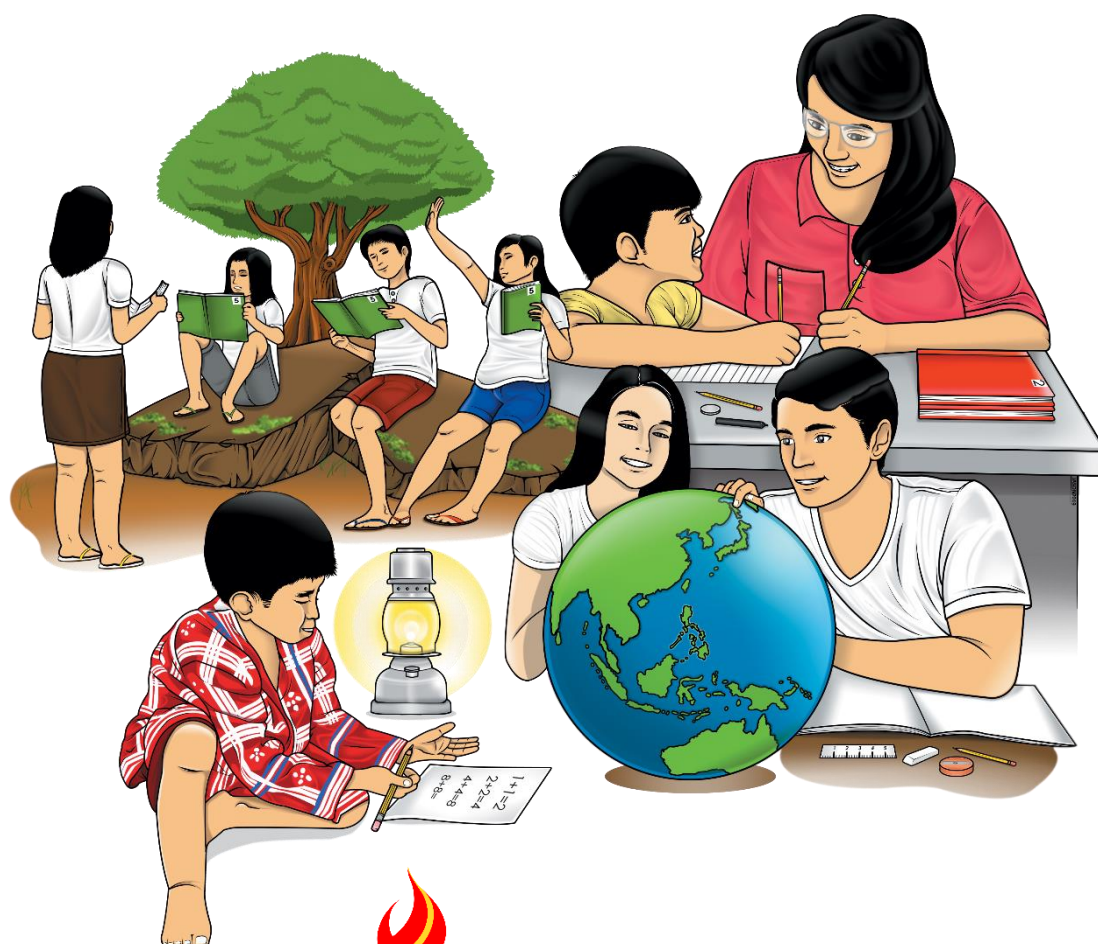


Senior High School

Earth Science for Stem

Quarter 1 – Module 14:

Earth Material and Processes



**Earth Science for STEM
Alternative Delivery Mode
Quarter 1 – Module 14: Earth Material and Processes
First Edition, 2021**

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Senior High School

Earth Science for STEM

Quarter 3 – Module 14:

Earth Material and Processes

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:

- Lesson 1 – What is a waste?
- Lesson 2 - Sources of Waste and Treatment
- Lesson 3 - How do different types of waste affect people’s health and environment?

After going through this module, you are expected to:

1. identify different types of waste commonly found in a house.
2. determine the different activities of improper waste disposal.
3. describe the wastes produced from different sources and their proper treatment.
4. identify hazardous materials and each impact on humans and the environment.
5. explain the effect of different waste on human health and the environment.
6. employ promotion on the conservation of the healthy environment through slogan.



What I Know

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

1. Which of these terms refer to the unwanted substances needed to be disposed?
 - A. compost
 - B. plastic
 - C. solid waste
 - D. waste
2. Approximately, how many years does it take for a plastic bottle to break down?
 - A. 150
 - B. 450
 - C. 700
 - D. 1000
3. Containers, jars and bottles are examples of what type of waste?
 - A. hazardous waste
 - B. liquid waste
 - C. organic waste
 - D. solid waste
4. Which of the following is an example of hazardous waste?
 - A. bottle
 - B. batteries
 - C. meat
 - D. paper
5. Farmers regularly use pesticides in their farms; they consider pesticides as what type of waste?
 - A. agricultural waste
 - B. fishery waste
 - C. industrial waste
 - D. municipal waste
6. Jose is an advocate of proper waste disposal and encourages other students to practice recycling. Will you help Jose identify which of the following items can be recycled?
 - A. aluminum cans
 - B. cardboard
 - C. paper cups
 - D. All of the above

7. People in the community strictly followed the local government ordinances when it comes to waste management. Which color of garbage bag do they use for non-recyclable waste?
- A. black
 - B. blue
 - C. green
 - D. yellow
8. In the XYZ power plant, dissolution of radioactive nuclides is processed and filtered to the atmosphere. What type of waste is being generated by the power plant?
- A. biomedical waste
 - B. gaseous waste
 - C. liquid waste
 - D. solid waste
9. Substances that are unsafe to use commercially are considered hazardous. Which of the following is NOT a property of hazardous waste?
- A. corrosive
 - B. malleable
 - C. reactive
 - D. toxic
10. When classifying waste at home, Jana knows that _____ is a solid waste and _____ is a liquid waste.
- A. bottle, detergent
 - B. can, plastic bag
 - C. bottle, tin can
 - D. egg shell, steel
11. What type of waste is commonly found in coastal and estuarine areas?
- A. E-waste
 - B. fishery waste
 - C. municipal waste
 - D. radioactive waste
12. What is E-waste?
- A. eco-friendly waste
 - B. hazardous chemical waste
 - C. obsolete electronically waste
 - D. waste from nuclear power plant
13. In times of Covid-19 pandemic, many people used facemasks to protect themselves. As a responsible citizen, disposable facemasks should be put in a _____ container.
- A. hazardous waste
 - B. liquid waste
 - C. organic waste
 - D. solid waste

