

STRAND 1

ENVIRONMENT

SUB-STRAND 1: ENVIRONMENTAL ISSUES

Content standard

- Demonstrate skills in dealing with environmental challenges.
- Examine the sources of energy and demonstrate the skills of conserving energy in Ghana.

Indicators

- ❖ Examine ways of dealing with sanitation challenges in the environment.
- ❖ Examine the sources of energy.

Warmer

Brainstorm students to come out with things they see around them in the school, at home and on their way to school.

Review Learners knowledge on energy. Example: Ask pupils what they eat and why they eat.

Expand

Meaning of Environment

Environment refers to all the things in the surrounding of man. These things include both living and non-living things, physical and artificial things that can be found in the surrounding of man. For example land, water bodies, air, vegetation, road etc.

Sanitation

Sanitation refers to public health conditions related to clean drinking water and adequate treatment and disposal of human excreta and sewage.

It can also be explained as the provision of facilities and services for the safe disposal of human urine and feces.

Sanitation systems aim at protecting human health by providing clean environment that will stop the transmission of diseases.

Types of Environment

There are two main types of environment. These are:

1. Physical Environment
2. Social Environment

The Physical Environment

The physical environment essentially is the material surroundings within which man and animal live. For Example Mountains, water bodies, mineral deposits, vegetation, road etc.

Social Environment

The social environment is the interaction or relationship among individuals, families and friends in a given society. It includes culture, politics, family systems, religion and religious practices etc. A good relationship in the social environment brings harmony and togetherness in a given society.

Note that, both physical and social environment influence each other. For example, the religious beliefs of an individual will influence the type of materials he/she keeps at home. A Christian's home may be filled with items related to his faith.



CAMON 12

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Environmental Problems

Environmental problem can be explained as problems with the planet's systems (air, water, soil, etc.) that have developed as a result of human interference or mistreatment of the planet. Examples of environmental problems are poor sanitation and pollution.

Poor Sanitation

Poor sanitation is when people who live in a particular setting or place do not have access to clean and save water, good sewage system such as latrine and live in a dirty environment.

One of the biggest problems facing Ghana is poor sanitation. In Ghana, the Metropolitan, Municipal and District Assemblies (MMDAS) are responsible for the provision of good sanitation to the citizens.

Causes of Poor Sanitation

The causes of poor sanitation are as follows:

1. **Inadequate funding:** Those who collect waste from our communities needed money to provide logistics such as vehicles, waste or dustbins, gloves, shovels etc to carry out their work effectively. There is, however little or no money to get these equipment in high quantities. The workers' salaries are also migre thereby hampering the good sanitation efforts.
2. **Poor drainage system:** In Ghana, most towns and cities don't have well-constructed gutters where running water can easily flow through. Most of the gutters are not covered and become chocked with plastic waste any time it rains causing flooding in most cases.
3. **Rapid population growth:** In most cities, rapid population growth, especially the urban areas have far outpace the metropolitan,

municipal and district assemblies capacity to provide good sanitation services to the people.

4. **Indiscriminate waste disposal:** It is common practice for people to dispose their waste indiscriminately in the community. Solid waste, especially plastics, are thrown into gutters and other unauthorized places when nobody is watching them.
5. **Over flowing garbage containers:** The few garbage containers placed at vantage points in our communities are left unattended for days. This leads to an overflow of garbage at these places. Most market centres in our cities such as Accra, Kumasi, Takoradi experience these unfortunate scenes.
6. **Inadequate toilet facilities:** Most communities have just a few or no toilet facilities thereby making people defecate in bushes, open spaces and beaches. This makes the environment heavily polluted with human excretion. This is mostly experienced at the shores of the sea in areas such as Labadi, Chorkor, etc.
7. **Poor layout of settlement:** Most slum communities tend to experience poor sanitation. This is mainly due to overcrowding of people and building in these slums. Buildings in these areas are not properly planned and so they have poor drainage systems which make the environment very dirty and unhealthy.
8. **Indiscipline on the part of residents:** Some people intentionally package their liquid and solid waste into plastic bags and dump them indiscriminately within their communities. Others leave sachets on the street after drinking sachet water without any shame.



