



THE SCIENCE OF
Air



MR. SLAPTAIL'S SECRET

By Judith Dresden, Barbara Tharp 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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Fourth edition. First edition published 1995.
Printed in the United States of America.

ISBN: 978-1-888997-71-2

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Development of the Air unit was supported by grant numbers R25 ES06932 and R25ES010698 from the National Institute of Environmental Health Sciences (NIEHS), National Institutes of Health (NIH). The opinions, findings and conclusions expressed in this publication are solely those of the authors and do not necessarily reflect the official views of Baylor College of Medicine, NIEHS or NIH.

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ACKNOWLEDGMENTS

The Science of Air educational materials, first developed as part of the My Health My World® project at Baylor College of Medicine, have benefited from the vision and expertise of scientists and educators representing a wide range of specialties. Our heartfelt appreciation goes to Michael Lieberman, M.D., Ph.D., William A. Thomson, Ph.D., and Carlos Vallbona, M.D., who have lent their support and expertise to the project.

Special acknowledgment is due to our partners in this project, the American Physiological Society and the Texas Medical Association. We especially thank Marsha Lakes Matyas, Ph.D., American Physiological Society, and Allison Schmidt, M.P.H. and Kristine Niemeyer, Texas Medical Association, for their active support and direction of field test activities. We also thank the National Institute of Environmental Health Sciences, National Institutes of Health, Allen Dearry, Ph.D., Frederick Tyson, Ph.D., and Liam O’Fallon for their support of this project.

Many dedicated professionals helped assure the educational and scientific integrity of this publication. In particular, we are grateful to the following individuals: Cassius Bordelon, Ph.D., Zenaido Camacho, Ph.D., Mary Ann Currie, M.S., Cynthia Jumper, M.D., Sharon Lekowski, M.S., Judith Livingston, Ed.D., Leslie Miller, Ph.D., Fabiola Pineda, M.S., Ronald Sass, Ph.D., Sheila Schwarz, B.S., Cathey Whitener, M.S., Ellison Wittels, M.D., and Vicki Wiste, M.S.

We also wish to express our gratitude for the invaluable feedback provided by the many teachers and students in and around Austin and Houston, Texas, and Washington, D.C., who participated in field trials of these materials.

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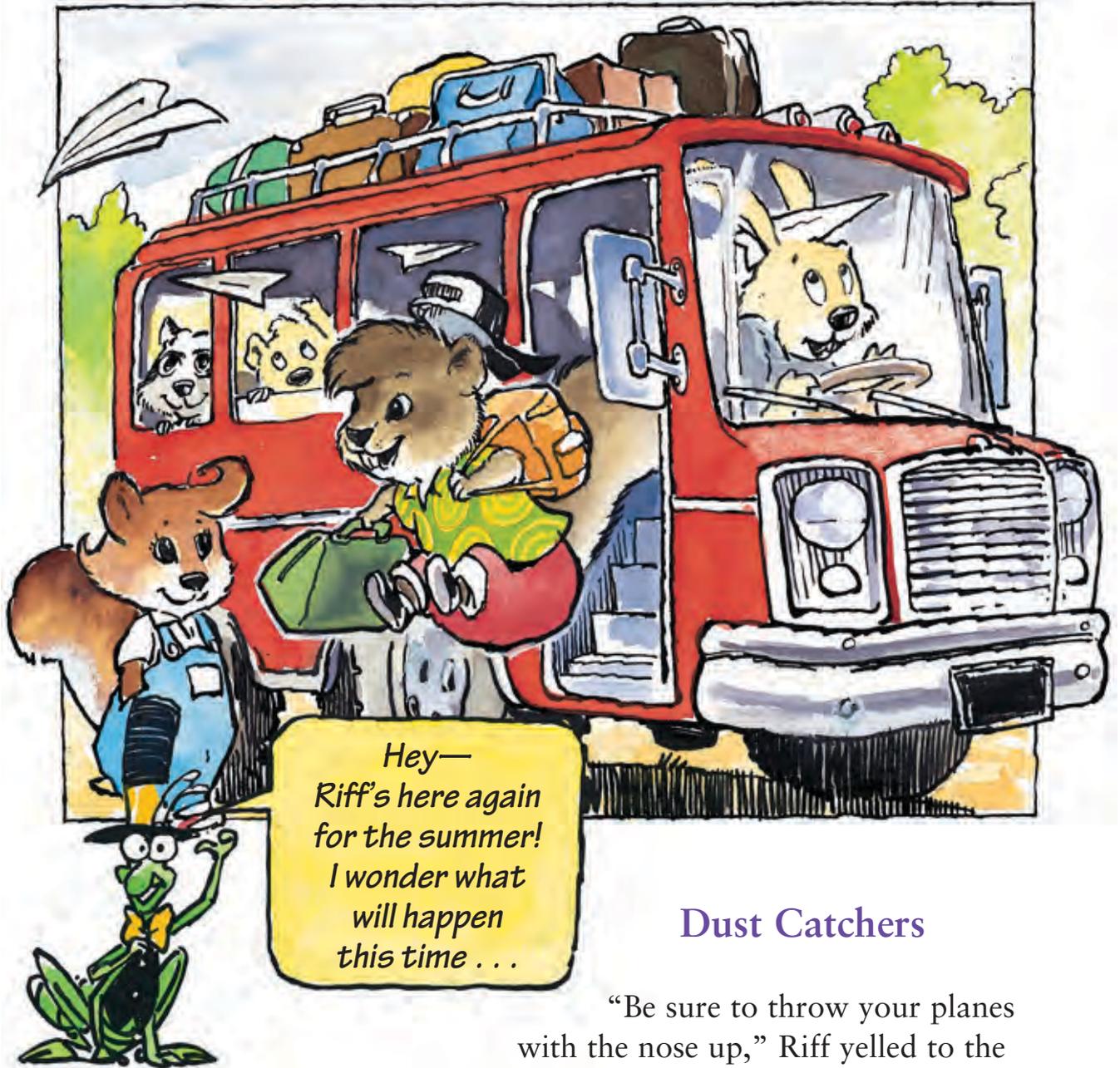
WELCOME TO
BRIGHT
WATER
CORNERS