14. Dealing with waste management is a very important task because of the _____.
- A. infrastructure consideration
 - B. large volume of waste produced in the community
 - C. environmental pollution
 - D. all of the above
15. Which is the appropriate definition of hazardous waste?
- A. Only liquid wastes that is considered toxic and chemically reactive
 - B. Only solid waste that is considered toxic and chemically reactive
 - C. Any solid, liquid or gaseous waste that is considered toxic and chemically reactive
 - D. Only gaseous waste that is considered toxic and chemically reactive

Lesson

1

What is a Waste?

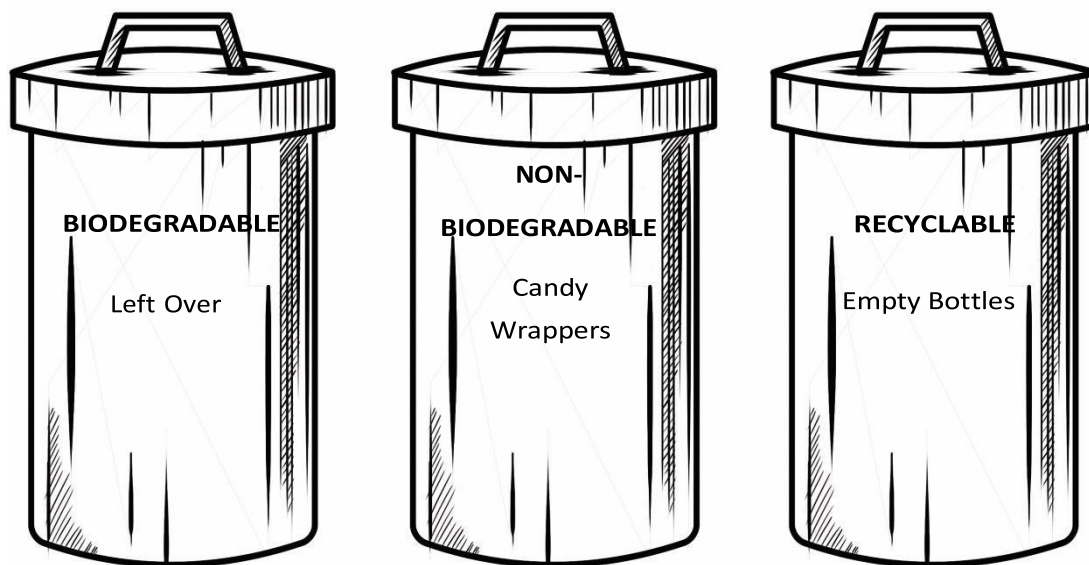
Waste (or wastes) are unwanted or unusable materials. Waste is any substance that is discarded after primary use or is worthless, defective, and of no use. A by-product by contrast is a joint product of relatively minor economic value. A waste product may become a by-product, joint product, or resource through an invention that raises a waste product's value above zero.

Examples include a municipal solid waste (household trash/refuse), hazardous waste, wastewater (such as sewage, which contains bodily wastes (feces and urine) and surface runoff), radioactive waste, and others.



What's In

Activity 1



Analyze the figure above. Answer the guide questions that follow. Write your answer on a separate sheet of paper.

1. What are the common trash bins present at home and in the community?

2. In what trash bin will you throw empty bottles?

3. What are the common wastes thrown in the non-biodegradable trash bin?

4. If you ate a banana, in what trash bin will you put the banana peel?

5. Why is there a need to segregate wastes?



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

Activity 2: Let's Investigate

Using the checklist below, put a check whether the given statement is available or observed in your surroundings. Write your answer on a separate sheet of paper.

	Yes	No
1. Is blue colored trash bin available?		
2. Is green colored trash bin available?		
3. Is yellow colored trash bin available?		

4. Are waste bins covered?		
5. Is the biohazard symbol imprinted over the waste bag?		

1. From your observations, what trashes/ wastes are present in the blue, green, and yellow colored trash bin?

2. Why is there a need to cover the trash bins?



What is It

What is solid waste?

Solid waste is defined as any garbage, refuse, sludge from waste treatment plant, water supply treatment plant, or air pollution control facility and other materials, including solid, liquid, semisolid, contained gaseous resulting from industrials, commercials, mining, and agricultural operations from community activities.

Types of Waste

A. Biodegradable waste. These are the wastes that come from our kitchen, and include food remains, garden waste, etc. These are also known as moist waste. These can be composted to obtain manure. They decompose themselves over a period depending on the material.

B. Non-biodegradable waste. These are the wastes which include old newspapers, broken glass pieces, plastics, etc. These are known as dry waste. Dry wastes can be recycled and can be reused. Non-biodegradable wastes do not decompose by themselves and hence are major pollutants.

Waste can be classified into five types of waste which are all commonly found around the house. These include liquid waste, solid rubbish, organic waste, recyclable rubbish, and hazardous waste. Make sure that you segregate your wastes into these different types to ensure proper waste removal.

1. Liquid Waste - commonly found both in households as well as in industries. It includes dirty water, organic liquids, wash water, waste detergents, and rainwater.

