WEEK 2

SOURCES OF WATER

We have two major sources of water, namely;

1. Surface- River, lake, pond, ocean, e.t.c.

2. Underground-Shallow well, well and Boreholes.

\* We also have Rain harvesting(Natural Rain water).

\* Another example of surface of water is glaciers (iceberg).

WATER POLLUTION

This is a situation whereby water is contaminated that can cause damage to living organisms.

TYPES OF POLLUTION

\* Physical Pollution—The use of sense organ to determine the pollution which are colors. <>Any water that is suitable for drinking and that is stored in the pot is called portable water. It is mostly used in the olden days.

\* Chemical pollution—

\* Biological pollution—

Water covers about 70% of the earth and it’s an important resources for the people and the environment, water is the basis of life and it make up about 60-95% of the total weight of any functioning living cell. Although 70% of surface of earth is cover with water, only 0.00192% is available for human consumption.

Pollution of water affect drinking water, lakes, rivers and oceans.

In most of the developing countries, the most cause of death is consumption of polluted water, water pollution affect all living organisms and the complete functioning of the ecosystem.

Water pollution can be defined as the pollution or contamination of natural water bodies such as lakes, rivers, streams, oceans and ground water due to inflow or deposition of pollutants directly or indirectly into water system.

Most cases, water pollution are caused by human activities such as pollution generally.

Any modification or change in physical, chemical and biological properties of water that can cause or lead to any harmful consequences on living things and the environment.

There are two ways of categorizing water pollution

A. The sources-Non point

-point

B. The origin

—Non point pollution is caused by non point sources. This is the cumulative effect of small contaminant gather in large areas which may include leaching of nitrogen compound from agricultural land, storm water runoff or from forest.

—Point source pollution is caused by point sources which ref

Point source pollutants can be discharged from sewage treatment plants, factories, or a city storm drain.

TYPES OF WATER POLLUTION

1. Nutrient pollution.

2. Surface water pollution.

3. Oxygen depletion.

4. Ground water pollution.

5. Natural pollution.

6. Chemical pollution.

7. Oil spillage.

8. Pollution as a result of sewage.

9. Industrial influence.

10. Agricultural runoff.

11. Thermal pollution.

1. Nutrient pollution: Sewage water is refers to as nutrient water that contains high level of nutrient that enter the water body, nutrient in the water encourage the growth of algae and weed in the water. This process is known as Eutrophication. This make the water unfit for consumption and also leads to clogging of filter beds. Below/under the filter bed are sands of different layers, in the process, where we have too much algae, we called it Algae bloom leading to suffocation of all other water organisms.

2. Surface water pollution : Surface runoff substances that are hazardous that dissolve and lead to water pollution polluting the water surface. This runoff substances can be from any source like factories, domestic, sewage and agricultural runoff

3. Oxygen depletion: Increase in the content of bio-degradable matters in the water encourages the growth of micro organisms which end up using most of the organisms, this result in organisms depletion killing aerobic organisms, producing more of toxins-like ammonia and sulphide.

4. Natural pollution: Sometimes pollution is caused by micro organisms like bacteria and Protozoa, this natural pollution can be lethal in fishes and other water life. Consumption of this types of water can lead to serious illness in human.

5. Chemical pollution: most of the industrial let off and chemical fertilizer used in farming end up in the water body. These materials are poisonous to most of the aquatic life’s and they can make them infertile and eventually cause death. Water from this type of resources is obviously unfit for consumption.

6. Oil spillage: Oil tankers and offshores petroleum refineries cause oil leakage polluting water. Oil spill can cause death of many aquatic organisms and also sticks to the body and feather of sea birds which make them unable to fly

7. Domestic sewage: This is the waste water from households, it also includes sanitary sewage and it contains a variety of dissolved and suspended matters. Domestic sewage also contain pathogenic microorganisms and chemical that are present in soap and detergents affect the health of life of living organisms

8. Agricultural runoff: The practices in agriculture affect the groundwater quality, intensive cultivation causes fertilizer and pesticides to see into the groundwater, this process is known as leaching. Irrigation runoff from agricultural fields causing high nitrogen effect.

9. Industrial influence: Untreated waste water from manufacturing industries contributed to water pollution.

10. Thermal water pollution: Thermal water pollution is a rise or fall in water temperature, this changes in temperature of water can be caused by industries, because some industries used water as cooling agent, the heated water is let off directly into the natural environment at a higher temperature, also cold water pollution happens when cold water is released into the water bodies, aquatic body like fish are vulnerable to slight changes in temperature. Heated water decreases oxygen in the water killing fish and other aquatic organisms, cold water affects eggs and larvae and some invertebrates of the aquatic eco-system.

