

US EPA ARCHIVE DOCUMENT



EXCUSE ME, IS THIS THE WAY TO THE DRAINPIPE?

Grades
K - 6

► OBJECTIVES

- Explain where drinking water comes from and where wastewater goes once it leaves the home.
- Explain how the water we use fits into the water cycle.

► INTERDISCIPLINARY SKILLS

Reading, Art, Science.

► ESTIMATED TIME

- K-3: 45+ minutes to read, discuss, and color story
- 4-6: 10 minutes to read story; 45 minutes to create water travel book



► MATERIALS

- ☐ Copies of the activity story
- ☐ Crayons (grades K-3)
- ☐ Paper and art supplies to make travel book (grades 4-6)

BACKGROUND INFORMATION

We seldom think about where the water we use in our homes or businesses comes from or where it goes once it disappears down the drain. The water we use everyday is very much a part of the earth's water cycle and is continually recycled. When we use water we are, essentially, detouring it from its natural cycle and then, in short order, returning it back to the environment.

Water can dissolve, suspend, and transport many substances. Therefore, the quality of the water we drink has a lot to do with where it has been and what has been in contact with it. For this reason, our water supply sources are not always drinkable and may need treatment to remove natural or manmade contaminants. All drinking water must meet federal and state standards that were put in place to ensure that the water is safe to drink. Needless to say, protecting our water from harmful contaminants to begin with, is important.

Our **drinking water** comes from either ground water (e.g., wells, springs) or surface water (e.g., rivers, lakes, manmade reservoirs). Ground water supplies are usually extracted by a pump, treated and disinfected when necessary, and delivered to homes and businesses through a network of pipes called a **distribution system**. Many people who live in rural areas have individual, on-site ground water wells with very simple piping systems; many other people who depend on ground water, but live in more populated areas, receive their water from large water supply wells with more complicated distribution systems.

Surface water supplies are withdrawn from rivers, lakes, and reservoirs through large intake structures. The water is disinfected and often treated at a **water treatment facility** to remove impurities before entering the distribution system. Surface water supplies often travel through many miles of underground pipes before reaching the faucets of people's homes and businesses.

Clean drinking water comes into our homes through one set of pipes and leaves our homes as **wastewater** through another set of pipes. The dirty wastewater that is flushed down the drain from our homes and businesses must be treated so that it can be safely and effectively recycled back to nature.



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NOTES

In rural areas, wastewater pipes are hooked up to small on-site sewage treatment and disposal systems, or **septic systems**, that are buried in the ground. In these systems, wastewater generally flows by gravity through a pipeline that runs from the home to a septic **tank**, where wastewater is partially treated before it flows onward to a **leaching system**. As wastewater passes through the leaching system (a buried network of pipes with holes through which the water passes) it is further filtered and treated by the soil and the microorganisms in the soil. Eventually, the treated water seeps into the ground water.

In more populated areas, wastewater is conveyed from the home into a network of sewer lines which lead to a **wastewater treatment plant**. Here, wastewater is cleaned by mechanical, biological, and chemical processes before it is discharged into ground water or surface water. Water that is discharged from wastewater treatment facilities must meet stringent federal and state standards.

Both septic systems and large wastewater treatment systems rely on small, **microscopic organisms** (e.g., bacteria) to help clean up water. These organisms, nature's own built-in water purifiers, devour and digest organic waste material in the wastewater. The more efficiently the organic solids are digested, the cleaner the water. This is a big reason why it is important not to flush harmful substances, such as household hazardous wastes, paints, paint thinners, and drain cleaners, down the drain. These substances can kill naturally-occurring bacteria, especially in septic systems, and cause the systems to function poorly.

