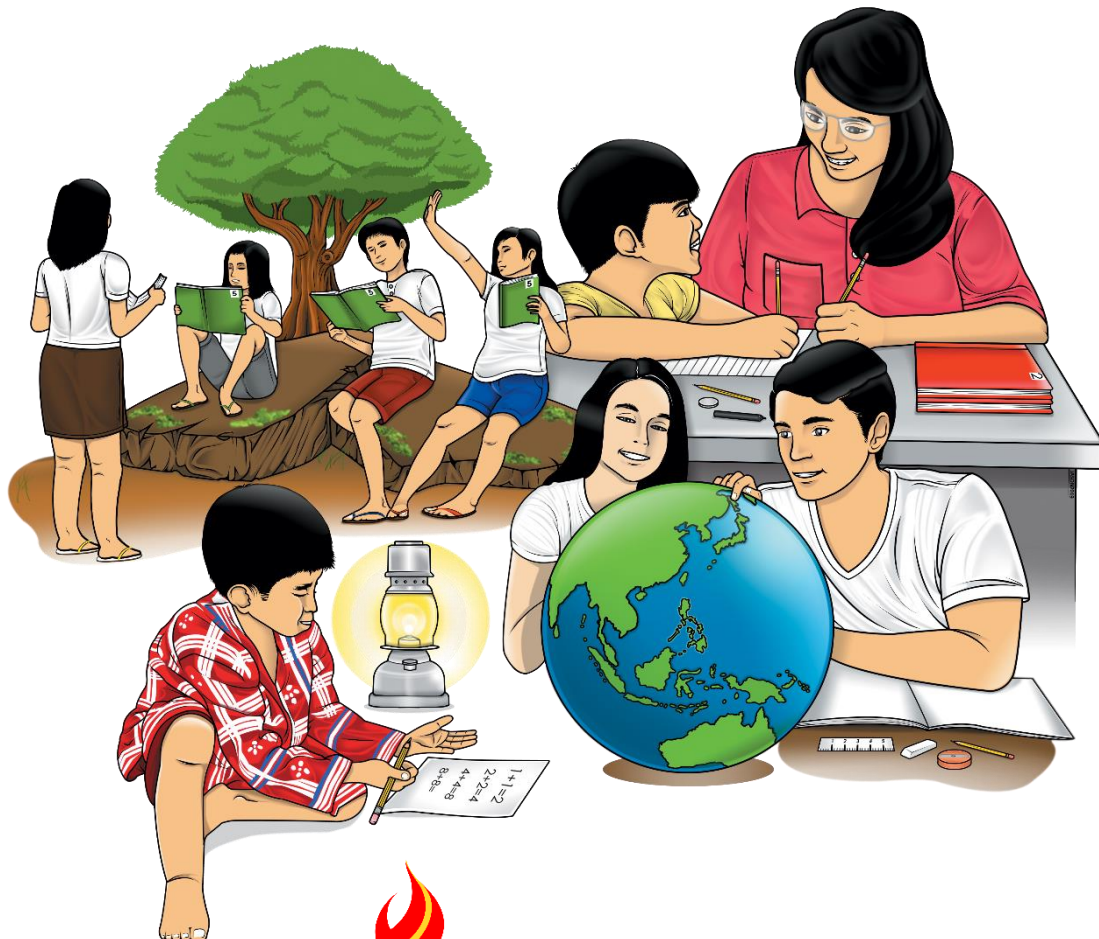


# Earth Science for STEM

## Quarter 1 – Module 10: Activities that Affect the Quality and Availability of Water for Human Use



**Earth Science for STEM  
Alternative Delivery Mode  
Quarter 1 – Module 10: Activities that Affect the Quality and Availability of Water for  
Human Use  
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**Earth Science for STEM**  
**Quarter 1 – Module 10:**  
**Activities that Affect the Quality**  
**and Availability of Water**  
**for Human Use**

## **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***

In this lesson, the learner will explain the activities that affect the quality and availability of water for human use. To achieve this learning competency, the learner should identify human activities that commonly affect the distribution, quantity, and chemical quality of water resources.