Chirpen J.
Wingfellow, III



Rosie

Riff



Dust Catchers

“Be sure to throw your planes with the nose up,” Riff yelled to the passengers as he leaped from the bus.

“I’m here!” Riff hollered to his cousin, Rosie, who was waiting for him at the bus stop.

“Same old Riff!” said Rosie. “I see you got everybody on the bus to make airplanes.” Riff grinned and took off toward Rosie’s house, tossing a paper plane as he ran.

That night in the playroom, Rosie sorted astronaut cards and Riff played with one of his cousin's spaceships. Soon he set it back on the shelf, sat down and pulled some pieces of an old telephone from his bag. He blew dust off of them and said, "Let me show you all the cool stuff I brought!"

"What did you—AAA-CHOO!—bring this time?" Rosie asked. Suddenly she began to sneeze, and she couldn't stop.

"What's making you sneeze so much?" asked Riff. "You're going to blow your cards away!"

"I think I'm allergic to you," Rosie answered.

"Allergic?! How can you be allergic to me?" Riff said.

"Well, I don't know, but I used to sneeze a lot before we got rid of



the dust catchers in this room. You make me feel the same way!” said Rosie.

“Dust catchers?” Riff said. “Like what?”

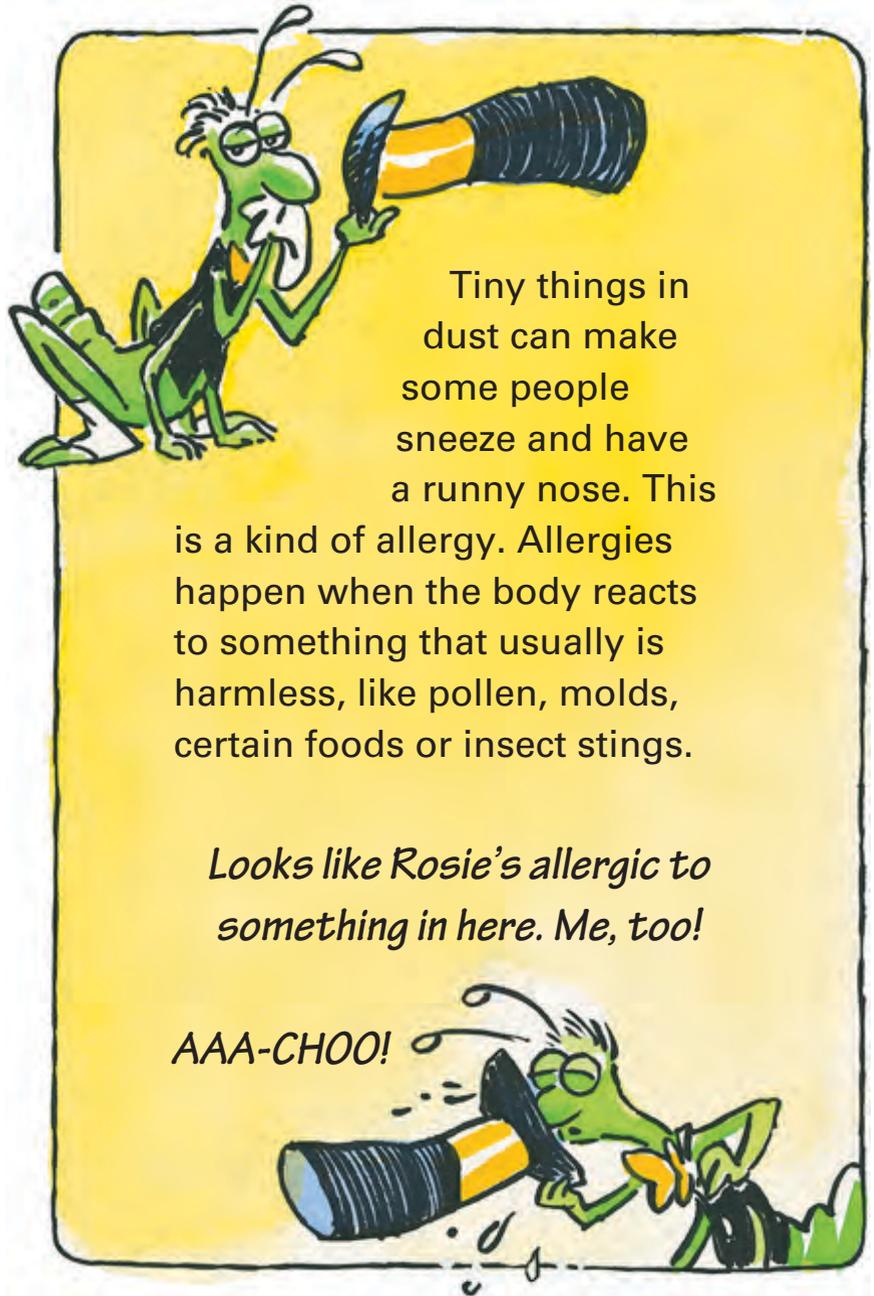
“Like curtains and rugs and stuff that hold dust,” Rosie answered. “I’m allergic to dust.”