TEACHING STRATEGY: GRADES K-3

1. Hand out copies of the story. For classes with pre-readers or early readers, read the story to the students. Discuss the story, ask questions, and show the students the pictures as you go along. (The art activity in the "Follow Those Pipes" activity can help students visualize what this story is describing.) Have older students read the story themselves and then have a discussion.
2. Discussion questions: Ask the students whether they think their water comes from a well by their home or whether it is piped in from somewhere else. If their water comes from somewhere



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else, do they know from where? Does their wastewater go to a septic tank or a wastewater treatment plant? Does Martha live in the city or the country? Ask the smaller children what parts of the story they think couldn't happen and what parts are true.

3. Have the students color the pictures in the story and take it home to share with their families.

TEACHING STRATEGY: GRADES 4-6

1. Distribute copies of the story.
2. Have students read the story on their own. (The art activity in the "Follow Those Pipes" activity can help students visualize what this story is describing.)
3. Discuss the story. Ask the students whether they think their water comes from a well by their home or whether it is piped in from somewhere else. If their water comes from somewhere else, do they know from where? Does their wastewater go to a septic tank or a wastewater treatment plant? Does Martha live in the city or the country? In the city, where is the water cleaned to make sure it is safe enough to drink? In the city, where does the water go after people have used it?
4. Have the students create a "Willy Wetsworth Travel Book" that shows their own ideas about what a good travel adventure for a water drop might be. Make sure students show how the water gets from one place to another and in which phases (liquid, gas, solid).

Supplementary Activities

- Take the class on a field trip to a water and/or wastewater treatment plant.
- Invite a member of your local water or wastewater department or a plumbing contractor to be a guest and explain how water comes into and leaves homes and businesses.

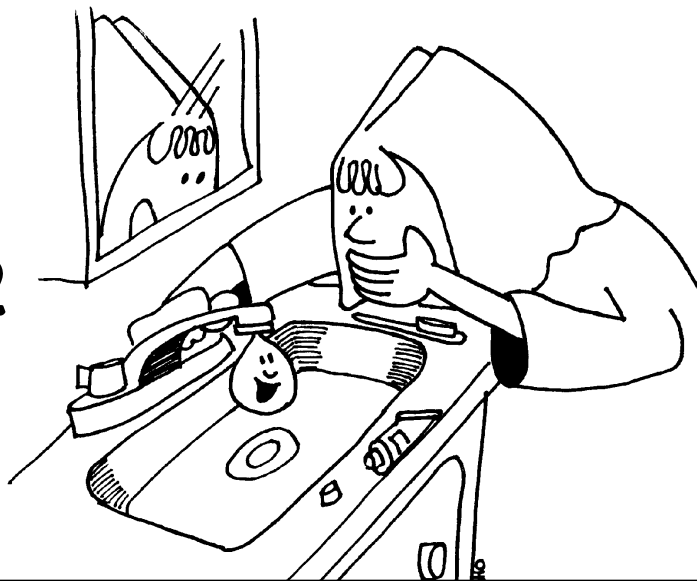


STORY: EXCUSE ME, IS THIS THE WAY TO THE DRAINPIPE?

Excuse Me, Is This The Way To The Drainpipe?

by Ellen Frye

illustrations by Hank Aho



Martha Merriweather forgot to brush her teeth. She'd already said goodnight to her mom and dad, to Benji, her brother, and Lulu, her parakeet. She was all snug under her red polka dot blanket. In fact, she was pretty near asleep when she remembered about her teeth.

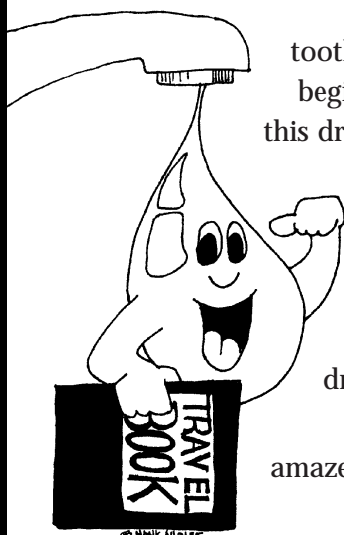
It had been one of those days—one of those forgetting days. She forgot her lunch and had to borrow lunch money from Mrs. Johnson in the school office. She forgot her homework assignment and had to call her friend Terry to find out what it was. She'd even forgotten to feed Lulu until her mother reminded her.