After going through this module, you are expected to:

1. explain the different activities that affect the quality and availability of water;
2. describe the quality of water available in your community;
3. suggest ways of conserving water resources; and
4. employ promotion on the conservation of water through slogan.



## ***What I Know***

Read and analyze the following questions. Choose and write the letter that best describes the following statements.

1. Which of the following can have a serious detrimental impact on water resources?
  - a. Human activities
  - b. Employment
  - c. Inflation
  - d. Virus
  
2. Which human activities threatened the quality of water?
  - a. Cleaning the seashore
  - b. Planting Trees
  - c. Agriculture
  - d. Mining
  
3. Farming is part of agriculture and before raising a crop, the soil is prepared by loosening the soil using tractors. Which of the following substances is produced in large amounts as a result of this activity?
  - a. Sediments
  - b. Water
  - c. Sand
  - d. Soil
  
4. All are threats to water resources, EXCEPT:
  - a. Farming
  - b. Growth of cities
  - c. Clearance of forest
  - d. Closing of illegal mining
  
5. Analyze the statements. Which of the following statements describe a great impact on the quality of water?
  - I. The building of infrastructures affects the status of water.
  - II. The degradation of ecosystems helps the conservation of clean water.
  - III. The poor solid waste management.
  - a. I only
  - b. II only
  - c. I and II
  - d. I and III
  
6. Which of these practices show conservation of water?
  - a. Repair leaking faucets.
  - b. Wash clothes every day
  - c. Take a long shower when bathing
  - d. Use running water when brushing teeth

7. Which of the following affects the quality of water?
  - a. Wastes
  - b. Climate
  - c. Precipitation
  - d. Hydropower plant
  
8. What is the massive driver of pollution?
  - a. Population
  - b. Urbanization
  - c. Development
  - d. Climate change
  
9. What human activity uses the most water?
  - a. Mining
  - b. Industrial
  - c. Agriculture
  - d. Construction
  
10. Which of the following is not considered as the Philippines' main source of water?
 

a. Rivers	c. Lakes
b. Ponds	d. Groundwater reservoirs
  
11. Which law would guide Filipinos to protect the country's water resources from pollution?
 

a. R.A. 9003	c. R.A.1995
b. R.A. 8749	d. R.A. 9275
  
12. Which of the following has the lowest distribution of water on Earth?
 

a. River	c. Glaciers
b. Ocean	d. Groundwater
  
13. People living in the area where there is not enough supply of surface water tends to frequently pump water from the ground. What would be the result of this activity?
 

a. Restoration	c. Depletion
b. Abundance	d. Wealth
  
14. Which is the best solution to restore water?
  - a. Dispose of trash anywhere
  - b. Avoid the use of chemical
  - c. Enjoy water supply to the fullest
  - d. Pumping should be free all the time
  
15. What describes the condition of the drinking water?
 

a. Quality	c. Availability
b. Suitability	d. Capability

**Lesson**

**1**

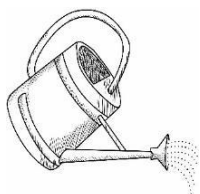
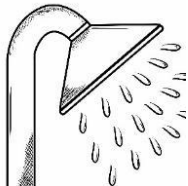
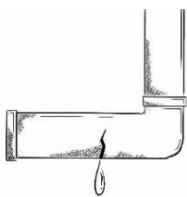
**Activities that Affect the Quality and Availability of Water for Human Use**

Water is a substance that forms water resources such as oceans, lakes and rivers. Our resources are facing threat from a variety of factors, the majority of which are driven by human activities. The impact of these activities on the quality and availability of water for human consumption would be considerably reduced if these activities were addressed.



***What's In***

Conservation is the ethical use and protection of valuable resources. Study the pictures then write two suggestions to conserve and protect water resources.







