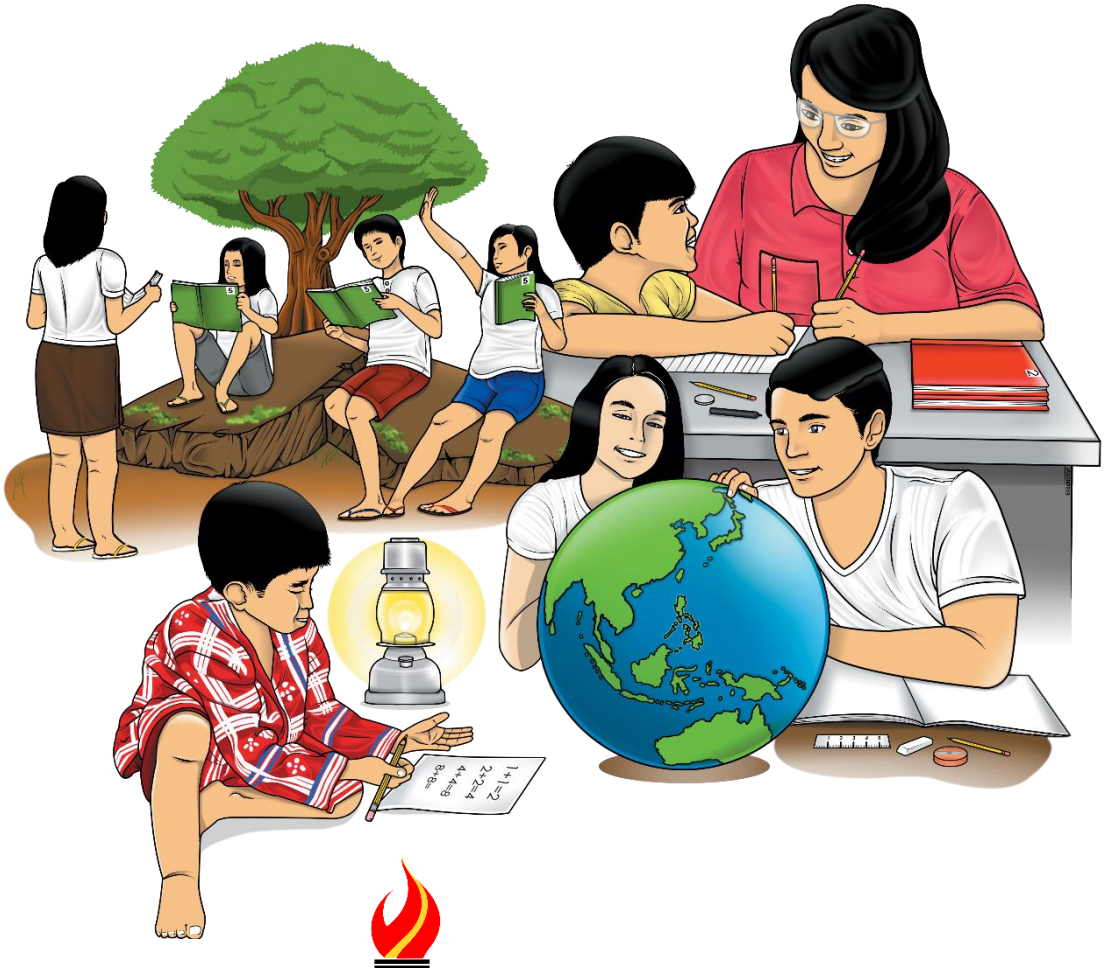
Senior High School

DepED
DEPARTMENT OF EDUCATION

Earth Science for STEM

Quarter 1 – Module 9:
Various Water Resources on Earth



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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.

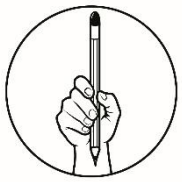
Thank you.

What I Need to Know

This module was designed and written to introduce to you a better understanding of how water resources are useful to humans. It is important because it is needed for life to exist. Specifically, this module describes the different water resources in the Philippines.