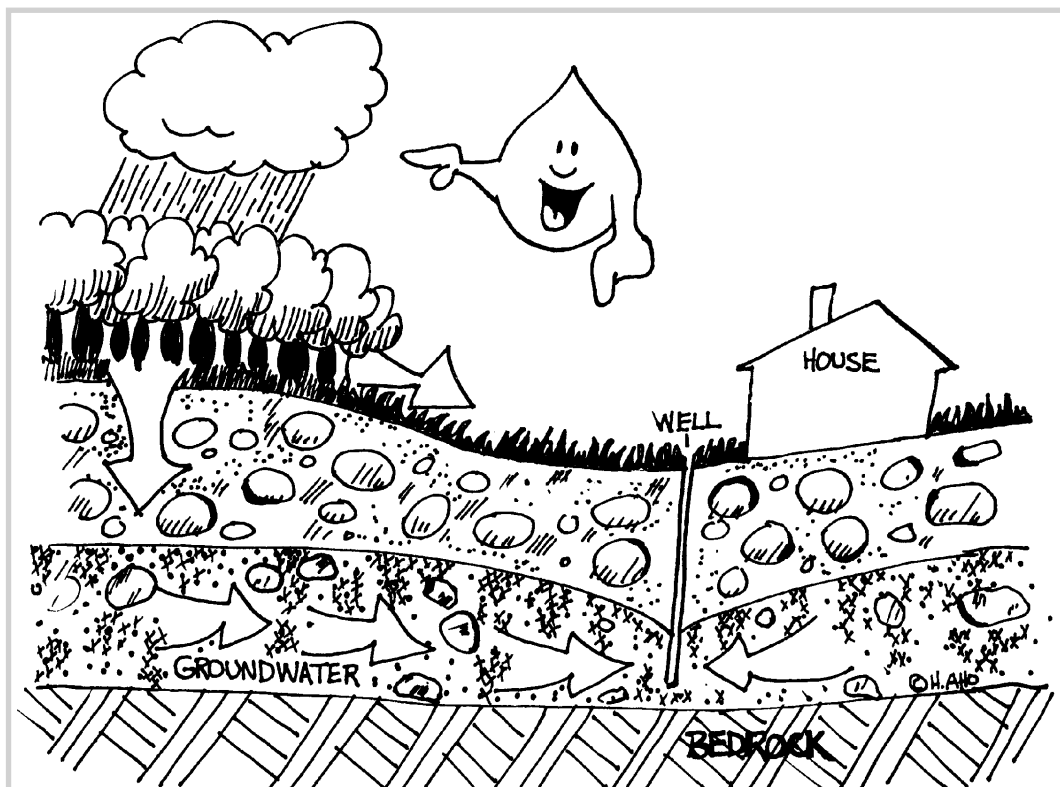
But Martha Merriweather did finally remember to brush her teeth. So she got out of bed, headed to the bathroom, turned on the light, picked up the toothbrush, picked up the toothpaste, put the toothpaste on the toothbrush...

But, just as Martha was bringing the toothbrush with the toothpaste to her teeth, she noticed a drop of water that was just beginning to drip from the faucet—which isn't so very unusual. But this drop didn't drip and it didn't drop; instead, it seemed to get bigger...and bigger. Furthermore, it seemed to be waving to her. Yes, it was waving to her. In fact, it seemed to be speaking to her. Yes...yes, it was speaking to her. In fact, it was asking her a question.

"Excuse me, is this the way to the drainpipe?," the drop was asking as it pointed to the drain in the sink.

"Yes it is," answered Martha, her eyes wide open with amazement. "But...but....you're talking!"