“Thanks a lot. Now you’re calling me a dusty old rug!” Riff replied.

“Well, I just started sneezing when you brought in your dusty old stuff. You figure it out,” Rosie said. “Get that junk out of here. Keep it in your own room!”

Riff wasn’t ready to go to his room yet. How could Rosie think his prized possessions from home were junk? He’d show her all the super things he could do with them! All she ever wanted to do was play with astronaut stuff.

Rosie sneezed again and blew her nose. “We need some fresh air,” she muttered as she opened the window.



Out the Window

Riff dumped out the rest of his treasures and turned them over in his hands, one by one. There was his homemade flyer—his favorite. He tossed it gently in the air.

Uh-oh! There it went, gliding straight toward his cousin’s head.

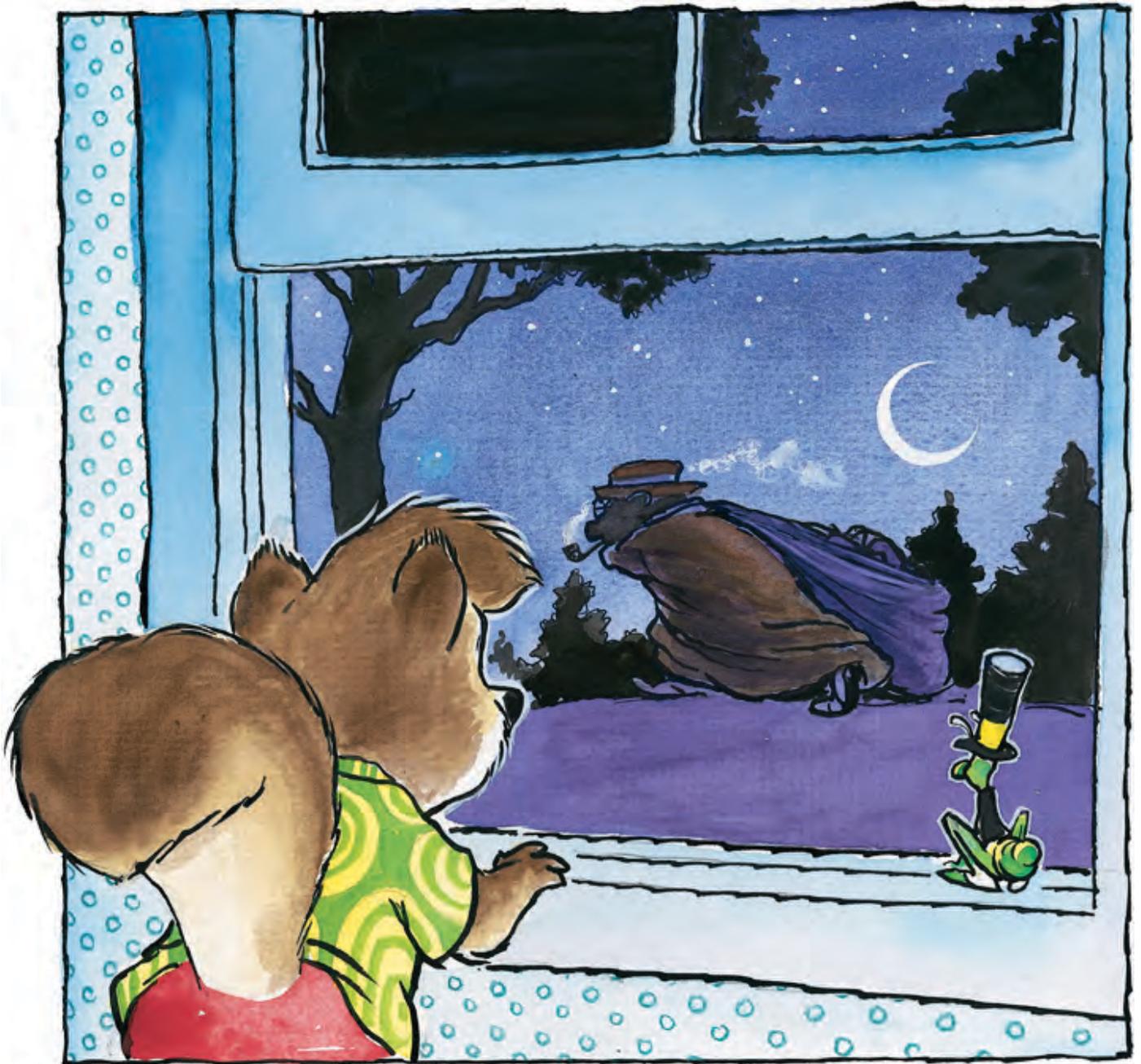


“Ouch! What’s *this*?” Rosie yelled. She grabbed the metal tube from the floor and threw it. It soared through the window and out of sight.

“You just threw my flyer out the window!” Riff yelled. “You’d better get it back!”

