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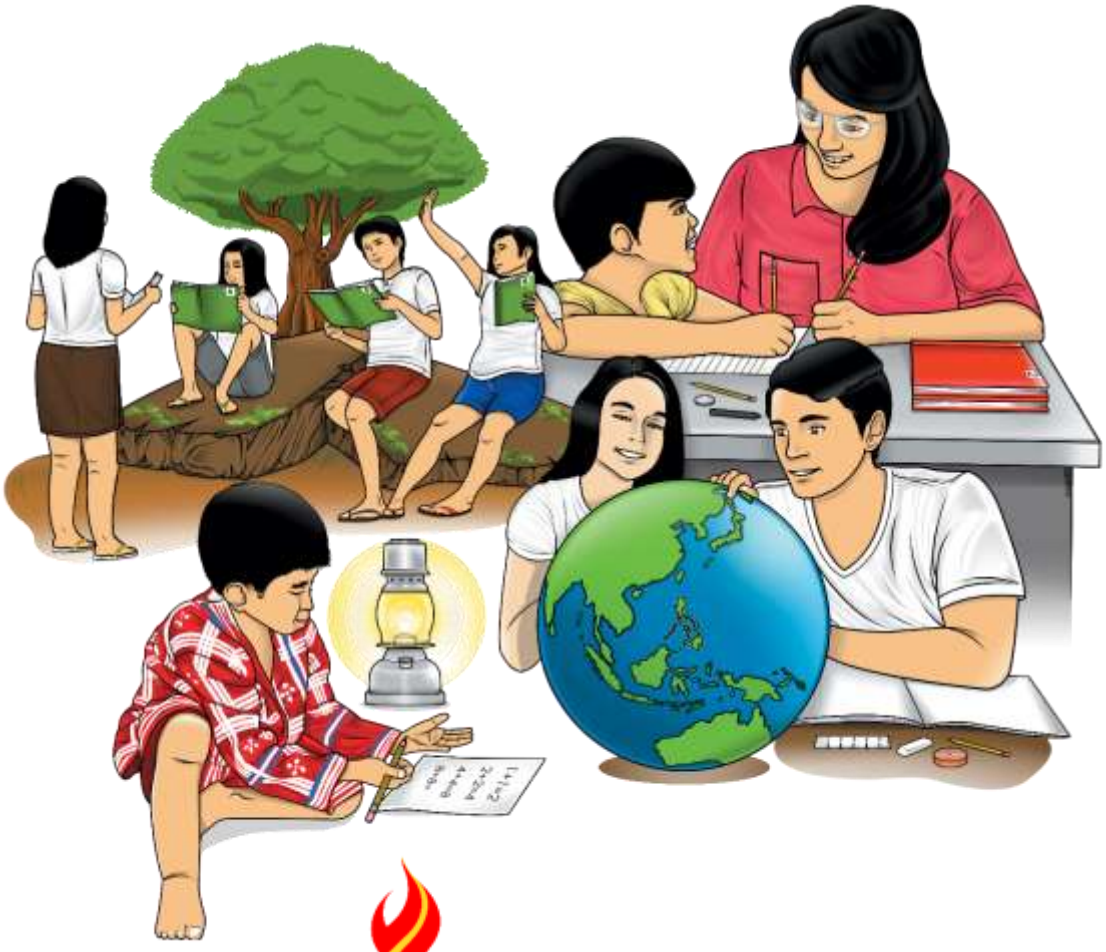
DEPARTMENT OF EDUCATION

Science

Quarter 4 – Module 11:
Impact of Human Activities in an Ecosystem



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Quarter 4 – Module 11: Impact of Human Activities in an Ecosystem

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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 impact of human activities in an 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 Learner's Material you are now using.

This module contains:

- **Lesson 1** – Impact of Human Activities in an Ecosystem

After going through this module, you are expected to:

1. Identify human activities that contribute negative and positive effects in the environment; and
2. Suggest ways to minimize human impact on the environment.
   (MELC Week 7 S8LT-IVj-25)

What I Know

Directions: Choose the letter of the correct answer. Write your answers on a separate sheet of paper.

