



WASTEWATER STORY

The water rich in lather, mixed with the oil and other pollutants that goes down the drains from sinks, showers, toilets, laundries, etc., is dirty. It is called **wastewater**.

WATER: OUR LIFELINE

- Clean water is a basic need of human beings which is unfortunately not available to a large segment of human population.
- The water which is unfit for human consumption, becomes the source of many water-related diseases and even death.
- So, realising the importance of water, we celebrate **MARCH 22** as **WORLD WATER DAY** to raise awareness amongst people about safe water that is fit for human consumption.
- The cleaning of water is a process of removing pollutants from the wastewater before it enters a water body or is reused. This process of wastewater treatment is commonly known as **Sewage Treatment**.



SEWAGE

- x It is wastewater released by homes, industries, hospitals, agricultural fields and other places of human activities.
- x It also includes rainwater that has run down the street during a storm or heavy rain.
- x **Sewage is a liquid waste**, which has dissolved and suspended impurities. These impurities are called **contaminants**.



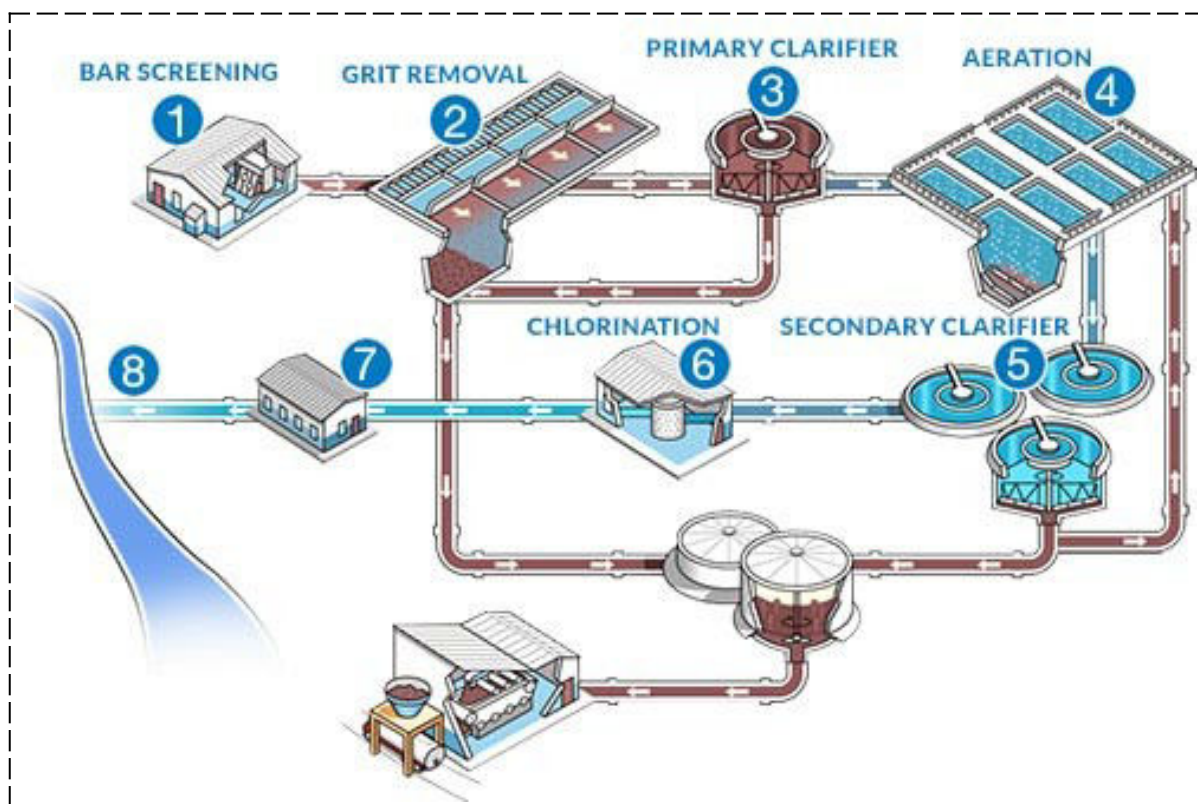
Composition of Sewage

The sewage constitutes of the following components -

- i. **Organic impurities**, e.g. human faeces (solid waste material), animal wastes (animal dung), urea (as urine), oil, fruits and vegetable wastes, pesticides, herbicides, etc.
- ii. **Inorganic impurities**, e.g. nitrites, phosphates and metals.
- iii. **Nutrients**, e.g. nitrogen and phosphorus.
- iv. **Bacteria**, includes bacteria that cause water-borne diseases such as cholera and typhoid.
- v. **Other microbes**, e.g. Protozoa that causes a water-borne disease called dysentery.

WASTEWATER TREATMENT PLANT

- x Waste Water Treatment Plant is also called sewage treatment plant. A place where wastewater (or sewage) from the houses and other buildings is brought for processing is called a wastewater treatment plant (WWTP).
- x The treatment of wastewater involves physical, chemical and biological processes which remove physical, chemical and biological matter that contaminates the wastewater. The process involves-



1. SCREENING -

The waste water is passed through bar screen. The bar screen removes large objects like rags, cans sticks, plastic bags, napkins, sanitary towels, etc. From the wastewater.