“Yes,” said the drop, “I often talk when I have a question, and, if you recall, I did have a question! You see,” he said, “my travel book says that I should flow from the Merriweathers’ ground water well, continue on up through the Merriweathers’ water pipes, until I get to the Merriweathers’ bathroom faucet. At that point, my travel book says, I should dive downward to the Merriweathers’ drainpipe.”

“Merriweather?,” cried Martha, “Merriweather? That’s my name—Martha Merriweather.”

“And my name is Willy Wetsworth, a traveler and adventurer,” said the drop. “Pleased to meet you.”

“A traveler and adventurer?,” whispered Martha gleefully.

“Yep,” said Willy Wetsworth, “I spend my life traveling—in the clouds, in the sky, in the rivers, oceans, and streams, along the roadways, through the woodlands and grasslands, down in the soil, and between the rocks. Today, I’m traveling through water pipes—your water pipes. I was just pumped up into your house from the well in your backyard. It was a fun-foodling ride. Up, up, up, up, from the ground, then through this pipe and that pipe, until...well....here I am.”

“Wow!,” said Martha, trying to imagine what it would be like to travel in water pipes. She thought it might be “fun-foodling” if she were wearing a snorkel and flippers. She thought it might be like zooming through a water slide at the amusement park.

“Do you mean to say,” she asked, “that any time people brush their teeth, or wash their hands, or take a shower, or wash the dishes, or do the laundry, or flush the toilet, or water the flowers...that all that water has just had an exciting ride through the pipes?”

“Yep,” replied Willy.

“Do you mean to say that all the water that people use comes right from a well in their own backyard?” asked Martha.

“Well...sometimes yes, and sometimes no,” replied Willy. “It says here in my travel book that some people, like the Merriweathers, live in the country where there are more trees than people, and where houses are spread apart. So when people who live in the country need water, they can usually get it from the water deep in the ground in their own backyard. But it’s different in the city—the city’s where there are more people than trees, and buildings are closer together. City water is usually piped in from a big well, or a lake, or a stream, or a reservoir that might be right near by or it might be many miles away. I have a friend who actually made the trip through city water pipes.”

“Really?,” asked Martha

“Yes,” said Willy, “he started out at a big reservoir. From there he went through a big pipe to a water treatment plant.”

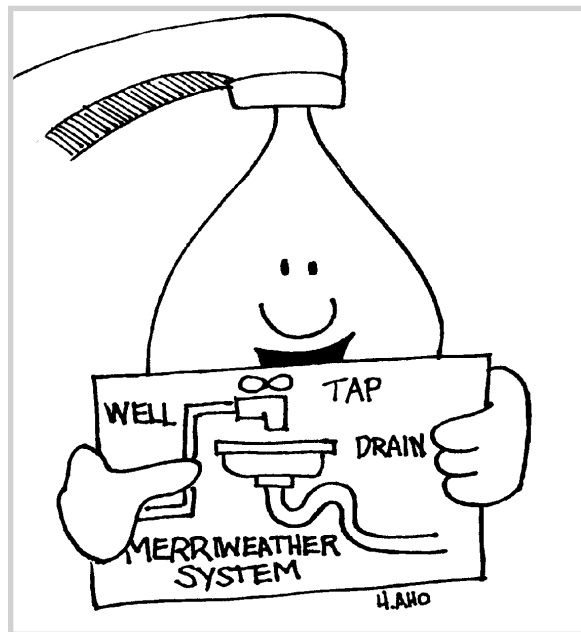
“A water treatment plant?,” asked Martha. “What’s that?”

