



SEWAGE TREATMENT: ALL THE POOEY FACTS

WHERE DOES IT GO... WHAT CAN IT BECOME?

Fact Sheets for Home and School

What is Sewage Waste?

Sewage or Sewage Waste is just dirty water. It is the water which leaves your home, factories, shops or farms and runs down the plug hole or toilet or bath or shower and into underground pipes called sewers.

It is mostly 99.5% water with only 0.05% of the wastewater dissolved into suspended solid material.

What is a Sewer?

The sewers in the streets join up to form larger and larger pipes. Some sewers are as big as underground railways tunnels.

The sewerage system (which carries wastewater) is made up of networks of different sized pipes. The smaller ones are called service branch lines (*imagine taking a local train*). Then there are the reticulation mains (*bigger pipes like taking a regional train service*); maintenance holes (*manholes - imagine these as stations where you can get a quick repair if you need one*); pump stations (*designed to take us up hills*) and trunk sewers (*these are the inter-city monster pipes*) that take us to the sewerage plant. Some of the pipes are so big that humans can walk through them. This is important, especially if they spring a leak or need to be inspected.

Definitions

- **Sewage** is the term used to describe the mixture of water and human waste.
- **Sewerage system** is the term used for the network of pipes that carries sewage to a sewage treatment plant.

Are all sewage treatment plants the same?

No, there are many different types of sewage treatment plants. The type of plant will depend on where it is located, what sewage it needs to treat, how many people live in the region etc.



Mexico City: June 2000

MEXICO CITY - Two days after heavy rains ruptured the retaining wall of an open-air sewage canal east of Mexico City, thousands of people were camped on their roofs with their homes inundated by three feet (one metre) of stinking water and human waste.

Why do we need to treat sewage?

Pathogens or disease-causing organisms are present in sewage. These need to be got rid of before the sewage can be released back into the environment. The goal is to reduce or remove organic matter, solids, nutrients, disease-causing organisms and other pollutants from the wastewater.

What is sewage treatment?

Sewage treatment is a multi-stage process to renovate wastewater before it re-enters a body of water, is applied to the land or is reused.

A Sewage treatment plant is a HUGE biological factory using enhanced natural processes to break down and remove substances that might harm the natural environment.

The majority of substances in dirty water are biodegradable(that is they can break down). This means that the sewage can be broken down into environmentally safe components such as fertilizers and methane and the water can be re-used.

Are all sewage treatment plants the same?

No, there are many different types of sewage treatment plants. The type of plant will depend on where it is located, what sewage it needs to treat, how many people live in the region etc.

Why do we need to treat sewage?

Pathogens or disease-causing organisms are present in sewage. These need to be got rid of before the sewage can be released back into the environment. The goal is to reduce or remove organic matter, solids, nutrients, disease-causing organisms and other pollutants from the wastewater.

Recycling Sewage: What are the options?

There are many different processes now available

A Day at the Sewerage Treatment Plant...

1: Everything entering the sewage plant is screened so that the plant machinery is not damaged. Sticks, rags, sand, toys, dead animals & plastic bags are removed by passing everything through giant screens (sieves). The rubbish collected is usually disposed of in a landfill.

2: The mixture (sludge) is then aerated. This is when good bacteria (tiny organisms) are used to break down and eat the sludge. Aeration can take from 4 hours to several days, during which time the sludge breaks down. It is then carried to the clarifier.

3: In the clarifier, the solid particles in the mixture are attracted together and settle to the bottom, separating from the wastewater. The water can then be diverted. This water will still have lots of nutrients in it. The next stage is to make sure that the nutrients are removed before the water is released back into the environment. Various methods may be used to "clean" the water including sand filters, reed beds, grass plots and disinfection.

4: The solids can now either go straight to the de-watering process, (in this case the belt-press (6)), or flow onto the Digester. Digesters are used to reduce the volume of sludge. They are giant enclosed tanks, mostly made of concrete where anaerobic bugs eat the sludge producing methane and other gases. The methane is used as energy for the plant and the other gases are trapped so as to not cause bad smells.



5: The water leaving the Digester is cleaned to remove collected nutrients before it is released back into the environment.

6: The solids have some chemicals added to make it easier to remove further water or dewater. The sludge is put through a belt-press to remove even more of the water. The end product- sludge cake- is then ready for its next adventure.

A different day at a different Sewerage Treatment Plant

Treating sewage by aquaculture

India continues research into finding a use for one of its least coveted resources: the 15 million cubic metres of sewage it generates every day.

Acting on the principle that sewage is not just waste water but also a source of nutrients, an experimental plant in operation since 1994 treats sewage with aquatic weeds and fish. One million litres of primary treated sewage a day sits first in ponds containing duckweed, then in ponds stocked with carp and prawns. After five days, water quality has improved to the point where it may be used for agriculture, although not for drinking.



A river of raw sewage (left) runs out of the city of Cuttack. One million litres a day are pumped into an experimental Aquaculture Sewage Treatment Plant (right), where it is treated with aquatic weeds and fish.

Although faecal coliforms were found to be present in the system and in the guts and gills of fish fed on sewage, none were found in fish muscle. The sale of fish fattened in the sewage ponds for 8 to 12 months almost offsets the operating cost of the plant, leaving a net cost of 15 000 rupees a year, about AUS\$650. The plant, which covers half a hectare, is run by two men.

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Questions:

Why are there different types of sewage treatment? Think about where you live? Which system would work well near you?