After going through this module, you are expected to:

1. learn and understand the role water plays in our lives;
2. identify the various water resources on Earth; and
3. describe the role of a Senior High School student in taking care of water resources.



What I Know

Read and analyze the following questions. Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Why is Earth known as the blue planet?
   a. It appears bright blue from space because it is covered with water.
   b. It is the color of the planet that is displayed after absorbing sunlight.
   c. It is the color of the planet that is displayed by reflecting heat from the sun.
   d. It appears to have a blue tint when seen from space due to the color of the sky.

2. Most of the water on Earth is _____.
   a. freshwater
   b. saltwater
   c. wet water
   d. lake water

3. How much water is there on Earth?
   a. 75%
   b. 73%
   c. 71%
   d. 70%

4. Where does Earth's freshwater come from?
   a. seas
   b. in storage tanks
   c. in icecaps and glaciers
   d. ocean tides and waves

5. The following are kinds of water that are needed for agricultural purposes EXCEPT _____.
   a. rainwater
   b. saline water
   c. ground water
   d. surface water

6. Water from a river, lake or freshwater wetland is called?
   a. saltwater
   b. freshwater
   c. groundwater
   d. surface water

7. Which of the following statements is true or false?
   I. Fresh water includes water in ice caps, glaciers, ponds, lakes, rivers, streams, and underground water.
   II. Freshwater is more plentiful than groundwater.
   III. Groundwater is more abundant than freshwater.
   a. Statements I and II are true.
   b. Statements I and III are true.
   c. Only statement I is true.
   d. Only statement II is false.

8. Water sources found present on the surface of the earth in the form of oceans, rivers, lakes, ponds and streams are called?
   a. rain water
   b. fresh water
   c. surface water
   d. underground water

9. The following are reasons for water reduction EXCEPT _____.
   a. overuse
   b. too much rain
   c. drying up of wells
   d. pollution on water resources

10. Water that is collected on Earth in the form of surface water and underground water is called?
   a. rain water
   b. lake water
   c. water vapor
   d. ground water

11. Which of the following is NOT a type of groundwater?
   a. spring
   b. stream
   c. infiltration
   d. open well

12. In what form is surface water mostly found on Earth?
   a. river
   b. lake
   c. stream
   d. water vapor

13. Which of the following is NOT a surface water?
   a. lake
   b. spring
   c. river
   d. pond

14. Which is NOT an activity that demonstrates conservation of fresh water?
   a. Take shorter showers.
   b. Check toilet leaks.
   c. Install water-saving shower heads.
   d. Leave the water running while brushing your teeth.

15. Which of the following statements is true or false?
   I. Water nourishes cell and removes waste it generates.
   II. Human body is 70% water.
   III. Water is essential to home and factories.
   a. Statements I and II are true.
   b. Statement II is false.
   c. Statement III is true.
   d. All statements are true.

Lesson 1 Various Water Resources on Earth

Water is a valuable natural resource that can be found in many different forms throughout the environment. Water comes in two forms: fresh water and salty, and it covers roughly 70% of the earth's surface. In this lesson, you will learn about the various sources of water as well as understand how water is essential to the survival of living beings.

What's In

The picture of the Earth taken from space via satellite is shown below. Study and answer the questions that follow. This would help us discover the components of the earth where we live in.

Figure 1. What does Earth look like from space?

QUESTIONS:

- How was this image taken?

  _____

- What do you see on earth from space?

  _____

- Do you think there is more land or water on Earth? Why?

  _____

Notes to the Teacher

Have the students be guided on their basic needs in What's in. Practically, basic necessities like materials needed in school, at home or personal protective equipment during such situation when they are necessary.

What's New

Read and analyze the article in the magazine, "Cronicas de los Tiempos" published in April 2002. Answer the questions that follow.

Letter Written in the Year 2070

By: Miguel Fernandez F. and Iris Guzman O.