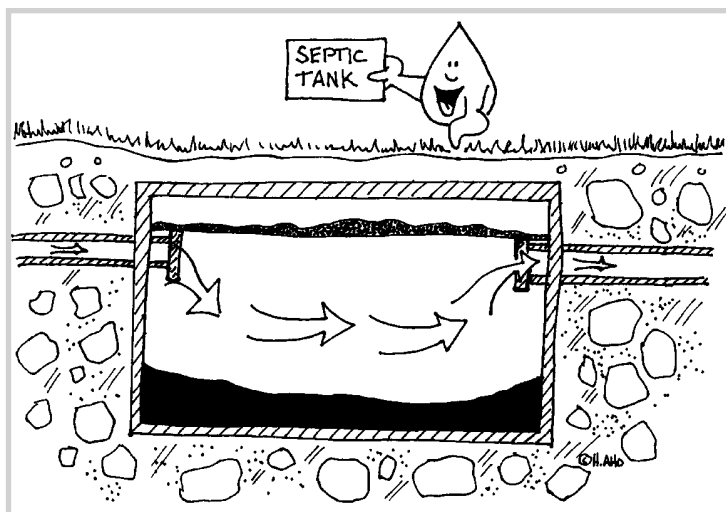
“According to my friend,” said Willy, “it’s a place where water is cleaned so it’s safe enough for people to drink.”

“You mean your friend isn’t safe to drink?” asked Martha.

“Well he probably is,” said the drop. “But, in our travels, we water drops never know what we’re gonna run into—or what’s going to run into us. Let’s face it, every living plant and animal on this earth needs us and uses us—people boil us, drink us, mix other stuff with us, throw their scumdiddle glunk in us. There are so many ways we can get dirty. Most days, mother nature can clean us up without anybody’s help. But sometimes mother nature can use some help and a water treatment plant does just that—it’s kind of like mother nature’s little helper. My friend said it was really weird going through the treatment plant, but he felt good as new by the time he got out of there. But then...,” continued the drop.

“But then what?,” asked Martha, who by now was trying to decide whether or not she would like it if *she* were a water drop.





"Then he took a wondrous, long, rip-snoodling ride through some great big pipes, and then some medium-sized pipes, and then some smallish pipes, right into an apartment house," said Willy. "Other water drops went to other places like office buildings and stores and museums and libraries. And then..."

"And then what?," gasped Martha, thinking that, indeed, it might be fun to be a water drop.

"Then," said Willy Wetsworth, "the people who live and work in those buildings turned on their faucets and used their water for something or other—like brushing their teeth."

"Oh," said Martha, looking at the toothbrush and toothpaste she was still holding. "I was just about to brush my teeth when I met you."

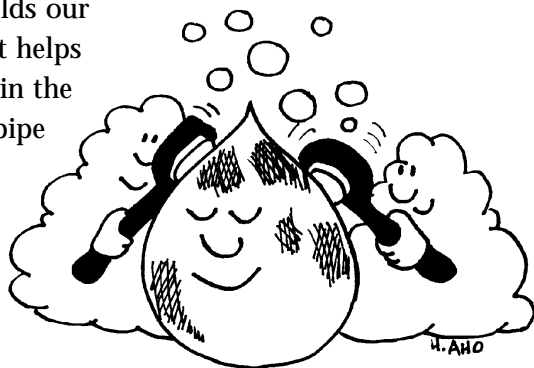
"And I was just heading for the drain," said Willy.

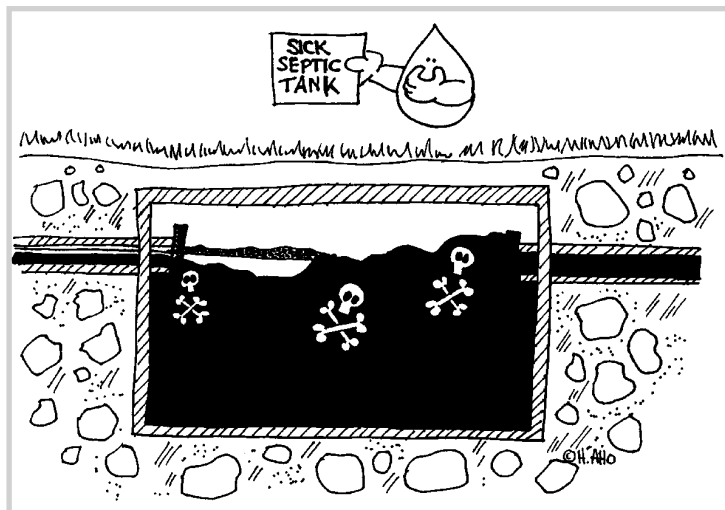
"But you mustn't," blurted Martha, who had already grown rather fond of the drop. "I mean...down the drain? What on earth will happen to you?"