“What are you talking about? What flyer?” Rosie asked. “You hit me with a can! Who cares about an old can?”

“I care! It’s my special flyer. Grandpa made it from a soda can, and it really does fly,” said Riff. “I bet it went a mile. How will I ever find it?”



Riff ran to the window. He knew he couldn't hope to spot his flyer tonight—but he saw something moving down the road in the moonlight.

“What’s that guy dragging in such a big bag?” Riff said with a shiver. “He sure looks creepy!”

The Search

Riff was out of bed as soon as the sun came up. He grabbed his hat and headed for Rosie's room. He banged on the door and hollered, "Get up, Sleepyhead! You've got to help me find my flyer!"

Rosie popped her eyes open, sat up straight and stammered, "What happened? An earthquake?" Then, looking at Riff, she threw herself back down on her pillow. "Oh, yeah . . . it's you."





Ouch! That sun is bright! It even shows the dust in the air. Dust is everywhere. Here—look under my microscope at all these different things in dust. All of these can cause allergies in some people.



Over here is a tiny flake of dry skin.



This little critter is a dust mite. You can't see him, but he likes to live inside mattresses and soft furniture.

The one with spikes is a pollen grain from a flower.



They searched the yard for Riff's flyer. "I know it isn't here," Riff said. "It must have gone farther, and it would have drifted to the left. Look," he said, pointing. "It has to be in that junkyard over there."



“How do you know it drifted to the left? And anyway, that’s not a junkyard. That’s Mr. Slaptail’s house,” said Rosie. “It’s a mess. He never talks to anybody, and we aren’t allowed to go into his yard.”



Riff didn't care. This flyer was special. He didn't mean to break the rules, but there were some things you just had to do. Riff headed off to find his flyer.

As he reached Slaptail's yard, Riff yelled, "Wow! Look at all this great stuff!" He poked through piles of junk, looking for his flyer.

"This place is a gold mine!" Riff cried.

"This place is a real mess!" Rosie said.



Riff spotted the flyer in a pile of old cans and paint brushes. He grabbed it with both hands, grinning.



“Get Off My Property!”

Suddenly there was a sharp, squeaky noise, and both cousins turned toward the house. The door opened slowly, letting out a mixture of odors—smoke, paint and other strange smells.

From the dark doorway a craggy voice demanded, “What are you doing here? What do you want?”

Riff stepped toward the house and said, “We’re sorry. My flyer landed in your yard, and we just came to get it.”

The old grump took the pipe out of his mouth and coughed. Finally he said, “Get off my property!”

“I really like your stuff,” said Riff, boldly. “You must be Mr. Slaptail. I’m Riff. My cousin Rosie’s house is just over there. I collect stuff, too. Do you make things with it?”

“Hrrumph . . . ,” Mr. Slaptail mumbled. “What I do is my business. What’s this ‘flyer’ you say came into my yard?”

Riff handed him the hollow can. “See? Here it is,” he said.