This is the Year 2070, I have just turned 50, but my appearance is of somebody of 85.

I suffer from serious kidney problems, because I do not drink enough water. I'm afraid I do not have much time left to live. I am one of the oldest people in this society. I remember when I was a child of 5. Everything was very different then.

There were lots of trees in the parks, houses with beautiful gardens, and could enjoy having a shower for half an hour. Nowadays we use towels with mineral oil to clean our skin.

Before, women had beautiful hair. Now, we have to shave our heads to keep them clean without the use of water. Then, my father washed his car with water coming out of a hosepipe. Now, my son does not believe that water could be wasted that way. I remember there were *SAVE WATER* warnings on outside poster, radio and TV, but nobody paid attention. We thought that water was to last forever. Now all the rivers, lakes, dams and underground water beds are either dry or contaminated.

Industry came virtually to a standstill and unemployment reached dramatic proportions. Desalination plants are the main source of employment and workers receive part of their salary in drinkable water. Assaults at gun point on the streets for a jerry can of water are very common. Food is 80% synthetic. Before, the recommended quantity of water to drink for an adult was 8 glasses a day. Nowadays, I am only allowed half of a glass.

We now have to wear disposable clothing, and this increases the amount of litter. We are using now septic tanks, because the sewerage system does not work for lack of water.

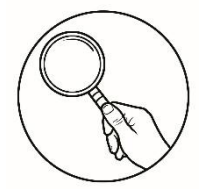
The outside appearance of the population is horrible: wrinkled, emaciated bodies, due to dehydration, full of sores caused by ultraviolet radiation, now stronger without the protective shield of the ozone layer. Skin cancer, gastrointestinal infections and of the urinary tracts are the main cause of death. Due to the excessive drying of the skin, young people of 20 look like 40. Scientists investigate, but there's no solution to the problem. Water cannot be produced, oxygen is also degraded due to the lack of trees and vegetation, and the intellectual capacity of the new generations is severely impaired. The morphology of spermatozoa in many men has changed. As a consequence, babies are born with deficiencies, mutation and physical deformities. Government makes us pay for the air we breathe, 137 cubic meters per day per adult person.

People who cannot pay are expelled from the "ventilated zones" with huge mechanical lungs driven by solar power. The air is not good quality, but at least people can breathe. The average life expectancy is 35 years. In some countries, where there are still some green zones crossed by rivers, these are guarded by heavy armed soldiers. Water became a very coveted treasure, more precious than gold and diamonds. Where I live, there are no trees, because it seldom rains. When it happens to register some precipitation, it is of acid rain. The seasons have been severely affected by the atomic tests and by contamination from the 20th century polluting industries. We were warned to look after the environment, but nobody cared.

When my son asks me to talk about my youth, I tell him about the green fields, the beauty of the flowers, the rain, how pleasant was to swim and fish in the rivers and dams, to drink all the water we could, and how healthy people were. He asks, "Daddy! Why is there no water?" Then, I feel a lump in my throat! I cannot help feeling guilty, because I belong to the generation who contributed to the destruction of the environment or simply did not take into account all the warning signs. Now our children pay a very high price! I sincerely believe that within a short time life on earth will not be possible, as the destruction of nature reached now an irreversible stage. How I would like to go back and make mankind understand that we still have time to save our planet Earth.

QUESTIONS:

1. How old is the man who wrote the letter and why does he not look his age?
   _____
2. What is the difference between his life in 2070 and when he was 5 years old?
   _____
3. What happened to the rivers, lakes and other water sources as mentioned in the article?
   _____
4. What happens if we do not take care of water resources?
   _____
5. What is the significance of nature's gifts and what is our role in preserving them?
   _____



What is It

Water Resources

Nearly three-fourths of the earth's surface is covered with water. Most of which is found in the ocean. Great amount of the freshwater is found below the earth's surface called ground water and the rest of the freshwater is found in lakes, rivers, streams. Water is also present in air in the form of water vapor.

