Build Your Own Wastewater Treatment Facility!

The following templates are based on real buildings or tanks involved in the treatment of wastewater. Wastewater is all of the used water that goes down a drain from a sink or shower as well as water flushed down a toilet. All this wastewater must go to a facility, like South Cross, to be treated (or cleaned) before it can be used again for watering lawns, trees and plants. This is called reclaimed water. To find out more about how we treat wastewater, please visit our education program at: pinellascounty.org/utilities/teachers

To complete this activity, you will need:
Scissors
Glue or a glue stick
Crayons, colored pencils or markers
Tape (optional but helpful if you make a mistake with cutting)

Each page contains a few symbols worth noting. Wastewater can vary in color based on where it is in the treatment process. When it first enters the facility, its brown but as it travels though the facility and gets cleaned (or treated) it becomes blue, sometimes it is even a bit blue green from chlorine.

At the top of each page there is also a picture of what the finished building or tank should look like when complete. The name of the building will be on top of the structure and a number printed on the bottom. The number also corresponds to the order of the building or tank and a brief description of its function (next page). Please note, all cuts should be along the perimeter of each building or tank.

From all of us here at South Cross Bayou Advanced Water Reclamation Facility, happy building! To give feedback or share a photo of your finished product, email us a picture or comment to SCBTOURS@pinellascounty.org 😊
Explanation of Buildings & Tanks:

1. **Operations Center** - Houses the control room where staff monitor the wastewater treatment processes 24 hours a day, 7 days a week, 365 days a year, using computers.

2. **Influent Pump Station** - Continuously pumps incoming wastewater from the sanitary sewer system to the facility’s headworks (Building #3).

3. **Headworks** - Screens capture large pieces of physical trash like toys, rags, clothing, and “flushable” wipes, which could otherwise damage machinery and clog pipes. Once removed, these wastes are deposited into a dumpster and sent to Solid Waste.

4. **Grit Removal** - This building houses what are called the “teacups.” The teacups spin water in a circle really fast, causing the heavier materials like corn, seeds, soil and rocks to “drop out” from the wastewater. Hence, the pile of grit on the side of the building- these wastes are also sent to Pinellas County’s Solid Waste to be burned for energy.

5. **Primary Clarifier** - These tanks allow heavy organic solids (think about the “solids” you flushed) to settle. As these solids settle to the bottom of the tank, called sludge, this sludge is collected by scrapers and pumped out of the tanks. Lighter materials that float on the surface of the water can be skimmed off or removed.

6. **Anoxic Tank** - Not all bacteria are bad! These tanks use bacteria and other microorganisms to remove nitrogen (or here, nitrate NO\(_3\)-). Too much nitrogen can harm the environment and we make a lot when we go to the bathroom!

7. **Aeration Tank** - These tanks are also full of hungry microorganisms that feast on our #2! In this tank, they are helping to remove ammonia-based nitrogen (lots in urine).

8. **Secondary Clarifier** - Like the primary clarifiers, these tanks also permit the settling of solids (including the now heavy microorganisms, stuffed from eating our #2). These solids, now called sludge, will be removed from the water to become fertilizer!

9. **Denitrification Filters** - This is why South Cross is called an advanced facility. These tanks help remove most remaining nitrogen from the water using filters filled with sand, gravel and more hungry bacteria! See, not all bacteria are bad!

10. **Chlorine Contact Tank** - One of two technologies we use to kill bacteria or any other disease-causing microorganisms (a process called disinfection) is to use chlorine (think pool water). The other technology is UV light. After adding chlorine, we must dechlorinate (or remove the chlorine) using sulfur dioxide.

11. **Reclaimed Holding Tank** - Once disinfected, up to 6 million gallons of treated water can be stored in a tank. This water is called reclaimed water and is safe to be reused.

12. **Digesters** - All of the solids from the clarifiers are sent to these giant “stomachs” full of hungry bacteria. These bacteria are special, called anaerobes, oxygen can kill them! As they eat the solids, called sludge, they produce gases like methane which we use as energy in our fertilizer facility! These bacteria break down the solids which will soon become fertilizer, a source of food for plants which we’ll sell to help keep us open!

13. **Fertilizer Pelletizing Facility** - This is where we turn the sludge into fertilizer pellets!

**Sludge Hauling Truck** - These trucks transport biosolids (our fertilizer)!!!
Grit Removal
Primary Clarifier Tanks
Anoxic Tanks

This Side Down

brown
Aeration Tanks

This Side Down
Secondary Clarifier Tank

This Side Down

blue
Denitrification Filters

Glue 9B Here
Chlorine Contact Tank

10
This Side Down

blue-green
Reclaimed Holding Tank

This Side Down

6 Million Gallons
4 Million Gallons
2 Million Gallons
Fertilizer Pelletizing Facility
Sludge Hauling Truck

This Side Down