STRAND 1: ENVIRONMENT



Scenes of poor sanitation in Ghana

Effect of Poor Sanitation

Poor sanitation has negative effects on the individual, environment and the nation at large. The following are some of the negative effects of poor sanitation.

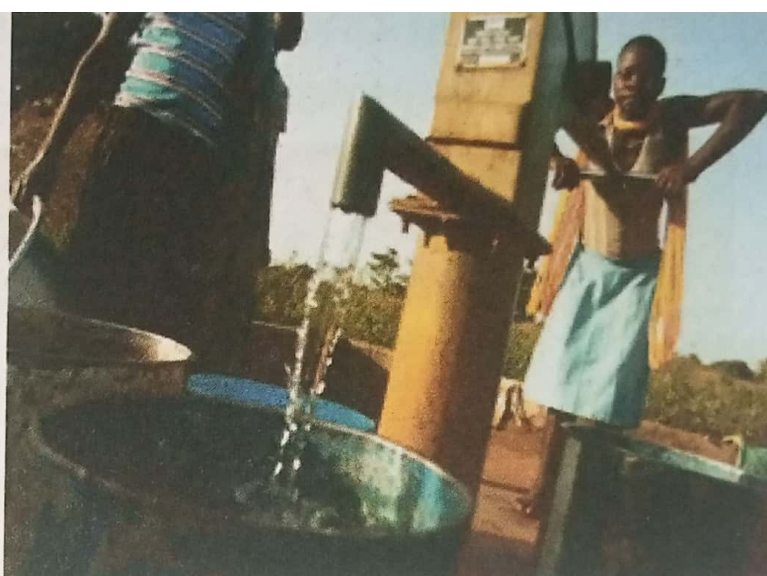
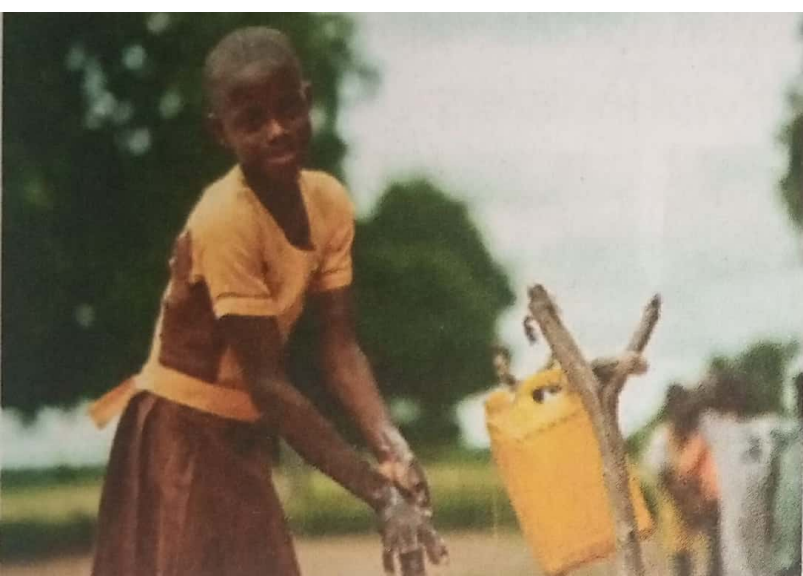
1. **Bad impact on health:** Outbreak of diseases such as cholera, dysentery, typhoid, skin irritations, respiratory diseases like asthma and sometimes blood infection, is mostly linked to poor sanitary conditions in the affected communities.
2. **Soil contamination:** Some waste contains hazardous chemicals that leak into the soil thereby contaminating the soil. This does not only affect plant growth but also affect the health of man and animals that feed on those plants.
3. **Flooding:** Poor sanitation especially in gutters cause serious flooding in our communities. Example, the odor river in Accra is choked with solid and plastic waste. This makes people living in its catchment area experiencing flooding annually.
4. **High cost of waste management:** The authorities mandated to manage waste and provide good sanitation tends to spend a

chunk of their revenue on sanitation, making it difficult to meet other equally important needs of the societies.