2. Solid Rubbish can include a variety of items found in your household along with commercial and industrial locations.

Solid rubbish is commonly broken down into the following types:

- **Plastic waste** – This consists of bags, containers, jars, bottles, and many other products that can be found in your household. Plastic is not biodegradable, but many types of plastic can be recycled. Plastic should not be mixed in with your regular waste. It should be sorted and placed in your recycling bin.
 - **Paper/card waste** – This includes packaging materials, newspapers, cardboards, and other products. Paper can easily be recycled and reused so make sure to place them in your recycling bin or take them to your closest recycling area near your place.
 - **Tins and metals** – These can be found in various forms throughout your home. Most metals can be recycled. Consider taking these items to a scrap yard or to your closest recycling area to dispose of this waste type properly.
 - **Ceramics and glass** – These items can easily be recycled. Look for special glass recycling bins and bottle banks to dispose them correctly.
- 3. Organic Waste** is another common household. All food waste, garden waste, manure, and rotten meat are classified as organic waste. Over time, organic waste is turned into manure by microorganisms. Organic waste in landfills causes the production of methane, so it must never be simply discarded with general waste.
- 4. Recyclable Rubbish** includes all waste items that can be converted into products that can be used again. Solid items such as paper, metals, furniture, and organic waste can all be recycled.
- 5. Hazardous Waste** - includes all types of rubbish that are flammable, toxic, corrosive, and reactive. These items can harm you as well as the environment and must be disposed of correctly.

Characteristics of wastes

1. **Corrosive:** these are wastes that include acids or bases that are capable of corroding metal containers, e.g., acid, or alkaline solution, rust remover, battery acid, and caustic hot tank waste.
2. **Ignitability:** this is waste that can create fires under certain conditions, e.g., waste oils and solvents.
3. **Reactive:** these are unstable in nature, they cause explosions, toxic fumes when heated, e.g., lithium-sulfur batteries and explosives.
4. **Toxicity:** waste that is harmful or fatal when ingested or absorbed, e.g., the household products in homes that are improperly disposed of such as old batteries, pesticides, paint, and car oil.
5. **Non-Hazardous waste:** is any type of industrial waste which, according to regulations, cannot be added to a dumpster or sewage line. e.g., refuse, garbage, sludge, municipal trash.
6. **Hazardous waste:** The most common examples of hazardous waste found within the home include paints, batteries, solvents, cleaning agents, pesticides, heavy metals, and chemical sludges.
7. **Radioactive:** high and low-level radioactive waste. Low-Level Radioactive Waste (LLRW) is a regulatory term defined as the broad group or class that is not included in the following classes of radioactive waste:
 - a. Spent nuclear fuel.
 - b. Fuel that has been withdrawn from a nuclear reactor after use.
 - c. High-level radioactive wastes are the highly radioactive materials produced as a byproduct of the reactions that occur inside nuclear reactorsHigh-level wastes take one of two forms:
 - i. Spent (used) reactor fuel when it is accepted for disposal.
 - ii. Waste materials remaining after spent fuel is reprocessed.
8. **Mixed waste:** Radioactive organic liquids, radioactive heavy metals. Mixed hazardous waste is waste that falls into two or more different categories of hazardous materials. Examples include radioactive contaminated phenol/chloroform, or blood labeled with a radionuclide.

Lesson

2

Earth Science: Sources of Waste and Treatment

What are the sources of waste materials?

The source of waste comes from industrial, the typical waste generated is light and heavy manufacturing, fabrication, construction sites, power, and chemical plants. The commercial is another source of waste like stores, hotels, restaurants, markets, office buildings, etc. The institutional source came from schools, hospitals, prisons, government centers.

How are waste materials treated?

Hazardous waste can be treated by chemical, thermal, biological, and physical methods. Chemical methods include ion exchange, precipitation, oxidation and reduction, and neutralization. Among thermal methods is high-temperature incineration, which can not only detoxify certain organic wastes but can also destroy them.



What's In

Activity 1: "Connecting"

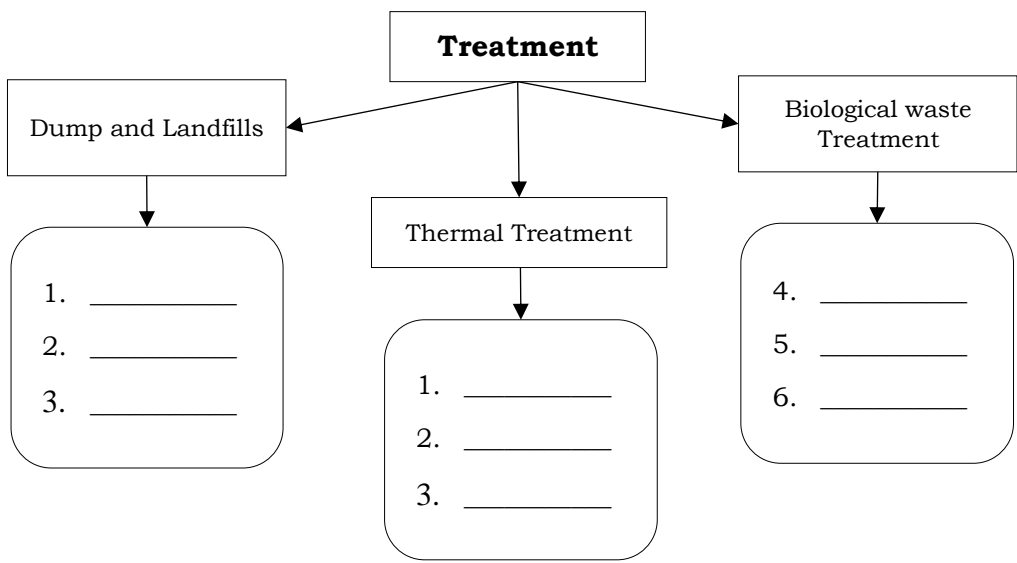
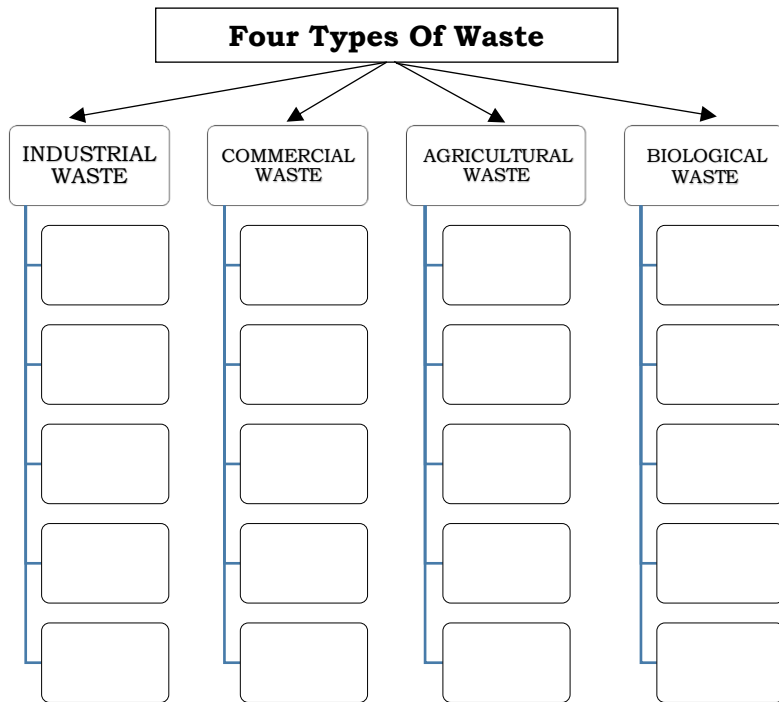
Connect the following word/s to find out the examples of types of waste sources and how they are treated. You may choose the word/s on Word Bank A for the waste source and Word Bank B for the treatment. Write your answer in your notebook.

