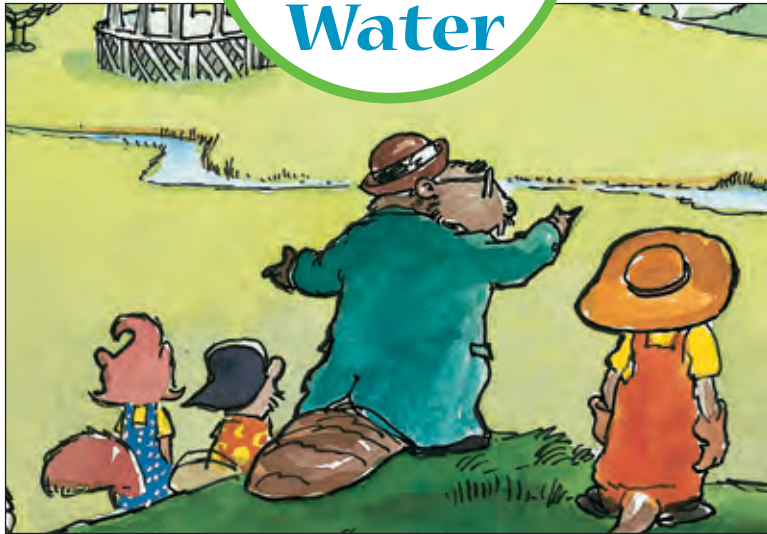




THE SCIENCE OF
Water



MYSTERY OF THE MUDDLED MARSH

By Barbara Tharp, Judith Dresden and Nancy Moreno
Illustrated by T Lewis

BCM
Baylor College of Medicine



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BioEdSM

Teacher Resources from the
Center for Educational Outreach at
Baylor College of Medicine

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The activities described in this book are intended for school-age children under direct supervision of adults. The authors and Baylor College of Medicine cannot be responsible for any accidents or injuries that may result from conduct of the activities, from not specifically following directions, or from ignoring cautions contained in the text.

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Authors: Barbara Z. Tharp, M.S., Judith H. Dresden, M.S., and Nancy P. Moreno, Ph.D.
Editor: James P. Denk, M.A.
Designer: Martha S. Young, B.F.A.
Illustrator: T Lewis, B.F.A.

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Center for Educational Outreach
Baylor College of Medicine
One Baylor Plaza, BCM411
Houston, Texas 77030
713-798-8200 | 800-798-8244
www.bcm.edu/edoutreach | www.bioedonline.org | www.k8science.org



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BRIGHT WATER CORNERS

CLEAR CREEK PARK

MR. OTTERBEE'S HOUSE

MARIGOLD MARSH

MR. SLAPTAIL'S HOUSE

BEAVER POND

BEAVER DAM

ROSIE'S HOUSE

CLEAR CREEK

Riff is spending the summer with his cousin, Rosie. What are they up to this time?





The Boat Race

“Okay, let’s see who’s right this time,” Rosie said to her cousin, Riff. She set her boat down in the water and gave it a push.

“See what I mean?” she said. “Paper boats *can* float!”

“I still bet they’ll get soggy and sink in a minute,” Riff answered.

“Un-unh,” Rosie argued. “Let’s have a race. Bet mine will get across the pond before yours!”

A puff of wind caught the two boats, and off they sailed. Riff ran along the bank after them. He almost tripped over Mr. Slaptail, Rosie's neighbor who lived by the pond.

"Watch where you're going," Mr. Slaptail said. "You almost knocked me into the pond, and I already had my bath today! I'm trying to find enough water hyacinths for my salad."

"We're sorry, Mr. Slaptail," Rosie answered. "We'll get out of your way. Look! My paper boat is halfway across the pond already!"

Rosie turned and ran around the pond to catch up with the boats and—WHAM! She crashed right into Mrs. Suzy Pondslider.