1. What farming strategy is used when farmers plant a single, highly productive crop year after year?
   A. crop rotation
   B. monoculture
   C. polyculture
   D. Sloping Agricultural Land Technology (SALT)

2. The following are good practices to conserve the environment EXCEPT:
   A. The use of insects to fight other insects.
   B. The use of organic fertilizer to grow more crops.
   C. Growing a variety of crops instead of only one crop.
   D. The use of pesticides to remove unwanted organisms.

3. Which activity would cause the greatest decrease in the biodiversity of a large ecosystem?
   A. building a new home
   B. widespread use of pesticides
   C. widespread recycling program
   D. building a new store in a shopping mall

4. Deforestation will directly result an instant increase in_____.
   A. atmospheric ozone
   B. wildlife population
   C. renewable resources
   D. atmospheric carbon dioxide

5. Which natural resource is used by humans in their daily lives?
   A. garbage
   B. plastic
   C. water
   D. inorganic chemical

6. The following are major greenhouse gases EXCEPT:
   A. carbon dioxide
   B. methane
   C. oxygen
   D. water vapor

7. Which of the following describes deforestation?
   A. planting of trees in the denuded forest
   B. cutting and removing of trees from rainforests
   C. permitting more animals to graze on the land than it can support
   D. cutting trees selectively for lumber, ensuring the forest remains verdant

8. Why is biodiversity important?
   A. It stops acid rain.
   B. It creates more fossils fuels.
   C. It helps an ecosystem to survive.
   D. It removes mercury and other pollutants.

9. How can we help keep our waters clean?
   A. by not throwing trash into streams
   B. by never pouring any chemical into rivers
   C. by cleaning up litters along streams, rivers, and beaches
   D. all of the above

10. Which is the best way to dispose plastic wastes?
   A. burning them into ashes
   B. burying them in the soil
   C. throwing them into the drains
   D. recycling them to make new plastic items

11. Which is a benefit of organic gardening?
   A. results in substantial or better soil health
   B. permits you to grow plants in half the time
   C. needs greater time than traditional gardening
   D. uses advanced synthetic fertilizers and pesticides

12. Which of the following may happen when a large area of forest is destroyed by fire?
   A. Less soil will be eroded.
   B. More plants will be grown.
   C. Wildlife will be endangered.
   D. The land will have more fresh air.

13. The following activities harm the environment EXCEPT:
   A. Burning fossil fuels
   B. Using weed killers for farming
   C. Planting trees in a nature reserve
   D. Increasing the use of chlorofluorocarbons

14. Which refers to the addition of harmful materials to the environment?
   A. conservation
   B. erosion
   C. pollution
   D. reforestation

15. Which is the biggest threat to biodiversity on earth?
   A. habitat devastation
   B. decline in pollution
   C. loss of drinking water
   D. decline in the food supply

Lesson 1 Impact of Human Activities in an Ecosystem

What's In

In Module 10, you have learned about the cycle of materials in the ecosystem. Let us have a quick review!

Activity 1. Recall Me

Directions: Write **True** if the statement is true and **False** if the statement is false. Write your answers on a separate sheet of paper.

1. Human beings need plants and trees as the source of oxygen gas.
2. Water cycle is essential for organisms including humans to survive.
3. Plants and animals release carbon dioxide into the atmosphere.
4. Humans harvest nitrogen from the atmosphere to form ammonia, nitrites, and nitrates.
5. When plants and animals die, the nitrogen in the organic matter reenters the soil where it is broken down by decomposers.

What's New

Activity 2. Match Me

Directions: Match the **problem** with the **solution** by writing the letter only on a separate sheet of paper.

PROBLEM	SOLUTION
1. adopting *kaingin* system	A. grow a variety of crops
2. disposing waste improperly	B. observe waste segregation
3. employing monoculture	C. practice reforestation
4. using chemical fertilizer	D. use insects to fight other insect
5. using synthetic insecticides	E. use organic fertilizer

What is It

Impact of Human Activities to Ecosystems

The Earth was created with all abundance and variety of living and non-living organisms, with the sun as the source of natural energy to all that inhabit it. Man is given dominion over all the creation. Hence, they may utilize resources found in it to survive and progress. However, the weight of human activities takes a toll on the environment. Human activities affect environmental conditions from multiple perspectives such as unsustainable farming practices, emission of harmful substances into the air, and introduction of pollutants to bodies of water, land, and air.