"Well, it says right here in my travel book that I'll wash down another set of pipes and end up in a septic tank that's buried in the Merriweathers' backyard."

"A septic tank?," exclaimed Martha. "I've heard of that. A man came to clean our septic tank a little while ago, and when I asked my mother what a septic tank was she told me that it was a big box that holds our dirty water after it goes down the drain. She said it helps make the water clean again. The dirty water stays in the septic tank for awhile and then goes into another pipe and then it goes into the ground."

Martha thought for a moment and then asked Willy, "Are you sure you really want to go down the drain to a septic tank? It sounds yucky!"





“It’s not so bad,” said Willy. “My travel book says the Merriweathers take good care of their septic system, so it does a good job of cleaning us up. My book also says the Merriweathers don’t throw all kinds of nasty scumdiddle glunk down the drain that might make my friends down in the septic tank sick.”

“You have friends in the septic tank?,” asked Martha.

“Yep,” said Willy. “heaps and gobs of eency, beency, plump, and jolly bacteria—mother nature’s little cleaner uppers. They live in the septic tank and love to eat the waste in your wastewater.”

“Ick,” thought Martha.

“They eat it and digest it and eat it and digest it,” said the drop, “and, like magic, they change it from *harmful* waste to *harmless* waste.”

“Wow!,” exclaimed Martha.

“But like I said,” said the drop, “my bacteria buddies get sick when people throw nasty scumdiddle glunk down the drain.”

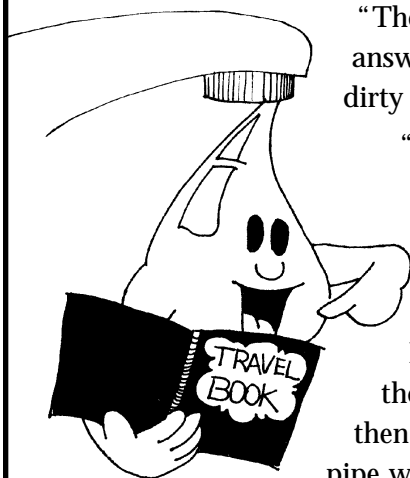
“What kind of scumdiddle glunk?,” asked Martha.

“Oh, like paint thinner or plastics or oils or pesticides,” said the drop.

“Oh,” said Martha, who was beginning to think that being a water drop might not be as much fun as she thought. “I can’t say that I’ve ever thrown any glunk down my drain, and I know now—for certain—that I never will!”

“Hooray for you, Martha Merriweather!,” shouted the drop. “As you know, I thrive on adventure, but I’ve heard there are some septic systems that even I wouldn’t want to visit. Some people just don’t take care of them and, after awhile, they clog up and bog down and then my bacteria friends are anything but jolly. And then, of course...” said Willy, his smiling face giving way to a deep, dark frown.

“And then, of course what?,” asked Martha, almost afraid to hear the answer.



“Then, of course, we water drops stay dirty, dirty, dirty,” he answered with a shudder, “too dirty for anyone to drink...too dirty for brushing anyone’s teeth.”

“Oh,” sighed Martha.

“But I’m going down that drain Martha Merriweather,” Willy laughed and pointed to the drain. His face was once again lit up like the Fourth of July. “And if I get a little dirty and smelly in the septic tank, so what?

Everybody gets dirty and smelly sometime. Down there in the septic tank, I’ll hang out with my friends for a while and then, like you said, I’ll float out of the tank and into a pipe—a pipe with holes in it,” he said.