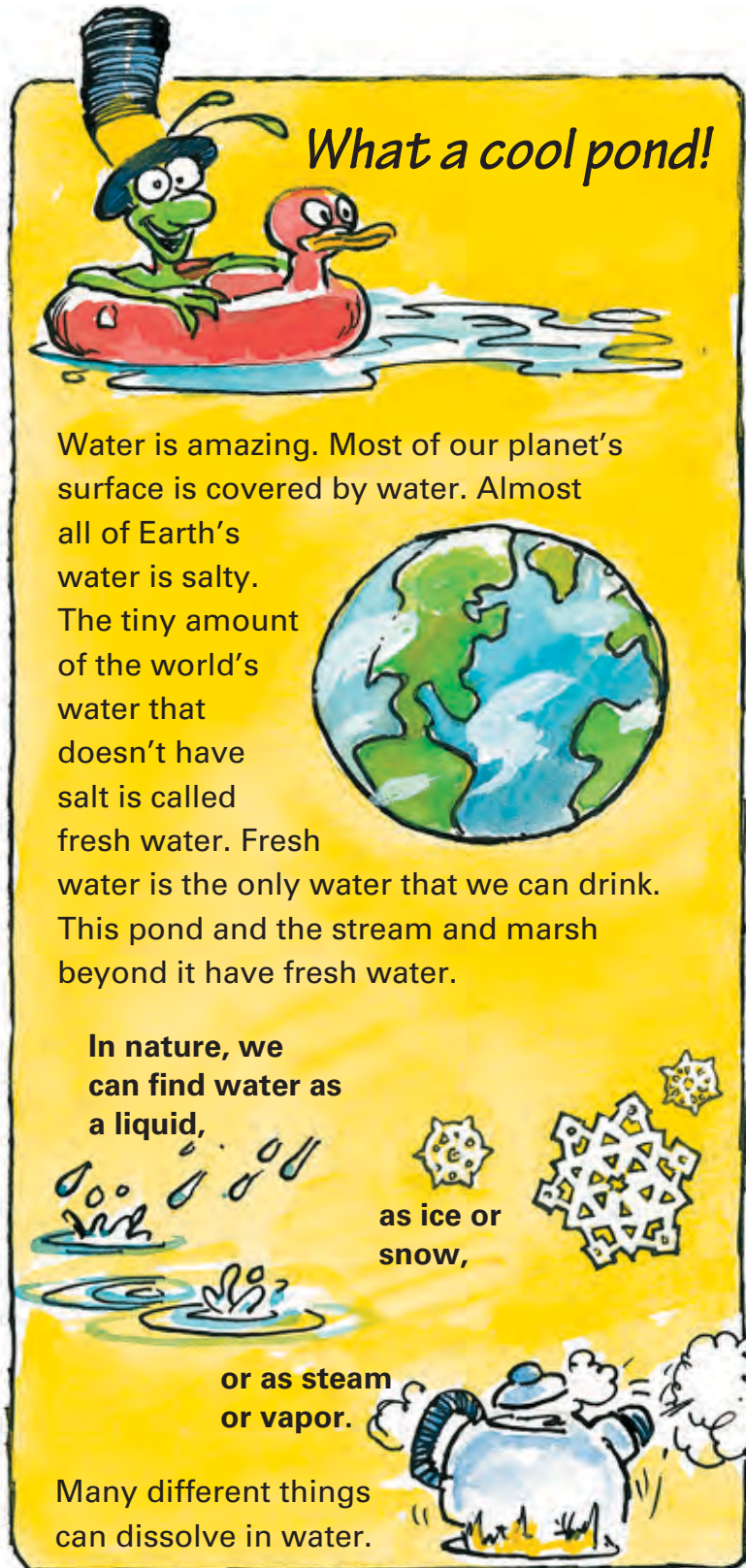
Warning Signs

Rosie took a deep breath and helped Suzy pick up her belongings.

“Mrs. Pondslider,” she asked, “what’s the matter? Where are you going with all your things?”

“The matter?! Haven’t you noticed? The water is getting too shallow—and it smells bad, and I don’t think we should be drinking it! I’m going to find a place with clean water, where my children will be healthy,” Suzy Pondslider answered. “We can’t live here anymore!” she said. Mrs. Pondslider marched across the dam with her children behind her, all in a row.

Rosie leaned down to look into the pond, and—SPLASH! The water came up and hit her in the face.





“Hoo-hah! Watch out!” said a familiar, chuckling voice. It was Oscar Otterbee, who lived upstream near Marigold Marsh.

He twirled around and splashed the water some more.

“Otterbee! I should have known!” said Mr. Slaptail. “You’re the one stirring up the water so I can’t see the stems of my hyacinths! The water’s gotten so muddy, I didn’t even see you.”

“Hoo-hah! You may be seeing a lot more of me!” said Otterbee. “Got a fish for my dinner! Nothing biting at *my* place but mosquitoes.”

Leaving Home

A big gust of wind came along and carried Rosie’s boat across the pond. Rosie dashed after it. “I win! I win!” she shouted.

Before Rosie reached the other side of the pond, she came to a dead stop. Woody Duck, Ronnie Rail and Brenda Blackduck were blocking the way.

“You’re going the wrong way, Rosie,” Ronnie Rail said. “We’re all heading south to Willow County. Maybe there we’ll find something

better to eat. There's not much left around here. Something is happening to our marsh."

"But you've always lived here. You can't leave!" Rosie said.

"I'm afraid we have to," said Brenda Blackduck. "We can't live here anymore!" she said, as she walked away.

Rosie found Riff and told him the sad news of her friends. As they talked, they walked slowly away from the dam and up the stream.



Whew!
I could use a cool glass of water right now!

Each of us needs about 8 to 10 cups of clean water every day. Most of it comes from things we drink. We also get some water from our food.

We use water to keep the places we live and ourselves clean. Water helps us stay healthy.



Soon more and more neighbors came toward them. Each one was carrying a big bundle. Were they all leaving?

“Where are *you* going?” Rosie asked.

“No good fish left,” moaned Ricardo Raccoon.

“No clean water to drink,” said Dolores Deer.

“Clear Creek isn’t clear anymore,” said Sully Salamander. “The water’s like pea soup!”