5. **Low social and self-esteem:** People living in unhygienic communities have low social esteems hence not respected by others who live in hygienic communities.

How to manage Sanitation Problems

1. **Public Education:** There is the need to educate the general public on the need to maintain sanitize environment. This will make them aware of the consequences of their actions and the need to live a health life
2. **There should be the provision of improved sanitation facilities:** Government should provide adequate facilities such as toilet, dust bins at vantage points in the communities will drastically improve our sanitation issues. In schools, clean drinking water, proper hand washing facilities, good toilet facilities and enough dustbins should be provided.
3. **Recycling:** Plastic and other waste can be used to produce other goods to reduce the amount of waste in our environment. This will also help to create job opportunities in the community
4. **Enforcement of sanitation by laws:** The Local Government Act (Act 462) includes bye-laws requiring landlords to provide toilet facilities to tenants. This and other sanitations laws must be enforced with offender severely punished.
5. **Reduction in waste production:** One can reduce quantity of waste produce by using a basket for shopping instead of collecting rubber bags for every item he bought. Farmers can also reduce waste by leaving some of the unwanted parts of their crops on the farm. E.g. the corn husked or the cassava peels.





3. **Washing and washing in water bodies:** when people who live close to rivers, lakes and streams bath and wash in the water bodies the water get polluted by dirt and chemicals in the soap pollute the water.
4. **Leakage of oil into water bodies:** Leakage of oil from fishing vessels and ships into water bodies pollute the water and make it unsafe for use by living organisms.
5. **Dumping of domestic waste into water bodies:** The dumping of solid and liquid waste from homes into water bodies pollute the water and make it impure for use.

Effect of Water Pollution

The follow are the effects of water pollution;

1. **Makes water impure:** It affects the quality of water as it makes it impure for use by man and other aquatic animals.
2. **Health problems:** Water pollution leads to the spread of water borne diseases such as guinea worm, cholera, dysentery, bilharzia leading to death.
3. **Dead of water bodies:** Water pollution leads to drying up of rivers and lakes. This may lead to the eventually dying of these water bodies. This becomes serious as it leads to shortage of water.
4. **Destruction of aquatic life:** Water pollution also leads to the destruction of fishes and other aquatic animals.
5. **High cost of treating water:** When treating polluted water, the cost becomes more as compare to treating pure or unpolluted water.

Controlling or Preventing Water Pollution

To control water pollution, the following must be observed.

1. **Proper fishing methods:** Fisher folks should be discouraged from using harmful chemicals for fishing. The laws banning the use of DDT and other chemicals for fishing should be enforced.
2. **Public Education:** There should be public education on the effects of water pollution. This will go a long way to create awareness and help to reduce water pollution.
3. **Proper waste disposal:** Domestic, Industrial liquid and solid waste should be disposed off properly instead of dumping them in water bodies.
4. **Enact and enforce by-laws:** Communities along water bodies should make by-laws to punish those who pollute the water bodies. Those who swim, bath, wash and mine in those water bodies must be severely punished.

Air Pollution

Air pollution is the introduction of harmful and poisonous gaseous substances into the atmosphere which makes the air we breathe unsafe. Through air pollution, the air surrounding man, plants and animals become dangerous to their health.