### **Notes to the Teacher**

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



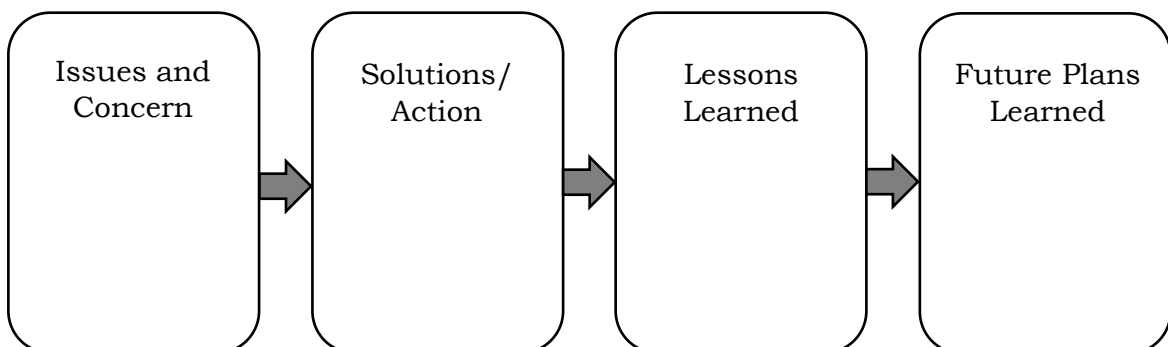
### **What's New**

Read the lyrics of the song and analyze its message. Fill in the boxes with the necessary information.

#### Waste Not, Want Not Environmental Song Lyrics and Sound Clip Two of a Kind

Use both sides of the paper, there'll be twice as many trees  
Don't leave the water running, save our lakes and rivers, please  
Take only what you'll eat, whether it's cake or lima beans  
Let's help to save the planet so that we can live in peace

Water's fun for swimming, or rowing with an oar,  
Or canoeing through the rapids, but even more-  
We need to survive, to clean with, and to drink  
So don't let it all just run down your sink!





## ***What is It***

Water quality describes the condition of the water, including chemical, physical, and biological characteristics, usually concerning its suitability for a particular purpose such as drinking or swimming.

Water has physical and chemical characteristics. Some of the physical attributes include temperature, color, taste, odor, and turbidity. The temperature of water affects some of the important physical properties and characteristics of water: thermal capacity, density, specific weight, viscosity, surface tension, specific conductivity, salinity, and solubility of dissolved gases, etc.

Color, on the other hand, is primarily a concern of water quality for aesthetic reasons. Colored water gives the appearance of being unfit to drink, even though the water may be perfectly safe for public use. It can indicate the presence of organic substances, such as algae or humic compounds. More recently, color has been used as a quantitative assessment of the presence of potentially hazardous or toxic organic materials in water.

Taste and odor are human perceptions of water quality. Human perception of taste includes sour (hydrochloric acid), salty (sodium chloride), sweet (sucrose), and bitter (caffeine). Relatively simple compounds produce sour and salty tastes. However sweet and bitter tastes are produced by more complex organic compounds. Humans detect many more tips of odor than tastes. Organic materials discharged directly to water, such as falling leaves, runoff, etc., are sources of tastes and odor-producing compounds released during biodegradation.

Furthermore, turbidity is a measure of the light-transmitting properties of water and is comprised of suspended and colloidal material. It is important for health and aesthetic reasons.

The chemical characteristics of natural water are a reflection of the soils and rocks with which the water has been in contact. In addition, agricultural and urban runoff and municipal and industrial treated wastewater impact the water quality. Microbial and chemical transformations also affect the chemical characteristics of water. (Source: [https://echo2.epfl.ch/VICAIRE/mod\\_2/chapt\\_2/main.htm](https://echo2.epfl.ch/VICAIRE/mod_2/chapt_2/main.htm))

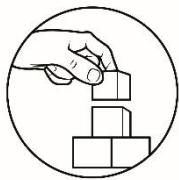
Water with good qualities is good for human consumption. Water availability is defined as the quantity of water that can be used for human purposes without significant harm to ecosystems or other users.

However, our water resources face a host of serious threats. Currently, about 40% of the world's population lives in water-stressed areas.

