How does wastewater treatment work?

Where does the water you put down the drain and flush down the toilet go? It goes to your community's wastewater treatment plant where it is cleaned to it can be put back into the environment safely. Let's take a look at how the operators at the plant accomplish this.

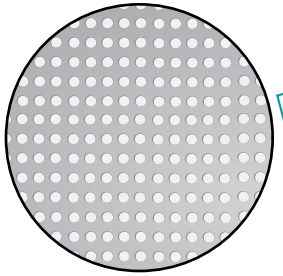
Crystal Clearwater

Step 1: Collection and Transportation to Plant

Every time you pour water down the drain, flush the toilet, or take a shower, the leftover water goes into sanitary sewers. Sanitary sewers take the water to the wastewater treatment plant.

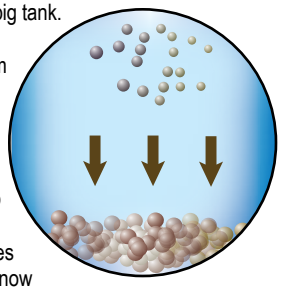
Step 2: Preliminary Treatment

At the wastewater treatment plant, the incoming water flows through a screen (like a screen door). The screen catches big stuff like food that hasn't dissolved or hair, to start the treatment process.



Step 3: Primary Clarification

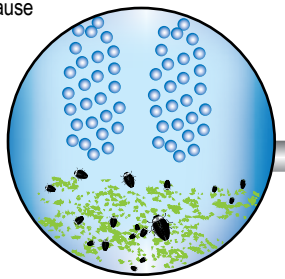
Next the water goes to a big tank. Here it sits very still so big particles sink to the bottom of the tank. Think of a snow globe. When you shake it, the sparkles float around in the water (like the water coming into the tank). When you set it on the counter, the sparkles sink to the bottom of the snow globe, just like the particles in the tank.



Step 4: Biological Treatment

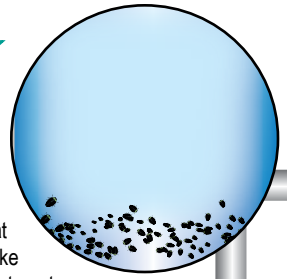
Biological treatment is the next step. The water moves to a special tank where tiny bugs that you can't see with your eyes live. The bugs eat the waste in the water (like human wastes). They are hungry bugs and there is a lot to eat. Because they are eating so much, they reproduce and make more bugs to eat more of the waste (their food). When they eat the waste, they digest it and instead of creating waste like humans do, they create oxygen. This puts more oxygen back in the water.

In a way, this tank is like a dairy farm. The farmers, or operators, give the bugs more food (wastewater) so they grow and make more bugs. Instead of producing milk like cows do, the bugs produce oxygen and clean the water.



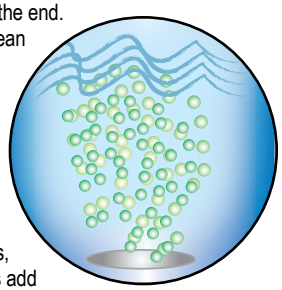
Step 5: Secondary Clarification

Just like in Step 3, the water goes into a big tank and sits. Now all the bugs sink to the bottom. Operators pump some of those bugs back to the biological treatment tank. It's important to put some of the bugs back into the biological treatment tank so they can eat the new waste that is coming in and reproduce to make more bugs. The other bugs are sent to the sludge treatment



Step 6: Disinfection

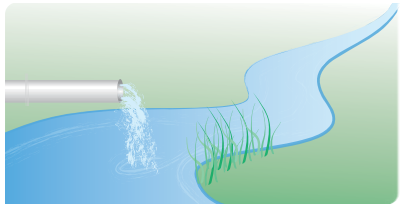
We're getting close to the end. The water may look clean and clear now but there still are some pathogens (bad bugs) in it that will make you sick if you touch them or that will hurt the fish or plants in the rivers, streams, lakes, oceans, and ground. Operators add chlorine or other chemicals to kill the rest of the bad bugs you can't see.



Step 7: Return Water to Waterways or Reuse

Finally, the water is ready to go back to the environment. It usually goes to a river or stream. Remember, we did a couple of things to change the water so it will help the river ecosystem. We killed any bad bugs that were left in the water. We also used good bugs to eat the waste and release oxygen in the water. These steps help protect river wildlife and plants from bad bugs and gives them oxygen to help them live.

Sometimes, people use the finished water instead of just putting it back into the river. They can use it to water golf courses or make fountains run. You may have seen non-potable water signs at these places. This means the water is safe to water the plants or make the fountain run but it is not safe for you to drink. They can also send finished water straight to a water treatment plant to make drinking water. Or they can send it deep into the ground to increase the groundwater supply.



Step 8: Sludge Treatment

Remember when we let particles and bugs settle to the bottom of the tanks in Steps 3 and 5? What happened to those? Well, they form a substance called sludge that we need to treat and get rid of. Operators first squeeze all the water out of the sludge to make it into a solid. Then they can either send it to a landfill or use it to do other things like make energy or fertilize crops that animals eat. If the operators are going to send it to a farmer to fertilize crops, they add chemicals to it to kill any bad bugs that may be in the sludge.