A **pollutant** is a harmful material that enters the biosphere through the land, air, or water. The most common human activity that causes water pollutants to get introduced to the aquatic ecosystem is by using fertilizer, pesticides, and herbicides near bodies of water. When it rains, these chemicals get into rivers, creeks, or even seas, thus contaminating or worse, polluting it. The build-up of fertilizers may cause algal bloom resulting in the death of those bodies of water.

Improper waste disposal is another crucial issue. People litter everywhere to the extent that canals are being blocked by numerous pieces of garbage. R.A 9003 enacted in the Philippines in 2003 prohibits open dumping of garbage as its leachate pollutes the soil and underground water aside from the fact that it invites all sorts of insects and rodents that carry infectious diseases and respiratory problems. Despite this standing Act, open dumping of garbage is still widely practiced all over the country. Also, farmers extensively practice the use of inorganic fertilizers, pesticides, and herbicides to ensure productivity. Using these pollutants more often can alter the nutrient of the soil resulting in the loss of organic matter in it. Furthermore, misuse of our forests such as ruthless cutting of immature trees, illegal logging, and operating kaingin systems cause soil erosion and flash floods.

The air gets polluted when there is a clear or invisible particle or gas found to mix in its original, normal composition. **Smog** - a gray-brown haze formed by a combination of chemicals is a sign of air pollution. It is mainly caused by human activities such as smoke-belching and congestion of vehicles during heavy traffic causing a higher concentration of carbon monoxide, which in turn causes respiratory ailments to humans over long exposure to it. Moreover, some human practices that contribute to greenhouse gases are the burning of plastics and combustion of fossil fuel, use of aerosols and CFC-containing products. Popularly known greenhouse gases are carbon dioxide (CO_2), methane, and nitrous oxide that hasten global warming.

Humans interfere with the ecosystem by disrupting the ecological balance. They are the highest consumers in numerous food pyramids. To increase food

production, man uses methods and farming practices that affect food chains and food webs, such as monocultures, the use of artificial fertilizers, pesticides and herbicides.

Monoculture, also known as monocropping, is a farming practice that involves the continuous cultivation of a single crop on the same large land areas without change. For farmers, this is practical since it facilitates the specialization of the sort of crop to plant to maximize the uptake of the nutrients the soil offers. However, planting the same crop in the same place over the years takes up most of the same nutrients leaving the soil weak and unable to support healthy plant growth leading to poor crop yield. Also, monocrops usually require large amounts of chemical fertilizers. Constant and uncontrolled use of chemical fertilizers may increase soil acidity, thus destroying soil structure. **Monocropping** also gives rise to resistant pests and diseases that account for chemical treatment. Farmers spray their crops with insecticides to kill insect pests, and with herbicides to kill weeds. An **herbicide** is a chemical used to destroy and stop the growth of plants. However, the chemicals also destroy other organisms, including beneficial insects and soil organisms that help in decay.

Therefore, wise management of natural resources should be taken into consideration to mitigate the negative impacts of human activities in the environment and thus support **sustainability**, the prevention of the decreasing of natural resources to maintain an ecological balance. **Conservation** is the careful preservation and protection of natural resources. So, as a steward of the earth, let us help one another to make our environment a better place to live in for us and for the next generation.

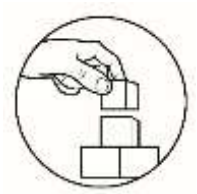
The following are among the recommended **desirable practices** to conserve natural resources:

1. Stop the kaingin system.
2. Use crop rotation method.
3. Use insects to combat other insects.
4. Grow different kinds of crops instead of only one crop.
5. Apply organic farming using natural fertilizers for crops.
6. Observe proper disposal of waste.
7. Use the 3Rs method (reuse, reduce and recycle).
8. Use appropriate size of nets when fishing.
9. Do not engage in illegal mining, logging, and fishing.
10. Minimize the use of CFC sprays.

Furthermore, you may ponder upon the quotation:

"The conservation of natural resources is the fundamental problem. Unless we solve that problem it will avail us little to solve all others."