“We can’t live here anymore!” they all said together. “We think the marsh and the creek are dying.”

“What are they talking about?” Riff asked. “Creeks don’t die.”

“Come on Riff.” Rosie said, “Let’s go! We’ve got to find out what’s wrong.”



All the plants, animals and other creatures on Earth depend on clean water. Without it, there would be no life on our planet.

We use water in our homes for cooking, bathing and cleaning.



Water is important for growing crops and raising farm animals.

It often is used for transportation and to produce electricity.



Many factories use water for making products.

Where does the water you use come from?



Riff ran ahead and disappeared around a bend. He called back to Rosie, “Wait until you see this! The creek disappears into a huge lake of tall grass!”



Mucky Marsh

“Wow! Look at all this stuff growing here!” Rosie said, catching up with her cousin. “The water is almost gone, and what’s left is covered with scum. No wonder they’re leaving.”

A worried Rosie slogged into the weed-choked marsh. Her feet kept sticking in the deep mud.

“What a mess! This is where the stream slows down and widens into



Marigold Marsh,” Rosie explained. “When Beaver Pond gets too full, the water backs up into the marsh. All kinds of plants and animals used to live here.”

“Now it’s only full of weeds and mud,” Riff added “and . . . Yuk! There’s a dead fish stuck in the cattails.”

“Hey, there’s a school of little fish!” cried Rosie, hopefully.

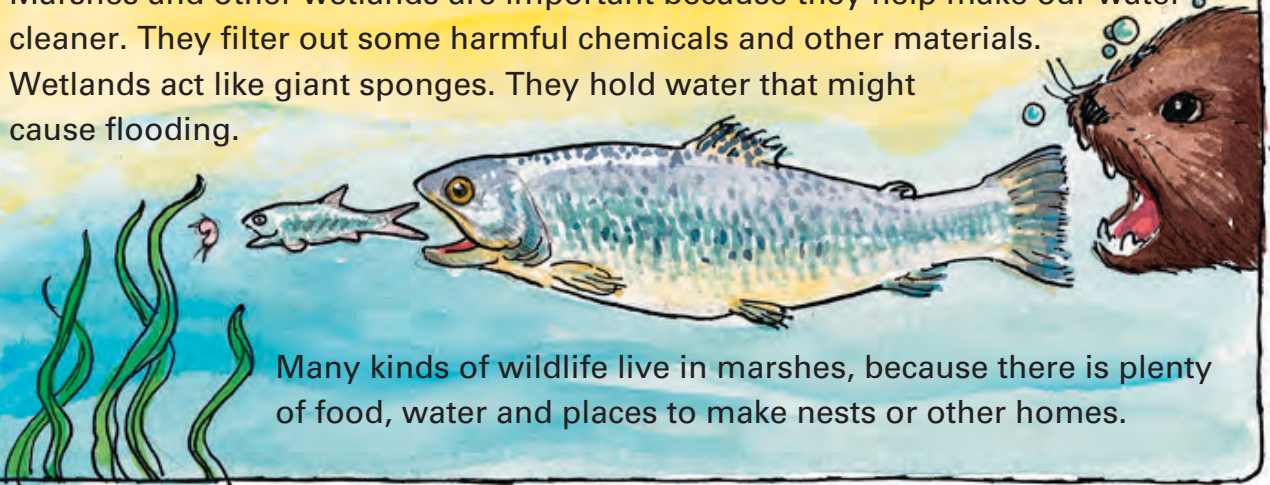
“But where are the *big* fish? Mr. Otterbee’s right. I don’t see any big ones at all,” Riff said.



What's up with the marsh?

Fish have a hard time finding food in murky, muddy water. When there aren't many fish to eat, other animals will be hungry too.

Marshes and other wetlands are important because they help make our water cleaner. They filter out some harmful chemicals and other materials. Wetlands act like giant sponges. They hold water that might cause flooding.



Many kinds of wildlife live in marshes, because there is plenty of food, water and places to make nests or other homes.

What's Going On?

Rosie and Riff walked on until the marsh narrowed and seemed to become a creek again. Suddenly they spotted Mr. Otterbee in front of his house.

“How did you get here so fast, Mr. Otterbee?” Rosie asked him.

“Never waste time. Came right home and ate my fish,” Mr. Otterbee said. “Got to check my line here, just in case,” he added, with little hope in his voice.

“You're still fishing?” Riff asked. “Look at this place! Weeds are choking out everything.”

“Never seen anything like it,” Mr. Otterbee grumbled, shaking his head.

“We ran into a lot of our neighbors on the way over here. They’re leaving,” Rosie announced. “They say they can’t live here anymore. What’s going on?”

“Beats me! Been here all my life, and now, all of a sudden, things are changing,” Mr. Otterbee said. “Bad news! Guess I’ll have to become a vegetarian—or move in with old Slaptail to fish in *his* pond! Hoo-hah!”



Otterbee looked up at the sky and said, “Getting late. You’d better turn around. Marsh can be a scary place at night.”

Riff and Rosie decided Mr. Otterbee was right. They *were* far from home. They headed back downstream.