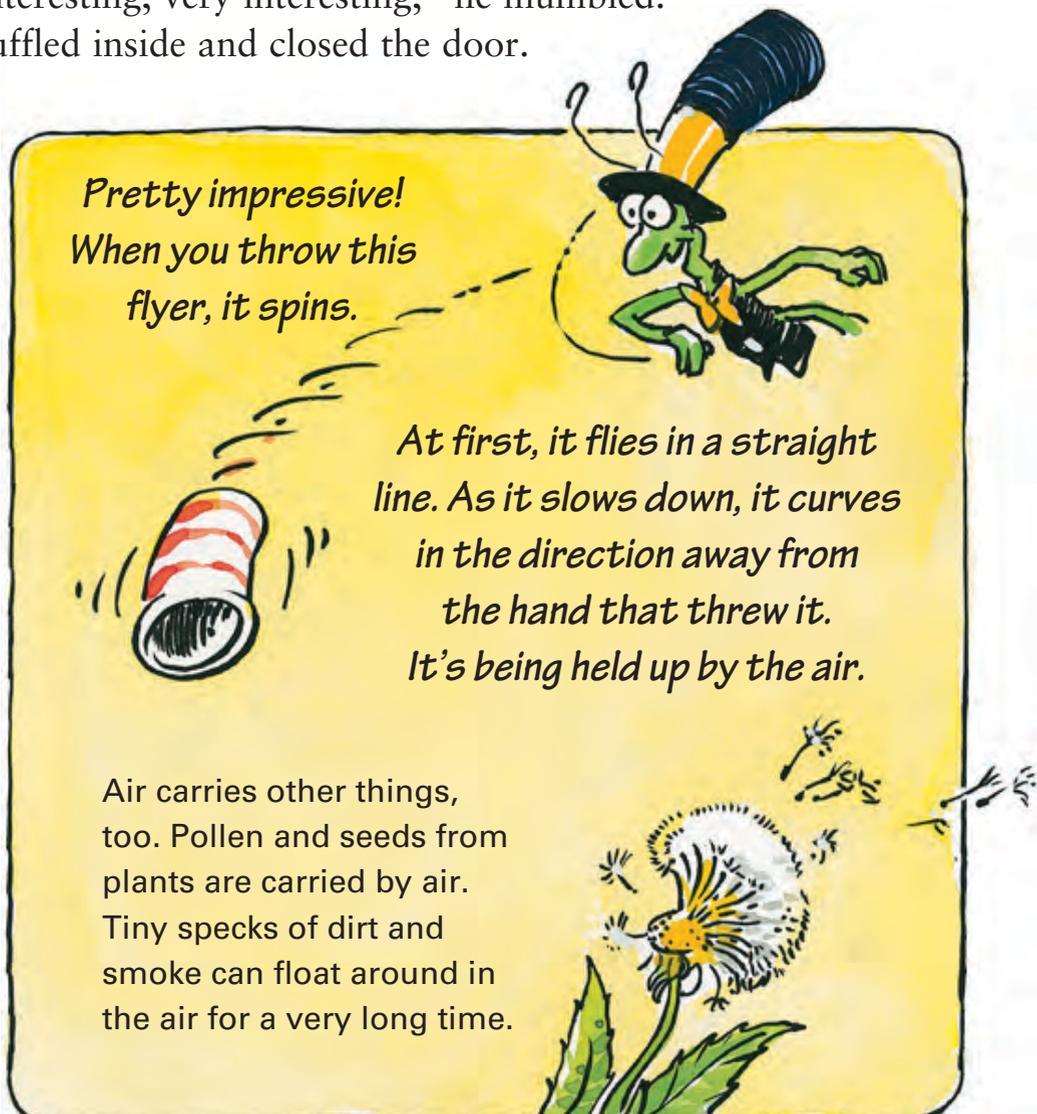
Mr. Slaptail said, “This is just a soda



can with no ends. Are you trying to trick me? Kids are always trying to get in here and make trouble.” He threw the can down, and it didn’t fly. It just hit the steps. “Flyer, indeed!” he said gruffly.

“But it really does fly, if you throw it right. It’s amazing! Last night it flew all the way over here from Rosie’s window,” Riff explained. “Not bad, huh? Rosie threw it with her right hand, so it was spinning clockwise and curved to the left—right into your yard.”

“You don’t say!” said Mr. Slaptail. He almost smiled. “Hmmm . . . very interesting, very interesting,” he mumbled. He shuffled inside and closed the door.



Junk Collectors

Riff showed Rosie how his flyer worked as they left Slaptail's yard. He threw it, watched it fly into an empty lot, and ran to pick it up. There on the ground was a piece of hose and some pipe, and he picked them up, too. Then he found an old washtub. He kept picking up things and putting them in the tub, until it was so heavy that it took all his strength to drag it.





Finally Riff caught up with his cousin and said, “Look at this cool stuff! We can use it to make things.”

“You’re collecting trash,” Rosie replied. “You’re as bad as old Slaptail.”

“Well, at least I don’t sneak around in the dark like he does!” Riff said. “Last night I saw someone dragging a big, lumpy bag along the road. I think it was Slaptail, and it didn’t look like just trash to me!”

“I told you, Mr. Slaptail is bad news. We’re never going back over there!” Rosie warned.

“Well, I want to know what he had in that bag. Besides, I don’t think he’s so bad,” Riff said.

“Yes, he is,” Rosie answered. “He’s weird! His eyes are all red, and he always smokes that stinky pipe. He lives in a junk pile, and he’s an old grouch. Nobody even knows what he does!”

The Lungometer

Riff dropped his new junk in Rosie's backyard. "Hey! Some of this stuff is just what you need to make a lungometer," Riff said.

"A what?" Rosie exclaimed.

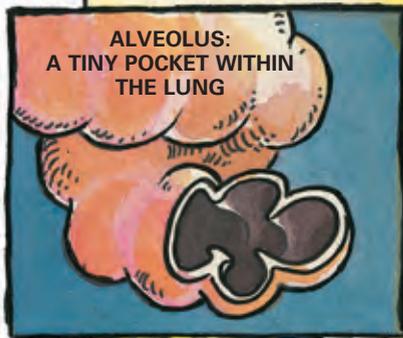
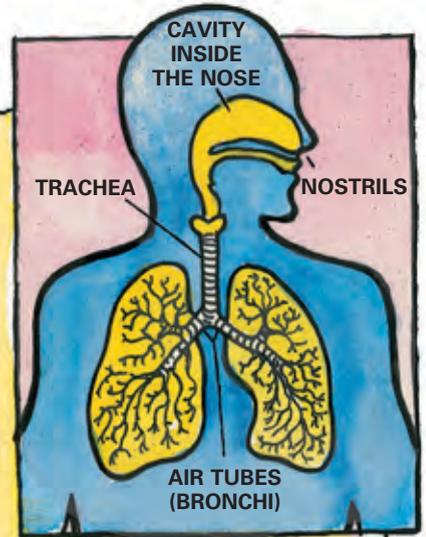
"A lungometer. We made them last year in Mrs. Warthog's class, to measure how much air we could blow out of our lungs. I could blow the most of anybody in the class," Riff said proudly.

He rummaged through the junk and said, "Here's everything we need—a milk jug, a piece of hose and a big tub."





When you breathe in, air is pulled into your lungs. Inside the lungs, oxygen from the air passes into the blood and is sent to cells all around your body. Carbon dioxide is passed back into the air as you breathe out.



In these tiny pockets, oxygen enters the blood, and carbon dioxide is removed.

Air enters here. The passages inside the nose filter the air.



The amount of air you can blow out is called your vital lung capacity. When you breathe out, some air still is left in your lungs. The total amount of air your lungs can hold (your total lung capacity) can only be measured by doctors in a lab. Sometimes things like smoking or illness can make it hard for a person to blow out much air.

