensively used in the production of these batteries.
    - I. Lead
    - II. Cobalt
    - III. Nickel
    - IV. Zinc
- Which among the minerals are used in electric car batteries?
- a. I and II
  - b. II and III
  - c. III and IV
  - d. I and IV
3. Minerals are not only used in manufacturing industry. Common households also make use of minerals for everyday use. Which of the statement best describes minerals as important part of a household?
    - a. Danny uses earthen oven to boil water.
    - b. Linda uses salt in enhancing flavors of the food.
    - c. Vella uses toothpaste to prevent tooth decay.
    - d. All of the above
  4. Copper is a good conductor of electricity and is less corrosive, therefore it is best used for \_\_\_\_\_.
    - a. Cooking
    - b. Electrical wiring
    - c. Plumbing
    - d. All of the above

5. Although gold is generally known in jewelries industry, they are also used in other products like cellphones and computers. What characteristics of gold is important for this purpose?
- Good conductor
  - Less Corrosive
  - Metallic
  - All of the above
6. Why is Titanium widely used in prosthetics over plastic, wood, and rubber?
- Titanium alloy is cheaper over other materials.
  - Prostheses made of Titanium is easy to produce.
  - Titanium has biocompatibility which makes it suitable for implants.
  - Titanium alloys are lighter compared to plastic, wood, and rubber.
7. Plaster: gypsum; Toothpaste: \_\_\_\_\_
- Fluorite
  - Gold
  - Sodium
  - Mercury
8. How does society benefit from using kitchen wares made of aluminum over other materials such as iron cast and stainless steel?
- Aluminum is lighter than stainless steel and iron.
  - Aluminum is stronger than stainless steel and iron.
  - Aluminum is less reactive to food than stainless steel.
  - Aluminum has a higher corrosion resistance than stainless steel and iron.
- I and II are true; III and IV are false.
  - I and III are true; II and IV are false.
  - I and IV are true; II and III are false.
  - All statements are true.
9. The paper used in magazine cover are specially made to be glossy and smooth. What mineral gives this kind of paper a glossy look?
- Diamond powder
  - Gold bits
  - Kaolin clay
  - Whale fat
10. At a young age, Eve has developed rickets, a condition that affects bone development in children. She experiences bone pain and has soft and weak bones that lead to bone deformities. Which mineral is Eve lacking for her bone condition?
- Calcium
  - Iron
  - Magnesium
  - Zinc

11. Which property of Aluminum makes it useful in making aircraft?

- a. Light
- b. Durable
- c. Less corrosive
- d. All of the above

12. Graphite is one of many forms of carbon with crystalline structure that allows layers to slide over each other easily. In which product is graphite commonly used because of this property?

- a. Ink
- b. Paper
- c. Pencil
- d. Carbon paper

13. Silicon is not a metal but is a good conductor. In which products do you expect Silicon to be used with this property?

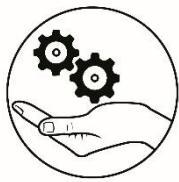
- a. Fiber glass
- b. Electric circuits
- c. LCD displays
- d. Rubber

14. Which set of minerals are necessary in making fertilizer?

- a. aluminum, iron and copper
- b. potassium, nitrogen, and carbon
- c. calcium, magnesium and potassium
- d. potassium, phosphorus, and nitrogen

15. Uranium is a heavy radioactive element from mineral uraninite. Although uranium is radioactive which makes it harmful to human upon exposure, it is very useful to society because it is important in \_\_\_\_\_.

- a. food production
- b. generation of electricity
- c. cleaning of coastal water
- d. decomposition of solid waste

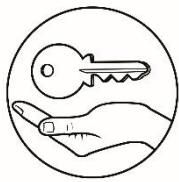


## ***Additional Activities***

Philippines is one of the leading exporters of important minerals that are used in many industries. Can you name two of these minerals? Locate the areas where the minerals are mined and identify their uses. Use a graphic organizer in presenting your output. Refer to the rubric below in accomplishing this task.

### **Rubric**

<b>Key elements</b>	<b>Very Satisfactory (5 points)</b>	<b>Satisfactory (3 points)</b>	<b>Needs Improvement (1 point)</b>
Content	<ul style="list-style-type: none"><li>Minerals identified belong to the top exported minerals by the country.</li><li>Information about the minerals is based on facts and valid.</li></ul>	Only one of the indicators is evident.	None of the indicators is evident.
Organization	<ul style="list-style-type: none"><li>Details are presented in a graphic organizer.</li><li>Appropriate labels/caption are used to showcase information.</li><li>Organization enhances the overall presentation.</li></ul>	Only two of the indicators are evident.	Only one of the indicators is evident.
Convention	<ul style="list-style-type: none"><li>A standard writing convention such as but not limited to spelling, capitalization, grammar, and paragraphing is correctly demonstrated.</li><li>Writing convention enhances readability.</li><li>Error is minimal to only two.</li></ul>	Only two of the indicators are evident.	Only one of the indicators is evident.



## Answer Key

What I Know		What's more		Assessment	
Picture 1:	Picture 2:				
1. C	Diamond	a. Calcite	b. Gold	c. Hematite	d. Kaolinite
2. C	Silver	b. Gold	a. Calcite	d. Copper	e. Chromium
3. D		c. Gold	b. Gold	f. Emerald	f. Lapis lazuli
4. C		d. Gold	c. Hematite	g. Ruby	g. Silica
5. D		e. Chromium	d. Kaolinite	h. Opal	h. Talc
6. A		f. Emerald	e. Lapis lazuli	i. Serpentinite	j. Titanium
7. C		g. Ruby	g. Silica	j. Garnet	j. Zinc
8. B		h. Opal	h. Talc	11. D	12. B
9. D		i. Serpentinite	i. Titanium	10. A	11. D
10. A		j. Garnet	j. Zinc	12. B	13. D
11. D		12. C	13. B	14. D	15. B

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