As the cousins passed Mr. Slaptail’s house, they saw him sitting on the back porch.





“We need your help,” Riff called to him. Both talking at once, Riff and Rosie told Mr. Slaptail about all they’d seen. They asked him to go with them in the morning to take a look.

“What do you think could be happening?” Rosie asked. Mr. Slaptail only gazed out across the dam, frowning, but not saying a word.

A Water Problem

Riff was up early the next day, collecting his gear for the marsh expedition. “Rosie,” he said, “I’ve been thinking. All of our friends’ problems seem to be about water. Did you know that almost everything on Earth depends on water? This is definitely a *water* problem!”

Rosie looked at her cousin with a raised eyebrow. “Well, ‘Mr. Know-It-All’—bet you didn’t know that *you’re* mostly water, yourself!” she said. “Come on. Let’s go see if Mr. Slaptail is ready.”

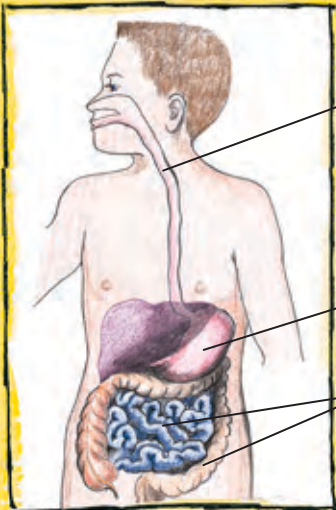
They found Mr. Slaptail on his dock. Soon the three of them left the pond and headed up the stream.

Mr. Slaptail looked around and said, “It’s been a long time since I was up here. Folks used to do a lot of fishing in this part of the creek. There were catfish, sunfish and bass—so many kinds of fish!”

The human body is almost $\frac{3}{4}$ water. Liquids inside our bodies, like blood, are made mostly of water. There even is water inside every tiny cell.



Bloodstream



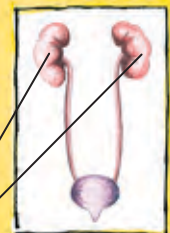
Esophagus

Water comes into the body through the mouth. When we swallow, it goes down the esophagus to the stomach. From there it passes into the intestines. The intestines are where most water is taken into the bloodstream, along with food needed all over the body.

Stomach

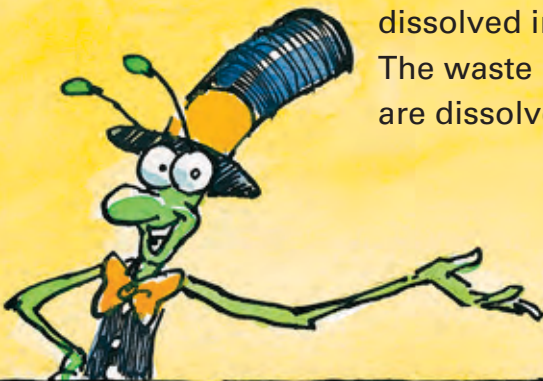
Intestines

Water is very important inside the body. All of the materials needed by cells are dissolved in the water part of our blood. The waste materials made by cells also are dissolved in the blood.



Kidneys

The kidneys are the body’s waste treatment plants. They filter wastes from the body, making urine.





“But *where* are they now?” Mr. Slaptail said, his voice rising in alarm. “And where did all the nasty weeds and scum come from?!”

“See? We told you!” said Rosie.

Rosie, Riff and Mr. Slaptail slowly made their way upstream. They reached Mr. Otterbee’s house and saw his fishing line hanging limply in the water. Insects were buzzing around, but there was no sign of Otterbee or any fish.

Unnatural Discovery

They trudged farther up the stream. Suddenly Rosie stopped, and her mouth dropped wide open. Something was very wrong.

“What happened here?” Rosie asked.

“What a mess! The bank of the stream has been scraped clean! And look at these plants in pots!” Mr. Slaptail exclaimed. “I’ve never seen plants like this around here.”



Rosie walked up a little hill covered in new grass. She found a small pool and peered into it. “How pretty! The water is really clear in here,” she said, “but look—it has green stuff growing in it, too!”

“That pool comes from a natural spring. The water comes right out of the ground,” Mr. Slaptail said. “When I was a kid, we always used to stop here for a nice cool drink. I wouldn’t dare to do it now.”

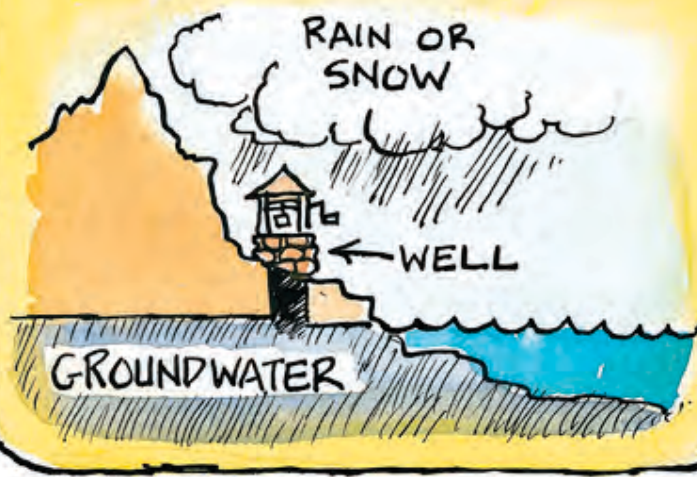
“What kind of place *is* this?” Riff asked. “There’s no good water to drink, no berries to eat, no fish to catch . . . Even these plants are strange.”



