

HEALTH EDUCATION II

MODULE 2

POLLUTION FREE WHY NOT ?



**What this Module is all about*

One consequence of our society's rapid advances in technology has been an increase in air and water pollution. Man-made substances and industrial by-products released into the air and water destroy the delicate balance of nature, affecting our environment tremendously. If a person's exposure to a pollutant exceeds a series of effect thresholds, the body will increasingly suffer from severe damage. Like air and water pollution, noise pollution can also contribute to a variety of physical and psychological problems

It is of utmost importance that we know about pollution and how it could affect our lives. It is then necessary to think of ways on how to prevent air, water, and noise pollution.

d. throw them into your regular garbage can

Compare your answers with the Key to Corrections. If you got 8-10 correct answers, that's great! This shows that you already know much about pollution. If you got a low score, don't feel bad. You would learn about them in this Module.

You may now proceed to Lesson 1.

* *LET'S LEARN !!!*



Lesson 1

WATER POLLUTION

This lesson will enable you to identify problems caused by water pollution. Do you know that our problems concerning water shortage and unsafe drinking water are all caused by water pollution?

The carrying capacity of a given region of the world, meaning, the region's ability to support a human population of certain size depends on the region's supply of water. However, the world's water supply is limited. It cannot keep pace with the current population growth. The water we have, not only our surface drinking water but our ground water and ocean is becoming more and more polluted for a variety of reasons.

Water pollution is not a new phenomenon. Some occur naturally especially when decaying plant and animal matters enter the water supply. These usually result to diseases such as cholera, dysentery, and typhoid fever that can be contracted by drinking contaminated water. On the other hand, industrialization and modern technology have contributed to creation of new and dangerous forms of water pollution.

Many industrial companies are concerned in preventing water pollution. They build water treatment systems to avoid contamination of their water supply. Unfortunately, even the best companies and factories have not prevented thermal pollution. The water released into our rivers and lakes is too hot. In such case, the temperature of the body of water rises, thus oxygen supply is depleted. When this process called EUTROPHICATION happens, animal life is diminished because the body of water loses its ability to support aquatic plant or ultimately dries up.

Many types of toxic substances such as by-products of the industrial and agricultural technologies pose severe threats to the quality of our water supply and to human health. Common substances are:

- **MERCURY** - a naturally occurring element that is widely distributed in the

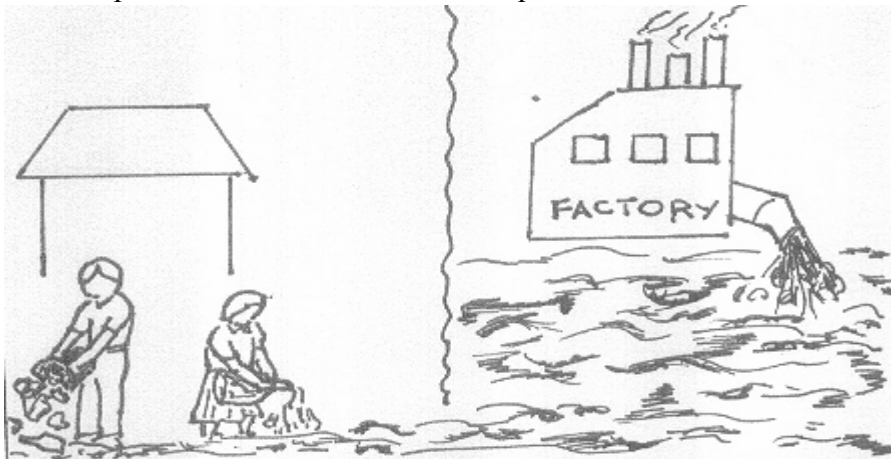
earth's crust. Certain microorganisms can convert mercury into an organic form, methyl/mercury, which, when consumed in large quantities, produce devastating symptoms. These may bring about inability to speak, mental retardation, numbness of arms and legs followed by deterioration of muscle tissue, gradual loss of vision and hearing, disruption of equilibrium, loss of coordination and emotional disturbance.

- **HYDROCARBONS** – chemicals that have a variety of uses in modern societies. Two types of hydrocarbons are potentially harmful to our water supplies. The chlorinated hydrocarbons that include dangerous pesticides such as DDT, chlordane, and kepone, might be used in food chains thus contaminate the food served. The other type is the polychlorinated biphenyls. These are substances that have been linked with reproductive disorders, kidney damage, liver ailments and eye irritations to humans.
- **OIL SPILLS** - These result when tankers are involved in accidents that may cause extensive damage.



