**Mid syllabus**

**Contents:**

**General introduction of pollution.**

**Water pollution**

**Radiation pollution**

**Land pollution**

**Noise pollution**

**General introduction of Pollution**

Pollution occurs when pollutants contaminate the natural surroundings. Pollution disturbs the balance of our ecosystems, affect our normal lifestyles and gives rise to human illnesses and global warming.Pollution has reached its peak due to the development and modernization in our lives. With the development of science and technology, there has been a huge growth of human potentials. People have become prisoners of their own creations.

We waste the bounties of our nature without a thought that our actions cause serious problems. We must deepen our knowledge of natures laws and broaden our understanding of the laws of the laws of human behavior in order to deal with pollution problems. .

**Types, causes, and effects of pollution:-**

Air pollution is one of the most dangerous forms of pollution. A biological, chemical, and physical alteration of the air occurs when smoke, dust, and any harmful gases enter into the atmosphere and make it difficult for all living beings to survive as the air becomes contaminated. Burning of fossils fuels, agriculture related activities, mining operations, exhaust from industries and factories, and household cleaning products entail air pollution. People release a huge amount of chemical substances in the air every day. The effects of air pollution are alarming. It causes global warming, acid rains, respiratory and heart problems, and eutrophication. A lot of wildlife species are forced to change their habitat in order to survive. **Soil Pollution:-**

Soil pollution occurs when the presence of pollutants , contaminants, and toxic chemicals in the soil is in high concentration that has negative effect on wildlife , plants , humans , and ground water. Industrial activity, waste disposal, agriculture activities, acid rain, and accidental oil spill are the main causes of soil pollution. This type of contamination influence health of humans, affects the growth of plants , decreases soil fertility, and changes the soil structure.

**Water Pollution:-**

Water pollution is able to lead our world on a path of destruction. Water is one of the greatest natural resources of the whole humanity. Nothing will be able to live without water. However, we do not appreciate this gift of nature and pollute it without thinking. The key causes of the water pollution are: industrial waste, mining activities, sewage and waste water, accidental oil leakage, marine dumping , chemical pesticides and fertilizers , burning of fossil fuels, animal waste, urban development , global warming , radioactive waste, and leakage from sewer lines. There is less water available for drinking , cooking, irrigating crops , and washing.  **Light pollution:-**

light pollution occurs because of the prominent excess illumination in some areas. Artificial lights disrupt the worlds ecosystems. They have deadly effects on many creatures including mammals, plants , amphibians, insects, and birds. Every year many bird species die colliding with needlessly illuminated buildings. Moreover, artificial lights can lead baby sea turtles to their demise.

**Noise pollution:-**

Noise pollution takes places when noise pollution and unpleasant sounds cause temporary disruption in the natural balance. It is usually caused by industrialization , social events, poor urban planning , household chores , transportation , and construction activities. Noise pollution leads to hearing problems , health issues, cardiovascular issues, sleeping disorders , and trouble communicating. Moreover, it affects wildlife a lot. Some animals may suffer from hearing loss while others become inefficient at hunting. It is very important to understand noise pollution in order to lower its impact on the environment. **Radioactive pollution:-**

Radioactive pollution is the presence of radioactive substances in the environment. It is highly dangerous when it occurs. Radioactive contamination can be caused by breaches at nuclear power plants or improper transport of radioactive chemicals. Radioactive material should be handled with the great care as radiation destroys cells in living organisms that can result in illness or even death. **Solution to Pollution Problems:-**

Environmental pollution has negatively affected the life of both animals and human beings. The only way to control current environmental issues is to implement conservation methods and create sustainable development strategies. We should find some effective solutions in order to restore our ecological balance. First of all , we should make sustainable transportation choices. We should take advantage of public transportation, walk or ride bikes whenever possible, consolidate our trips , and consider purchasing an electric car. It is very important to make sustainable food choices. Choose local food whenever possible; buy organically or grown vegetables and fruits or grow your own.

People should conserve energy. Turn off electronics and lights when you are not in room. Consider what small changes can lead to big energy savings. Use energy efficient devices. It is also essential to understand the concept of reduce, reuse and recycle. Try to buy used items whenever possible. Choose products with minimal packaging. Buy reusable items. Remember that almost everything that you purchase can be recycled. Conserve water as much as possible. Dispose of toxic waste properly. Do not use herbicides and pesticides. Use natural, environmentally friendly chemicals for your everyday chores.

**Conclusion:-**

Environmental pollution is one of the biggest problems caused by human activities that we should overcome to see a tomorrow and guarantee our descendants a healthy life. There are many environmental concerns for communities around the world to address. We should always remember that pollution problems affect us all so each of us has to do his or her best to help restore ecological balance to this beautiful place we call home. Learn about the major polluters in your area to protect the air and water where you live. Encourage people to stop pollution, tell them everything you know about this problem, and protest local polluter together. The masses should be educated on the danger of different types of pollution. People should know everything about all consequences of environmental pollution in order to prevent the worst from happening. Lets protect the water we drink, the air we breathe, and the soil we use to grow our food.

**Water pollution**

Water pollution is generally induced by humans. The growth of human population, industrial and agricultural practices is the major causes of pollution. Water pollution becomes worse as a result of overcrowding in urban areas. Agricultural, domestic and industrial wastes are the major pollutants of agnatic habitats. Sewage is the biggest pollutant of fresh water when discharged into them. Some of the important sources of water pollution are discussed below:

**1.Urbanization**

Urbanization generally leads to higher phosphorus concentrations in urban catchments. Increasing imperviousness, increased runoff from urbanized surfaces, and increased municipal and industrial discharges all result in increased loadings of nutrients to urban streams.

**2.Sewage**

Management of solid waste is not successful due to huge volumes of organic and non-biodegradable wastes generated daily. Garbage is unscientifically disposed and ultimately leads to increase in the pollutant load of surface and groundwater courses. Chemical fertilizers used by farmers also add nutrients to the soil, which drain into rivers and seas and add to the fertilizing effect of the sewage.

**3.Industrial wastes**

Many of the industries are situated along the banks of river such as steel and paper industries for their requirement of huge amounts of water in manufacturing processes and finally their wastes containing acids, alkalies, dyes and other chemicals are dumped and poured down into rivers as effluents. Chemical industries concerning with manufacture of Aluminium release large amount of fluoride through their emissions to air and effluents to water bodies.

**4.Agro-chemical wastes**

Agro-chemical wastes include fertilizers, pesticides which may be herbicides and insecticides widely used in crop fields to enhance productivity. Improper disposal of pesticides from field farms and agricultural activities contributes a lot of pollutants to water bodies and soils.

**5.Thermal pollution**

Some of the important sources of thermal pollution are nuclear power and electric power plants, petroleum refineries, steel melting factories, coal fire power plant, boiler from industries which release large amount of heat to the water bodies leading to change in the physical, chemical and biological characteristics of the receiving water bodies.

**6.Oil spillage**

Oil discharge into the surface of sea by way of accident or leakage from cargo tankers carrying petrol, diesel and their derivatives pollute sea water to a great extent. The residual oil spreads over the water surface forming a thin layer of water-in-oil emulsion.

**7. Disruption of sediments**

During construction work, soil, rock, and other fine powders sometimes enter nearby rivers in large quantities, causing water to become turbid (muddy or silted). sediment flow affect adversely the formation of beaches, increases coastal erosion and reduces the flow of nutrients from rivers into seas.

**8. Acid rain pollution**

Atmospheric Sulfur dioxide and nitrogen dioxide emitted from natural and human-made sources like volcanic activity interact with atmospheric chemicals, to form sulfuric and nitric acids in the air. These acids fall down to earth through precipitation in the form of rain or snow. Once acid rain reaches the ground, it flows into waterways that carry its acidic compounds into water bodies.

**Heavy metals**

The heavy metals are among the most common pollutants found in wastewater. These metals pose a toxicity threat to human beings and animals even at low concentration. Some of the heavy metals like lead (Pb), arsenic (As), mercury (Hg), chromium (Cr), nickel (Ni), barium (Ba), cadmium (Cd), cobalt (Co), selenium (Se), vanadium (V), oils and grease, pesticides, etc are very harmful, toxic and poisonous even in ppb (parts per billion) range. Environmental pollution from hazardous metals and minerals can arise from natural as well as anthropogenic sources. Natural sources are, seepage from rocks into water, volcanic activity, forest fires etc. Pollution also arises from partitioning of polluting elements, between sedimentary rocks and their precursor sediments and water. The pollution occurs both at the level of industrial production as well as end use of the products and run-off.