WORD BANK A

bricks tile rubble metal
 plastics
rubber tile chemicals scrap
metal bricks cattle waste
 weed husk grapes
 vegetables leave peels
bottle paper concretes

WORD BANK B

Incineration Gasification
 open burning
Sanitary landfill Controlled
 Dumps
 Bio-reactors landfill
 Composting
Anaerobic Digestions

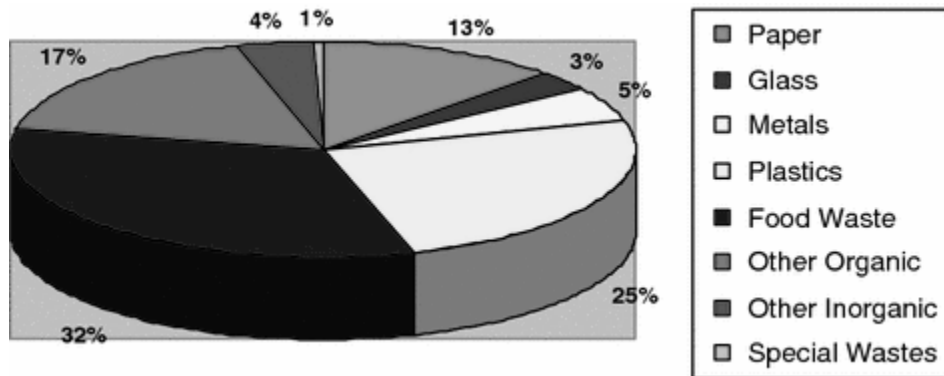




What's New

Activity 2: Let's Analyze!"

The Philippines faces more pronounced waste management challenges in urban metropolitan centers. Cities within Metro Manila generate almost 25 % of the country's total waste generation. Study the picture below and answer the guided questions. Write your answer in your notebook



1. What is the most generated waste listed and how many percent is it?

2. What is the least generated waste listed and how many percent is it?

3. Do you think your municipality is one of the highest producers of waste?
Explain your answer.



What is It

According to a report by the Senate Economic Planning Office (SEPO), the country's waste generation steadily increased from 37,427.46 tons per day in 2012 to 40,087.45 tons in 2016. Meanwhile, solid wastes produced by Philippine cities are expected to increase by 165 percent to 77,776 tons by 2025.

Solid wastes are generated from residential, commercial, industrial, and institutional sources. Residential wastes account for more than half (57%) of the total solid wastes (e.g., kitchen scraps, yard waste, paper and cardboard, glass bottles, etc.) Wastes from commercial sources, which include commercial establishments

and public/private markets, account for 27%. Wastes from institutional sources such as government offices, educational and medical institutions account for about 12% while the remaining four percent (4%) is waste coming from the industrial or manufacturing sector (NSWMC).

Causes of Increase in Solid Waste

1. Population growth
2. Increase in industrials manufacturing
3. Urbanization
4. Modernization, technological advancement, and an increase in the global population created rising in demand for food and other essentials. This has resulted into rising in the amount of waste being generated daily by each household.

Sources of waste can be broadly classified into four types:

1. **Industrial Waste.** These are the wastes created in factories and industries. Most industries dump their wastes in rivers and seas which cause a lot of pollution. Example: plastic, glass, etc.
2. **Commercial Waste.** Commercial wastes are produced in schools, colleges, shops, and offices. Example: plastic, paper, etc.
3. **Domestic Waste.** The different household wastes which are collected during household activities like cooking, cleaning, etc. are known as domestic wastes. Example: leaves, vegetable peels, excreta, etc.
4. **Agricultural Waste.** Various wastes produced in the agricultural field are known as agricultural wastes. Example: cattle waste, weed, husk, etc.

When you are thinking about solid waste management, it is likely the same as garbage being dumped in landfills or incinerated. For example, treatment techniques act to reduce the volume and toxicity of solid waste. These steps can transform it into a more convenient form of disposal. The composition and quantity of waste are based on selecting waste treatment and disposal methods.

Here are major waste treatments and disposal methods:

- A. Thermal Treatment refers to the processes that use heat to treat waste materials.

Following are some of the most used thermal waste treatment techniques:

1. **Incineration** is one of the most common waste treatments. This approach involves the combustion of waste material in the presence of oxygen. It is commonly used as a means of recovering energy for electricity or heating. The advantages of this approach are it is quickly reduced waste volume, lessens transportation costs, and decreases harmful greenhouse gas emissions.
2. **Gasification** and **Pyrolysis** are two similar methods, both of which decompose organic waste materials by exposing waste to low amounts of oxygen and very high temperature. Pyrolysis uses no oxygen while gasification allows a very low amount of oxygen in the process. Gasification is more advantageous as it allows the burning process to recover energy without causing air pollution.
3. **Open Burning** is a legacy thermal waste treatment that is environmentally harmful. The incinerators used in such a process have no pollution control

devices. They release substances such as hexachlorobenzene, dioxins, carbon monoxide, particulate matter, volatile organic compounds, polycyclic aromatic compounds, and ash. Unfortunately, this method is still practiced by many local authorities internationally, as it offers an inexpensive solution to solid waste.