Causes of Air Pollution

The causes of air pollution include the following;

1. **Burning of lorry tyres:** During special occasions (31st night) people burn lorry tyres as a way of celebrating the day. Butchers burn lorry tyres for removing the wool from the animals. In this process, thick smoke is released into the atmosphere thereby causing air pollution.
2. **Harmful and toxic gases from factories.** Factories release smoke or gases that are very poisonous to living things into the environment. Examples of the factories include Tema Oil Refinery (TOR) and Volta Aluminum Company (VALCO).
3. **Smoke from exhaust pipe of cars:** Smoke from exhaust of vehicles also pollutes the air. The use of over aged vehicles with weak engines give off a very thick smoke into the atmosphere that cause serious air pollution.
4. **Uncontrolled burning:** Burning of garbage and bushes also contribute significantly to air pollution. These fires send thick smoke into the atmosphere thereby polluting the air.
5. **Dust from construction and quarry sites:** The construction of roads and quarrying pollute the air in the catchment areas. Excavators used in the mining of stones as well as machines use in road construction throw high quantity of dust into the air leading to air pollution.
6. **Smokers:** Smoke from cigarette and tobacco is another cause of air pollution. People who smoke release volumes of smoke into the atmosphere making it impure
7. **Bad or unpleasant odour from decomposed animals and waste:** The odour from dead and decomposed animals, odour from waste and human excreta causes air pollution.



Effects of Air Pollution

Air pollution has adverse effects on the environment. These effects include the following.

1. **Health problems:** Air pollution causes respiratory skin diseases. Examples of these diseases are lung cancer, asthma, tuberculosis (TB) among others. Air pollution can also cause skin rashes and skin cancer.
2. **Formation of acid rain:** Air pollutants such as dust and chemical mix up with rain water changing the otherwise pure rain water into acid rain water. Acid rain water is harmful living things.
3. **Destruction of ozone layer leading to global warming:** The ozone layer is a layer of gases with strong smell above earth. Its main duty is to prevent the sun's ray from reaching the earth directly. Air pollution destroys the ozone layer, thereby causing the rise in temperature (global warming) on the earth.
4. **Hampering visibility:** Smokes and thick fumes in the atmosphere prevent people especially drivers from seeing clearly from afar. This may lead to road accidents in some cases.

How to control Air Pollution

Air pollution can be controlled in the following ways.

1. **Public Education on the effects of air pollution.** There should be regular public education on the causes and most especially the effects. This will help become aware of the seriousness of their act and help bring it under control.
2. **Existing laws on the environment must be enforced.** Law on the environments should be enforced. Breakers of the law must be severely punished to serve as deterrent to others.



3. **Proper sitting of factories:** Sitting of factories at non-residential areas must be abolished. Factories that are sited at residential areas must regulate or control their activities so as to not to pollute the air.
4. **Discourage burning:** Burning in all forms should be discouraged. People should not burn bushes, tyres and garbage indiscriminately. This will limit the emission of smoke into the atmosphere thereby controlling air pollution.

Land Pollution/degradation

Land pollution is the gradual destruction in the quality of land rendering it useless due to the loss of its fertility through activities of man and natural disasters. It is also referred to as land degradation.



Land pollution/degradation activities

Causes of Land pollution

Land pollution can be caused by the following activities:

1. **Mining and Quarrying:** Improper mining of mineral deposits by man as well as quarrying of stones turn to render of fertile lands into non fertile.



2. **Sand winning:** The top sandy soil is mostly removed and collected for sale. This practice exposes the land and all living organisms to the direct sun and also lead loss of soil fertility.
3. **Excessive use of fertilizer:** Too much use of fertilizer affects the land this is because, and chemicals are released into the soil. The chemicals kill the living organisms and reduce the quality of the land.
4. **Bad farming practices:** Shifting cultivation, slash and burn and other bad method of farming lead to deforestation thereby destroying the land.
5. **Dumping of refuse and other toxic waste in the land:** Portions of the land are set aside to collect refuse and other waste materials (landfill sites). These practice leads to the toxic killing living organisms in the soil leading to the loss of the quality and fertility of the land.
6. **Bush burning:** Bush burning is another cause of land degradation. Bush fires kills living organisms in the soil. It also destroys the vegetative cover of the soil and exposes the soil to erosion leading to loss of soil fertility.
7. **Overgrazing:** Sheep, goats and cattle graze on the land for survival. However, if we allow them to graze in a particular portion of land excessively can cause land pollution since the land becomes bare and prone to erosion.
8. **Indiscriminate felling of trees:** The felling of trees for sales export is termed lumbering. Indiscriminate and continuous felling of trees without planting any to replace them result in the destruction of forest opening the area to erosion and loss of soil nutrients hence land pollution.