**Domestic Water Pollution**

Domestic Pollution is the pollution caused to the earth by domestic use. Domestic water pollution is mainly caused by **sewage .**

**Sewage** is defined as the water-borne waste derived from home, animal or food processing Plants and includes human excreta, soaps, organic material, different types of solids waste food, oil detergents, paper and cloth. Thy are the largest group of water pollutants. Water pollution is caused by uncontrolled dumping of waste collected from villages, towns and cities into ponds, streams lakes and rivers. A major ingredient of most detergents is phosphate. Phosphate support luxurious growth of algae. Algae withdraw large quantities of oxygen from water. It becomes detrimental to other organism. The domestic sewage contributes to the largest amount of waste. Untreated sewage water in areas without access to sanitary conditions can contaminate the water, which can result with disease.

**Effects of domestic pollution:**

Shellfish breath water through their gills, but have to strain to trap microscopic plants and animals for food. If the water was contaminated with disease causing bacteria, these could be consumed as food by shellfish . When eaten raw or somewhat cooked, these shellfish can make people sick. Certain fish in contaminated waters can develop high levels of toxic substance. When these food are taken in frequently over a lifetime, they increase the risk of unwanted health effects. Detergents can cause liver and kidney damage, while sewage water carries disease that may be extremely harmful to the human body, and all of the see life around the area. Bathers are increased risk of catching any illness from bacteria and viruses in the sewage effluents.

**Water borne infectious disease in man:**

* Virus: Viral hepatitis, Poliomyletitis
* Bacteria: Cholera, Diarrhea, Dysentery
* Protozoa: Amoebiasis, Giardiasis
* Helminthes: Roundworm, Hookworm

**Industrial Pollution**

Causes , Effects and Biggest culprits of Global Warming

**Definition**

Industrial pollution refers explicitly to any contamination caused by industrial activities. Industrial pollution is a big issue because most pollution is caused by some industry, making it the most significant form of pollution on the planet.

**Causes**

**Industrial growth that is unplanned**

A lot of air and water pollution has occurred from companies who ignored rules or standard practices to facilitate rapid growth. Industrial growth has been a frequent culprit for pollution.

**Lack of effective policies**

Many industries have been able to ignore or entirely by pass pollution laws because the policies are either not valid or not adequately enforced by pollution control boards.

**The sheer number of industries**

There are many industries and factories and most of them are polluting the air every day. Those companies have been discovered to release significant amount of toxic gas, making pollution an even more substantial issue.

**Natural resources use**

Raw material is necessary for a lot of industries. When industries pull minerals the process causes pollution in the soil and also causes oil leakes and spills that are harmfull and deadly to people and animals.

**Improper disposal of waste**

This is one of the most significant causes of pollution because the effect include sever and chronic health issues and lower air quality.

**Effects**

1. Industrial pollution pollute the water which affect the plants,animals and insects in their habitat ,farmers also use that water for irrigation ,causing harmful effects to the food we eat.
2. Industrial pollution pollute soil which cause poisons agriculture and sometimes kills local vegetation and degrade the land . It effect human health by using contaminated food.
3. Air pollution has been the culprit of many illness. It is caused by the smoke released by various industries.
4. Glaciers are melting, polar animals are becoming extinct, hurricanes, floods, and other natural disasters are increasing and all of those are the effect of global warming.

**Facts about industrial pollution**

* Burning fossil fuels like oil, natural gas, and petroleum.
* Burning of coal.
* Chemical solvents used in dyeing and tanning industries.
* Untreated gas and liquid waste being released into the environment.
* Improper disposal of radioactive material.

**Reducing industrial pollution**

* Development of batter technology for waste disposal.
* Increasing recycling efforts.
* Creating policies that prevents land misuse.
* Adopting organic water and soil clearing methods like using microbes that feed off of metal and waste.

**Water purification**

**Water purification** is the process of removing undesirable chemicals, biological contaminants, suspended solids, and gases from water. The goal is to produce water fit for specific purposes. Every year more than 4 billion cases are register for diarrhea out of that approximately 90% of cases are due to the drinking of impure water. WHO says that this ratio can be decreased by up to 95% simply by getting access to pure and healthy water for drinking purposes and modification in the environment.

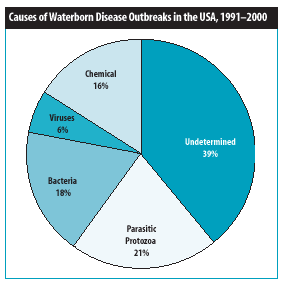


Fig 1 waterborn diseases cases in USA

## Why Water Purification as Necessity:

## The problem is that as the water flows from the treatment plants to our homes, it passes through worn-out pipes and gets saturated with all sorts of contaminants. These contaminants pose a threat to our wellbeing, affecting our health in the long run. Bad water could bring [harmful bacteria](https://www.livestrong.com/article/164759-a-list-of-bad-bacteria/) to our body, spreading faster than the immune system could react. Plus the contaminants damage our plumbing and household appliances.

## Methods:

## There are many different types of water purifiers available in market. Water purifiers range from simple water filters to advanced purifiers using membrane technology for water filtration followed by disinfection with UV lamp filters.Here are the common water purification methods used for filtering water.

**1 – Boiling**

Boiling water is the cheapest and safest method of water purification. Water sources and channels of distribution may render our water unsafe. For example, parasites and germs are things we may not see by bare eyes, but their effects can be life threatening .In this method, clean water should be brought to boil and left at rolling-boil for 1-3 minutes. For people living in high altitude areas, it is recommended to boil your water for longer than water boiled at lower altitudes. Boiled water should be covered and left to cool before drinking. For water drawn from wells, leave it for compounds to settle before you filter out clean water for use.

**2 – Filtration**

Filtered water is considered as clean water. Filter usually remove dirt and impurities but may not necessarily remove the harmful bacteria and virus. These harmful germs can cause stomach disorders. In our country where majority of water sources are polluted with sewage effluents, filters water may not be a very sound decision. Moreover the filters get damaged frequently and loose the cleaning ability with time and need to be replaced.

**3 – Distillation**

Distillation is a water purification method that utilizes heat to collect pure water in the form of vapor. This method is effective by the scientific fact that water has a lower boiling point than other contaminants and disease-causing elements found in water. Water is subjected to a heat source until it attains its boiling point. It is then left at the boiling point until it vaporizes. This vapor is directed into a condenser to cool. Upon cooling, vapor is reversed into liquid water that is clean and safe for drinking. Other substances that have a higher boiling point are left as sediments in the container.

This method is effective in removing bacteria, germs, salts and other heavy metals such as lead, mercury and arsenic. Distillation is ideal for people who have access to raw, untreated water. This method has both advantages and disadvantages. A notable disadvantage is that it is a slow process of water purification. In addition, it requires a heat source for the purification to work. Although cheap sources of energy are being developed, distillation remains a costly process of purifying water. It is only ideal (effective and least costly) when purifying small quantities of water (It is not ideal for large scale, commercial or industrial purification).