Water resources are natural resources of water that are potentially useful. Uses of water include agricultural, households, recreational and environmental activities. Moreover, about 70 percent of the human body is water and bodies of all plants and animals also contain water. All living things require water to grow and reproduce.

Sources of Water. Rainwater, oceans, rivers, lakes, streams, ponds and springs are natural sources of water. Dams, wells, tube wells, hand-pumps, canals, etc, are man-made sources of water.

Figure 2. Hand-pumps: A man-made water source at Balayan, Batangas. May 22, 2020.

Rain Water. Rain water is collected on Earth in the form of surface water and underground water.

Two Main Sources of Water

1. **Surface Water.** Water present on the surface of the earth in the form of oceans, rivers, lakes, reservoir, ponds and streams is called surface water. The water in rivers and lakes comes from rain and melting of snow on mountains. Rivers flow into the sea.

Figure 3. The Caliraya River photo taken at nightfall. February 15, 2018.

2. **Underground Water.** Some of the rainwater seeps through the soil on to the non-porous rocks below. This is underground water. Sometimes due to high pressure, this water sprouts out in the form of springs. It can be obtained by digging wells or sinking tube wells, etc. Groundwater lies under the surface of the land, where it travels through and fills openings in the rocks. The rocks that store and transmit groundwater are called aquifers.

Water Distribution on Earth

Figure 4 is a pie chart showing where all water on, in, and above the Earth exists.

The first pie chart shows how almost all of Earth's water is saline and is found in the oceans. Of the small amount that is actually freshwater, only a relatively small portion is available to sustain human, plant, and animal life. It is observed that only 3% of Earth's water is freshwater which is the water needed for life to survive.

The middle pie chart shows the breakdown of freshwater. Almost all of it is confined in ice and in the ground. Only 0.3% of all freshwater is surface water, which serves most of life's needs.

The last pie chart shows the breakdown of surface water. Most of this water is found in lakes. Rivers make up 2% of surface freshwater and 11% swamps. Although rivers account for only a small amount of freshwater, this is where humans get a large portion of their water.

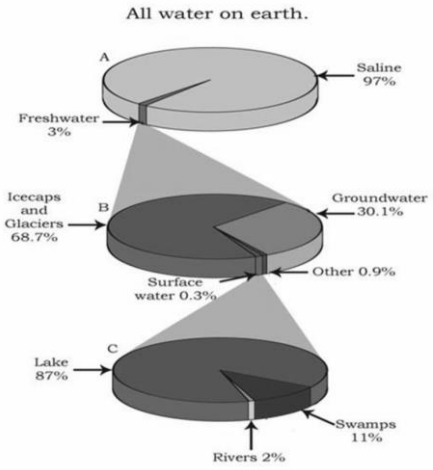


Figure 4. Water Resources Distribution

Sources of Drinking Water

Water is very important in each of our lives. Not only it is essential to our health, but also, we use it for numerous household tasks. Every day we use water for cooking, bathing, cleaning, and drinking.

The World Health Organization and UNICEF Joint Monitoring Report (2017) define improved drinking water sources as those that have potential to deliver safe water by nature of their design and construction. These include piped water tube wells or boreholes; protected dug wells, protected springs; rainwater. Families that use bottled water or refilling stations for drinking are classified as using an improved source only if the water they use for cooking and hand washing comes from an improved source.

According to the results of the 2017 APIS, 94 percent of the 24 million Filipino families have improved source of drinking water. In the urban and rural areas, 97 and 91 percent, respectively, have improved source of drinking water. Residents in rural areas are more likely to have an unimproved source of drinking water than those in urban areas (9.1% vs. 2.6%). Almost four in every five families (77%) do not practice any method or treatment in ensuring that their drinking water is safe to drink.

