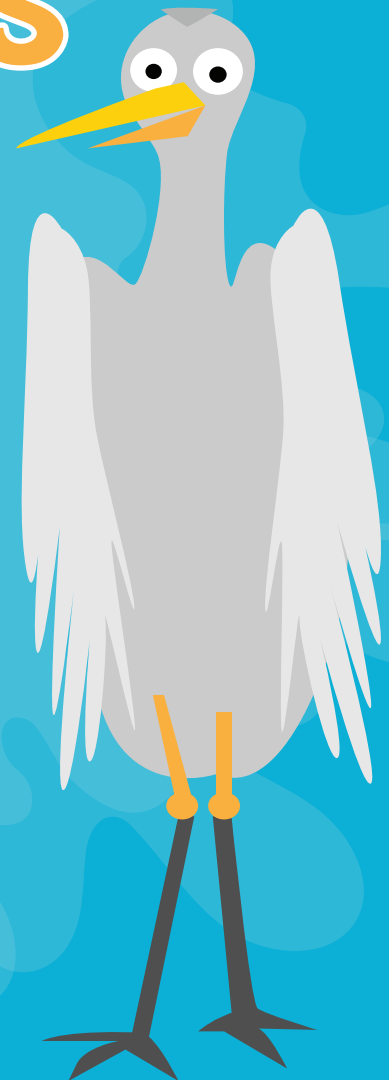


WELCOME  
-TO-  
WASTEWATER  
TREATMENT  
FOR KIDS



## What is wastewater?

**Wastewater is used water.** It includes substances such as human waste, food scraps, oils, soaps, and chemicals. In homes, this includes water from sinks, showers, bathtubs, toilets, washing machines, and dishwashers. Businesses and industries also contribute their share of used water that must be cleaned.

# WASTEWATER TREATMENT FOR KIDS

Produced by the Metropolitan Council



## Introducing our video, slide show, and learning materials

Follow our delightful guides Ardea (an egret), Anati (a duck), and Anura (a frog) as they explore the water cycle and what happens to water after humans use it. Wastewater Treatment for Kids provides a simplified look at wastewater treatment by taking viewers on a tour of the process at the Metro Wastewater Treatment Plant in Saint Paul.

**Target audience:** Students aged 7 to 12

## Learning objectives

- Identify ways that humans use water
- Understand the water cycle
- Learn sources of drinking water, how water gets to homes and businesses, and where it goes once it has been used
- Identify the stages of wastewater treatment
- Understand the benefits of wastewater treatment
- Learn what not to flush down the toilet

## [Wastewater Treatment for Kids video](#)

We also have a downloadable slide presentation that allows students to learn at their own pace.

**Part 1: The Water Cycle and How We Get Clean Water** (25-page PDF)

[How Wastewater Gets Clean Again Part1](#)

**Part 2: How Wastewater Gets Clean Again** (21-page PDF)

[How Wastewater Gets Clean Again Part2](#)



Anati



Anura

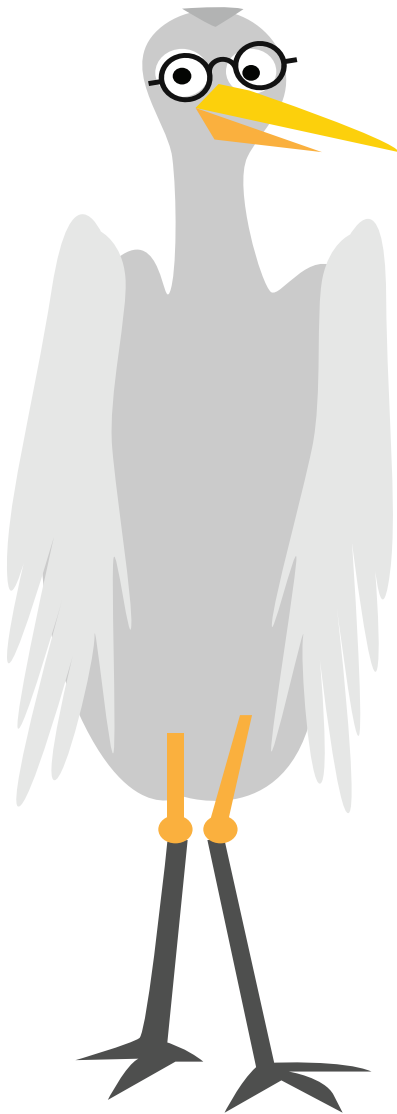


Ardea

# WHAT NOT TO FLUSH - CLASSROOM ACTIVITY

**Objective:** Students will understand what should and should not be put in a toilet.

Hi, I'm Ardea!  
I love clean water.  
Help us keep  
it clean.



## Materials

- Diaper
- Paper towel
- Wipes
- Dental floss
- Tissue
- Cat litter
- Expired medicines
- Rags
- More amusing items such as plastic toys, a cellphone, a bracelet
- Piece of PVC pipe at 4 inches diameter or other object (like a soup mug) that has a similar-sized base, or a ruler.

## Demonstration

Review the process of how wastewater goes from a house to a treatment plant:

House → 4" diameter pipe to street → city water main → pumping station → regional sewer pipe → lift station → bigger regional sewer pipe → treatment plant

Show what four inches in diameter looks like and talk about how materials that don't belong in the toilet could easily get caught in the pipe and cause a sewer back-up into the house.

Show items on the list to students, one at a time, and ask if they belong in the toilet or not. None of the items on the above list should be thrown in the toilet.