MAJOR WATER POLLUTANTS

Major water pollutants are as follows:

1. Sewage- Sewage pollutants include domestic and hospital wastes, animal and human excreta etc.The sewage let off causes oxygen depletion, spread of diseases/epidemics. Metals-Metals like mercury are let off into water bodies from industries. Heavy metals like mercury cause poisoning and affect health causing numbness of tongue, lips, limbs, deafness,blurred vision and mental disorders.
2. Lead- Industrial wastes also lead to Lead pollution. If lead enters the human body system in higherquantities it affects RBCs, bone, brain, liver, kidney and the nervous system. Severe lead poisoningcan also lead to coma and death.
3. Cadmium- Source for cadmium pollution is industries, fertilizers. Cadmium gets deposited in visceral organs like liver, pancreas, kidney, intestinal mucosa etc. Cadmium poisoning causes vomiting, headache, bronchial pneumonia, kidney necrosis, etc.
4. Arsenic- Fertilizers are source for arsenic pollution. Arsenic poisoning causes renal failure and death. It also causes liver and kidney disorders, nervous disorders and muscular atrophy,etc.
5. Agrochemicals like DDT- It is a pesticide. Accumulation of these pesticides in bodies of fishes, birds, mammals and man affects nervous system, fertility and causes thinning of egg shells in birds.Bacteria,Viruses and 6. Parasites- These are sourced from human and animal excreta, they are infectious agents.Plastics, Detergents, Oil and Gasoline - They. are a waste from industries, household and farms. They

trigger organic pollution and is harmful to health.

1. Inorganic Chemicals - Inorganic chemicals like acids, salts, metals are a result of industrial effluents, household cleansers, and surface run-off and are injurious to health.
2. Radioactive Materials- Mining and ores processing, power plants, weapons production andnatural give rise to radioactive pollution like that of uranium, thorium, cesium, iodine and radon.Radioactive pollution causes serious health diseases to all organisms.
3. Sediments- Sedimentation of soil, silt due to land erosion and deposition causes disruption in ecosystem.
4. Plant Nutrients- Nutrients like nitrates, phosphates, and ammonium are let off from agricultural and urban fertilizers, sewage and manure. Excess of nutrients cause eutrophication and affect the ecosystem.
5. Animal Manure and Plant Residues - These substances in water causes increased algal blooms and microorganism population. This increases oxygen demand of water, affecting aquatic ecosystem. This is introduced into water due to sewage, agricultural run-off, paper mills, food processing etc.
6. Thermal Pollution- Temperature changes of water caused due to using water as cooling agent inpower plants and industries causes increase in water temperature affecting the aquatic life.

The contaminants that lead to water pollution include a wide variety of substance like chemicals, pathogens, temperature changes and discoloration.

Industrial activity causes huge water polluting. Wastes from factories are let off into freshwater to carry waste from plants into rivers. This contaminates water with pollutants like lead, mercury, asbestos and petrochemicals.

Sewage let off from domestic households, factories, commercial buildings are untreated in water treatment plants yet are disposed into the sea. Sewage containing flush chemicals and pharmaceuticals causes greater problems.

Solid waste dumping and littering of cardboard, plastics, glass, styrofoam, aluminium tins, etc., in water bodies.

Oil spills from tankers and ship travel causes oil pollution. Oil does not dissolve in water and forms a thick laver on the water surface.

Burning of fossil fuels and emissions from industries and motor vehicles causes formation of acidic particles in the atmosphere. These particles fuse with water vapor resulting in acid rain. Acid rain harms aquatic life.

Increase in water temperature is a result of global warming and thermal plants use water as cooling agents for mechanical equipments.

**Other causes of water pollution:**

Detergents, by-productions of disinfection, food processing waste, insecticides, petrochemicals, debris from logging operations, volatile organic compounds, personal hygiene and cosmetic products, drug pollution, chemical wastes, fertilizers, heavy metals, and sedimentation are other causes of water pollution.

Water pollution extensively affects health in humans and aquatic ecosystems.

Groundwater contamination causes reproductive and fertility disorders in wildlife ecosystems.

Sewage, fertilizer and agricultural run-off has nutrients, organic substances which lead to increase of algal bloom causing oxygen depletion. The lower oxygen levels affect the natural ecological balance of rivers and lake ecosystem.

Consumption and swimming in contaminated water causes skin diseases, cancer, reproductive problems, stomach ailments in humans.

Industrial effluents and agricultural pesticides accumulate in aquatic environments causing harm to aquatic animais and lead to biomagnifications. Heavy metals like mercury, lead are poisonous to small children and women. These chemicals interfere in the development of nervous system in Fetuses and voung children.

Rising water temperatures destroy aquatic ecosystem. Coral reefs are bleached due to warmer temperatures. Warmer waters forces indigenous water species to seek cooler water causing ecological shift of the affected area.

Littering by humans like plastic bags, clog and suffocate aquatic animals.

Water pollution causes soil erosion in streams, rivers and flooding due to accumulation.