About half of the fresh water we use comes from lakes and rivers. The rest comes from underground.

Water from rain soaks deep into the soil and fills the little spaces between pieces of sand and rock. We can find this water by drilling wells. When the water is near the surface, sometimes it flows out and makes a spring.

Groundwater can be polluted by harmful chemicals that soak into the soil with rainwater.



“I know! This must be the new park,” Rosie exclaimed. “We heard about it at school—but I didn’t think it would be like this. It gives me the creeps.”



A Close Call

Suddenly, a roaring noise filled the air. It got louder and louder. Riff raced past Rosie and headed up the hill to see what it was.

“Wow! Wait ’til you see this,” Riff shouted. “There’s a gigantic red machine coming straight up the hill!”

Rosie reached the top and quickly yelled, “Don’t just stand there, Riff! It’s a tractor—and nobody’s driving it! Run!”

They headed for a big tree. As they frantically began to climb, the tractor roared up over the hilltop! Dust and seeds were flying everywhere.

“Hold on! It’s headed straight for this tree,” Riff hollered. They both wrapped themselves firmly about a big, sturdy branch.

Crash—BOOM!!! The tractor hit the tree with the force of a giant—and then stopped.

When Riff and Rosie uncovered their eyes, they saw the runaway tractor below them. But there was something even worse! A creature was staggering up the hill in a cloud of dust—an ugly, gasping monster!

Mr. Slaptail finally puffed his way to the top of the hill. “Rosie! Riff! Are you okay?” he shouted. “What in the world?!”

“Aargh-Aaaaachoo-waah,” the monster spewed and spluttered. It staggered closer to the tree.





The Dust Clears

Mr. Slaptail grabbed Riff and Rosie, one under each arm, turned and headed down the hill.

“Wait! It’s *me*—Oscar. Oscar Otterbee,” the monster gasped.

Mr. Slaptail stopped and looked again at the strange creature.

“It’s me,” Otterbee explained again. “That new power tractor took off without me. I was putting in the last bag of grass seed and—POW—it kicked into gear! Been running after it for a mile! Now look at it. It’s a mess!”

“And so are *you*, my friend!” Mr. Slaptail said. “I didn’t even know you.”

“You really scared us, Mr. Otterbee!” Rosie added.

“Yep, you’re about the scariest looking thing I’ve seen in a long time!” Mr. Slaptail added. A grin crept across his face.

“Hoo-hah! Me?” said Otterbee. “Been called a lot of things before, but never scary!” Mr. Otterbee laughed for a minute with his friends, but his smile soon turned to a frown.

“Now I’m in big trouble,” Otterbee moaned. “Look at this tractor!”

Got to finish seeding and then fertilize again. It's my job to get the park ready to open next month."

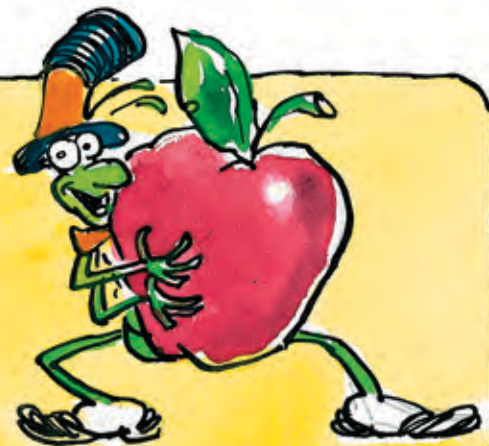
Rosie sneezed and then wondered out loud, "Hmm . . . fertilize? You're fertilizing all this new grass, and the flowers, and everything in the park? *Of course!* It's making the new plants grow—but it's making other things grow, too."

"What's *that* got to do with anything?" Oscar Otterbee wheezed.

"Your fertilizer is running off into the creek and making the water plants grow *too* much," Rosie said.

In addition to light, carbon dioxide and water, plants need nutrients to grow. Sometimes, we help plants by giving them extra nutrients. One way to do this is by adding fertilizers to the soil.

Fertilizers make crops grow very well. The wise and careful use of fertilizer is important for producing food.



However, when rain washes extra fertilizers or rich soil into lakes and rivers, some water plants grow too much.

Too much of other green things, like algae, also grow in the water.



“Dirt’s washing into the water, too,” said Riff, “and it’s all choking out the stream.”

“—And making the water scummy,” Rosie said.

“—And making our neighbors leave,” Mr. Slaptail added.

“Yes! That’s it!” Rosie cried. “I think we’ve solved the mystery! You are polluting our stream and causing all the trouble, Mr. Otterbee,” she said boldly.