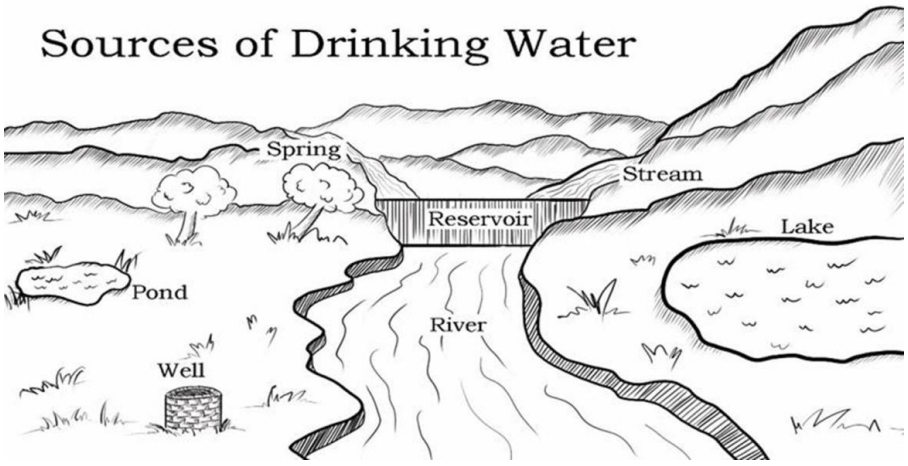


Figure 5. Water Resources

1. Based on pie graph A in Figure 4, what is the most abundant water resource?

   _____

2. Based on pie graph C in Figure 4, what is the most abundant type of surface water?

   _____

3. Where does the water that you use come from?

   _____

4. Is water a finite or infinite resource? Explain.

   _____

5. How can you help in the preservation of water supply?

   _____

What's More

Figure 6 shows the various bodies of water found in the Philippines. Characterize and classify the various sources of water by listing them on the appropriate column.

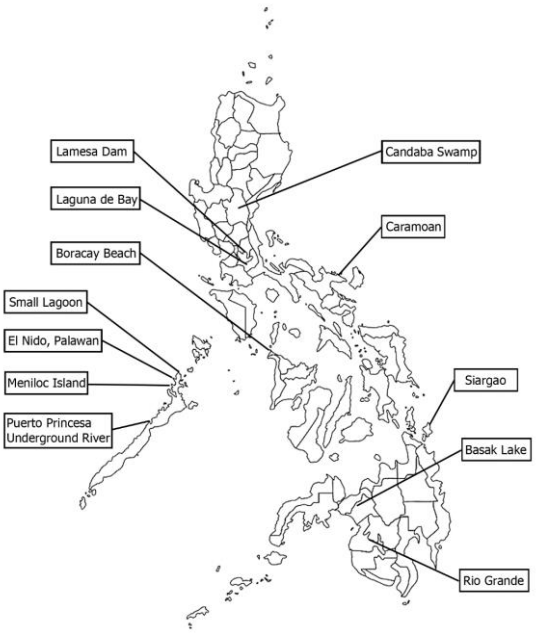


Figure 6. Bodies of Water in the Philippines

Saline Water	Underground Water	Surface Water

What I Have Learned

Answer the following questions.

1. How is water distributed on Earth?

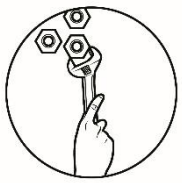
   _____

2. How is groundwater related to surface water?

   _____

3. As a Grade 11 student, what should you do to take care of our water resources?

   _____



What I Can Do

Make a slogan with the theme, “Water as a universal need.”

Rubrics for Slogan

	4	3	2	1
Craftsmanship	In terms of neatness, the slogan is very appealing. It's well-made and neat.	In terms of neatness, the slogan is good. It's well-made but a bit messy.	The slogan is quite appealing although it is a bit messy.	The slogan is distractingly messy.
Creativity	Slogan is creative. A lot of thought and effort was used to make it.	Slogan is creative and a good amount of thought was put into it.	Slogan is creative and some thought was put into it.	The slogan does not reflect any degree of creativity.
Originality	The slogan was made with the use of excellent new concepts, new ideas and uniqueness.	The slogan was made with good use of new ideas and originality.	The slogan was created with average utilization of new ideas and inventiveness.	No use of new ideas and originality to create slogan.
Content	The message is delivered in a clear and concise manner	The message is delivered, but it is not as clear as it could be.	The message is a bit confusing.	There was no message displayed.