“See, you fill the tub and the jug with water, and you put one end of the hose into the jug, and you blow on the other end, and”

“But this stuff is trash,” Rosie said. “What a crazy idea!”

“We just need to wash them first,” said Riff, “and they’ll work fine. The amount of water you force out of the jug shows how much air you can blow out of your lungs. Awesome, huh?”



“Yeah, it would be awesome if you really could make it work,” Rosie answered.

Riff gave her a friendly punch on the shoulder and handed her the jug to wash. He cleaned the piece of hose and began to fill the tub with water. But out the water came, leaking all around the bottom of the tub and onto the ground.

“Oh, no . . . ,” Riff cried, “this tub won’t work!”

“Told you so,” Rosie said, smiling. “Awesome—really awesome!”

“Wait a minute,” Riff said. “I know—Mr. Slaptail has a washtub. I saw it by his front door. Let’s go get it.”

“No way!” Rosie answered. “We’re *not* going back. We could get grounded for the summer—or worse!”

A Dark Discovery

Riff ran toward Mr. Slaptail’s house, with Rosie yelling after him. As he dodged around an old tire, Riff’s feet suddenly slipped out from under him. He found himself sliding into a deep, dark hole.

He landed at the bottom with a thud. “Help . . . ,” Riff cried. He heard a voice coming from above. “Riff,” it said, “where are you?” It was Rosie.

“I’m down here!” he yelled back. “Watch out for the”

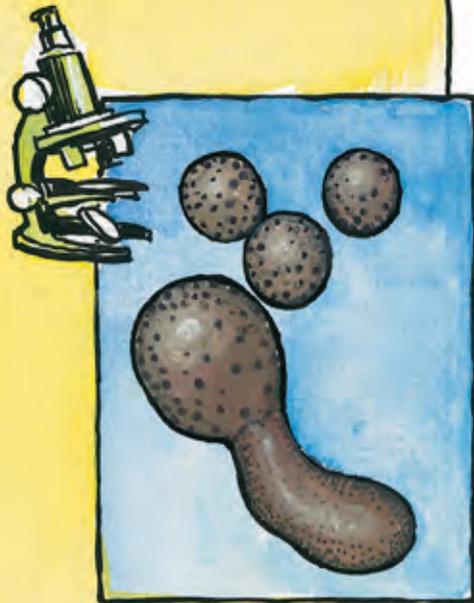
“Aaah! . . . ,” Riff cried, as a body landed right on top of him.





This isn't good! Looks like this cellar needs some fresh air! It's stuffy and damp—a great place for molds to grow. Molds spread by producing thousands of tiny spores that float in the air.

Here's what mold spores look like. Whew! There must be a million mold spores in here—and Rosie is allergic to them!



“Rosie? I tried to warn you . . . ,” Riff said in a raspy voice. He couldn't say more. He was coughing too much.

“Where are we? This place is disgusting! It's hard to breathe,” Rosie said, and she began coughing, too.

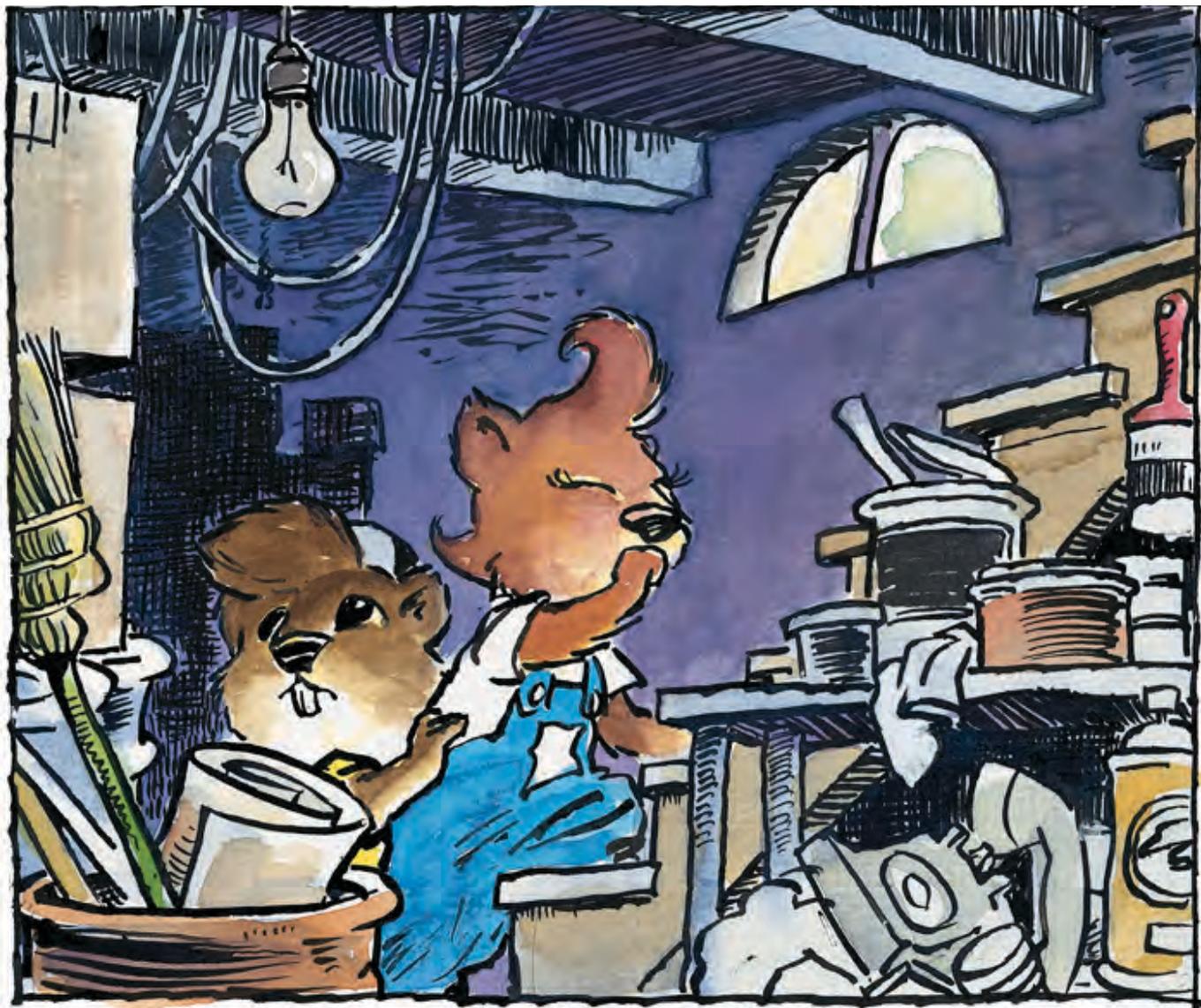
“It smells terrible, wherever we are,” Riff said. “I can't see much, but it looks like we're in a cellar. It must be old Slaptail's cellar!” Yes, he could smell that same