Too Much of a Good Thing

“What?! I’m not polluting!” Mr. Otterbee snapped back. “I’m just trying to get my job done the quickest way I know how.”

“Oscar, you just don’t understand,” Mr. Slaptail said. “Don’t you see? It’s the runoff. When it rains, the loose soil and fertilizer run into the creek with the water, and make all the plants *there* grow. Extra fertilizer

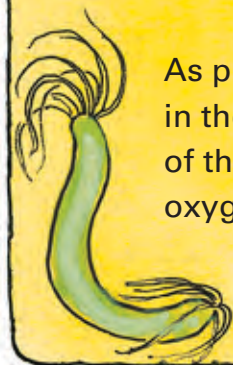




Rain water washes off chemicals like fertilizers, spilled gasoline and insect sprays, and carries them into our waterways. These can be harmful to people and to the creatures that live in rivers and lakes.

On bare land, rain also washes bits of soil into rivers, lakes and wetlands. Washed-off soil can make the water in streams and lakes become muddy. It can make them too shallow for fish.

As plants and algae in a polluted marsh die, tiny bacteria in the water use them for food. The bacteria use up most of the oxygen in the water. This doesn't leave enough oxygen for fish and other water animals.



Pheweee! This water even smells bad!



even soaks way into the ground and pollutes the water that comes from the spring.”

Riff scratched his head and said, “So the pool by the spring is growing green stuff, too. The creek is shallow and full of weeds . . .”

“ . . . That choke out everything, and the fish can't get oxygen anymore, right?” Rosie finished.

“Ooh! Fertilizer went all the way down the creek and did all that damage? Who'd think of that?” said Otterbee. “So *that's* why I can't catch fish at my place anymore!”

“I'm afraid so,” Mr. Slaptail said, “but I wish you'd stay out of *my* pond. You mess up my plants with your fancy flips and somersaults in the water.”

“What a disaster! Guess I’ve ruined everything!” Mr. Otterbee groaned. “Ooh-waah”

“Wait a minute,” Rosie said. “It’s not all your fault, Mr. Otterbee. It’s *everyone’s* fault. Everybody wanted to have a new park, but nobody thought about the problems it could make.”

“We’ll think now,” Mr. Slaptail exclaimed. “All we have to do is get everybody together and try to do something about it.”

“But almost everyone has left,” Riff said.

“I’d better go find them,” said Mr. Slaptail, and he started off.



Pulling Together

In the morning, Rosie and Riff joined Mr. Slaptail and all the neighbors he had found on their way out of town. They hurried to the new park. There was Oscar Otterbee, working on his tractor. He looked up sadly at his old friends.



“Sorry,” Otterbee said. “Didn’t mean to cause all this trouble. Thought I was doing the right thing. I just didn’t know.”

Mr. Slaptail gave his friend a pat on the back, saying, “It’s okay. We’ll finish it up somehow, *without* polluting.”

“Let us help!” everyone cried. “We’ll find a way to clean up the water.” “And save our homes!” “We’ll all work together.”

Rosie and Riff grinned, and Oscar Otterbee finally began to smile.



Water can be polluted in lots of different ways. Did you know about these pollutants?



- Sewage from houses and towns
- Chemicals from factories and our homes
- Heated water from factories and electrical plants
- Oil and gasoline from cars, trucks, boats and gas stations
- Over-used fertilizers and pesticides
- Washed-off soil



Look at the many ways they are helping to make Clear Creek clean again.

You can make your own fertilizer by building a compost heap.



Polluted water can have germs or chemicals that could make you sick. You can have your local health department check your water if you think it may have problems.

Prevent soil from washing into streams and lakes by putting plants on hillsides.



Use water carefully. We all need clean water.



Take old paint and household chemicals to a disposal center. Don't dump them down the drain.

Take old motor oil to a gas station so it can be used again.

Use native plants in yards and gardens. They don't need as much water, fertilizer and pesticides.

*Now that's a job well done!
There are lots of ways to make sure
that we all have enough clean water.
The park will look great, too!*

A Fresh Start

“Come on, Riff,” said Rosie. “The park is opening today, and I want to be there for the first boat race.”

“Okay, okay,” Riff replied. “I’m almost finished. This boat will win for sure!”

“You’ll have to beat mine!” Rosie said.

“I’m ready!” Mr. Slaptail announced. “We worked hard to fix the park, and our water is clean again, so everyone can live here! We deserve this celebration. Everybody does! Hurry up—it’s time to go!”





TO KEEP OUR WATER SAFE TO DRINK, AND SAVE OUR WILDLIFE, TOO, BEFORE YOU ACT YOU HAVE TO THINK!...

...IT'S REALLY UP TO YOU!