Theodore Roosevelt



What's More

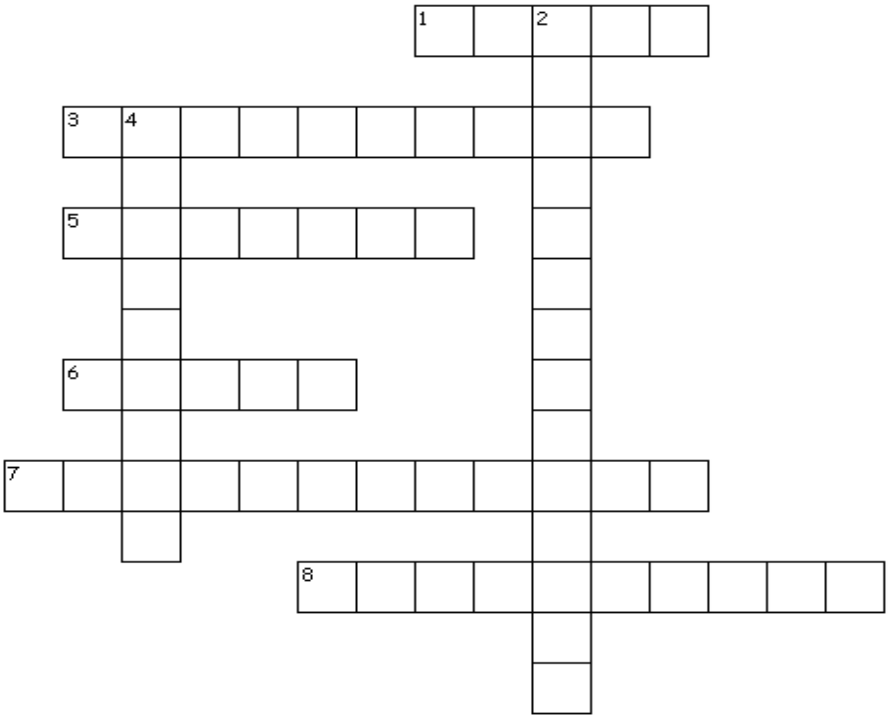
Activity 3. You Affect Me

Directions: Fill in the needed information on the table below. Write your answers on a separate sheet of paper.

Human Activities	Pollutant derived from human activities	Effect of pollutant on the environment
1.	Nitrates	Alter the nutrient of the soil
2.	Pesticides and herbicides	Pollute bodies of water
Burning of plastics	Carbon dioxide	3.
4.	Toxic chemicals	Fish kill
Using smoke-belching vehicles	Smog	5.

Activity 4. Hunt Me

Directions: Complete the crossword puzzle. Write your answers on a separate sheet of paper.



Across

1. Observe proper disposal of _____ that can destroy biodiversity.
3. The popularly known _____ gases are carbon dioxide, methane, and nitrous oxide.
5. Constant and uncontrolled use of chemical fertilizers may increase soil _____.
6. The buildup of fertilizers may cause algal _____ leading to the death of bodies of water.
7. _____ gives rise to resistant pests and diseases that account for chemical treatment.
8. _____ a chemical used to destroy plants or stop plant growth.

Down

2. Ecological _____ includes the stability of climate systems, biodiversity, and everything that is connected with the Earth's ecosystem.
4. Three ways to conserve resources include reducing, _____, and reusing.

Note to the teacher

Please provide loose copies of this activity for students' use.