strange mix of odors, only stronger. What was going on in this place?

Rosie started sneezing violently. “Riff, let's get out of here,” she snuffled.

They looked through the dark room for a way out. As he turned around, Riff spotted some stairs. He started toward them, and suddenly—CRASH! He tripped over a stack of paint cans.

A door creaked open at the top of the rickety old steps. The light



shining downward made strange shapes appear from the shadows. There were piles of stuff everywhere—things of all shapes and sizes, covered with dust and cobwebs.

A voice came from above. There stood old Slaptail, his pipe dangling from his mouth. “What’s all the racket? *Who’s* in my cellar?” he snarled.

Riff knew they were in double trouble. They had to get out of this polluted cellar, and now Mr. Slaptail thought they were trespassing.



What a Mess!

“You! I told you kids to stay away,” Mr. Slaptail growled. “What are you doing here?”

Riff didn’t answer, but he headed up the stairs. Rosie was coughing and sneezing so hard that she tripped on a step.



Pollution of the air inside our homes can cause all kinds of health problems. Twenty-five million people in the United States have allergies like Rosie's. And sometimes there are irritating chemicals in the air that bother everyone. Since we spend most of our time inside, having clean indoor air is important to all of us!

Mr. Slaptail's face changed. He looked worried and said, "What happened to you? Are you all right? Come up here, and I'll get you some water. But then I want an explanation."

While Rosie drank her water, Riff explained how they had come to borrow a washtub and fallen into the cellar.



*Do you know how many
air polluters there are
in people's homes?*

How about:

- *Cigarette smoke*
- *Household cleaners*
- *Hair spray*
- *Cooking smoke*
- *Pesticides*
- *Dust*
- *New carpets and paints*
- *Chemicals like paint removers*

*I'll bet you can even think
of some more!*

Rosie sneezed again. She rubbed her eyes and wiped her dripping nose. "I think Rosie needs some fresh air," Riff said. "Something in your house is making her feel terrible!"

Riff and Rosie headed out the door. Mr. Slaptail followed.

Rosie said, "Mr. Slaptail, what's wrong with your house? It's so stuffy and smelly! It made me sick."

"Yeah, it made me feel bad too, and I don't even have allergies," Riff added. "Doesn't it make you sick?"

"Sick? *I'm* not sick! I'm just old and tired," Mr. Slaptail said. "I can't see well, I can't hear well, and I can't even breathe very well. That's just the way it is."

Mr. Slaptail's Secret

"I don't think it has to be that way, Mr. Slaptail," Riff said. "I always thought a little mess wouldn't hurt anybody, but this is unhealthy!"



“This place just needs a little cleaning up, that’s all,” Rosie said. “What is all this, anyway?”

“I collect trash and recycle it to make toys,” Mr. Slaptail said. “I use lots of glue and paint, and there’s dust everywhere. I guess I haven’t cleaned up for a long time. I seem to get out of breath when I”

“Toys? What are the toys for?” Riff asked.

“I make model cars and planes and spaceships for youngsters who might not have any toys,” Mr. Slaptail answered. “This year, I’m afraid I’m way behind schedule.”

“Wow! Can I see your spaceships? I’m going to be an astronaut,” said Rosie.

“Right now, you had better get home and take care of yourselves,” Mr. Slaptail said. “Here, take the tub you wanted. You’re welcome to come back—but use the front door next time!”





A Healthy Home

Riff got right to work that afternoon, drawing lines on the jug for his lungometer.

Rosie said to him, “I’ve got to tell my Mom that Mr. Slaptail isn’t so mean after all. He sure could use some help, though.”

Riff didn’t answer.

“Riff,” Rosie yelled, “can’t you think of *anything* but making stuff? I want to talk about Mr. Slaptail. We should go back and help him clean up. Besides, I want to see his spaceships.”