B. Dumps and Landfills.

1. **Sanitary landfills** provide the most used waste disposal solution that is desired to eliminate or reduce the risk of environmental or public health hazards due to waste disposal. These sites are situated where land features work as natural buffers between the environment and the landfill. For instance, the landfill area can be comprised of clay soil which is quite resistant to hazardous wastes or is characterized by an absence of surface water bodies or a low water table, preventing the risk of water pollution.
2. **Controlled dumps** are the same as sanitary landfills. These dumps comply with many of the requirements for being a sanitary landfill but may lack one or two. Such dumps may have a well-planned capacity but no cell planning. There may be no or partial gas management, basic record-keeping, or regular cover.
3. **Bioreactor landfills** are the result of recent technological research. These landfills use superior microbiological processes to speed up waste decomposition. The controlling feature is the continuous addition of a liquid to sustain optimal moisture for microbial digestion. The liquid is added by re-circulating the landfill leachate. When the amount of leachate is not adequate, liquid waste such as sewage sludge is used.

C. Biological Waste Treatment

1. **Composting** is another most frequently used waste disposal or treatment method which is the controlled aerobic decomposition of organic waste materials by the action of small invertebrates and microorganisms. The most common composting techniques include static pile composting, vermin composting, windrow composting, and in-vessel composting.
2. **Anaerobic Digestion** also uses biological processes to decompose organic materials. Anaerobic Digestion, however, uses oxygen and a bacteria-free environment to decompose the waste material where composting must have air to enable the growth of microbes.

Some of the main waste disposal methods include:

- a. **Incineration**- The burning of waste materials at high temperatures to transform them into gases or residue.
- b. **Recycling**- The conversion of waste material into new products. It aims to reduce strain on the environment by minimizing the waste that is added to the water, air, and land.
- c. **Open Dumping**- A simple and inexpensive method that involves the deliberate disposal of garbage in an open space.
- d. **Ocean Dumping**- Occurs when sewage, garbage, construction debris, hazardous chemicals, etc. are intentionally discarded at sea by ships,

aircraft, and other man-made machines. Incineration of trash at sea is also included in this definition.

Proper waste disposal and management can be done by applying the 3Rs—Reduce, Reuse and Recycle. Reducing means lessening the amount of trash/garbage produced. Reusing involves the repeated use of items or parts of items that still have usable aspects. Recycling means the use of waste itself as a resource.

Color coding exists to allow you to easily distinguish the different types of biomedical waste, by sorting them into different categories, each pertaining to a single color. Your colored bins take different kinds of waste. Green for biodegradable waste (non-recyclable waste); black for electronic product-waste; and blue for plastic and metal waste (recyclable waste).

Lesson

3

The Effect of Different Kind of Waste to People's and Environment

How is waste affecting our environment?

Disposing of waste has huge environmental impacts and can cause serious problems. Some waste will eventually rot, but not all. In the process, it may smell, or generate methane gas, which is explosive and contributes to the greenhouse effect. Leachate produced as waste decomposes may cause pollution.

How does waste affect people's health?

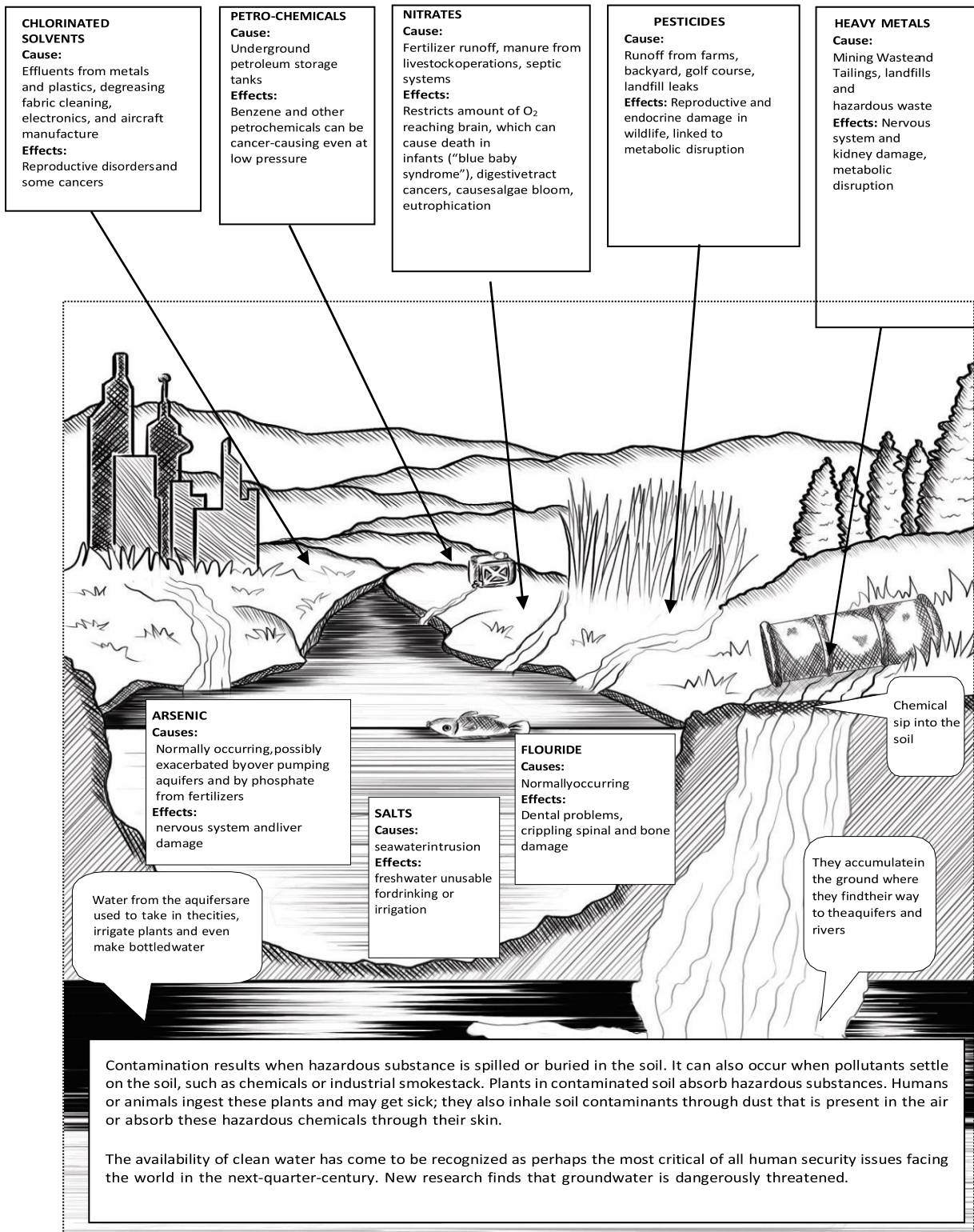
The more emissions that we produce due to how much trash we generate, may affect us in the long term. One can develop diseases such as asthma, birth defects, cancer, cardiovascular disease, childhood cancer, COPD, infectious diseases, low birth weight, and preterm delivery.