2. GRIT AND SAND REMOVAL -

After passing the bar screen, the wastewater is passed slowly through a grit and sand removal tank. The speed is decreased to allow the sand, grit, and pebbles to settle down at the bottom and are removed.

3. SEDIMENTATION TANK -

The water is then allowed to settle in a large tank. The solids like faeces settle at the bottom and are removed with a scraper. This solid part is called sludge. A skimmer removes floatable materials like oil and grease. Water so cleared is called clarified water. Sludge is transferred to a separate tank where it is decomposed by anaerobic bacteria to produce biogas. Biogas is used to fuel or can be used to produce electricity.

4. AERATION TANK -

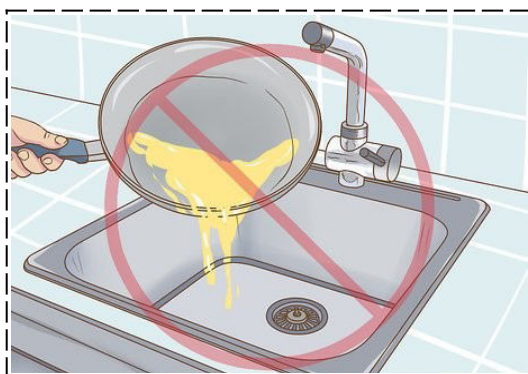
Clarified water is then passed through an aerator tank where the air is pumped into the water. It helps aerobic bacteria to grow which decompose organic matter like a human and animal waste. After several hours, the suspended microbes settle at the bottom of the tank as activated sludge. The dried, activated sludge is used as manure. The activated sludge is about 97% water. The water is then removed from the top.

5. CHLORINATION -

The treated water has a low level of organic material and suspended matter. It is discharged into a sea, a river, or into the ground. Sometimes it is disinfected through chemicals like chlorine and ozone before discharging into water bodies.

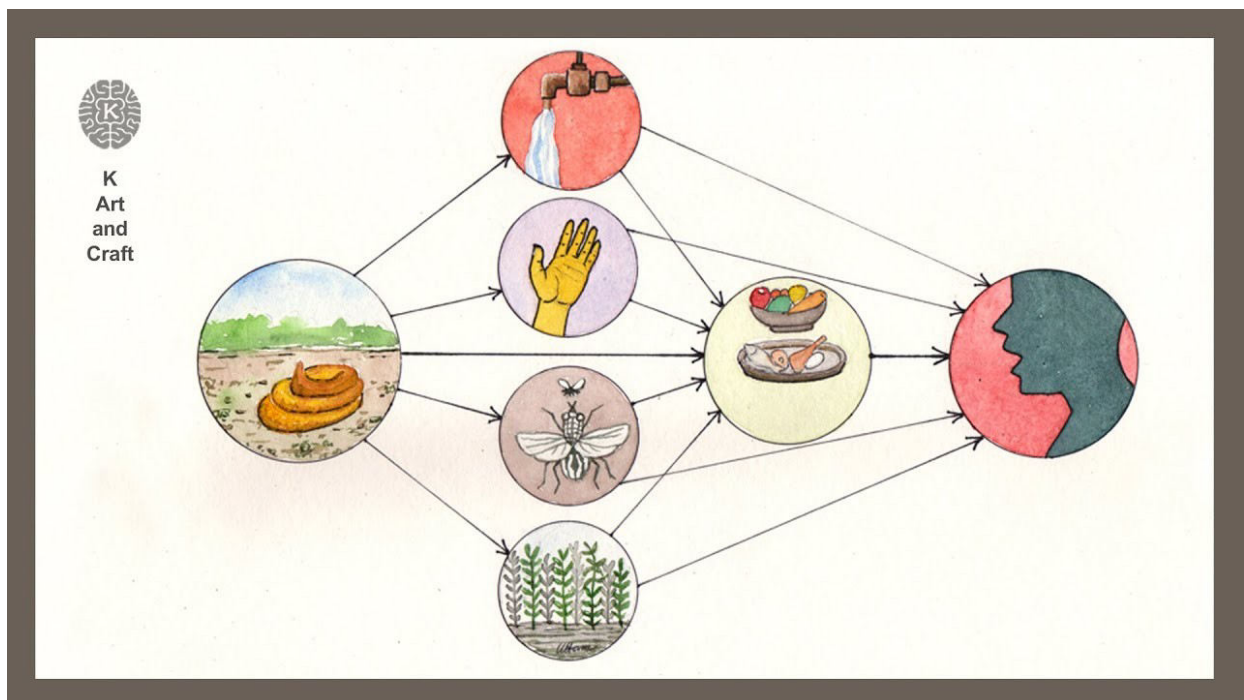
SOME GOOD HOUSING PRACTICES

- ✗ We should throw cooking oil and fats in the dustbin. Drains get blocked by cooking oil and fats. In an open drain, the fats clog the soil pores reducing its effectiveness in filtering water.
- ✗ Used tea leaves, solid food remains, soft toys, cotton, sanitary towels, etc. should also be thrown in dustbin. These waste choke the drains. They do not allow free flow of oxygen and hamper the degradation process.
- ✗ We should not drain chemicals like paints, solvents, insecticides, motor oil, and medicines. They may kill microbes that helps purify water.



