

# Just Throw It Away Lesson Plan

#### **SOL Standards**

- 3.8 The student will investigate and understand that natural events and humans influence ecosystems.
- 5.9 The student will investigate and understand that the conservation of energy resources is important.
- 6.6 The student will investigate and understand that water has unique physical properties and has a role in the natural and human-made environment.
- 6.8 The student will investigate and understand that land and water have roles in watershed systems
- 6.9 The student will investigate and understand that humans impact the environment and individuals can influence public policy decisions related to energy and the environment.
- BIO.8 The student will investigate and understand that there are dynamic equilibria within populations, communities, and ecosystems
- ES.6 The student will investigate and understand that resource use is complex.
- ES.8 The student will investigate and understand that freshwater resources influence and are influenced by geologic processes and human activity.
- ES.10 The student will investigate and understand that pollution and waste management affect an ecosystem.

#### **Overview**

Students find out what happens to the substances that we "just throw away" in our daily water use. Following a story, the students create wastewater by adding ingredients to a bucket. The students learn that there's no such thing as away and the items we place down our toilets and sinks travel to the wastewater treatment plant.

### **Teacher Notes**

Our society often "throws away" waste and trash when, in reality, it must go somewhere and be dealt with. In the United States, some streams and rivers were once so polluted that one of them even burned. So much oil and chemical waste was in the Cuyahoga River outside Cleveland, Ohio, that it caught fire in 1969. Our rivers, lakes, and even oceans were once thought to be capable of carrying off and naturally treating our liquid wastes. Cities pumped raw sewage from homes and businesses directly into rivers. Factories sent water that had been used in manufacturing processes, untreated, into streams, rivers, and oceans. As this practice continued and populations expanded, water supplies degraded to the point of posing serious health and environmental hazards. The 1972 federal Clean Water Act began the process of cleaning our waterways and establishing guidelines to ensure that all cities have wastewater treatment facilities.

#### **Procedures**

Option 1: Divide the students up into groups of three or more students. Each group will have their own wastewater bucket and create their own wastewater with their group.

Option 2: Hand everyone a scenario card (multiple students will have the same card). As you read through the story, the students with that item will come to the front of the class and add that item to one wastewater bucket for the class.



- 1. Explain to the class that they are going to represent HRSD customers. Show the students the clean water in the bucket and explain that the water that enters each house and business is as clean as the water in the bucket; however, the water that leaves the house is quite a different story.
- 2. Give each group one of the Water Users cards and ask them to read the card together as a group. Each card gives a short scenario and tells the group which waste they are to put into the water. \*if you are doing option two, give the students each a card. Remember, multiple students will have the same card. This is okay. They are each representing a person in the household.
- 3. One at a time, have each group read the information aloud on their Water Users card, explain how they measured their substance, and dump the pollutant into the wastewater pipe (bucket).
- 4. Before each group adds their substance to the wastewater, ask the class if that items should our should not go down the drain or toilet. If it should not go down, what could they do with it instead?
- 5. After each group adds its pollutant, use the large spoon to stir the bucket contents.
- 6. When all the items are added, stir the wastewater well to allow the pollutants to mix together and the tissue to liquefy. Explain that this represents the wastewater that enters the HRSD wastewater treatment plants. Allow the entire class to see the final wastewater.
- 7. Ask the class if they think the wastewater could ever be clean enough to be discharged into a lake, stream, or river. That is the problem that HRSD faces every day.
- 8. Optional: save the wastewater and use it in the water cleaning activity Washing Water

## **Materials**

- 1 bucket half filled with water (clear buckets work best)
- 1 large mixing spoon
- Water scenario cards
- Coffee grounds
- Dishwashing detergent
- Food pieces (crushed crackers, cookies, etc.)
- Vinegar with yellow food coloring
- Hand soap
- Toilet tissue
- Dirt
- Cut up straw pieces
- Alum (optional) shows how the items clump together.
- Yeast (optional) represents living organisms that are found in wastewater.

### Discussion

- Have each group explain a way to prevent or reduce their type of pollution in our wastewater.
- Make sure the students explain the measurement method and the metric instrument their group used.
- Ask students to explain what wastewater is and who produces it. Must we have wastewater in our society? (yes) Should we try to produce less wastewater with fewer pollutants? (yes)

**Project Extension** 





- For each item listed on the water scenario card, specify a measurement to challenge students to use measuring tools before adding the items to the "wastewater."
- Using measuring tools creates complexity in the activity.
- Examples of measuring tools include 1000-ml beaker, 100-ml graduate cylinder, balance scales, metric ruler and meter stick, metric thermometer.
- BONUS: Within the next couple of days, use the class-created wastewater for the <u>Washing</u> <u>Water activity</u>, as the water will become unpleasant.



The day began at the Wilkins house as it did every day. Mom was up early getting the coffee started. Oops! Mom accidently dropped the coffee grounds on the kitchen counter. No problem – she just wiped them off the counter into the sink. Once the faucet was turned on and Mom ran the garbage disposal, they were gone!

Pour coffee grounds into the bucket.

Dad came into the kitchen ready to cook breakfast. Before long the whole house was filled with the smell of frying bacon and Dad's famous pancakes. These pancakes were the standard breakfast every Saturday morning at the Wilkins' house. Dad, Mom, and the three children ate, talked and laughed as they ate. Time to clean up the mess! Dad plunged the pancake pan into the hot water in the sink.

Pour vegetable oil into the bucket.

The breakfast dishes were set on the counter ready to be washed. It was Janna's turn to wash the dishes that Saturday. Her two younger brothers ran upstairs to brush their teeth and get dressed. Janna put a generous squirt of dishwashing detergent into the full sink of dishes. She sure wished that the family would get a dishwasher soon. **Pour dishwashing detergent into the** 

bucket.

After Janna finished the dishes and wiped off the table, she scraped the leftover food into the sink and turned on the garbage disposal. The food was ground into tiny pieces and away it went.

Add chopped food into the bucket.

While the dishes were being washed in the kitchen, the youngest Wilkins son, Charlie, was proudly showing his mom how he could now use the potty like a big kid. He was a proud 3 years old. **Pour vinegar into the bucket.**  Mom reminded little Charlie that big boys also wash their hands every time they use the potty. Charlie squirted a blob of liquid soap on his little hands and rubbed until they were covered in lather. Charlie thought it was fun being a big boy! **Pour hand soap into the bucket.**  Carl, the Wilkins' middle child, had a cold all week. He was tired of watery eyes and a constantly runny nose. Carl stepped into the bathroom, pulled off some toilet paper, blew his nose, dropped the tissue into the toilet, and flushed.

Add toilet paper to the bucket.

Back in the kitchen, Dad held his running shoes over the sink and scraped off the dried mud that had caked all over them the night before. Once he removed all the mud, he cleaned the sink by turning on the faucet. The sink was spotless again! Add dirt to the bucket.

Charlie was still playing in the bathroom. He loved watching the water whirl around and listening to the water gurgle down the hole when he flushed the toilet. He found some pieces of plastic in the trashcan and giggled as he dropped them into the swirling water. Boy was this fun! Add plastic straw pieces to the bucket.

Every household uses toilet paper! On average, Americans use 20,000 sheets of toilet tissue annually. Add toilet tissue to the waste water pipes