What's New

Activity 1: "Picture me out!"

Take a look at the informative image below. Answer the 5-test question that follows.



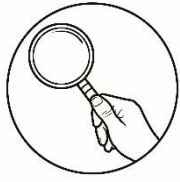
1. Which of the following hazardous substances contaminate the soil and water and can cause kidney damage?
 - a. chlorinated substance
 - b. Petro-chemicals
 - c. heavy metals
 - d. nitrates

2. Contamination of nitrates on soil is caused by manure from livestock operations. The following are the effects of nitrates except for _____.
 - a. algae bloom
 - b. metabolic disorders
 - c. eutrophication
 - d. “Blue baby syndrome”

3. Long-term exposure to arsenic in drinking water can cause _____.
 - a. skeletal system damage
 - b. cancer in the skin
 - c. dental problems
 - d. liver damage

4. The effects of pesticides present in water are reproductive and endocrine damage in wildlife. It is caused by _____.
 - a. runoff from farms
 - b. forest
 - c. deep sea
 - d. rivers

5. Contamination results when a hazardous substance is spilled or buried in the soil. It also occurs when pollutants settle on the soil and plants in contaminated soil absorb hazardous substances. How do humans or animals are affected by this contamination?
 - I. They inhale soil contaminants through the dust that is present in the air.
 - II. Humans or animals ingest these plants and may get sick.
 - III. They absorb these hazardous chemicals through their skin.
 - IV. It often causes a reduction in crop yields.
 - a. I, II, III
 - b. II, III, IV
 - c. III, IV, I
 - d. IV, II, I



What is It

Exposure to hazardous waste can affect human health, with children being more vulnerable to these pollutants. Waste from agriculture and industries can also cause serious health risks. Other than this, co-disposal of industrial hazardous waste with municipal waste can expose people to chemical and radioactive hazards.

Soil, water, and air pollution can be a result of improper waste disposal and occurs when either of them becomes contaminated with hazardous materials. Not only does this contribute to the creation of greenhouse gas effects but also causes significant harm to marine and wildlife. Ignorance of people about proper waste disposal and laziness can cause improper garbage disposal. Some people do not follow the rules of proper waste disposal. They always throw it in what place they want, and they have no care of what will be its effect.

Disposing of waste has huge environmental impacts and can cause serious problems. Some waste will eventually rot, but not all, and in the process, it may smell, or generate methane gas, which is explosive and contributes to the greenhouse effect. Leachate produced as waste decomposes may cause pollution.

Sources of Human Exposures

1. Exposures occur through
 - a. Ingestion of contaminated water or food
 - b. Contact with disease vectors
 - c. Inhalation
 - d. Dermal
2. Points of contact, Soil adsorption, storage, and biodegrading
3. Plant uptake
4. Ventilation
5. Runoff
6. Leaching
7. Insects, birds, rats, flies, and animals
8. Direct dumping of untreated waste in seas, rivers, and lakes results in the plants and animals that feed on it

Impacts of solid waste on health

1. Chemical poisoning through chemical inhalation
2. Uncollected waste can obstruct the stormwater runoff resulting in a flood
3. Low birth weight
4. Cancer
5. Congenital malformations
6. Neurological disease
7. Nausea and vomiting
8. Increase in the hospitalization of diabetic residents living near hazardous waste sites.
9. Mercury toxicity from eating fish with high levels of mercury

Effects of Solid Waste on Animals and Aquatics life

1. Increase in mercury level in fish due to disposal of mercury in the rivers.
2. Plastic found in oceans ingested by birds
3. Resulted in a high algal population in rivers and sea.
4. Degrades water and soil quality

Impacts of solid waste on Environment

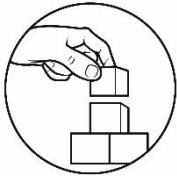
1. Waste breaks down in landfills to form methane, a potent greenhouse gas
2. Change in climate and destruction of the ozone layer due to waste biodegradable
3. Littering, due to waste pollutions, illegal dumping.
4. Leaching is a process by which solid waste enters soil or groundwater and contaminates them.

The Negative Effects of the Improper Removal and Disposal of Waste

1. Soil contamination - It does not only affect plant growth, but it is also unhealthy to humans and animals feeding on those plants. Take the case of plastic bottles. When they eventually break down, they release DEHA (diethyl hydroxylamine), a carcinogen that affects our reproduction systems, causes liver dysfunction, and weight loss.
2. Air contamination - Waste that releases dioxins are also dangerous and pose a health risk when they diffuse into the air that we breathe. Landfill gas produced by the decomposing wastes can be explosive and can harm nearby communities.
3. Water contamination - Untreated sewages can destroy and suffocate marine habitats, such as corals. Contaminated water is also dangerous and harmful to humans who consume fish and other marine life.
4. Bad impact on human health - Improper disposal of waste can greatly affect the health of the population living nearby the polluted area or landfills. Exposure to improperly handled wastes can cause skin irritations, blood infections, respiratory problems, growth problems, and even reproductive issues.
5. Impact on animals and marine life- The effects of pollution caused by improperly disposed wastes and rubbish, Styrofoam, and cigarette butts have been known to cause deaths in marine animals. Animals who consume grasses near contaminated areas or landfills are also at risk of poisoning due to the toxins that seep into the soil.
6. Disease-carrying pests- Mosquitoes breed in cans and tires that collect water and can carry diseases such as malaria and dengue. Rats find food and shelter in landfills and sewage, and can carry diseases such as leptospirosis and salmonellosis.
7. Adversely affect the local economy- Landfill facilities that are mismanaged can cause the local economy to sink, which can then affect the livelihood of the locals.