The use of land as **recreation sites**: Recreational sites such as football fields, Children's park renders the land bare and useless. This land cannot support plant growth because, nutrients are lost. It also leads to erosion.

Effects of Land Pollution

The effects of land pollution include the following.

1. **Loss of soil fertility**: As the land is polluted, the top soil which mostly support plants growth loses its fertility making the soil unable to support plants growth. This happens mostly at the areas that experience mining and quarrying and also place with cases of overgrazing.
2. **Desertification**: Land pollution leads to desertification (a process by which land on which plants grow is made a desert by human activities) such lands are mostly covered by sand and cannot support plants growth.
3. **Destruction of soil organisms**: Some of the activities of man kill soil organisms that help in the formation of nutrients. Example mining and application of fertilizer add dangerous chemicals to the soil. These chemicals kill living organisms in the soil. Bush burning is also another activity that kills and destroys soil organisms.
4. **Drying up of lakes, rivers and other water bodies**: Water bodies dry up easily and the lands at their banks are polluted especially when the trees in these places are felled.
5. **Loss of arable and fertile land**: Excessive quarrying, mining, sand winning and road constructions destroy land which could have been used for agriculture purposes.

6. **Famine:** One major consequences of land pollution is famine (a period of hunger due to unavailability of food). This is because, the soil cannot support food crop production due to the loss of soil nutrients. This results in the decline in the crop yield causing famine.
7. **Removal of vegetation and habitats for animals:** Land pollution leads to destruction of the vegetation which is the home animals and other wild life species.

How to control Land Pollution

Land pollution can be controlled through the following.

1. **Public education:** Public education should be given to all in order for people to see the negative effects of it. This way all the activities that lead to land pollution will be brought under control.
2. **Checking soil erosion:** We can plant cover crops and grasses to check soil erosion. Stones can also be used to fill gullies that are created so as to check soil erosion.
3. **Law enforcement:** The laws banning illegal mining, lumbering and quarrying should be enforced by punishing law breakers.
4. **The use of appropriate farming methods:** Farmers should be encouraged to desist from using bad farming methods for farming. This will help conserve soil fertility thereby increasing crop yield.

Energy

Energy is the strength and vitality require for sustained physical and mental activity. It can also be explained as the ability to do work.

Activities such as walking, dancing, lifting heavy loads, running, weeding all require energy. Can you mention more activities that need energy?

Sources of Energy

There are two (2) major sources of energy. These are:

- I. Renewable sources
- II. Non Renewable sources of energy

Renewable Sources

The renewable sources of energy are those sources that are in continuous supply. They can be replenished after it has been used and are not limited.

They are from natural sources and are in high supply. Examples include energy from the sun (solar energy), wind energy, biogas or biomass energy, water energy, geothermal. The Sun is the primary source of energy.

Non Renewable Sources of Energy

These are exhaustible or limited source of energy. This means that, they are consumed faster than nature can produce them. They are not supplied in high quantities.

It also implies that, they cannot be replaced as fast as they are consumed. Examples are dry cell, firewood and charcoal, fossil fuel (coal, petrol, diesel, kerosene and LPG), nuclear energy etc.

How sun and wind are used to generate energy to perform work

Sun/Solar Energy

Solar energy is the energy from the sun. It is the most commonly used source of energy. Solar energy is renewable because, it is always available for use in unlimited supply.