SANITATION AND DISEASE

- ✗ Creating a hygienic environment around us which is essential for preventing diseases and keeping good health is called **SANITATION**.
- ✗ Poor sanitation and contaminated drinking water is the cause of a large number of diseases.
- ✗ Many people defecate in the open areas. Untreated human excreta is a health hazard. It causes soil pollution and is carried along by rainwater and pollutes surface water and ground water.
- ✗ Water contaminated with untreated excreta causes many water-borne diseases like Cholera, typhoid, dysentery, polio, meningitis, and hepatitis.



Vermi-processing Toilets –

In the vermi-processing toilets, human excreta is treated by earthworms in a pit. The earthworms usually eat all the organic matter present in human excreta and turn it into compost. These toilets use very less water for the safe processing of human waste.

Swachh Bharat -

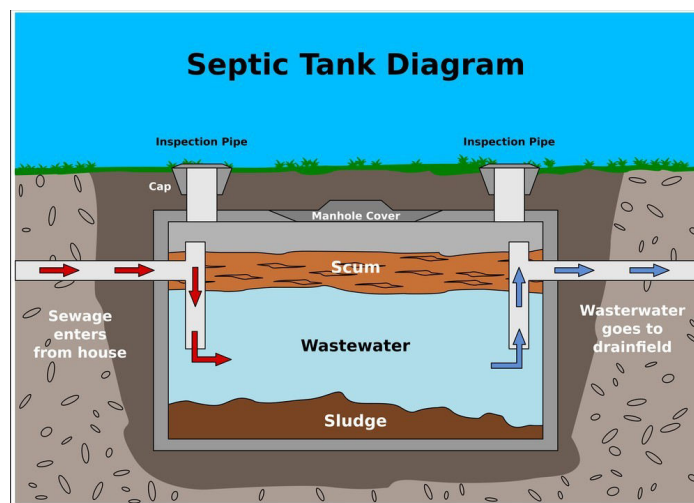
In the year of 2016, the Government of India initiated a new mission called 'Swachh Bharat'. Under this mission a lot of drives, such as proper sewage disposal and providing toilets for everyone have been started.

ALTERNATIVE ARRANGEMENT FOR SEWAGE DISPOSAL

- x In order to prevent water-borne diseases and to improve sanitation onsite and low-cost sewage disposal are being encouraged.
- x Some onsite sewage disposals for human waste are:

a) SEPTIC TANKS :

In this arrangement, the human waste is allowed to settle in tank where anaerobic bacteria decompose the waste. This is suitable for those places where there is no sewerage system.



b) COMPOSTING PITS :

It is a dry toilet where the toilet is not connected to the sewer line or septic tank. In this arrangement, the toilet seat is fixed on composting pit dug into the soil. The composting chamber breaks the human waste aerobically and converts it into compost. This is used where there is no or limited water supply.



c) **CHEMICAL TOILETS :**

A chemical toilet uses a chemically treated reservoir located below the toilet seat. Chemical toilets have a limited storage capacity, so the reservoirs need to be emptied into a sewer line after a certain time. All the portable toilets are chemical toilets. Chemical toilets are used at construction sites, at large outdoor gatherings such as music festivals and marriages, etc.



CONCLUSION

As active citizens, we have many responsibilities regarding sanitation. These can be listed as follows:

- i. To ensure that our surroundings are clean.
- ii. To ensure that the sewerage system in our house is properly managed.
- iii. If any leakage or any open drain in the sewerage system is present, then it should be reported to the Municipality or the Gram Panchayats to insist that the open drain must be covered properly so that several air and water-borne disease can be prevented.

GLOSSARY

- **Aeration** – Introduction of air into a material.
- **Aerobic bacteria** – Organism / bacteria that require oxygen for its growth.
- **Anaerobic bacteria** – Organism that does not require oxygen for its growth.
- **Biogas** – A fuel that is produced when organic matter such as food or animal waste is broken down by microorganism in the absence of oxygen.
- **Contaminant** – Dissolved and suspended impurities in the sewage or wastewater.
- **Sanitation** – Process of setting solid particles at the bottom of a liquid.
- **Sewage** – Wastewater released by homes, industries, agricultural fields, etc.
- **Sewer** – An underground pipe that carries away dirty drainage water.
- **Sewerage** – The provision of drainage at a places by laying sewers under the ground.
- **Sludge** – Solid waste that settles at the bottom of the first sedimentation tank during wastewater treatment.
- **Wastewater** – The dirty water that goes down the drains from sinks, showers, toilets, laundaries.