Activity 1 “LET’S ANALYZE”

Look at the pictures below and answer the questions that follow.



1. List down the bad practices that you have spotted in the picture. Write a brief explanation why you consider each of them as bad practice.



Activity 2 “THEN AND NOW”

Make two columns on a separate sheet. Label the first one “When Younger” and the second one “Now.” Copy the items below that describe you when you were younger in the

first column, and those that describe you now in the second column. Leave out any item that describes something that is untrue about you, both when you were younger and now. You may use any item in both columns.

- wait until I find a trash can before throwing something away
- limit the use of hazardous chemicals
- clean up spilled oil and grease
- clean household drains with hot water mixed with ½ cup of baking soda
- properly dispose off household toxic wastes

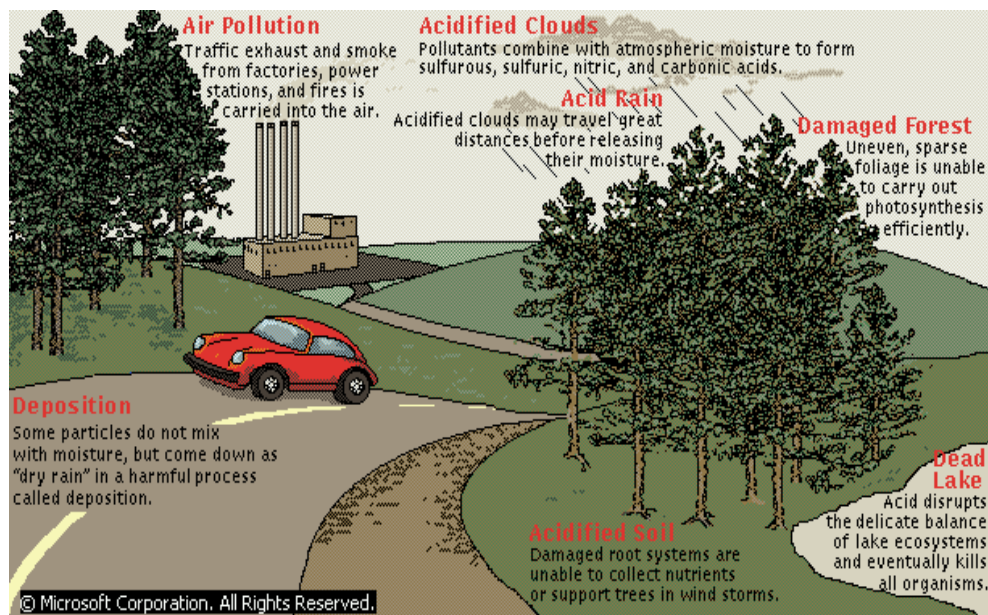
Compare your lists. Can you find evidence that you know more about the causes of water pollution and the ways you can help to cut down on it?



Lesson 2

AIR POLLUTION

Air pollution is the presence in the air of contaminants that do not disperse properly and that which interfere with human health. We once believed that the earth has an unlimited supply of breathable air. However, we must be aware that the air must also be protected.



Air pollution poses its threats to different parts of the body including the brain and the heart but most especially to the respiratory system. The principal contaminants responsible for air pollution are the following:

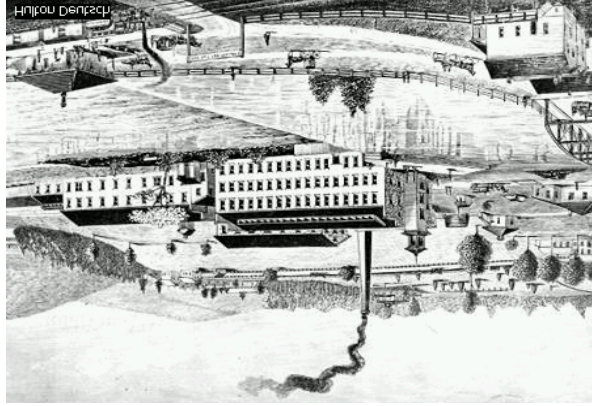
POLLUTANTS	MAJOR SOURCES	CHARACTERISTICS & EFFECTS
Carbon Monoxide (CO)	Vehicle Exhaust	Poisonous gas. Replace oxygen in red blood cells causing dizziness, unconsciousness or death.
Hydrocarbons (HC)	Incomplete Combustion of gasoline, evaporation of petroleum fuels, solvents and paints.	Although some are poisonous, most are not. React with NO ₂ , to form ozone, or smog.
Lead (Pb)	Anti-knock agents in gasoline	Accumulates in the bones and soft tissues. Affects blood-forming organs kidneys and nervous system. Suspected of causing learning disabilities in young children.
Nitrogen Dioxide (NO ₂)	Industrial processes, vehicle exhausts	Causes structural and chemical changes in the lungs, lowers resistance to respiratory infections, contributes to acid rain.
Ozone (O ₃)	Formed when HC and NO ₂ react	Principal constituent of smog. Irritates mucous membranes, causing cough, choke, impaired lung function, aggravates chronic asthma and bronchitis.
Sulfur Dioxide (SO ₂)	Burning coal and oil, industrial processes	Corrosive poisonous gas causing cough, colds, emphysema

