



RECYCLED SEWERAGE

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

Fact Sheets for Home and School

Why do we treat sewerage waste? A brief History...

At the beginning of the 20th century, engineers needed to decide whether to separate the sewage from water or, to let it dilute in water and flow straight into lakes, rivers and oceans.

By 1910, the most common way to get rid of sewage was to dump it into water.

Towns drawing their drinking water downstream from sewage discharges began to have typhoid outbreaks.

Cities started to filter and disinfect the drinking water and the typhoid decreased.

Under pressure of industrialisation, greater waste disposal capacity was needed. Money was invested to provide sewage systems for both homes and factories.

As a result, the nutrients in poo became mixed with industrial wastes. These were often poisonous or toxic.

In the 1950s, waters receiving sewage piped wastes had become badly polluted due to a combination of excessive nutrients and toxicants.

Environmental concern led to public demands to clean or treat waste before being dumped.

This was done: but with 100s of sewage treatment plants producing toxic sludge in huge quantities, the question was what to do with all the sewage?

Research provided the answers.

Recycling - your end is a new beginning!

Nowadays there are many ways that sewerage is recycled. For example, worm farms can turn it into fertilizer; it can also be turned into road fill, energy, compost, electricity, bricks or gas!

Fertilizers: More and more farmland is using treated sewage on their land as it produces bountiful crops and money and landfill space.

Centres, like the University of Nebraska, have developed guidelines for applying biosolids, (or what's left after sewage is treated,) in ways that protect water and the environment. Under the right circumstances, biosolids can safely substitute commercial fertilizers if applied in the right amounts.



Fuel Cells: Researchers at the University of Warwick (UK) have devised a process that turns wet waste from sewage farms and paper mills into a source of power. University of Warwick researcher Dr Ashok Bhattacharya and his team are part of a Europe wide consortium that have cracked the problem of how to extract very pure levels of hydrogen from wet bio-matter, such as sewage or paper mill waste. This very pure hydrogen can then be used in "fuel cells" to power homes, factories and cars. The research consortium has received £2.5million in European funding...*imagine...you can make money from muck!!*



Fuel and Electricity: Scientists at the University of California, Riverside are developing a way of converting 'wet waste,' such as sewage sludge and grass clippings, into synthetic diesel fuel and electricity in a move that could potentially reduce the need for landfill space and provide a cost-effective alternative to increasingly restricted land application.



Worm Farms: In some places giant worm farms are built for worms to EAT sewage sludge or biosolids. The worms can eat their weight in biosolids a day and if they are really hungry they can eat twice their weight. The biosolids pass through the worm and the worm excretes it in the form of a fertilizer called Vermicast. Vermicast can be used successfully as a fertilizer as it contains high levels of beneficial microbes which help to break down organic material in the soil.



Evolution of Modern Sewerage Systems in the Western World

538: Disappearance of piped water in Rome after the Goths invaded the city.

1200: Piped water systems started to be built in some British cities. These carried clean water to public fountains.

1388: In England, an act of Parliament “forbade the throwing of filth and garbage into ditches, rivers, and water”.

1596: First Flushing Toilet (Water Closet).

Built by Sir John Harrington, godson to Queen Elizabeth I of England. It was called a "necessary" but it was laughed at by his friends. He never built another one.

1728: First sewer built under the streets of New York.

1739: First separate toilets for men and women in Paris.

1819: Albert Giblin patented the *Silent Valveless Water Waste Preventer* in Britain. This system allowed a toilet to flush effectively.

1850s: First city sewers constructed in Sydney, Australia. They drained straight out into the harbour in front of the current site of the Opera House.

1854: Dr. John Snow(England) proved the connection between cholera and bad sanitation.

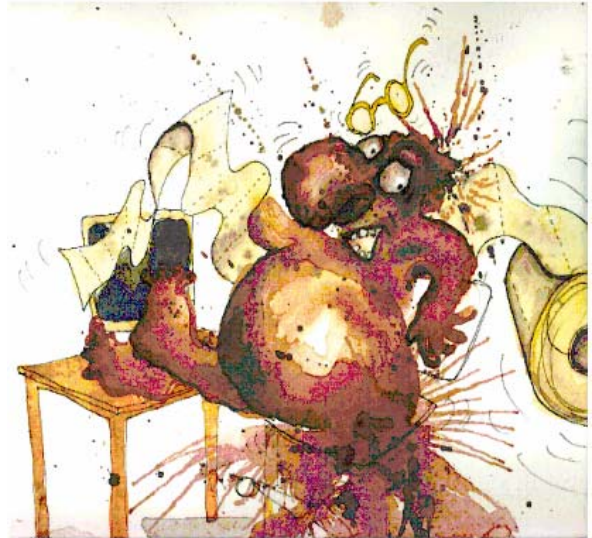
1857: Toilet-paper is thought to have been invented by American, Joseph Coyetty.

1858: Known as the 'Year of the Great Stink' in the U.K. Led to changes in the law regarding sewage disposal.

1859: Toilet of Queen Victoria of England is decorated with gold.

1861: Thomas Crapper obtained patent rights from Albert Gilpin for his flush toilet invention and began commercial production of toilets.

1880: 'British Perforated Paper Company' manufactured toilet paper which came in boxes of small pre-cut squares.



Australia produces three million tonnes of sewage sludge each year

City	Number of Sewerage Plants	Tonnes per week of sewage	End Use for Sewage
Sydney	30	3,800(captured)	Lime. Compost, Farm as fertilizer
Brisbane	11	1.800	Compost, stockpile
Gold Coast	4	1,000	Compost
Melbourne	2	3,600	Stockpile
Canberra	3	500	Incinerate

Introduction to a Sewerage Treatment Plant: a.k.a Waste Water Treatment Works

Do you ever think about what happens to all the rubbish and waste that leaves your house? Where does it go and what happens to it?

Questions:

1. List all the different types of waste that you can think of that your house has.
2. One of the main types of waste is dirty water. How many different types of waste water can you think of that leaves your house?
3. In the past people did not get rid of waste water in a healthy way. Can you think of how they used to get rid of their water?
4. What happens to waste at a Sewerage Treatment Plant?