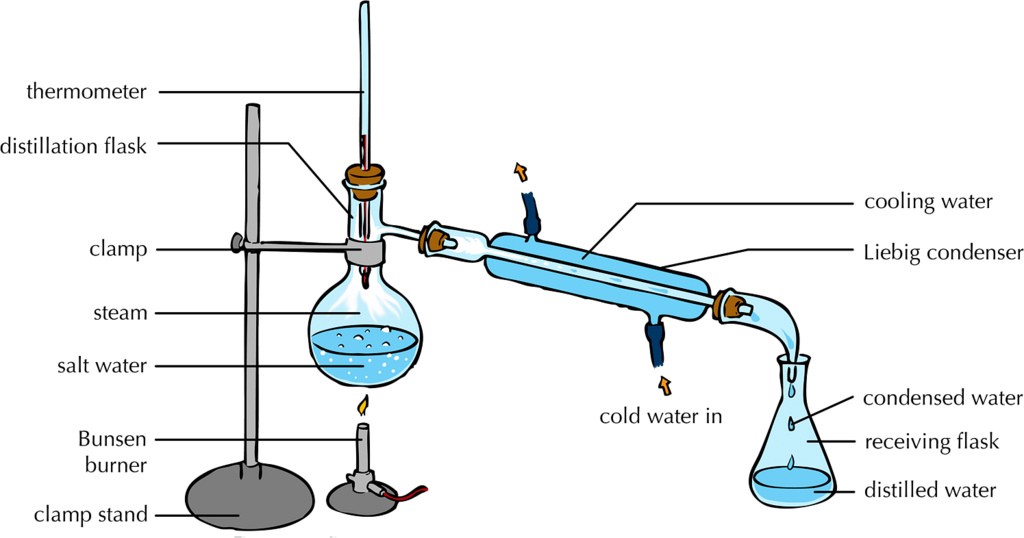


Fig.2 Distillation Process

**4 – Chlorination**

Chlorine is a powerful chemical that has been in use for many years to treat water for home consumption. Chlorine is an effective water purification method that kills germs, parasites and other disease-causing organisms found in ground or tap water. Water can be purified using chlorine tablets or liquid chlorine. As an off-the-shelf water purification product, chlorine is cheap and effective. However, caution should be taken when using chlorine liquid or tablets to treat drinking water. For example, people suffering from thyroid problems should talk to a medical practitioner before using this product. When using chlorine tablets, it is important to apply them in heated water, as they dissolve well in water that is at 21 degree Celsius or higher. Chlorine tablets kill all bacteria leaving our water clean and safe.



Fig.3 Chlorination at household level

**5\_Water Softeners**

Water softeners employ ion exchange technology in order to reduce the amount of magnesium and calcium in the water. Since these harmful elements are replaced with sodium, water treated with this process tends to contain high levels of sodium. If we can consume large amounts of salt, it is best to avoid softened water. It is also unwise to water plants with softened water since it contains such high levels of sodium.

### 6\_Reverse Osmosis

Reverse osmosis works by moving water through a semi-permeable membrane in order to stop larger, more harmful molecules from entering. Since this process can only block molecules that are larger than water, contaminants with larger molecules, such as chlorine, cannot be removed. [Reverse osmosis systems](https://www.allergyandair.com/reverse-osmosis/) are able to remove more contaminants than carbon, making them a popular choice for many consumers. These filters consume far more water than they produce, so they are best suited for domestic use.

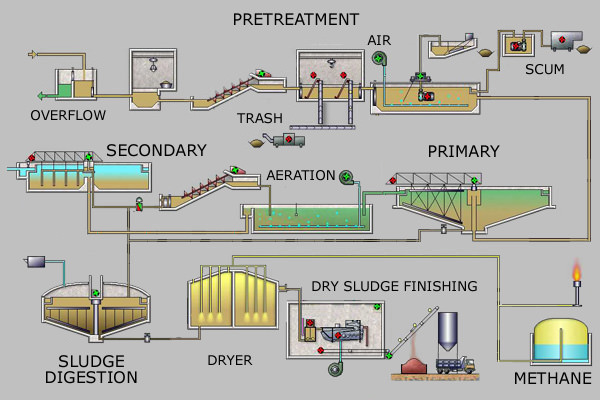
### 7\_Ozonation

### It is a chemical water purification process, which is now one of the advanced methods; thus, it is mainly present in modern and advanced water purification system. This process is based on the infusion of the ozone in the water. Ozone is a gas which is consist of 3 molecules of oxygen, which is one of the potent oxidants. Ozonation in water purification system in use to eliminate organic compound and microbes related water contamination. The ozone water purification system in use has great application, but it is mostly used to remove organic and microbial contamination.

**Waste Water Treatment:**

Wastewater treatment is done at a sewage treatment plant in urban areas and through a septic tank system in rural areas.The main purpose of **sewage (wastewater) treatment** is to remove organic matter (oxygen-demanding waste) and kill bacteria. Special methods also can be used to remove nutrients and other pollutants.

The numerous steps at a conventional wastewater treatment plant include **pretreatment**(screening and removal of sand and gravel), **primary treatment** (settling or floatation to remove organic solids, fat, and grease), **secondary treatment** (aerobic bacterial decomposition of organic solids), **tertiary treatment** (bacterial decomposition of nutrients and filtration), **disinfection**(treatment with chlorine, ozone, ultraviolet light, or bleach to kill most microbes), and either **discharge**to surface waters (usually a local river) or reuse for some other purpose, such as irrigation, habitat preservation, and artificial groundwater recharge.(Figure 4)



The concentrated organic solid produced during primary and secondary treatment is called **sludge**, which is treated in a variety of ways including landfill disposal, incineration, use as fertilizer, and anaerobic bacterial decomposition, which is done in the absence of oxygen. Anaerobic decomposition of sludge produces methane gas, which can be used as an energy source.

A **septic tanksystem** is an individual sewage treatment system for homes in typically rural settings. The basic components of a septic tank system (Figure 5) include a sewer line from the house, a septic tank (a large container where sludge settles to the bottom and microorganisms decompose the organic solids anaerobically), and the drain field (network of perforated pipes where the clarified water seeps into the soil and is further purified by bacteria). Water pollution problems occur if the septic tank malfunctions, which usually occurs when a system is established in the wrong type of soil or maintained poorly.

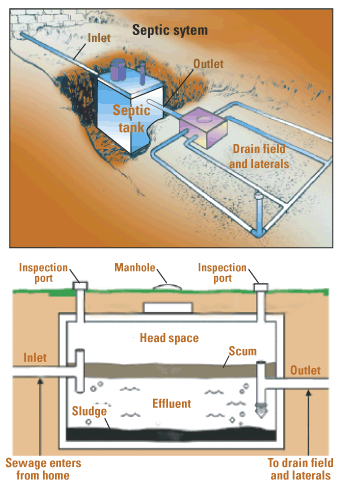
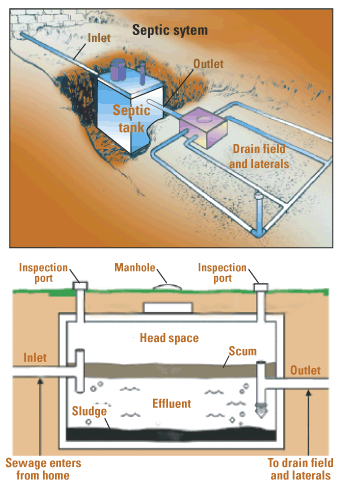


Fig.5 Septic tank system

**Ozone wastewater treatment**

**Ozone wastewater treatment** is a method that is increasing in popularity. An ozone generator is used to break down pollutants in the water source.

* The generators convert oxygen into ozone by using ultraviolet radiation or by an electric discharge field.
* Ozone is a very reactive gas that can oxidise bacteria, moulds, organic material and other pollutants found in water.
* Using ozone to treat wastewater has many **benefits**:

1-Kills bacteria effectively.  
2-Oxidises substances such as iron and sulphur so that they can be filtered out of the solution.  
3-There are no nasty odours or residues produced from the treatment.  
4-Ozone converts back into oxygen quickly, and leaves no trace once it has been used.

* The **disadvantages** of using ozone as a treatment for wastewater are:

1-The treatment requires energy in the form of electricity; this can cost money and cannot work when the power is lost.  
2-The treatment cannot remove dissolved minerals and salts.  
3-Ozone treatment can sometimes produce by-products such as bromate that can harm human health if they are not controlled.