There are three **kinds of sources of air pollution**. These are:

- **MOBILE SOURCES** – sources that are free to move from one place to another. Vehicles such as cars, trucks, buses, and jeepneys, which ply the roads 24 hours a day are the main mobile sources of air pollution.



- POINT SOURCES - stationary sources such as industrial firms and the smokestacks of power plants, hotels, and other establishments.

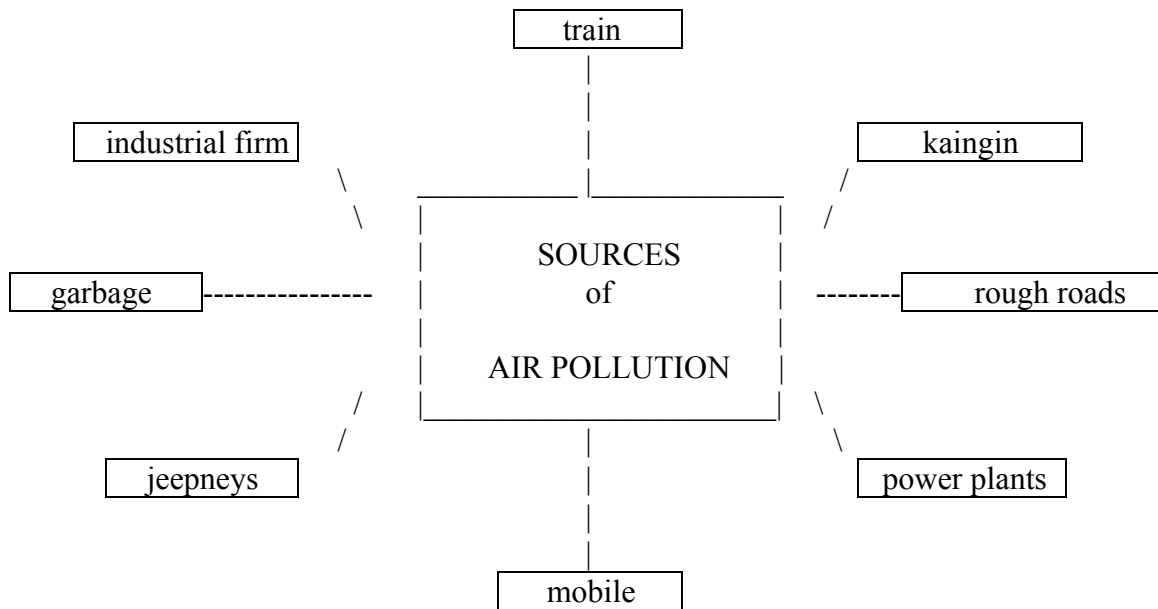


- AREA SOURCES - smoke emissions from airplanes and those from cigarette smoking, and burning of garbage. It also includes dust from construction, unpaved grounds, rough roads, etc.



Activity 3 “YAKSSS!”

Identify the following sources of air pollution. Write MS if it’s a mobile source; PS if point source; and AS if an area source.



Activity 4 “POLLUTION PUZZLE”

Use the clues in the box to solve the puzzle.