“It says right here in my travel book,” Willy began reading from his book, “You will float out of one of the holes in the pipe and sink down into a big gravelly place. From there, just relax and enjoy your journey into the soil below. Here in the soil you will find yourself getting cleaner and cleaner and cleaner and cleaner. In time, you will find yourself back in the ground water, not far from where your little adventure began.” Willy smiled a big, wide smile and closed his book.

Martha asked Willy if his friend in the city had gone into a septic tank when he went down the drain.

“Oh no,” replied Willy. “There’s no room for septic systems in cities. Your septic tank is only a short trip from your house, but in the city, all the dirty water that goes down the drains of all the apartment houses and businesses travels through oodles upon oodles of pipes—smaller-sized, then middle-sized, then bigger-sized pipes that are buried under the streets. All that dirty water ends up at a flumongous, magrungous wastewater treatment plant.”

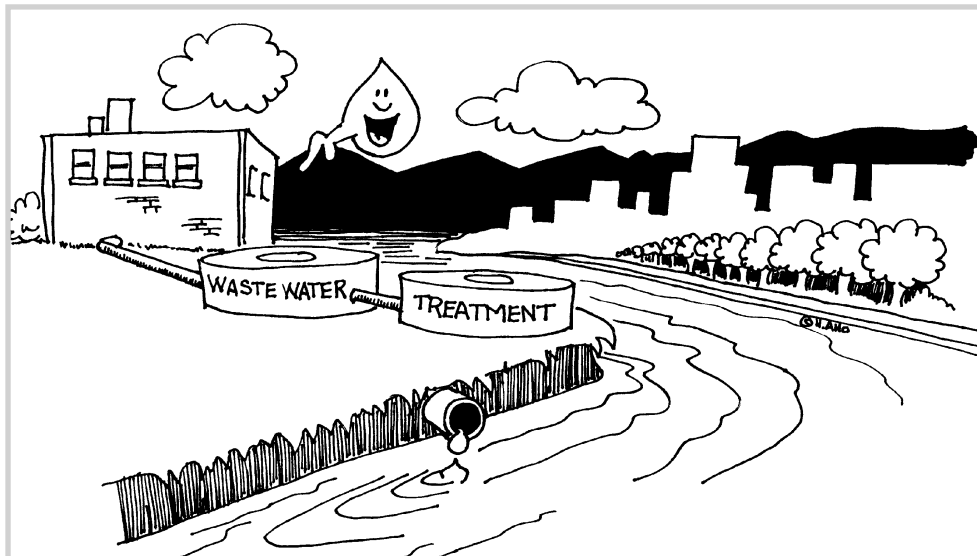
“Another treatment plant?,” asked Martha.

“Another treatment plant,” replied the drop, “but this one is called a waste-water treatment plant. A wastewater treatment plant is a place where dirty water that’s flushed down drains and toilets gets cleaned up so that it’s clean enough to go back into a nearby river, lake, stream, or ocean. Yep, my friend flowed into the wastewater treatment plant. He flowed from one big, flumongous tank to another getting cleaner and cleaner.”

“Were there heaps and gobs of eency, beency, plump, jolly bacteria to help him get clean?,” asked Martha.

“As a matter of fact, there were, Martha Merriweather, jillions and scillions and gadrillions of them. They were eating and digesting and eating and digesting...they ate so much,” laughed Willy, “that after awhile they just sank to the bottom of the tank and took a nap.”

“Took an nap?,” giggled Martha.



"Yep," laughed the drop. "And, guess what they did next?"

"What?..What?," cackled Martha. "What did they do next?"

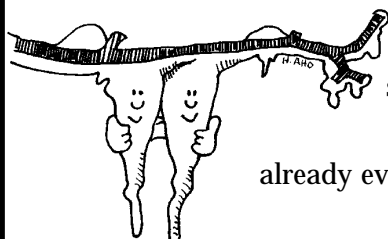
"They woke up and started eating and digesting all over again," roared the drop, swinging gleefully from the faucet. Martha was laughing gleefully too—she couldn't help it—although she wasn't sure which was funnier, the thought of jillions and scillions of plump and jolly bacteria having a giant feast or seeing a drop of water named Willy laughing himself silly.