8. Missed recycling opportunities. There is revenue in recycling. Cities that do not implement proper removal and recycling of wastes miss on this, miss out on the resources that can be reused, and on the employment opportunities that a recycling center brings.

9. Causes extreme climate changes. Decomposing waste emits gases that rise to the atmosphere and trap heat. Greenhouse gases are one of the major culprits behind the extreme weather changes that the world is experiencing.



What's More

Activity 1: “5 Sentence Summary”

Create five sentences that summarize each lesson discussed above. You may begin with the topic or main idea, then record three important details or facts, and finish with the wrap-up or resolution. You may use the template given below. Do the same thing with Lesson 2 and Lesson 3. Write your answer on a separate sheet of paper.

5 SENTENCE SUMMARY

Lesson 1 (Title):

MAIN IDEA:

Detail 1:

Detail 2:

Detail 3:

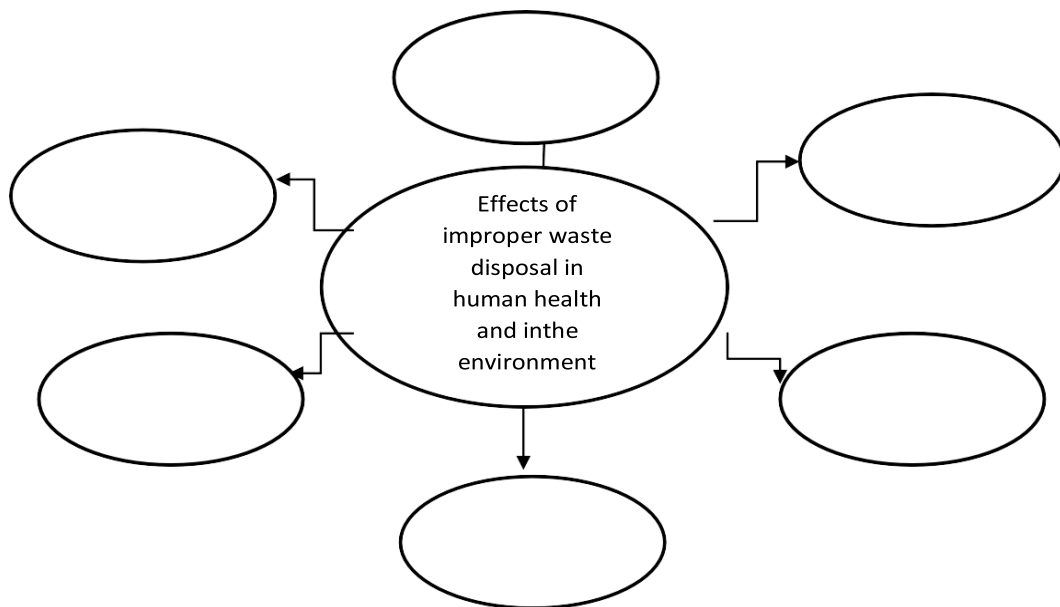
WRAP-UP/RESOLUTION:

Activity 2: “Graphic Organizer”

Using the graphic organizer, cite the effects of improper waste disposal in human health and the environment from the given article.

Different types of wastes affect people’s health and the environment. Some of the effects of today’s poor waste management system include soil contamination, water contamination, climate contamination, air contamination, animal and marine life damage and human damage.

Soil contamination occurs by spilling and burying hazardous components in soil. Water becomes polluted when it dissolved substances like various chemicals and gases which may cause animal and marine life damage, too. Harmful greenhouse gases are created from decomposing waste which rise to the atmosphere and trap the heat. As soil, water and air become contaminated, it may result to human harm. Humans will be exposed to skin irritation, blood infections, respiratory and visibility problems, and cancer.



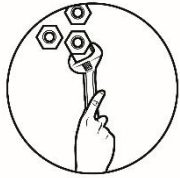


What I Have Learned

1. Waste is classified into two types which is _____ waste also known as _____ waste also known as _____.
2. Sources of waste can be broadly classified into four types namely: _____, _____, _____ and _____.
3. The results of improper waste disposal occur when either of them becomes contaminated with hazardous materials, includes _____, _____, _____ and _____.
4. The burning of waste materials at high temperatures to transform them into gases or residue is called _____. The deliberate disposal of garbage in an open space is _____ while _____ is when sewage, garbage, construction debris, hazardous chemicals is intentionally discarded at sea.
5. The method of waste disposal that involves burying the waste in the land is called _____. The conversion of waste material into new products is termed _____.
6. The effects of exposure to improper waste disposal are _____, _____, _____ and _____. Mosquitoes and rats are known to live and breed in sewage areas, and both are known to carry _____ diseases.
7. The common elements found in water are _____ and _____, _____, _____. Too much content in water is harmful to _____ and _____.
8. The causes of increase in amount of solid waste are increase in the number of _____, increase in _____, _____, _____, and _____.
9. Human are exposed to solid waste by means of _____ of contaminated water or food, contact with disease _____, _____, and _____.
10. The impacts of solid waste on health are chemical poisoning through chemical inhalation, uncollected waste can obstruct the storm water runoff resulting in _____, _____, _____, _____, _____, and _____.

11. The impact of solid waste on environment are _____, _____, _____, _____, and _____.

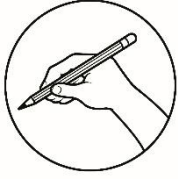
12. The major treatment and disposal methods are _____, _____, and _____.



What I Can Do

Using the box given below, create a slogan on the conservation of a wealthy environment. Rubrics will be used to evaluate your output.