(Source: <https://freshwaterwatch.thewaterhub.org/>.2020)

Water scarcity occurs when the amount of water withdrawn from lakes, rivers or groundwater is so great that water supplies are no longer adequate to satisfy all human or ecosystem requirements, resulting in increased competition between water users and other demands. Water scarcity can be caused primarily by human activities which promote sedimentation, pollution, climate change, deforestation, landscape changes, and urban growth. Human waste disposal contributes to pollution of the air, land, and water resources. Such pollution can affect the quality of rainwater and water resources both above and below ground, thus damaging our natural systems.

Although it is difficult to instantly put an end to such problems, man must manage, develop, and protect water and related resources in an environmentally and economically sound manner.



## ***What's More***

Read the essay. Make a concept map on the different activities that affect the quality and availability of water.

### **How are aquatic ecosystems threatened by sediments in water?**

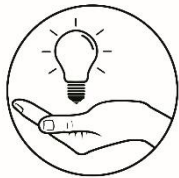
One of the most serious threats to water resources is the degradation of the ecosystem. It often takes place through changes of landscapes such as the clearance of forests, the conversion of natural landscapes to farmland, the growth of cities, the building of roads, and surface mining. Each type of change to a landscape will have its specific impact, usually directly on the natural ecosystem and directly or indirectly on water resources.

Also, sediments can occur in bodies of water naturally, but they are also produced in large amounts because of land-use change and agriculture. Sediments are naturally occurring particles that develop as earth materials are broken down through weathering and erosion. Sediment can consist of sand, rocks, and minerals, or may consist of organic particles of plants and microbes. Activities such as farming, clearing forests, building roads, and mining can put too much soil and particulate matter as sediment in rivers. These sediments can harm plants and animals by carrying toxic chemicals into the water, smothering fish eggs and small organisms used by fish as food, raising the water temperature, and reducing the amount of sunlight penetrating the water.

Sediment can also reduce the capacity of reservoirs and make it difficult for ships to navigate in waterways. It can also damage equipment used in water supply installations and hydroelectric plants, thus increasing their maintenance costs.

Rubrics for Concept map

	3 High	2 Average	1 Low
Concept	Constructs an appropriate and complete concept map	Places almost all concepts in an appropriate order	Places only a few concepts
Content	Presents all essential information	Presents most of the essential information	Presents some irrelevant information
Accuracy	Commits no error in grammar and spelling of words.	Commits at least two grammatical errors and misspelled words	Commits three or more grammatical errors and misspelled words



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

Conduct an interview regarding the quality and availability of water for human consumption. The interview guide is provided for you. Make sure to follow the safety protocols in conducting this task. You may conduct a virtual interview then write your reflection about the activity.

### **Interview Guide**

1. What is the source of your drinking water?
2. How safe is your drinking water?
3. Is it always available for consumption?
4. How do you ensure enough water supply in your household?
5. What preventive measures do you employ to keep water safe for human consumption?



I learned that...

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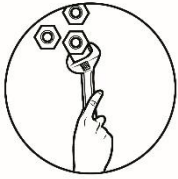
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## What I Can Do

Put a check (✓) on the activities that support conservation of the availability and quality of water.

- \_\_\_ 1. Converting lands into farming
- \_\_\_ 2. Limiting urban growth
- \_\_\_ 3. Planting more trees
- \_\_\_ 4. Surface mining
- \_\_\_ 5. Minimizing sedimentation

On a clean sheet of paper, write a slogan that promotes the conservation of water.

### Rubrics for Slogan Making

	4	3	2	1
Creativity	Slogan presents outstanding ideas and effort.	Slogan presents good ideas and effort.	Slogan presents some sort of ideas and effort.	The slogan does not present creativity.
Originality	Excellent use of ideas and originality in crafting the slogan.	Good use of ideas and originality in crafting the slogan.	Average use of ideas and originality in crafting the slogan.	Poor ideas and no originality in crafting the slogan.
Grammar	There is no grammatical error.	There is only one grammatical error.	There are two grammatical errors.	There are three or more grammatical errors.

Read and analyze the following questions. Answer each briefly.

1. Among the aforementioned activities, which brings great danger to the quality and availability of water? Support your answer.

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2. Observe the physical characteristics of tap water at home. Write your observations.