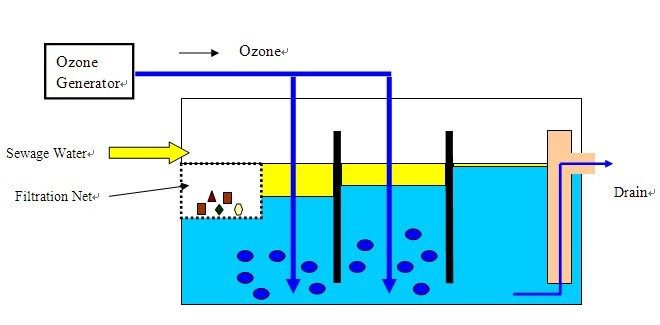


Fig.6 Ozone wastewater treatment

**Radiation pollution**

The radioactive pollution is defined as the physical pollution of living organisms and their environment as a result of release of radioactive substances into the environment during nuclear explosions and testing of nuclear weapons, nuclear weapon production and decommissioning, mining of radioactive ores, handling and disposal of radioactive waste, and accidents at nuclear power plants. Nuclear tests are carried out to determine the effectiveness, yield, and explosive capability of nuclear weapons. The proportion of radioactive pollution is 15% of the total energy of the explosion. Radioactive pollution of water, water sources, and air space is the result of radioactive fallout from the cloud of a nuclear explosion. Radionuclides are the main sources of pollution; they emit beta particles and gamma rays, radioactive substances.

**Types of radiation pollution:**

Radiation is classified as being ionizing or nonionizing. Both types can be harmful to humans and other organisms.

**Ionizing radiation:**

Ionizing radiation is the short wavelength radiation or particulate radiation emitted by certain unstable isotopes during [radioactive decay](https://www.encyclopedia.com/earth-and-environment/atmosphere-and-weather/atmospheric-and-space-sciences-atmosphere/radioactive). There are about 70 radioactive isotopes, all of which emit some form of [ionizing radiation](https://www.encyclopedia.com/medicine/divisions-diagnostics-and-procedures/medicine/ionizing-radiation) as they decay from one isotope to another. A radioactive isotope typically decays through a series of other isotopes until it reaches a stable one. As indicated by its name, ionizing radiation can ionize the atoms or molecules with which it interacts. In other words, ionizing radiation can cause other atoms to release their electrons. These free electrons can damage many biochemicals, such as proteins, lipids, and nucleic acids (including DNA). If intense, this damage can cause severe human health problems, including cancers, and even death.

Ionizing radiation can be either short-wavelength [electromagnetic radiation](https://www.encyclopedia.com/science-and-technology/physics/physics/electromagnetic-radiation) or particulate radiation. Gamma radiation and X-radiation are short-wavelength electromagnetic radiation. Alpha particles, beta particles, neutrons, and protons are particulate radiation. Alpha particles, beta particles, and [gamma rays](https://www.encyclopedia.com/medicine/divisions-diagnostics-and-procedures/medicine/gamma-rays) are the most commonly encountered forms of radioactive pollution. Alpha particles are simply ionized helium nuclei, and consist of two protons and two neutrons. Beta particles are electrons, which have a negative charge. Gamma radiation is high-energy electromagnetic radiation.

**Non ionization radiation:**

Nonionizing radiation is relatively long-wavelength [electromagnetic radiation](https://www.encyclopedia.com/science-and-technology/physics/physics/electromagnetic-radiation), such as radiowaves, microwaves, visible radiation, [ultraviolet radiation](https://www.encyclopedia.com/science-and-technology/physics/physics/ultraviolet-radiation), and very low-energy electromagnetic fields. Nonionizing radiation is generally considered less dangerous than [ionizing radiation](https://www.encyclopedia.com/medicine/divisions-diagnostics-and-procedures/medicine/ionizing-radiation). However, some forms of nonionizing radiation, such as ultraviolet, can damage biological molecules and cause health problems. Scientists do not yet fully understand the longer-term health effects of some forms of nonionizing radiation, such as that from very low-level electromagnetic fields (e.g., high-voltage power lines), although the evidence to date suggests that the risks are extremely small.

**Sources of radiation pollution:**

There are two types of sources of radiation pollution.

1. Natural sources
2. Man-made sources

**Natural sources:**

* Cosmic rays
* Radioactive minerals
* Radio nuclides

**Cosmic rays:**

The cosmic rays containing highly energetic particles reach the surface of the earth causing pollution. The intensity of cosmic rays depends on latitudes and altitude of the place. The intensity is maximum at the poles and minimum at the equator.

**Radioactive Minerals:**

The minerals containing Uranium- 235 (U235), Uranium-238 (U238), Thorium-232 (Th232), Plutonium- 239 (Pu239) etc. are capable of emitting energetic radiations caus­ing pollution.

**Radio nuclides:**

The unstable radio-nuclides in the at­mosphere can be splitted up into smaller parts emitting energetic radiation. The smaller radio-nuclides enter into the body of or­ganism along with air during respiration.

**Man-made sources:**

The various sources of manmade radiation pollutions may be:

* Nuclear power plants;
* Radio-active wastes;
* Nuclear explosions
* Radio isotopes
* Television set

**Nuclear Power Plants:**

Nuclear power plants emit radiation to a very smaller extent except accidental leaks (Chernobyl acci­dent of undivided USSR).

**Radio-active Wastes:**

The nuclear power plants produce a lot of nuclear radio-active wastes. The disposal of these wastes has become a global problem. Some countries producing large quantity of nuclear wastes dump them in ocean near other coun­tries.

**Nuclear Explosion:**

During nuclear explosion, a large number of radio-nuclides are generated in the atmosphere. The radio ­nuclides settle down with rain contaminating the soil and water bodies. Finally, these enter into food chain causing serious prob­lem to the living organisms.

**Radio-isotopes:**

Radio-isotopes are also prepared artificially either by nuclear fusion or by nuclear fission. If these radio-isotopes are not properly handled, these emit radiations causing pollution.

**Television Set:**

Television sets produce radiations which can also cause cancer.

**Effects of radiation pollution:**

**Genetic mutations:**

Radiation has adverse effects when it comes to genetics. It leads to damage of DNA strands

leading to genetic break up in the course of time. The degree of genetic mutation leading to changes in DNA composition vary due to the level of radiation one has been exposed to and the kind of exposure. In the event that a human or an animal is exposed to too much radiation from the atmosphere, food consumed and even water used then chances are that their bodies have already absorbed the radiation. Once in the body, it remains active because energy cannot be destroyed. The resulting mutation makes one highly susceptible to cancer. For pregnant women, kids born have adverse defects caused by genetic mutations like low weight during birth. Effects such as disfigured births and impairment like blindness in children have also been reported. Infertility has also been mentioned as an effect of radiation.

**Diseases:**

Cancer is the most dominant radiation related disease. It has developed over the years and poses great risk in global health. Others include leukemia, anemia, hemorrhage, a reduction in the life span leading to premature aging and premature deaths as well as others such as cardiovascular complications. Leukemia, for instance, is caused by radiation in the bone marrow.

**Soil infertility:**

Exposure of radiation to the atmosphere means it is present even in soils. Radioactive substances in the soil react together with the various nutrients leading to destruction of those nutrients, thus rendering the soil infertile and [highly toxic](https://www.conserve-energy-future.com/top-10-worst-toxic-pollution-problems.php). Such soil leads to the harvest of crops that are riddled with radiation and thus, unfit for consumption by both humans and animals.

Plants that grow from such soil are also genetically modified. Since these are at the base of the food chain, the herbivores consume them and retain the radiation levels. The carnivores such as lions, vultures end up consuming them and increasing their levels of radiation – explained through the concept of [Biomagnification](https://www.conserve-energy-future.com/effects-pesticides-human-health-environment.php).

**Cell destruction:**

[Radioactive pollution](https://www.conserve-energy-future.com/pros-and-cons-of-nuclear-energy.php) has diverse effects such as the alteration of cells. The bodies of living

organisms areunique in that there are millions of cells in one single body, where each has its purpose to fulfill. Radiation distorts the cells present leading to permanent damage of the various organs and organ systems. In the face of too much radiation, permanent illnesses and death are inevitable.

**Burns:**

Radiation is not easy to feel but it is easy to realize that you have been affected by it. The immediate presence of burns, red lesions and sores is evidence. To make it worse, this can lead to skin cancer.

**Solutions of radiation pollution:**

**Proper method of disposing radioactive waste:**

[Radioactive waste](https://www.conserve-energy-future.com/nuclear-waste-disposal-methods.php) still has some level of radiation. Accordingly, it cannot be disposed in the same way as normal waste. It cannot be incinerated or buried. Since there is likelihood of seepage, this waste should be stored in heavy and thick concrete containers. Another option is to dilute the radiation since storage may not be possible. Since there are no easy ways of disposing of radioactive material, professional assistance should always be sought.