"And what happened to your friend?" asked Martha, trying to calm her giggles down.

"Then," said the drop, trying to calm his giggles down, "then he splashed out of the treatment plant and into the Witchywatchy River. That's where I met him—in the Witchywatchy River. We spent one cold January as icicles on the bank of the Witchywatchy River."

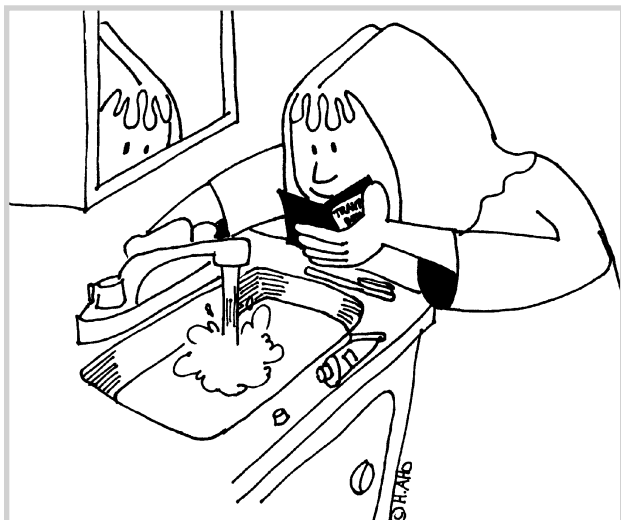
"Icicles?," shivered Martha. "Weren't you cold?"

"Nah," answered the drop. "We're water. Sometimes we float and flow as a liquid, sometimes we freeze into ice, and sometimes the heat makes us evaporate into the air as a vapor. It's fun-foodling Martha Merriweather...fun-foodling. But now," checking his waterproof watch, "I really must be moving on down the drain, and I think you must be brushing your teeth." He noticed a big, wet tear well up in Martha's eye and slide slowly down her face.



"Hey, hey, Martha Merriweather, I see a friend of mine sliding down your face—Tina Teardrop's her name. When I see Tina Teardrop I know somebody's sad. Are you sad?"

Martha felt her cheek for Tina Teardrop, but Tina had already evaporated into the air. "Must you go?," she asked. "I could



keep you with me in a special, special little jar..." But Martha knew that a jar would be a very bad place for a traveler and adventurer. "Will I ever see you again?," asked Martha.

"Of course you will," smiled Willy. "Whenever you turn on your faucet, or catch a snowflake in your hand, or see the frost on your windowpane, or watch the mist rise from your spaghetti water, or swim in a swimming pool, or watch a flower grow—I'll be there. I'm always here,

Martha Merriweather. But if I were to become too dirty, even you wouldn't want to have me around. So make sure you let your friends and family know that we water drops need to stay clean—for the sake of all the people and animals and flowers and trees in the whole wide world. So, S.Y.L., Martha Merriweather."

"S.Y.L.?", puzzled Martha.

"See Ya Later," laughed Willy. "See Ya Later, Martha Merriweather," he waved and winked.

"S.Y.L., Willy Wetsworth," whispered Martha.

And, before her very eyes—right before her eyes—Willy got smaller and smaller until he was simply and purely a drop at the faucet. But, he'd left something behind. And what do you think it was?

He left his travel book with all the pictures of pipes and wells and ground water and ponds and lakes and oceans and glaciers and raindrops and snow flakes and...

Martha picked up the little book and opened it to the first page. And what do you think she saw?

She saw a little message. It said, "To my friend Martha Merriweather. From your friend, Willy Wetsworth." That's what it said.

As Martha brushed her teeth, she watched the foamy water wash down the drain, knowing that Willy was on his way to another adventure. She turned the water off, put her toothbrush away, and returned to bed. She crawled under her polka dot blanket, then she took the travel book and tucked it carefully under her pillow. It had been quite a night...a FUN-FOODLING NIGHT!