HYDROCARBONS	MOBILE	CO	OZONE
COLORLESS	KIDNEY	AREA	LEAD

		1	2		6								
3	A	L	S	M	O	B	I	L	E	D	A	F	M
	E	G	C	A	N	A	C	F	A	S	M	S	E
	D	A	L	E	C	R	F	A	G	R	O	B	M
	M	O	E	I	L	E	L	B	S	E	Z	E	O
	D	C	A	I	M	A	K	E	N	A	O	G	B
4	H	Y	D	R	O	C	A	R	B	O	N	A	I
5	E	S	U	N	C	O	L	O	R	L	E	S	S
7	D	C	O	A	O	A	F	N	E	A	H	O	I
8	F	E	M	K	I	D	N	E	Y	N	A	E	C

Across

- 3 sources of air pollution which includes smoke from vehicles
- 4 pollutant that comes from incomplete combustion of gasoline
- 5 characteristic of carbon monoxide
- 7 air pollution that comes from vehicles
- 8 organ that can be affected by lead

Down

- 1 pollutant from anti-knock agents in gasoline
- 2 source of air pollution that includes smoking and burning of garbage
- 6 principal constituent of smog



Activity 5 ***“I Can Do It”***

What can you do to help clean the air if you were:

- vehicle owner/ motorist
- commuter
- In your house
- In your community

Write your answer in your notebook.

Compare your answers with those in the Key to Correction.

Let's see how you fared. If you got a perfect score, CONGRATULATIONS! This means you really learned a lot from this lesson. If your score is 6 or 7, that's GOOD! However, go over the difficult parts in this lesson. If your score is 5 or lower, don't feel bad. You simply need to go over this Module again to better understand the lessons.



• ***Let's Remember***

Findings of the UP College of Public Health show that the incidence of chronic cough, phlegm, wheezing and shortness of breath among jeepney drivers and commuters reveal that jeepney drivers, representing 32% of the subjects are the most exposed to pollution.

Air pollution has indeed become a serious problem. With much efforts that had been

undertaken in the past to address the problem, the passing of the Clean Air Act in 1999 marked a milestone since it provides a comprehensive and integrated policy for air quality management. Republic Act No. 8749 otherwise known as the Philippine Clean Air Act, is a comprehensive air quality management policy and program which aims to achieve and maintain healthy air for all Filipinos.

Are you now ready to learn about another type of pollution? You may now proceed to the next lesson.



Lesson 3

NOISE POLLUTION ***“When It Is Too Noisy”***

In recent years there have been rapid increase in the amount of noise all over the world. Because noise has begun to change our environment, it is affecting us so much.



Man working with a jackhammer.

Noise Pollution refers to the presence of too loud, so sudden or very unpleasant sound that becomes an assault to the body causing mental or physical harm. The roaring of motor vehicles, jackhammer’s grating sound, squeaking tires, screeching brakes and even loud shouting are some types of dangerous noise. When continuously exposed to them, it affects not only the ears but also directly or indirectly impairs the mind and the whole body. Directly it can cause deafness, indirectly, it may lead to increased heart beat and high blood pressure that eventually causes cardiovascular disease.



Activity 6 “Making Noise”

Write the numerals from 1 to 10 in your notebook. Decide how noisy you think each of the following activities listed below are. Rank these activities in your notebook by writing the noisiest as number 1 to the least noisy as number 10.

- dropping a book in the library
- cheering at a basketball game
- group discussion in class
- dropping a loaded tray in the cafeteria
- talking in a quiet school corridor
- exercising during physical education class
- band practice
- shouting of children while playing
- full volume karaoke
- cleaning with a vacuum cleaner



Activity 7 “Falling Asleep”

What kind of noise can keep you from falling asleep? Draw <- in your notebook for situations you find tolerable, thus would least affect your sleep, and -> to those which you could not tolerate and would affect your sleep the most.

- street being cleaned
- jet planes at take off
- loud television in the adjacent room
- trash being collected outside your house
- radio playing softly in the room
- people talking quietly in a portion of the room

1. Why do some noises affect your falling asleep more than others would?
2. Could you eventually get used to falling asleep with each of the kind of noises listed?
3. Can you fall asleep easily if your environment is absolutely silent?








Activity 8 “Peace and Quiet”

You might want to look around for some sources of too much noise in your home and school. Suggest ways of making your home and school environment more quiet. List down in your notebook.

Let's Read

Have you ever heard of the word **decibel**? A decibel is a unit for measuring relative loudness of a sound. Zero decibel is the lowest level of sound that a young healthy human ear can detect. Noise at 130 decibels and higher can cause pain. Prolonged exposure to sounds at 80 decibels and above can cause permanent hearing loss.