**Proper labelling:**

It is necessary for any material with radioactive content to be labeled and the necessary precautions advised on the content of the label. The reason for this is because radiation can enter the body by a mere touch of radioactive material. Containers with such elements should be well labeled in order for one to use protective gear when handling them.

**Banning of nuclear test:**

It has already been proven that nuclear power has a lot of latent power that is very destructive. Nevertheless, the tests done to perfect the energy contribute greatly to the overall presence of radioactive substances. Moreover, these tests though done in the deserts end up escaping from one [ecosystem](https://www.conserve-energy-future.com/keystone-species-examples.php) to another eventually affecting the lives of many people.

**Alternative energy source:**

The evolution and use of nuclear power was not a bad thing initially. However, considering the [damage and threats it has on the environment](https://www.conserve-energy-future.com/effects-pesticides-human-health-environment.php), it is high time for its use to be discontinued and for the world to perhaps focus on alternative and environmentally friendly energy sources – like renewable sources of energy namely Solar, hydro-electric and wind power.

The use of radioactivity to generate energy in nuclear power plants, for example, leads to the production of more radiation to the atmosphere considering the waste released from the various processes and combustion.

**Proper storage:**

It is mandatory for containers carrying radioactive material to be stored properly. For starters, such substances should be stored in radiation proof containers to ensure no seeping or leakage during handling. Proper storage means no harm and can minimize cases of accidental leakage.

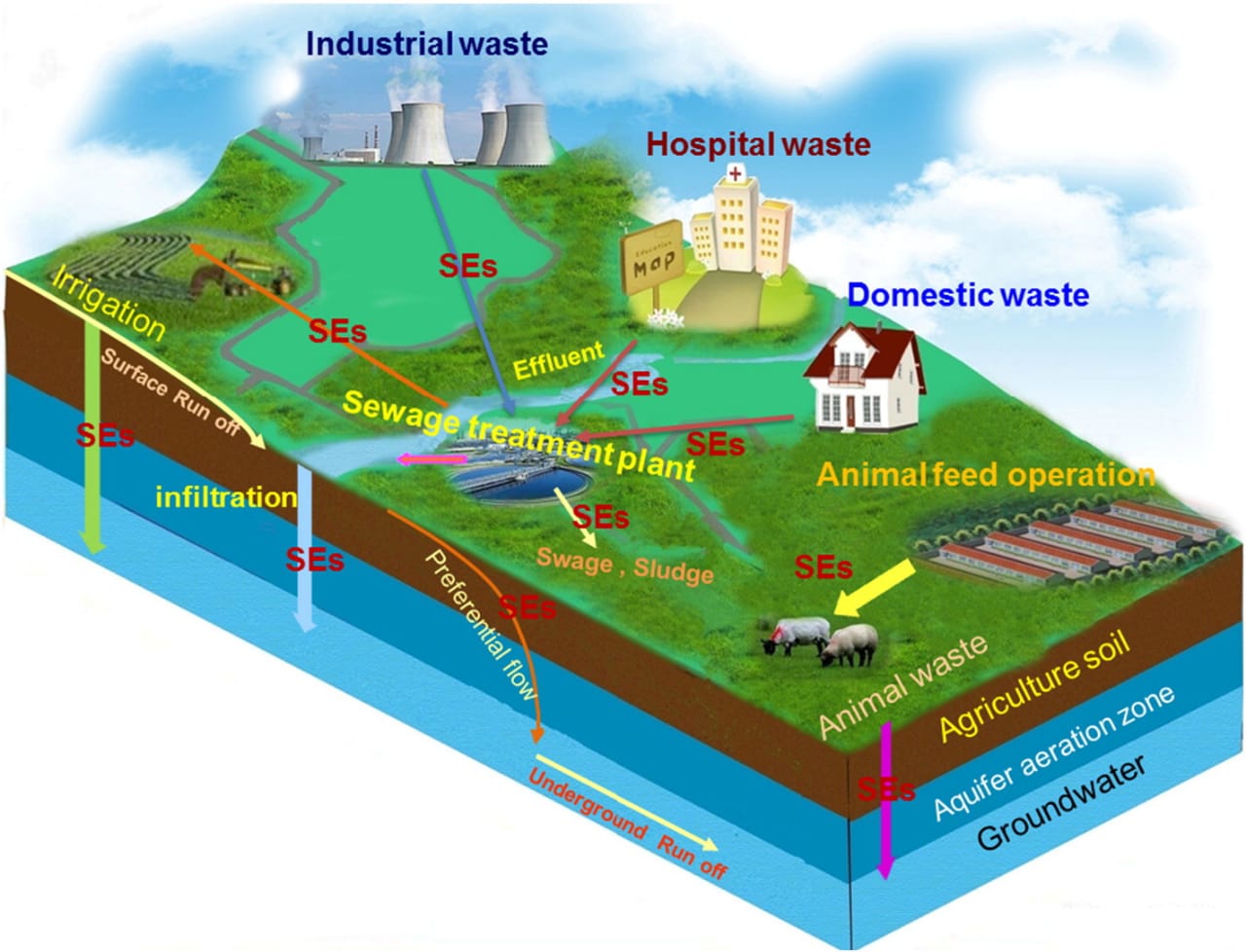
**Reusing:**

Since it is not easy to store or dispose the waste, it can be recycled and used for other purposes like in another reactor as fuel thereby [protecting the environment](https://www.conserve-energy-future.com/ways-to-be-better-environmental-steward.php).

**Land pollution**

**Land pollution**

**Introduction**:

Land is defined as the “the surface of earth not covered by water.” Like air and water pollution land pollution also arises from various human activities. It comprises highly heterogenous mass of discarded and waste materials from urban community, industrialist, agriculturists and scientists. Land pollution is defined as; “ deterioration of earth’s land surfaces, often directly or indirectly as a result of man activities and their misuse of land resources”. Human actions have also caused many large areas of land to lose or reduce their capacity to support life forms and ecosystem. 

Sources of land pollution:

1.Domestic effluents and wastes:

Common domestic waste generally includes food materials, vegetables and fruit remains, packing materials, polythene bags, papers, remnants of used cloths, old shoes, plastic material, glass bottles, tin containers, ash, wood materials and garden wastes etc. Some of these are non-reusable while some can be recycled. If they are not properly dumped then it becomes home and breeding place for rats, flies, cockroaches, mosquitoes, bacteria and several other micro organisms. These cause diseases like plague, malaria, cholera, diarrhea etc besides pollution.

2.Industrial effluents and wastes:

Several industries as oil refineries, paper mills, sugar mills, fertilizer manufacturers, plastic and rubber manufacturers, tanneries, acid and alkali plants are the main sources of land pollution. Some industries produce toxic, these hazardous chemicals are transmitted to man from soil through uptake by plants, causing serious carcinogenic, mutagenic and teratogenic diseases.

3. Agricultural wastes:

There is indiscriminate use of several chemicals to meet the increasing demand of various crops, vegetables and fruit plants for rapidly growing population. Pesticides and fertilizers are two major constituents of agricultural wastes.

4. Municipal wastes:

These include domestic, industrial and commercial wastes which are collected by Municipal Corporations for disposal. But unfortunately at present there is no scientific system for disposal of municipal wastes. Heaps of garbage can be seen in every city. Hundreds of polythene bags, papers, pieces of used clothes are seen floating over roads. It also results into spread of diseases. The situation is rapidly worsening with growing population.

5.Pollution by natural disaster:

Natural disaster like earthquakes, floods, volcanoes are sources of land pollution. As earthquakes lead to the demolition of buildings where dead bodies of human beings and animals start polluting the environment after their rotening. Long standing flood water becomes breeding place for mosquitoes and bacteria. Likewise volcanoes spread toxic material on soil causing land pollution.

6.Water logging, Salinity and Sodicity:

Water logging, salinity and sodicity problems deteriorate the soil texture and structure adversely. After a certain period of time, soil pollution result into water pollution.

7. Soil erosion and Degradation:

These problems are seen in areas where forests are cut extensively leaving the soil exposed for erosion and degradation through high rainfalls, floods or wind storms etc. large scale plantation can check this problem.