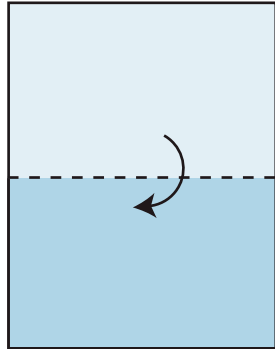
What do you know? They did it! Water can be made clean and safe again. Now, I wonder whose boat will win that race

How to Make a Paper Boat

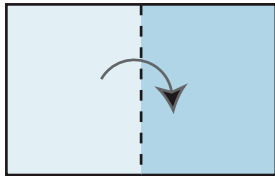
Materials: 8½-in. x 11-in. piece of paper and a pencil or pen. Other sizes in similar proportions (such as 9½-in. x 12-in., or 15½-in. x 20-in.) also will work. For best results don't use newsprint, which will absorb water quickly.

Procedure

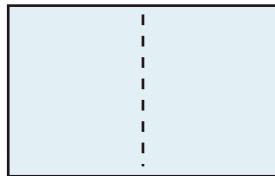
1. Lay the paper in front of you vertically on the table.



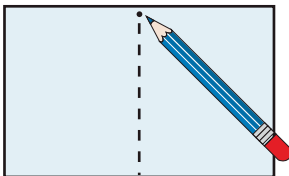
2. Fold the sheet of paper in half, bringing the top half over the bottom.



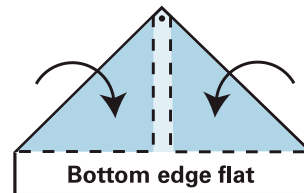
3. Now, fold the paper in half from left to right. Make a crease. Open the paper back up so that it looks like it did in Step 2.



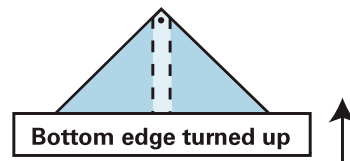
4. With a pencil or pen, make a small dot at the top center of the paper.



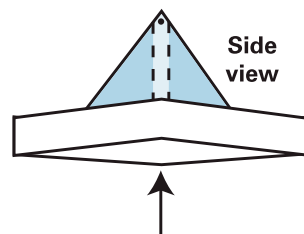
5. Fold each of the top corners diagonally to the center crease.



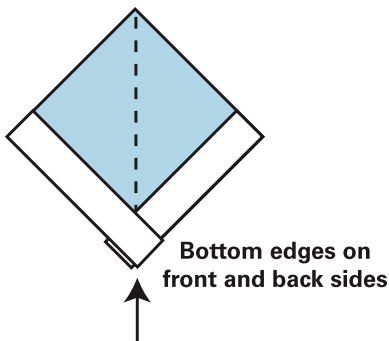
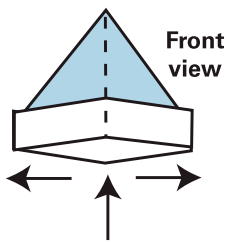
6. Fold the bottom edges up on either side.



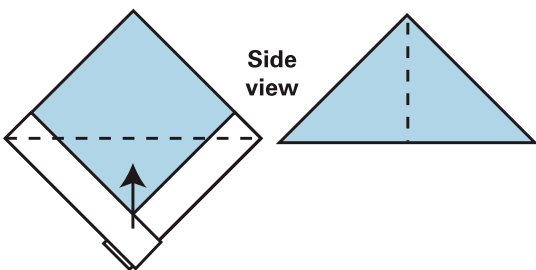
7. Slip your fingers inside the bottom and gently open—but not too far. Right now, you have a paper hat!



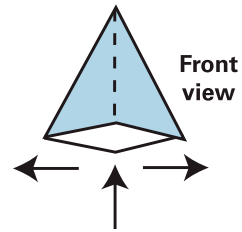
8. Turn the "hat" so that you are looking at it from the front, or "on edge." Slip your fingers inside the bottom and continue to gently open the "hat" until it becomes a flat square. Neatly straighten any pieces that bulge out. Turn the square so that it looks like the picture below.



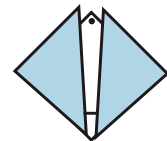
9. Fold the bottom edges up on either side to make a small triangle.



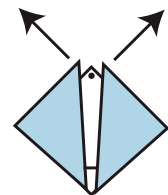
10. Turn the triangle so that you are looking at it from the front, or "on edge." Slip your fingers inside the bottom and gently open until it becomes a flat square. Turn the flat square so that it looks like the picture below.



11. Hold the square by the top two edges. You should be able to see the dot you made on the top center point.



12. Gently pull the top two edges all the way out to each side. Flatten the paper. Slip your fingers inside the bottom and open it just a bit.



Now you have a boat, with a sail in the middle!



You may wish to color or decorate your boat, or add a toothpick flag. If you wish to make a smaller, sturdier boat, repeat steps 9 and 10 before going on to steps 11 and 12.