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How sun and wind are used to generate energy to perform work

Sun/Solar Energy

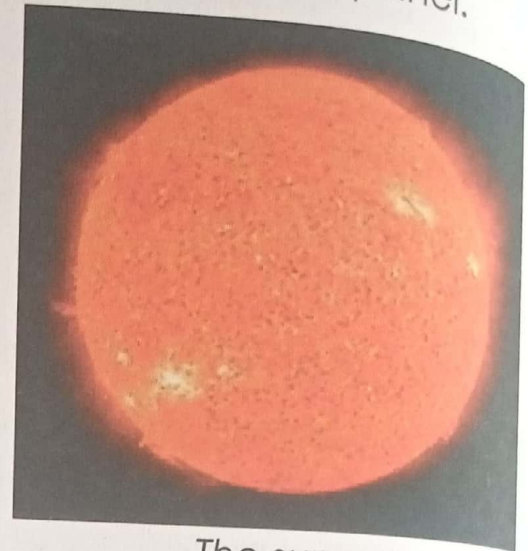
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SUB-STRAND 1: ENVIRONMENTAL ISSUES

When the sun shines, some of its light reaches the earth surface. light energy is trapped and turn into heat energy which is used in daily activities. For instance; it is used for cooking, electric generation, and water boiling as well as keeping us warmth. The trapping is made possible through the use of solar panel.



Solar Panels



The sun

Wind Energy

Wind energy is the energy that is generated from the wind. Wind is the natural movement of air across earth. Wind energy is renewable source of energy because it's never expires. Huge fans called wind turbines are installed to capture the wind and convert it into electricity for domestic and commercial use. The blades of the turbines spin and turn round to power generators to produce electricity.



Wind turbines

Benefits of using renewable energy

Below are some benefits that are derived from the use of renewable energy:

It helps to improve public health: Renewable energy produces little or no gas emissions and helps to reduce air pollution in the environment which improve the health of the people.

Expand energy supply: Renewable energy use helps in producing energy locally thereby reducing dependency on imported energy. This makes a country energy sufficient.

Maintenance requirements are lower: The use of renewable energy saves money and time as there is limited maintenance due to fewer or no moving parts.

Efficient use of waste materials: Biomass uses organic product such as byproducts of vegetables, corn and human excreta to generate energy. This helps to reduce waste in environment and improve the health of the people.

Unlimited energy supply: Renewable energy will not run out or get finished. They are readily available in the environment. E.g. there is enough sunshine that falls on our planet every day that could meet our energy need for an entire year.

Benefits of using non-renewable energy

Benefits of using non-renewable energy include;

Low cost: Non-renewable sources of energy are cheap and easy to use. You can easily fill up your car tank and power your motor vehicle.

Job creation: Non-renewable sources of energy help in creating Jobs. The extracting transporting and refining of crude and other non-renewable sources provide employment for people.

High energy supply: Resources such as coal and oil tend to provide with more energy than renewable sources of energy such as solar, wind energy.

Easy to store: Non-renewable energy sources are easy to store. It can easily be stored in barrels and other containers. For instance, like petrol and gas.

Easy to use: Non-renewable energy resources are easy to use in homes and anywhere else such as factories. They are also found everywhere because they can be moved easily from one place to another.

Ways of Using Energy

Transportation: All or current transportation modes including automobiles, trains, buses, cars, airplanes, etc depend on energy such as fuel and electricity to operate. We are able to travel from one place to another by the use of energy.

Food production: Our food is grown by the help of energy from the sun. Plants depend on sunshine together with water, carbon dioxide and chlorophyll to prepare their own food through the process of photosynthesis. This process helps in food production.

Lighting: Electric energy is used to provide lighting in our homes and office buildings. This makes movement and work possible especially during the night.

Communication: Our current modes of communication such as telephones, internet, etc run on energy. Electricity is required to power these gadgets to ensure effective communication.