8.Mining wastes:

Wastes extracted from coal mines are generally spread on the surface of earth without proper disposal which gives ugly look besides affecting texture and structure of soil in adjoining areas.

9.Atomic and Nuclear wastes:

These include :

* High-level waste: spent fuel elements as HNO3 containing fission products, fuel roads
* Intermediate level waste: equipments that have become radioactive
* Low level waste: includes ordinary wastes as paper, glass, metal, protective clothing, tissues, plastic bags.

Solid wastes:

These are the unusable or unwanted solid products that results from human activity. These include paper, glass, metals, plastics, leather, rubber, textile, wood and straw etc. Solid wastes may be classified based partly on content and partly on moisture and heating value. A typical classification is as under:

* Garbage
* Rubbish
* Pathological wastes
* Industrial wastes
* Agricultural wastes

Pesticides :

Pesticides are chemical substances that are meant to kill pests.These are grouped as

* Insecticides :insects
* Herbicides :plants
* Rodenticides :rodents
* Bactericides :bacteria
* Fungicides :fungi
* Larvicides :larvae

The intensive use of these pesticides leads to increase risk of contamination of environment and harmful effects on biodiversity, food security and water resources. Soil is the major reservoir for a variety of pollutants such as organochlorine pesticides (OCPs) that may coexist in soil and accumulate in crops and human bodies through food chains, posing risks to human health and the ecosystem. In addition soil plays an important role in pesticide residue in plants.

* Pesticides could shift or fall onto the soil when pesticide is applied onto the plants. Next, most of the deposited pesticides on the plant could be washed off by rainfall to the soil.
* Residues of adsorbed pesticides in soil especially for organochlorine pollutants remain as contaminants in the environment because of long term persistence and mobility and they could enter into food again via plant uptake effect.

It affects humans (as we eat plants) they accumulate in body tissues of organisms and cause health problems.

Bacterial toxins:

These are the chemical agents that damage the host tissues. These are classified as:

* Exotoxins: these are toxic substances secreted by bacteria and released outside the cell and can damage the target cell by signaling pathways
* Endotoxins: they consist of lipids that are located within the cell and can cause activation of innate immune system

These toxins cause many harmful effects by spoiling food and causing diseases in humans such as typhoid, paratyphoid, cholera, shigellosis.

* Typhoid : it is caused by genus Bacillus. It is ingested with food or water.
* Paratyphoid: it is caused by bacteria of genus Salmonella.
* Cholera: it is caused by bacterium Vibrio comma.
* Shigellosis: it is caused by genus of rod shaped bacteria.

Synthetic hormone

Introduction

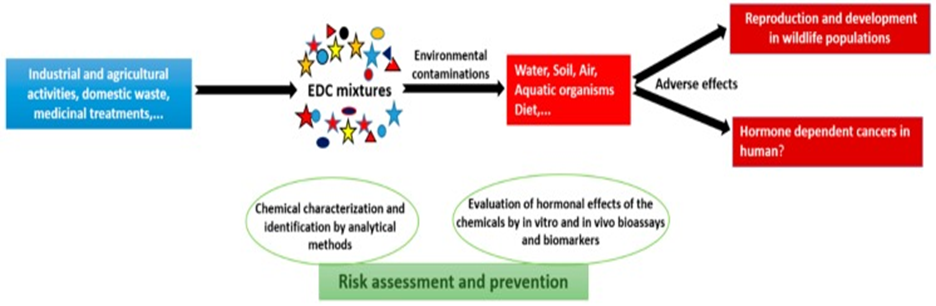
Since the inception of global [industrialization](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/industrialisation), steroidal estrogens and other synthetic hormone have become an emerging and serious concern. Worldwide, [steroid](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/steroid) estrogens including estrone, estradiol and estriol, pose serious threats to soil, plants, water resources and humans. Indeed, estrogens have gained notable attention in recent years, due to their rapidly increasing concentrations in soil and water all over the world. Concern has been expressed regarding the entry of estrogens into the human food chain which in turn relates to how plants take up and metabolism estrogens.

Sources

The world's human population of about 7 billion discharges approximately 30,000 kg/yr. of natural steroidal estrogens (E1, E2, and E3) and an additional 700 kg/yr. of synthetic estrogens (EE2) solely from birth control pill practices. However, the possible release of estrogens to the environment from livestock is much higher. For example, in the United States and European Union, the annual estrogen discharge by livestock, at 83,000 kg/yr., is more than twice the rate of human discharge. Indeed, possible causal relationships have been established between concentrated animal feeding operations (CAFOs) and the detection of estrogens in the [aquatic environment](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/aquatic-environment) . Clearly, natural estrogens in animal and [human waste](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/human-wastes) pose a serious risk to the environment. This risk is heightened by the application of animal manure or sludge bio-solids to agriculture lands, being an alternative nutrient source for organic farming, a widely adopted practice in modern agriculture . Indeed, application of animal manure to agricultural land has been identified as a main source of estrogens in the environment.

The occurrence of natural estrogen hormones as minute concentrations in the environment has been examined by many scientists and is an emerging contamination issue. However, CAFOs have risk implications for the environment. For example, CAFOs involving both natural and synthetic steroids have a knock-on effect as animal manure has seeped into the [aquatic environment](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/aquatic-environment). Steroidal estrogens used in CAFOs have been detected in faeces, [liquid manure](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/liquid-manure) and solid waste collected from cattle, [lagoon](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/lagoon) effluent, and in [fertilizers](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/fertiliser) applied directly to agricultural land . Arguably, animal manure is the largest source of estrogen hormones in the natural environment. Certainly, poultry, cow and horse manure may contain the greatest amount of steroidal estrogens . About 49 tons of estrogens were excreted by farm animals in the USA in 2002. In the UK, total excretion of estrone (E1) and estradiol (E2) from the farm animal populations was 1315 and 570 kg/yr., respectively

Impact on environment

Natural and synthetic hormone at polluting levels have been detected at sites close to waste water treatment facilities and in groundwater at various sites globally. Estrogens at [pollutant levels](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/pollutant-level) have been linked with breast cancer in women and prostate cancer in men. Estrogens also perturb fish physiology and can affect reproductive development in both domestic and wild animals. Treatment of plants with steroid estrogen hormones or their precursors can affect root and shoot development, flowering and [germination](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/germination). However, estrogens can ameliorate the effects of othr

environmental stresses on the plant.

**NOISE POLLUTION**

**CONTENTS:**

1: Concept of Noise Pollution

2: Characteristics of Noise Pollution

3: Types of Noise Pollution

4: Sources of Noise Pollution

5: Causes of Noise Pollution

6: Effects of Noise Pollution

7: Control of Noise Pollution

8: Conclusion

**Concept of Noise Pollution:**

Noise is derived from the Latin word “nausea” implying ‘unwanted sound’ or ‘sound that is loud, unpleasant or unexpected’. The noise originates from human activities, especially the urban - ization and the development of transport and industry.

**Definition:**

Sound, a normal feature of our life, is the means of communication and enter­tainment in most animals, including human beings. It is also a very effective alarm system. A low sound is pleasant whereas a loud sound is unpleasant and is commonly referred to as ‘noise’. Noise can be defined as an unpleasant and unwanted sound.

**Characteristics of Noise Pollution:**

Even though noise pollution is not fatal to human life, yet its importance cannot be overlooked because repeated exposure to noise reduces the sleeping hours and productivity or efficiency of a human being. It affects the peace of mind and invades the privacy of a human being. The importance of noise pollution as environmental problem is being recog­nised as the ill effects of noise on human health and environment are becoming evident with each passing day.

**Sources of Noise Pollution:**

Major causes / sources of noise pollution are:

**(i) Industrial Sources:**

Progress in technology (industrialization) has resulted in creating noise pollu­tion. Textile mills, printing presses, engineering establishments and metal works etc. contribute heavily towards noise pollution. In industrial cities like Kolkata, Ludhiana, Kanpur etc., often the industrial zones are not separated from the residential zones of the city especially in the case of small scale industries.

These operate from workshops located on the ground floors of the residential areas and cause annoyance, discomfort and irri­tation to the residents exposed to the noise that is inevitably produced. The situation is much better in modern planned cities like Chandigarh where the industrial area is kept away from the residential areas and both are sepa­rated from each other by a sufficiently wide green belt.