Assessment

Read and analyze the following questions. Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Which of the following statements is NOT true?
   a. Fresh water is a non-renewable resource.
   b. Surface water is water in a river, lake or freshwater wetland.
   c. 97% of the water on Earth is salt water and only 3% is fresh water.
   d. Groundwater is fresh water located in the subsurface pore space of soil and rocks.

2. Most of the water on Earth is _____.
   a. saltwater
   b. dam water
   c. freshwater
   d. lake water

3. It consists about 68% of freshwater on Earth.
   a. river
   b. swamp
   c. groundwater
   d. icecap and glacier

4. Why is surface water the most important water resource?
   a. It is rich in minerals.
   b. It is often readily accessible.
   c. It is clearer than the ground water.
   d. It is a small channel of water that eventually runs into a river.

5. The entire body of saltwater that covers about 71% of Earth is _____.
   a. lake
   b. ocean
   c. stream
   d. wetland

6. These are water found in rivers, glaciers, ice sheets and underground that contains little to zero salt.
   a. ocean
   b. glaciers
   c. salt water
   c. fresh water

7. What percent of Earth's water is freshwater?
   a. 3%
   b. 79%
   c. 70%
   d. 97%

8. Water that is collected on Earth in the form of surface and ground water is called _____.
   a. rain water
   b. water vapor
   c. fresh water
   d. ground water

9. Which of the following is a source of water from the ground?
   a. lake
   b. rainfall
   c. aquifer
   d. reservoir

10. Sources of water that are in the form of rivers, lakes and swamps.
   a. rain water
   b. fresh water
   c. surface water
   d. underground water

11. It is a manmade source of water that is manually operated pump and widely used for a variety of industrial, marine, irrigation and leisure activities.
   a. dam
   b. canal
   c. tube well
   d. hand pump

12. Which of the following is a way to conserve water?
   a. Use hose to wash car.
   b. Check faucet and pipes for leak.
   c. Leave the tap water running while brushing your teeth.
   d. Leave the shower flowing while you shampoo your hair.

13. Why do we need to conserve water?
   a. It is a limited resource.
   b. It is a renewable source.
   c. It is a non-renewable source.
   d. There is no need to conserve water.

14. Which of the following is a type of water pollution?
   a. oil spill
   b. fish waste
   c. sand from beaches
   d. people swimming from the ocean

15. The following are ways you can protect the water resources EXCEPT _____.
   a. Handle and dispose waste properly.
   b. Pour leftover water onto the garden.
   c. Practice water conservation at home and in school.
   d. Don't mind water leaks in school's comfort room anyway you're not paying the bill.

Additional Activities

Congratulations! You have successfully finished Module 9. You may now proceed to Module 10. Please do an advance reading on human activities which commonly affect the distribution, quantity and chemical quality of water resources or recall your elementary and junior high discussions on this topic. Good luck! You may advance to the next level.

Answer Key

What I Know

1. a
2. b
3. c
4. c
5. b
6. d
7. a
8. c
9. b
10. a
11. b
12. b
13. b
14. d
15. d

What's More

Saline Water
Boracay Beach
Celebes Sea
El Nido, Palawan
Caramoan
Siargao, General Luna

Underground water
Small Lagoon
Puerto Princesa
Underground River
Magsindanao's Blue
Lagoon
Maquinit Hot spring
Cavinti Underground
River

Surface Water
Candaba Swamp
Rio Grande De
Mindanao
Laguna de Bay
La Mesa Dam
Ba lake of Lanao del Sur

Assessment

1. a
2. a
3. d
4. b
5. b
6. d
7. a
8. a
9. c
10. c
11. d
12. b
13. a
14. a
15. d

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