

Cleaning your waste water

Read the text carefully before answering the questions below. Remember to answer in full sentences, and use evidence to support your answers.

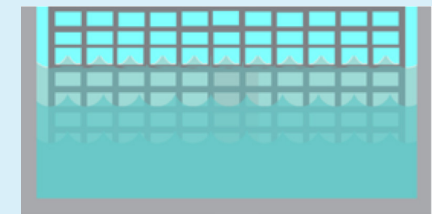
1. Find and copy one word which means it is very important that Welsh Water clean the waste water before returning it to the environment.
2. On average, how many litres of water does a person use in a day?
3. What is the main job of the screens?
4. What is the process called when the poo particles settle to the bottom of the tank?
5. What gases are released during the process of anaerobic digestion?
6. What is 'a culture of bacteria' known as?
7. What does the rotating arm do in the final settlement tanks?
8. What is cleaned water also known as?
9. What do we call the energy made from the process of anaerobic digestion?
10. Why do you think it is important to return the water to the water cycle once it is cleaned?
11. What are the three Ps? And why are they important?

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On average, each person in Wales uses 150 liters of water a day, but when you flush the toilet or watch the water disappear down the plughole, have you ever wondered where it all goes? All the waste water we produce in our homes, schools and businesses goes on a long journey through Welsh Water's network of sewers which stretches over 30,000km around the country. Although what runs through our sewers is 99% water, it also contains a high level of impurities, so it is vital that we purify this waste water so that we can safely return it to the river or the sea, where it can become a part of the water cycle again.

Screening

Water enters the cleaning process through the inlet channels. The water then passes through screens, which act like giant sieves to filter out wet wipes, plastics and anything else that might have been flushed down the toilet. Waste is then shredded, squashed and collected by rotary arms in the macerator as the water is squeezed out. This is then put into a skip and taken to landfill. Last year, Welsh Water removed 1.3 million cotton buds and tonnes of nappies and wet wipes from our network of pipes. Only the 3 P's should be flushed down the toilet – Pee, Poo and toilet Paper!



Primary Tanks

Screened waste water is then piped to the Primary Tanks. Fine, solid particles (poo) settle out of the sewage, and fall to the bottom of the tank to form sludge. This process is called sedimentation. A huge metal arms rotates around the tank, and the attached scrapers push the sludge into the centre of the tank. The sludge is then collected and transported to Cardiff Bay. The sludge goes through a process called anaerobic digestion, where the sludge breaks down and lets off gases called methane and carbon dioxide. This can then be used to create electricity which we call Poo Power!

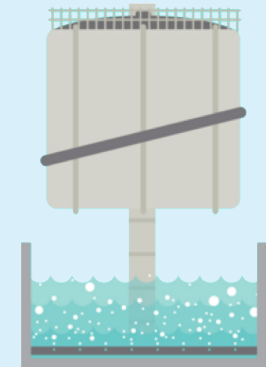


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Aeration - Activated sludge:

Water is piped from the Primary Tanks and into the activated sludge tanks.

In the Aeration Tanks, oxygen makes the bacteria work harder at cleaning the water. A culture of bacteria (activated sludge) feeds on the sewage. The air is introduced to help bacteria break down solid particles. These tanks are constantly bubbling as air is being pumped in under high pressure.



Final Settling Tanks

The Final Tanks are very similar to the Primary Tanks, however, instead of scrapers, the rotating arm has 'hoovers' which suck up remaining sludge. Any solids which might be still in the water settle to the bottom of the tank and the water is tested to ensure that it is clean enough to go back out into the river.

Even after final sedimentation the cleaned water, or effluent, may still contain organic material which could cause pollution if entered back into the river. In these cases 'polishing' treatments are used such as pebble bed clarifiers, sand filtration and micro-straining, where the water is filtered to ensure any remaining material is removed. The treated effluent then flows over weirs to rivers and streams where it re-joins the natural water cycle.