**(ii) Transport Vehicles:**

Automobile revolution in urban centers has proved to be a big source of noise pollution. Increasing traffic has given rise to traffic jams in congested areas where the repeated hooting of horns by impatient drivers pierce the ears of all road users.

Noise from airplanes constitutes an increasing serious problem in big cities like Delhi & Mumbai. Airport situated in the vicinity of population centres and the air planes pass over residential areas. Heavy trucks, buses trains, jet-planes, motor-cycles, scooters, mopeds, jeeps—the list of vehicles is endless but the outcome is same — noise pollution.

**(iii) Household:**

The household is an industry in itself and is a source of many indoor noises such as the banging of doors, noise of playing children, crying of infants, moving of furniture, loud conversation of the inhabitants etc. Besides these are the entertainment equipment in the house, namely the radio, record-players and television sets. Domestic gadgets like the mixer-grinders, pressure cookers, desert coolers, air- conditioners, exhaust fans, vacuum cleaners, sewing and washing machines are all indoor sources of noise pollution.

**(iv) Public Address System:**

In India people need only the slightest of an excuse for using loud speakers. The reason may be a religious function, birth, death, marriage, elections, dem­onstration, or just commercial advertising. Public system, therefore, contrib­utes in its own way towards noise pollution.



**(v) Agricultural Machines:**

Tractors, thrashers, harvesters, tube wells, powered tillers etc. have all made agriculture highly mechanical but at the same time highly noisy. Noise level 90 dB to 98 dB due to running of farm machines have been recorded in the state of Punjab.

**(vi) Defence Equipment**

A lot of noise pollution is added to the atmosphere by artillery, tanks, launching of rockets, explosions, exercising of military airplanes and shooting practices. Screams of jet engines and sonic booms have a deafening impact on the ears and in extreme cases have been known to shatter the window panes and old dilapidated buildings.

****

**(vii) Neighborhood Noise:** Gadgets, electrical appliances like the grinder and mixer are the prime contributors to noise pollution. Loud loudspeakers in the name of wedding, political parties and other such events call for a significant amount of noise pollution. In the long run they become difficult to bear posing problems to the health of humans.   
In many market areas, people sell with loud speakers, others shout offers and try to get customers to buy their goods.  
And no! Humans are not the only ones to get affected. Marine animals also suffer a disturbance in their cycle. Some of these types of noise pollution cannot be really controlled for and calls for other ways for us to take care of ourselves.  
  
**Miscellaneous Causes of Noise Pollution:**

The automobile repair shops, construction-works, blasting, bulldozing, stone crushing etc. are other sources of noise pollution.

1. **Road Traffic Noise:**

In the city, the main sources of traffic noise are horns of vehicles, raise of accelerators, vehicle with damaged silencer, exhaust system of autos, smaller trucks, buses and motorcycles.



1. **Noise From Railroads:**

The noise from locomotive engines, horns and whistles, and switching and shutting operations in rail yards can impact neighboring communities and railroad workers. For example, rail car traders can produce a high frequency, high level screech that can reach as a high level to the railroads worker’s ear.

1. **Construction Noise:**

The noise from the construction of highways, city streets, and buildings is a major contributor of the urban scene. Construction noise sources include pneumatic hammers, air compressors, bulldozers, loaders, dump trucks and pavement breakers etc.

1. **Noise From Industry:**

Industrial noise also adds to the already unfavorable state of noise pollution. Industrial pollution are usually produced by Reciprocating and rotating machinery, cutting and grinding of materials, blow hammers, running generators et.c

**Effects of Noise Pollution:**

Noise is generally harmful and a serious health hazard. It has far-reaching consequences and has many physical, physiological as well as psychological ef­fects on human beings.

**(i) Physical Effects:**

The physical manifestation of noise pollution is the effect on hearing ability. Repeated exposure to noise may result in temporary or permanent shifting of the hearing threshold of a person depending upon the level and duration of exposure. The immediate and acute effect of noise pollution is impairment of hearing (i.e. total deafnes

Human ears have sensory cells for hearing. If these cells are subjected to re­peated sounds of high intensity before they have an opportunity to recover fully, they can become permanently damaged leading to impairment of hearing. Be­sides the sensory cells, the delicate tympanic membrane or the ear drum can also be permanently damaged by a sudden loud noise such as an explosion.

**(ii) Physiological Effects:**

**The physiological manifestations of noise pollution are several as mentioned be­low:**

(a) Headache by dilating blood vessels of the brain.

(b) Increase in the rate of heart-beat.

(c) Narrowing of arteries.

(d) Fluctuations in the arterial blood pressure by increasing the level of choles­terol in the blood.

(e) Decrease in heart output.

(f) Pain in the heart.

(g) Digestive spasms through anxiety and dilation of the pupil of the eye, thereby causing eye-strain.

(h) Impairment of night vision.

(i) Decrease in the rate of colour perception.

(j) Lowering of concentration and affect on memory,

(k) Muscular strain and nervous breakdown.

(l) Psychological Effect

**The psychological manifestations of noise pollution are:**

(a) Depression and fatigue which considerably reduces the efficiency of a person.

(b) Insomnia as a result of lack of undisturbed and refreshing sleep

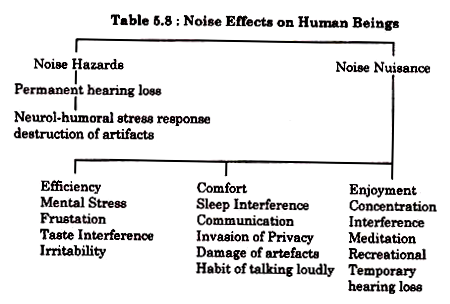
(c) Straining of senses and annoyance as a result of slow but persistent noise from motorcycles, alarm clocks, call bells, telephone rings etc.

(d) Affecting of psychomotor performance of a person by a sudden loud sound

(e) Emotional disturbance

For a talkative person, the most important effect of noise pollution would in­variably be that noise interferes with our conservation. So, noise is annoying and the annoyance depends on many factors not merely the intensity of the sound but also repetition, because even a sound of small intensity (e.g. dripping tap or clicking of clock) may become annoying, simply by repetition.

Some of the well- known effects of noise on human beings and the relation of noise pollution level and its harmful effects respectively.

**[](http://cdn.yourarticlelibrary.com/wp-content/uploads/2014/02/image196.png)**

**Adverse Health Effects of Noise:**

The WHO has documented seven categories of adverse health effects of noise pollution on humans. Much of the following comes from the WHO Guideline on Community Noise and follows its format. The guideline provides an excellent, reasonably up-to-date, and compre hensive overview of noise-related issues, as do the other recent reviews on this subject.

**Hearing Impairment**

Hearing is essential for well-being and safety. Hearing impairment is typically defined as an increase in the threshold of hearing as clinically assessed by audiometry. Impaired hearing may come from the workplace, from the community, and from a variety of other causes (eg, trauma, ototoxic drugs, infection, and heredity). The major cause of hearing loss is occupational exposure, although other sources of noise, particularly recreational noise, may produce significant deficits. Studies suggest that children seem to be more vulnerable than adults to noise induced hearing impairment.

**Negative Social Behaviour and Annoyance**

Annoyance is defined as a feeling of displeasure associated with any agent or condition believed by an individual to adversely affect him or her. The term annoyance does not begin to cover the wide range of negative reactions associated with noise pollution; these include anger, disappointment, dissatisfaction, withdrawal, helplessness, depression, anxiety, distraction, agitation, or exhaustion. Lack of perceived control over the noise intensifies these effects.

**Sleep Disturbances**

Uninterrupted sleep is known to be a prerequisite for good physiologic and mental functioning in healthy individuals. Environmental noise is one of the major causes of disturbed sleep. When sleep disruption becomes chronic, the results are mood changes, decrements in performance, and other long-term effects on health and well-being. The primary sleep disturbances are difficulty falling asleep, frequent awakenings, waking too early, and alterations in sleep stages and depth, especially a reduction in REM sleep [1]. Apart from various effects on sleep itself, noise during sleep causes increased blood pressure, increased heart rate, increased pulse amplitude, vasoconstriction, changes in respiration, cardiac arrhythmias, and increased body movement.