- a. Color

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- b. Taste

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- c. Odor

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- d. Turbidity

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3. Write three precautionary measures to maintain a clean and safe water for human consumption.

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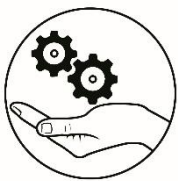
## **Assessment**

Read and analyze the following questions. Choose and write the letter that best describes the following statements.

1. Which human activities promote the quality of water?
  - a. Cleaning of the seashore
  - b. Surface mining
  - c. Deforestation
  - d. Urban growth
  
2. Which is NOT a cause of sedimentation in aquatic areas?
  - a. Agriculture
  - b. Reforestation
  - c. Urban growth
  - d. Surface mining

3. What kind of pollution degrades watersheds?
  - a. Chemicals
  - b. Fertilizers
  - c. Sediment
  - d. Algae
  
4. Why is there a need to observe the quality of water?
  - a. Determine clogging inside the water pipelines
  - b. Continue patronize water refilling stations
  - c. Ensure that water is safe for human use
  - d. Certify compliance with standards
  
5. What is the role of man in the ecosystem?
  - a. Steward God's creation
  - b. Abuse power over nature
  - c. Transform nature for human convenience
  - d. Enjoy the use of resources beyond limitations
  
6. What is a measure of the light-transmitting properties of water and is composed of suspended and colloidal material?
  - a. Odor
  - b. Color
  - c. Taste
  - d. Turbidity
  
7. What affects the chemical characteristics of water?
  - a. Temperature
  - b. Organic materials
  - c. Colloidal materials
  - d. Microbial transformations
  
8. What do you call the ethical use and protection of valuable resources?
  - a. Environment act
  - b. Conservation
  - c. Consumption
  - d. Utilization
  
9. How will you promote water conservation effectively as a student?
  - a. By making vlogs
  - b. By posting updates about water resources
  - c. By conducting a seminar on water conservation
  - d. By practicing simple but effective tips of water conservation
  
10. Which is one of the most serious threats to water resources which often take place through changes of landscapes?
  - a. Catastrophe
  - b. Degradation
  - c. Reforestation
  - d. Climate change

11. What activity extracts the valuable minerals or other geological materials from the Earth?
  - a. Sedimentation
  - b. Urbanization
  - c. Agriculture
  - d. Mining
  
12. What quantity of water can be used for human purposes without significant harm to ecosystems or other users?
  - a. Quality
  - b. Suitability
  - c. Capability
  - d. Availability
  
13. Why is there a scarcity of potable water supply?
  - a. Water resources nowadays are polluted
  - b. Inappropriate utilization of water
  - c. Pumping is not regulated
  - d. Deforestation
  
14. What threat is brought by sedimentation to water and aquatic inhabitants?
  - a. Lowers water temperature
  - b. Fosters the fish eggs and small organisms
  - c. Increases the amount of sunlight that penetrates the water
  - d. Harms plants and animals by carrying toxic chemicals into the water
  
15. Harmful materials created by human activities such as the throwing of waste and burning affect the quality of rainwater and water resources both above and below ground. Which phenomenon occurs in this scenario?
  - a. Pollution
  - b. Deforestation
  - c. Climate change
  - d. Landscape changes



## ***Additional Activities***

Congratulations! You have successfully finished Lesson 10. You may now proceed to Lesson 11. Please do an advanced reading on human activities, such as farming, construction of structures, and waste disposal that affect the quality and quantity of the soil or recall your elementary and junior high schools' discussions on this topic. Good luck! You may advance to the next level.





## Answer Key

Assessment	What's More	What I Know
1. a	Activities that affect the	1. a
2. b	quality and availability of	2. d
3. c	water:	3. a
4. c	- clearance of forests	4. a
5. a	- conversion of natural	5. d
6. d	resources	6. a
7. d	- building of roads	7. a
8. b	- surface mining	8. a
9. d	- sedimentation	9. c
10. b		10. b
11. d		11. d
12. d	Presentation of concept map	12. a
13. a	may vary	13. c
14. d		14. b
15. a		15. a

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