Below is the decibel scale.

160	Jet plane at Takeoff /150	
140		
120	Jackhammer/ 120 Motorcycle/ 111 Power Mower/ 107	
100	Outboard Motor/ 102 Subway Train/ 95	
80	Food Blender/ 93 Bus Idling/ 90 Industrial Noise Level During an 8 Hour Day Known to Cause Hearing Loss/ 80 Average Traffic/ 65-75	
60	Conversational Speech/60	
40		
20	Library/ 35	
0	Broadcasting Studio/15	



Activity 9 "CLUES"

Use the clues to fill in the words. Write your answers in your notebook.

1. Unit of measurement used to get the level of loudness of a sound
_____ C _____
2. Presence of too loud or sudden sound that could affect one's health.
_____ E _____
3. Lowest level of sound
_____ R _____
4. Level of decibel that can cause permanent hearing loss
E _____
5. Direct effect of noise pollution
_____ F _____ S _____



* *Let's Summarize*

- ➔ Water pollution is a result of too much waste and garbage thrown in bodies of water. It is harmful to our health, homes, and environment.
- ➔ The air around us becomes polluted when we release harmful materials into the atmosphere in big amounts.
- ➔ Noise is now recognized as a form of pollution that can be hazardous to human health.

- *Let's see what you have learned*



POST TEST

Put a check (/) if the concept is correct and an asterisk (*) if the concept is incorrect. Make your answers in your notebook.

1. Smog is a condition in which chemical pollutants and particulate matters in the air are noticeably dense.
2. Noise can only affect our sense of hearing
3. Excessive inhalation of carbon monoxide slows down mental performance.
4. Sulfur dioxide is not harmful to our health.
5. Philippine Clean Air Act is a comprehensive air-quality management policy and program that aims to achieve and maintain healthy air for all Filipinos.
6. Pollution is not associated with any undesirable change in the physical, chemical, and biological conditions of the environment.
7. Mercury when consumed in large quantities can produce devastating effects to our health.
8. Frequent exposure to noise is not hazardous to human health.
9. Nitrogen Dioxide is not considered as a pollutant.
10. The extent of water pollution is measured by decibels.

Compare your answers with those in the Key to Correction.



* *Key to Correction*

Pre-Test

- | | |
|------|-------|
| 1. D | 6. B |
| 2. B | 7. B |
| 3. D | 8. C |
| 4. C | 9. A |
| 5. A | 10. A |

Activity 1 “Let’s Analyze”

PICTURE # 1

- throwing of garbage in the canal/ pond/ lake/ river/ sea

PICTURE # 2

- industrial waste disposed off in the lake/ river/ sea

Note: Explanations may vary according to your rationalization.

Activity 2 “Then and Now”

Answers may vary depending upon your values and training. However, your answer may be as follows:

YOUNGER

NOW

Wait until I find a trash can before throwing something away

Wait until I find a trash can before throwing something away

Limit the use of hazardous chemicals

Clean up spilled oil and grease

Clean household drains with hot water mixed with $\frac{1}{2}$ cup of baking soda

Properly dispose off household toxic wastes

Activity 3 “YAKSSS!”

Picture # 1 - PS (Point Sources – power plant)

Picture # 2 - MS (Mobile Sources – vehicles)

Activity 4 POLLUTION PUZZLE

1. LEAD
2. AREA
3. MOBILE
4. HYDROCARBON
5. COLORLESS
6. OZONE
7. CO
8. KIDNEY

Activity 5 “I Can Do It”

Answers may vary depending upon your sense of responsibility and values.

Activity 6 “Making Noise”

Note: Answers may vary depending upon your senses, physical and emotional condition

Activity 7 “Falling Asleep”

Note: Answers may vary depending upon your senses, physical and emotional condition

Activity 8 “Peace and Quiet”

Note: Answers may vary depending upon your senses, physical and emotional condition

Activity 9 “CLUES”

1. DECIBEL
2. NOISE
3. ZERO
4. EIGHTY
5. DEAFNESS

Post Test

- | | | | |
|----|---|-----|---|
| 1. | / | 6. | * |
| 2. | * | 7. | / |
| 3. | / | 8. | * |
| 4. | * | 9. | / |
| 5. | / | 10. | * |



What is your score? If you got 10 correct answers in the post test,

Congratulations !

If your score is 6 or below, you need to go over this Module again.