**Cardiovascular Disturbances**

A growing body of evidence confirms that noise pollution has both temporary and permanent effects on humans (and other mammals) by way of the endocrine and autonomic nervous systems noise can trigger both endocrine and autonomic nervous system responses that affect the cardiovascular system and thus may be a risk factor for cardiovascular disease. These effects begin to be seen with long-term daily exposure to noise levels above 65 dB or with acute exposure to noise levels above 80 to 85 dB. Acute exposure to noise activates nervous and hormonal responses, leading to temporary increases in blood pressure, heart rate, and vasoconstriction. Studies of individuals exposed to occupational or environmental noise show that exposure of sufficient intensity and duration increases heart rate and peripheral resistance, increases blood pressure, increases blood viscosity and levels of blood lipids, causes shifts in electrolytes, and increases levels of epinephrine, norepinephrine, and cortisol. Sudden unexpected noise evokes reflex responses as well.

Children are at risk as well. Children who live in noisy environments have been shown to have elevated blood pressures and elevated levels of stress-induced hormones.

**Disturbances in Mental Health**

Noise pollution is not believed to be a cause of mental illness, but it is assumed to accelerate and intensify the development of latent mental disorders. Noise pollution may cause or contribute to the following adverse effects: anxiety, stress, nervousness, nausea, headache, emotional instability, argumentativeness, sexual impotence, changes in mood, increase in social conflicts, neurosis, hysteria, and psychosis. The aforementioned effects of noise may help explain some of the dehumanization seen in the modern, congested, and noisy urban environment.



**Control of Noise Pollution:**

**How to Reduce Noise Pollution**

We can reduce noise pollutionby following ways;

**1.Turn off Appliances at Home and Offices**

We can turn off appliances at home and offices when not in use such as TV, games, computer etc. it can create unnecessary stress n ears. We can also save electricity by turning off appliances.

**2. Shut the Doors when using noisy Machines**

We can shut the doors after we turn on dishwasher or washing machines for rooms where it is kept as doors serve means as a barrier by which the intensity of sounds is lowered to a manageable level.

**3. Use of Earplugs**

Use of earplugs or earmuffs can bring down loud noises to manageable level. Earplugs are small inserts that fit into out our canal and they do not block out all the noise; rather, they bring sounds down to a comfort hearable. And earmuffs fit over the entire outer ear to form an air seal keeping ears safe from loud noises. Earplugs can also be great if you are noisy event or concert.



**4. Lower the volume**

We can listen songs, radios, TVs in lower volume when listening from headphones of speakers. Experts recommend keeping sound levels at somewhere between 60 and 85 decibels to minimize the damage your ears are exposed to. If you are listening to music at around 100 decibels, restrict your usage to within 15 mins.

**5. Stay away from Noisy area**

Noise producing industries, airports, vehicles should be far from residential areas as it very dangerous for infants and senior citizens.



**6. Follow the Limits of Noise level**

Community law should check use of loudspeakers, outdoor parties as well as political public announcements. Sounds at or below 70 dBA are generally considered safe. Any sound at or above 85 dBA is more likely to damage your hearing over time. Researchers have found that people who are exposed over long periods of time to noise levels at 85 dBA or higher are at a much greater risk for hearing loss.

**7.Control Noise level near sensitive areas**

There should be control on noises level (silent zones) near schools, hospitals, masjids. Place noise limits board near sensitive areas. High noise levels can negatively affect the health and performance of both teachers and pupils. Children are particularly vulnerable to the effects of noise because of its potential to interfere with learning at a critical development stage.

**8. Go Green by planting trees**

We can plant more trees as they are good noise absorbents. According to studies can reduce noise by 5 to 10 Db around them. Evergreen plants make the best plants for noise because they provide year-round noise reduction along the roadsides. Broadleaf evergreens are more effective than narrow-leaf plants and conifers. Choose trees and shrubs with dense branches that reach all the way to the ground. Plants, such as hollies and junipers, that have thick branches at ground level provide excellent noise reduction.



**9. Create Healthy noise to eliminate unwanted noise**

If we cannot eliminate unwanted noise coming from outside then we can reduce it by creating healthy noise like music, singing birds or sounds of waterfall in homes or offices.

**10. Use noise absorbent in noisy machines**

We can reduce noise by checking machines properly and lubricating well and use of noise absorbents in them, in building demolition, replace use of ball machine with selective demolition, replace pneumatic tools by changing manufacturing methods, such as molding holes in concrete rather than cutting after production of concrete component, separate noisy workers in time, but keep noisy operations in the same area, separated from non-noisy processes, select slowest machine speed appropriate for a job - also select large, slow machines rather than smaller faster ones, minimize width of tools in contact with workpiece (2 dB(A) reduction for each halving of tool width).

**11. Better maintenance and notify authorities about disobedience of noise level**

Proper time to time maintenance and checking keeps machinery in good condition and cause less noise. The violation of noise laws should be strictly obeyed and law broker should be punished.

**Conclusion:**

The survey indicates that noise affects individuals in several ways. It results in improper communication, sleeplessness and reduced efficiency. Though the psycho-somatic effects (annoyance and depression) are also common yet the extreme effects e.g. deafness and mental breakdown are not ruled out. In a majority of cases, the affected party tenders a request to stop noise. A substantial proportion of respondents among various age-groups complain to administration. Interestingly, about one-third of young people (below 20 yrs) prefer to quarrel with the erring party. Public education, appears to be the best methods as suggested by the respondents. However, government and NGOs can play a significant role in the process.

**References:**

**[1]. Basner, M., Babisch, W., Davis, A., Brink, M., Clark, C., THE LANCET, Volume 383, issue 9925(April, 2014), page 1325-1332.**

**[2]. Berglund B, Lindvall T. (eds.) Community Noise. Archives of the Center for Sensory Research. 1995;2:1-195. This document is an updated version of the document published by the World Health Organization in 1995, (January 6, 2007).**

**[3]. Firdaus, G., Ahmad, A., Noise Pollution and Human Health: A Case Study of Municipal Corporation of Delhi, Indoor and Built Environment, Sage Publications(2010).**

**[4]. Goines, L., Hagler, L., Noise Pollution: A Modern Plague: Southern Medical Journal 2007, 100(3): 287-294**

**[5]. Hsu, T., Ryherd, E., Wage, K., Ackerman, J., Noise Pollution in Hospitals: Impact to patients, Clinical Review-vol.19, No.7 (July, 2012), JCOM Journal**

**[6]. Passchier, W., Passchier, W., Noise Exposure and Public Health, Environmental Health perspective, Vol. 108, Supplemental (March, 2000).**

**[7]. Singh, N., Davar, S., Noise PollutionSources, effects & Control, Journal of Human ecology, 16(3):181-187(2004).**

**(8). Noise Pollution- Sources, Effects and Control Narendra Singh and S. C. Davar Department of Commerce, Kurukshetra University, Kurukshetra 136119, Haryana, India.**

**(9).**[**https://www.researchgate.net/publication/308640301\_A\_STUDY\_OF\_THE\_SOURCES\_OF\_NOISE\_POLLUTION\_AND\_THEIR\_IMPACTS\_ON\_THE\_BUILT\_ENVIRONMENT**](https://www.researchgate.net/publication/308640301_A_STUDY_OF_THE_SOURCES_OF_NOISE_POLLUTION_AND_THEIR_IMPACTS_ON_THE_BUILT_ENVIRONMENT)**.**

**(10). Bulunuz, N., Bulunuz, M., Orbak, A. Y., Mulu, N., & Tavşanlı, Ö. F. (2017). An evaluation of primary school students' views about noise levels in school. International Electronic Journal of Elementary Education, 9(4), 725-740.**

**(11). Jiang, J., & Li, Y. (2018). Review of active noise control techniques with emphasis on sound quality enhancement. Applied Acoustics, 136, 139-148.**

**(12). Borchi, F., Carfagni, M., Martelli, L., Turchi, A., & Argenti, F. (2016). Design and experimental tests of active control barriers for low-frequency stationary noise reduction in urban outdoor environment. Applied Acoustics, 114, 125-135.**