Industries: Energy is used in industries and factories to power machines for the manufacturing of goods.

Residential/home uses: These are the most basic use of energy. They include watching television, washing clothes, heating, working from home on your laptop or computer, cooking, etc

Reasons Why Ghana Sometimes Imports Energy

Ghana may imports energy due to the following reasons;

Rapid population growth: As the number of people living in a country increase as a result of rapid population growth, there will be the need for additional energy. Ghana will therefore import energy if the country's capacity cannot meet the demand of the people.

Waste of energy: Energy conservation is the surest way by which Ghana can be energy sufficient. We may have to import energy as a country because we waste a lot of energy. For instance; we leave our lights and electrical gadgets on when we do not need them. As a result of the wastage Ghana may import energy to meet the demand for energy.

Inadequate investment in the energy sector: The production of energy required a lot of capital. Failure of government to invest in the sector will lead to low supply energy which will force government to import energy from other countries.

Industrialization: When Ghana decides to industrialize by establishing more industries and factories more energy will be required to power the machines. The country will therefore import additional energy to supplement the country produces.

Low level of technology: Ghana lacks the right technology and know-how to produce the energy we need. We therefore export crude in its raw form and have to import the final product which the energy we required. We do not also have adequate skilled personnel to assist the production of energy.

Trial questions

Objective Test

1. All the things in the surrounding of man is referred to as
 - A. Environment
 - B. Pollution
 - C. Production
 - D. Socialisation
2. Our environment is made up of
 - A. Natural and man-made things
 - B. Only non-living things
 - C. Plants and animals
 - D. Roads and rivers
3. Indiscriminate felling of trees cause the following except
 - A. Afforestation
 - B. Desertification
 - C. Soil erosion
 - D. Water pollution
4. Water pollution is caused by all the following except
 - A. Alluvial mining
 - B. Bad fishing
 - C. Oil spillage
 - D. Recycle of waste
5. All except one of the following are effects of land pollution
 - A. Desertification
 - B. famine
 - C. High productivity
 - D. loss of soil fertility
6. Major environmental problem facing municipal and metropolitan assemblies in Ghana is
 - A. Air pollution
 - B. Deforestation
 - C. Gully erosion
 - D. Waste disposal
7. Making too much noise is considered as
 - A. Air pollution
 - B. Destruction of the vegetation
 - C. Land pollution
 - D. Water pollution
8. The strength and ability to do a piece of work is referred to as
 - A. Energy
 - B. Pollution
 - C. Strength
 - D. Work

The following are non-renewable sources of energy except

- A. dry cell
- B. Firewood and charcoal
- C. Fossil fuel
- D. The Sun

The energy source that is generated by organic matter such as plants and animals is known as

- A. Biomass energy
- B. Geothermal energy
- C. Solar energy
- D. Wind energy

Essay Test 1

1. (a) Define the term environment.
(b) State the differences between physical environment and social environment.
2. (a) State four ways in which the environment may be destroyed.
(b) Suggest four ways of protecting the environment from degradation.
3. Explain how the social environment influence the physical environment.
4. (a) Identify three major sanitation problems in your community
(b) Suggest three ways of solving sanitation problems in your country.
5. (a) What is energy?
(b) Identify the two main sources of energy and give two examples each.

Project

Students to visit their communities to identify major environmental problems, their effects on the community and suggest solution to them

SUB-STRAND 2: MAPPING SKILLS

Content standard

Demonstrate a range of mapping skills

Indicators

Demonstrate skills involved in mapping and locating places in the environment

Warmer

Through question and answers, let pupils describe location to their homes in the community

Expand

What is a Map?

A map is a representation on a flat surface, of a whole or a part of the earth surface drawn to scale.

You can draw the map of your house, classroom, school compound town or village and country as a whole. Maps are drawn beginning with sketches.

A **sketch** is a roughly drawn map which is not drawn to scale.

Note: A map is drawn to scale while a sketch is not drawn to scale.