Explain that the term "flushable" for wipes is often a marketing gimmick and in practice is almost never true. They may be flushable (in other words, they will go down the toilet) but that doesn't mean they will dissolve into the wastewater. Wipes that are marketed as "flushable" should also be thrown in the trash. Even tissues are not manufactured for easy disintegration in water. Emphasize that **the only materials that belong in the toilet are the "Three Ps" – pee, poop, and toilet paper.**



Get your students laughing: [\(124\) Wipes Clog Pipes 1:00 - YouTube](#)

[Don't flush your disposable wipes | Minnesota Pollution Control Agency \(state.mn.us\)](#)

# HOW MUCH WATER DO YOU USE?

## Objective

Students will understand the average amount of water that different household activities use and identify ways to reduce their personal or household water use.

## Materials

- Personal water use chart (adapted from the Teach Engineering STEM Curriculum for K-12, from the University of Colorado, Boulder).
- Calculator

## Activity

Provide a copy of the personal water use chart to each student. Review the sheet with them so they understand each category. Instruct students to bring it home and count the number of times each day they do the things on the list, and, with the help of their family, count the activities that occur in their household that they may not personally do (for example, wash the dishes or wash a load of laundry).

At the end of the week, they will bring the sheet back in and add up the total number of times they or their household did each activity. Then they can multiply this number by the estimated amount of water used for that activity to determine their total weekly water use for all activities.

**Note:** The math can be further refined by dividing the number of household members into the total weekly gallons for shared activities: dishes, laundry, etc., to get a more accurate number of individual water use for their household.

## Background

Over the last several decades, manufacturers have begun producing appliances that are more water-efficient. In general, older appliances use more water than newer ones. Consumers interested in reducing their water use are driving demand for more efficient showerheads, faucets, toilets, dishwashers, and clothes washing machines.

The same is true for outdoor irrigation systems. Replacing leaking sprinkler heads, installing a relatively inexpensive smart water controller, and knowing how little water lawns actually need can save homeowners tens of thousands of gallons of water each year.

However, not all households can afford to replace older appliances, or may not even have them on site. Nonetheless, we can all save water by such practices as:

- Taking showers instead of baths
- Taking fewer and/or shorter showers
- Turning off the faucet while brushing teeth
- Fixing leaks
- Only running the dishwasher and clothes washers with full loads
- Only flushing the toilet when necessary
- Reusing towels before washing



# PERSONAL WATER USE CHART

ACTIVITY	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total # time	Estimated amount of water used (gallons)	Total weekly water use (gallons)
Washing face or hands									1	
5-minute shower (standard shower head)									25	
5-minute shower (low-flow shower head)									10	
Taking a bath									40	
Brushing teeth (water running)									1	
Brushing teeth (water turned off)									.2	
Flushing the toilet (standard toilet)									4	
Flushing the toilet (low-flow toilet)									1.5	
Drinking water (8 oz. glass)									.06	
Cooking a meal									3	
Washing dishes by hand									10	
Running a dishwasher (standard)									15	
Running a dishwasher (energy saver)									6	
Washing laundry (top- loading machine)									40	
Washing laundry (front- loading machine)									20	
Watering lawn									300	
Washing car									50	
<b>Total weekly water → use (in gallons)</b>										



# WASTEWATER WORD SEARCH

Find and circle the words from the glossary

N G R A V I T Y F L O W M O I A L G U F  
W A S T E W A T E R A U T O W O C E R I  
E R E S T E M O B L A M F A C C U I U L  
F I T A L W P R E C I P I T A T I O N T  
F M V A Q U A P R E C I O U S N O T A R  
L B D E W A T E R I N G T Q U I L A U A  
U A P O L L U T A N T S T E D P A E C T  
E R U M G Q U I D Q U E O F U C G V A I  
N S E D I M E N T A T I O N M W L A O O  
T C A T M O S P H E R E D B P P A P Q N  
P R S E M O B L A M F A U P S W N O D J  
G E C O N V E Y O R D O A D T K D R W F  
W E T W I N C I T I E S A R E A F A M T  
A N K D F J A R L D K J F J R K I T S D  
I D I N F L U E N T A A O W F L L I B C  
L I N C I N E R A T I O N O L K L O F G  
A D F L K S E D I M E N T A T I O N A J

## Glossary

- Atmosphere** - The envelope of gases surrounding the Earth; air.
- Bar Screen** - A mechanical device used for separating objects from the wastewater stream.
- Conveyor** - A mechanical device used for carrying objects away from a source.
- Dewatering** - The removal of water from a particular substance.
- Dumpster** - A large container that holds trash.
- Effluent** - The outflow or discharge of clean water from a wastewater treatment plant.
- Evaporation** - The process of turning from liquid into vapor (suspended in air).
- Filtration** - A process used for the removal of one substance from another, as in solid material from water.
- Gravity flow** - A process which uses the Earth's gravitational pull to move wastewater.
- Incineration** - To consume by burning up.
- Influent** - Something that flows in or into.
- Landfill** - An area of land where trash and waste material is dumped and buried.
- Pollutant** - A waste material that dirties air, soil, or water.
- Precious** - Of great worth, valuable.
- Precipitation** - Rain, snow, sleet, or hail that falls to the ground.
- Sedimentation** - The process where solid materials settle to the bottom of a liquid.
- Twin Cities Area** - The seven counties that include the cities of Saint Paul and Minneapolis, Minnesota, USA.
- Wastewater** - Water that has been used in a home, a business, or as part of an industrial process.



# MAYFLY

Mayflies are short-lived insects that only hatch in clean, unpolluted water. There was a time in the Twin Cities area when it was very difficult to find any mayflies near our great Mississippi River. Because of advances in wastewater treatment, they have returned. Some years they are so numerous that bridges are closed because the piles of dead mayflies are a traffic hazard.