Criteria	4	3	2	1
Craftmanship	The slogan is exceptionally attractive in terms of neatness. well-constructed and not messy	The slogan is exceptionally attractive in terms of neatness. Good construction and not very messy	The slogan is acceptably attractive though it may be a bit messy	The slogan is distractingly messy
Creativity	The slogan is exceptionally attractive. a lot of thought and effort was used.	The slogan is creative and a good amount of thought was put into it.	The slogan is creative and some thought was put into it.	The slogan does not reflect any degree of creativity
Originality	Exceptional use of new ideas and originality	Good use of new ideas and originality	Average use of new ideas and originality	No use of new ideas and originality



Assessment

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

1. What refers to any material that can be harmful to human health or the environment if not properly disposed?
 - a. biodegradable waste
 - b. hazardous waste
 - c. paper
 - d. plastics

2. What substance can be broken down and recycled by bacteria and other decomposers?
 - a. biodegradable
 - b. landfills
 - c. paper
 - d. resins

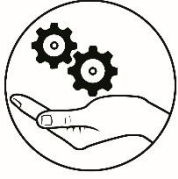
3. Which of the following is an example result of long-term exposure to hazardous wastes?
 - a. Asthma
 - b. Breathing difficulties
 - c. Cancer
 - d. Internal bleeding

4. What wastes were dissolved or eaten through many materials?
 - a. Corrosive
 - b. Explosive
 - c. Radioactive
 - d. Toxic

5. DEHA stands for _____.
 - a. diethyl hydroxylamine
 - b. diethyl hydroxylamide

- c. diethyl hydroxylamime
 - d. diethyl hydroxylamife
6. Which one of the following is not normally a pollutant?
- a. Carbon dioxide
 - b. Carbon monoxide
 - c. Sulfur dioxide
 - d. Hydrocarbons
7. The following can be caused by exposure to improperly handled wastes except _____.
- a. skin irritations and blood infections
 - b. respiratory and growth problems
 - c. Nervous and skeletal problems
 - d. reproductive issues.
8. Untreated sewage can destroy and suffocate marine habitats.
- a. Soil contamination
 - b. Air contamination
 - c. Water contamination
 - d. Human contamination
9. Which of the following refers to the waste materials produced in homes, businesses, schools, and other places in a community?
- a. Incineration
 - b. Landfills
 - c. Leachate
 - d. Municipal solid waste
10. Mosquitoes breed in cans and tires that collect water and can carry diseases such as _____.
- a. salmonellosis
 - b. leptospirosis
 - c. dengue
 - d. diarrhea

11. This refers to waste that is harmful or fatal when ingested or absorbed.
- Corrosive
 - Toxicity
 - Reactive
 - Mixed waste
12. Which of the following is a non-hazardous waste?
- Garbage
 - solvents acid
 - heavy metals
 - pesticides
13. Fluoride is a natural content of water and large amount of it will produce dental problems and _____.
- Muscle rigidity
 - Bone damage
 - Eye irritation
 - Skin cancer
14. Harmful greenhouse gases are created from _____.
- Decomposing waste
 - Municipal solid waste
 - Hazardous waste
 - Leachate
15. Cattle waste is an example of _____.
- Industrial Waste
 - Commercial Waste
 - Domestic Waste
 - Agricultural Waste



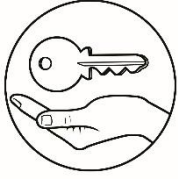
Additional Activities

The title of this activity is “MEMORY MATRIX”. This is a two-dimensional diagram, a rectangle divided into rows and columns used to organize information and illustrate relationships. The row and column headings are given, but the cells are left empty for you to fill out.

Complete the table below to explore the effects of different wastes on humans and their environment.

Different wastes affect not only human beings, animals, and our environment. This waste produces hazardous products. Remember the topic discussed in answering the activity below.

Waste Products	Health	Animals	Environment
Mercury toxicity			
Diethylhydroxylamine			
Plastics			
Methane			
Leachate			
Dioxins			



Answer Key

<p style="text-align: center;">Assessment</p> <p>1. A 2. D 3. A 4. A 5. A 6. A 7. C 8. C 9. D 10. C 11. B 12. A 13. B 14. A 15. D</p>	<p style="text-align: center;">What I Have Learned</p> <p>1. biodegradable, moist waste, non-biodegradable, dry waste. 2. Industrial Waste, Commercial Waste, Domestic Waste and Agricultural Waste. 3. hazardous materials soil contamination, water contamination, climate contamination, air and human damage. 4. incineration, open dumping, ocean dumping and landfill, recycling 5. skin irritation, blood infections, respiratory and visibility problems, and cancer. life-threatening 6. greenhouse. fluoride, arsenic, and salts. 7. populations, industrial manufacturing, urbanization, and modernization. 8. ingestion vectors, inhalation and dermal. low birth weight, cancer, congenital malformations, neurological disease, nausea and vomiting and mercury toxicity. 9. greenhouse gas, climate change and destruction of ozone layers, littering due to waste pollution, illegal dumping. 10. thermal treatment, dumps and landfills and biological waste treatment.</p>	<p style="text-align: center;">What I Know</p> <p>1. C 2. D 3. C 4. A 5. B 6. A 7. D 8. A 9. A 10. B 11. C/D 12. D 13. A 14. D 15. B</p>
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What's New (Lesson 3)

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

Activity 2

Plastic 25%- highest
Least 1%- special wastes

What's In (Lesson 2)

1. Bricks
2. tile
3. rubble
4. metal
5. plastics
6. rubber
7. tile
8. chemicals
9. scrap metal
10. bricks
Agricultural waste
1. cattle waste,
12. weed,
13. husk
14. grapes
15. vegetables

Household Waste

16. leaves
peels
bottle
paper
concretes

Thermal Treatment

Incineration
Gasification
open burning
Dump and Landfills
Sanitary landfill
Controlled Dumps
Bio-reactors landfill

Biological Waste Treatment

Composting
Anaerobic Digestions

References

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<https://edugreen.teri.res.in/explore/solwaste/health.htm>

<https://www.greenchoices.org/green-living/waste-recycling/environmental-impacts>

<https://www.metropolitantransferstation.com.au/blog/negative-effects-of-improper-waste-management/>

https://www.senate.gov.ph/publications/SEPO/AAG_Philippine%20Solid%20Wastes_Nov2017.pdf

<https://www.skipthetip.com/10-negative-effects-of-improper-rubbish-removal/>

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