What I Have Learned

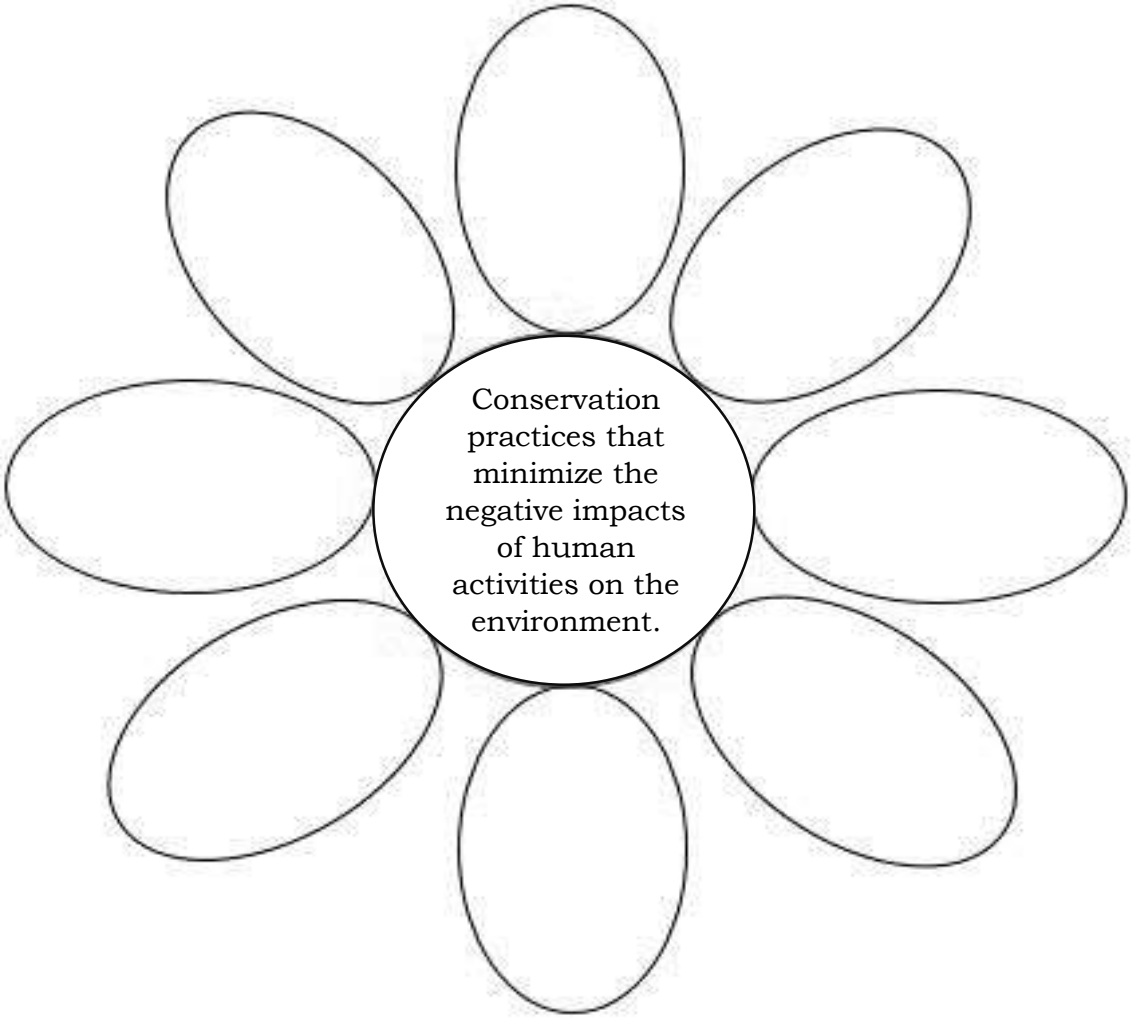
Directions: Complete the statement by writing the appropriate word or phrase on the blank. Write your answers on a separate sheet of paper.

1. A chemical substance that is used to kill pests is called _____.
2. The cultivation of a single crop in a large area is known as _____.
3. _____ is a harmful material that can enter the biosphere through the land, air or water.
4. The _____ is a substance that is added to soil to help the growth of plants.
5. The _____ is a chemical substance that is used to kill insects.
6. The preservation and wise use of natural resources is known as _____.
7. The cutting and removing of trees from rainforest is called _____.
8. The major gas produced when fuels are burned and when animals respire is called _____.
9. A _____ is the gray-brown haze formed by a combination of chemicals.
10. The prevention of the decreasing of natural resources in order to maintain an ecological balance is called _____.

What I Can Do

Activity 5. Complete Me

Directions: List/suggest conservation practices that minimize the negative impacts of human activities on the environment. Write your answers on a separate sheet of paper.



Note to the Teacher

Please provide loose copies of this activity for students' use.

Assessment

Directions: Choose the letter of the correct answer. Write your answers on a separate sheet of paper.

1. One way to conserve resources is the 3R initiative, which means reducing, recycling, and _____.
   A. reconstructing
   B. reconsidering
   C. rethinking
   D. reusing

2. What happens when humans cut down trees from forests to build houses?
   A. Plants produce more oxygen in that area.
   B. The house decreases the amount of pollution in the area.
   C. Plants and animals flourish in the new environment and pollution decreases.
   D. Habitat of plants and animals changes and pollution increases.