Glossary

algae (*AL-jee*) - Plant-like organisms that grow in water or damp places.

bacteria (*bak-TEER-ee-uh*) - A kind of tiny organism that has only one cell. Some bacteria are helpful to living things and some cause diseases.

carbon dioxide (*KAR-buhn dy-AHK-syd*) - A gas made up of carbon and oxygen. You cannot see or smell it. It is given off by living things when they burn or decay. It also forms the bubbles in soda pop.

cell (*SEL*) - The smallest unit of all living things.

dissolve (*dih-ZAHLV*) - When one chemical substance mixes completely with another.

filter (*FIL-tuhr*) - To strain something out of a liquid or gas.

groundwater (*GROWND-wau-tuhr*) - Water that sinks into the soil and collects underground.

ice (*iys*) - Frozen water. This is the solid form of water.

intestines (*ihn-TES-tihnz*) - Long, coiled parts of the digestive system after the stomach.

kidneys (*KIHD-nees*) - A pair of organs in the lower back that separate water and waste products from the blood, and pass them out of the body as urine.

liquid (*LIHK-wihd*) - A substance that flows easily, can be poured, and takes the shape of its container. One of the three states of matter.

marsh (*mahrsh*) - An area of low, wet land covered by grasses and other small plants.

nutrient (*NOO-tree-uhnt*) - Any substance that an organism needs to live and grow.

oxygen (*AHK-sih-juhn*) - An invisible, odorless gas that is needed by living things. Oxygen combines with hydrogen to form water.

pesticide (*PEHS-tuh-syd*) - Chemical used to kill pests, especially weeds and unwanted insects.

pollute (*puh-LOOT*) - To spoil the air, water or soil by adding harmful substances.

runoff (*RUHN-awf*) - Water from rain or melting ice and snow that does not soak into the earth. It drains off the surface into nearby waterways.

sewage (*SOO-ij*) - Waste water that is carried away, usually by underground pipes and drains. It must be treated before being used again.

snow (*sno*) - Frozen water vapor in the air, usually falling in the form of small, white flakes or crystals.

soil (*soyl*) - The ground in which plants grow. Soil includes materials that come from rock (sand, silt, clay), decaying plant and animal material, water, air and living organisms.

steam (*steem*) - The gas or vapor into which water is changed by boiling. Steam is water in the form of a gas.

urine (*YOOR-in*) - A liquid containing body wastes. Urine is released by the kidneys, stored in the bladder, and then discharged from the body.

vegetarian (*vehj-uh-TEHR-ee-uhn*) - One who eats grains, vegetables, fruits, and no meat.

wetland (*WEHT-land*) - Land that is covered with shallow salt or fresh water for all or part of the year. Marshes, swamps and bogs are kinds of wetlands.

The authors of this story are Barbara Tharp, Judith Dresden and Nancy Moreno. Ms. Tharp and Dr. Moreno are members of the Center for Educational Outreach (CEO) at Baylor College of Medicine (BCM) in Houston, Texas. Ms. Dresden was a team member in the CEO while this story was being developed. The team worked together for several years on science education projects involving teachers and students from kindergarten through college and graduate school.

- **Barbara Tharp, M.S.**, originally from California and Oklahoma, once worked for the FBI in Washington, D.C., and later was an economic analyst for an oil company. More recently, she has followed her primary interest of working with children, serving as an elementary school teacher and specializing in her favorite subjects, science and math. Currently, she serves as a full-time faculty member at BCM. In addition to creating instructional materials, she directs science and math teacher enhancement programs with classroom teachers from Houston and throughout the US.
- **Judith Dresden, M.S.**, originally from New York and New England, formerly conducted educational research and evaluation for public and private schools, specializing in language arts. Editorial work with a publishing company also led to her interest in writing and editing stories and science activities for young students. As a BCM faculty member, she served as director of the BrainLink project, which brings the complex concepts of neuroscience within the grasp of children. Other activities involved promoting minority student access to careers in science and the health sciences.
- **Nancy Moreno, Ph.D.**, originally from Wisconsin and Michigan, is a biologist with a specialization in botany. She studied and classified neotropical plants in Mexico before completing her doctoral degree. Her current interests focus on the involvement of scientists in the education of students and teachers. She designs curricula, conducts workshops for teachers on creative methods for teaching science and using technology, and is involved in science education at all levels. BCM's My Health My World project, which she directs, builds upon her special interests in ecology and environmental issues.

The illustrator, T Lewis, was born in Texas but has traveled extensively, living in such exotic locales as Africa, Switzerland and Alaska, and now makes his home in Washington State. His illustrations were first used in the CEO educational storybook, *Skullduggery*, as part of the BrainLink project. In all, Lewis illustrated 10 storybooks for the CEO, including *Trouble at Tsavo*, *The Cookie Crumbles*, *Danger at Rocky River*, *Mr. Slaptail's Secret*, *Mystery of the Muddled Marsh*, *Mr. Slaptail's Curious Contraption*, *The Mysterious Marching Vegetables*, *Tillena Lou's Day in the Sun* and *Tillena Lou's Big Adventure*.

Lewis co-authors and illustrates the nationally syndicated comic strip, "Over the Hedge," which served as the basis for several books, a video game and the 2006 DreamWorks SKG movie, "Over the Hedge." While his broad range of professional artwork has appeared in many formats, he is especially fond of creating illustrations for children and has illustrated more than 20 storybooks. In 1999, he won the National Cartoonists Society Rueben Award for book illustration.



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