3. Which refers to preservation and wise use of natural resources?
   A. conservation
   B. ecosystem
   C. habitat
   D. population

4. Which human activity causes air pollution?
   A. littering
   B. burning fossil fuels
   C. garbage found on the side of the road
   D. water used as a coolant by power plants

5. Which human activity would most likely have a negative impact on the environment?
   A. clogging of canals with garbage
   B. planting trees to control landslide
   C. limiting the use of chemicals that kill weeds
   D. using natural gas for fuel instead of burning petroleum

6. Which results to the rise in carbon dioxide levels?
   A. burning fuels
   B. deforestation
   C. soil erosion
   D. CFC sprays

7. A farmer is spraying chemicals on his crops to kill insects. The chemicals that he uses leaks into the river. Which most likely happen to the organisms that live in the river?
   A. They change color.
   B. They get sick or die.
   C. They have more food to eat.
   D. They have more energy to use.

8. Which would result to water pollution?
   A. drought
   B. typhoon
   C. volcanic eruption
   D. dumping of garbage in water ways

9. Which activity can best help conserve our environment?
   A. leaving water faucet on
   B. leaving the refrigerator door open
   C. running the washing machine for only 1 shirt
   D. turning off the water faucet, lights, and appliances when not in use

10. Which is an example of habitat destruction?
   A. planting more trees
   B. cleaning up oil spills
   C. using organic fertilizer
   D. clearing a tropical rainforest

11. Which human activity could best improve the quality of air?
   A. Planting more trees
   B. Cutting down the forest to clear land for factories
   C. Purchasing trucks that get more miles per gallon of gasoline
   D. Expanding the number of coal-burning power plants that generate electricity

12. Which would happen if humans continue cutting down trees from the forest without replacing it?
   A. decrease in air pollution
   B. decrease in acid rain fall
   C. increase of paper supply in the market
   D. increase of carbon dioxide in the atmosphere

13. How can you conserve aquatic resources?
   A. by using fine fishnets
   B. by collecting corals and shells
   C. by using the appropriate size of nets
   D. by using cyanide for collecting coral fish

14. Which results to the release of too much amount of harmful substances into the air such as vehicle and factory fumes?
    A. Air pollution
    B. Land pollution
    C. Noise pollution
    D. Water pollution

15. Which human activity has the most positive environmental impact on the environment?
    A. Export of different kinds of endangered species
    B. Use of pesticides to control insect populations
    C. Reforestation and crop rotation to inhibit soil erosion
    D. Overhunting of many predators to avoid the death of prey animals

Additional Activities

Activity 6. Explain Me

Directions: Answer the question below. Write your answers on a separate sheet of paper.

Suppose you were a farmer, what kind of fertilizer will you use to ensure higher crop yield without damaging the environment? Explain your answer.

_____

_____

_____

_____

_____

Scoring Rubrics	
3	Discussions do not have misconceptions with complete scientific evidence.
2	Discussions do not have misconception with incomplete scientific evidence.
1	Discussions have misconceptions and without scientific evidence.
0	No discussion.

Answer Key

Assessment

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

What I Have Learned

1. Pesticide
2. Monoculture
3. Pollutant
4. Fertilizer
5. Insecticide
6. Conservation
7. Deforestation
8. Carbon dioxide
9. Smog
10. Sustainability

What I Can Do
Activity5.Complete Me

1. Plant more trees
2. Use organic pesticide
3. Use organic fertilizer
4. Recycling of materials
5. Use the 3R initiative
6. Do not use dynamite in fishing
7. Do not burn plastics
8. Do not engage in illegal logging

Additional Activities
Activity6.Explain Me

Sample answer
Organic fertilizer because it is safe to our environment and it cannot alter the nutrient of the soil.

What's More Activity 3.
You Affect Me

Possible Answers

1. using of artificial fertilizer
2. using of commercial pesticides and herbicides
3. Rising of temperature in the atmosphere that results to global warming
Health problems
4. Throwing of waste from factories
5. Depletion of ozone layer
Health problems or respiratory diseases

Activity 4. Hunt Me

Across
1. Waste
3. Greenhouse
5. Acidity
6. Bloom
7. Monocropping
8. Herbicides

Down
2. Sustainability
4. Recycling

What I Know

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

What's In
Activity1. Recall Me

1. True
2. True
3. True
4. False
5. True

What's New
Activity2. Match Me

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

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