Riff finally paid attention to his cousin. “So do I,” he answered, “and maybe we could help him finish those toys.”

He put down the milk jug and scratched his head. “I’m afraid there’s so much to clean up, we can’t do it by ourselves,” Riff said. “We’ll need help. Hey—do you think your neighbors would pitch in?”

“I bet they’d do it,” Rosie replied. “Everybody would like to get rid of that mess!”

What do you know? The whole neighborhood really did turn out to help Mr. Slaptail!

You know, this old motor oil can be used again. You just need to take it down to the gas station.

Don't pour out that old paint! Take it to a disposal center.



Door mats aren't just for decoration, you know. They help keep dirt outside, where it belongs.

You can put this by the road for recycle pick-up.



These could be poisonous. Let's put them up high.

Now that's what I call a good day's work! The whole neighborhood will be happier, and Mr. Slaptail will be healthier, I'll bet!





The Results are In

All through the summer, Riff and Rosie went to make toys with Mr. Slaptail. He had stopped smoking his old pipe, and the air in his house didn't bother them any more. Mr. Slaptail didn't cough or wheeze so much. He even stood straighter and moved faster than before.

"Here, Rosie, hold the jug upright while Mr. Slaptail blows," Riff said. "I want to finish these flyers before I leave for home."

Mr. Slaptail took a deep breath and blew hard into the hose. "This lungometer of yours is great!" he said. "Just look at how much I blew out this time!"

Riff was still painting a flyer when Rosie picked up Riff's bags and hollered, "Come on—your bus is here!"

“Bye . . . ,” Riff called as he dropped his brush and ran for the door.

“Whoa,” said Mr. Slaptail, grabbing Riff by the sleeve. “Slow down, son. I want to thank you for your help this summer. Here—take this plane along to remind you to come back.”

“Wow! Thanks!” Riff exclaimed, tucking the model plane under his arm. “I’ll be back. Rosie and I are making a big spaceship next year!”

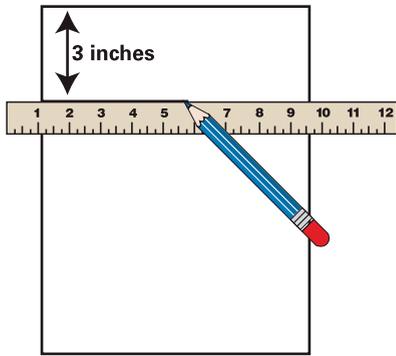


How to Make a Paper Flyer

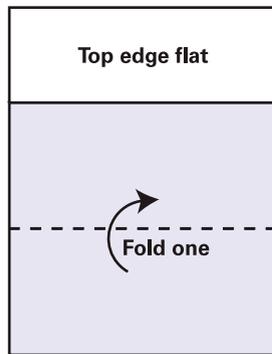
Materials: 8½-in. x 11-in. piece of paper, pencil or pen, colored pencils, crayons or markers, ruler and clear tape.

Procedure

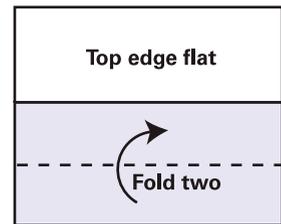
1. Lay the paper in front of you vertically on the table.
2. Use the ruler and a pencil to draw a line across the paper, three inches from the top.



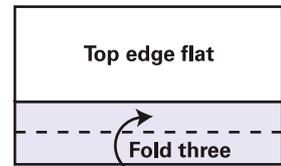
3. Fold the bottom edge of the paper up to the pencil line and crease the paper on the fold.
4. Fold the bottom edge of the paper up to the pencil line a second time and crease the paper on the fold.



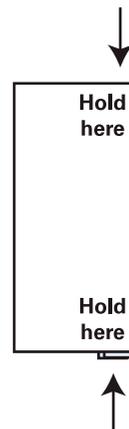
5. Fold the bottom edge of the paper up to the pencil line a third time and crease the paper on the fold.



6. You should have a piece of paper with a thick band of folded paper at the bottom. The thick band should be about 1 inch tall.



7. Flip the paper over. Hold the thick band of folded paper together so that it stays

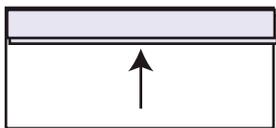


“closed.” Carefully rub the entire sheet of paper against the edge of a table.

Do this several times. This will strengthen the creases on the folded band. It also will give the whole sheet of paper a slight curve.

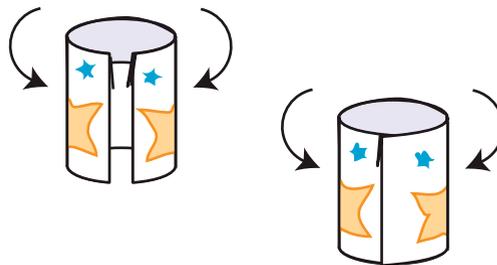


8. Lay the paper down so that the thick band is face down on the table. Use colored pencils, crayons or markers to decorate the side that is facing you.



9. Stand the paper up vertically with the thick band at the top. The thick band should be facing you.

10. Bring the edges of the paper together to form a cylinder. Gently slide one band inside of the other band.



11. Tape the seam shut.



To sail your flyer, hold it at the bottom, between your thumb and fingers with the “band” end facing away from you. Throw it overhead, like a football.



With adult help, flyers may be made from cans that have a metal rim on one end (for example, soft drink, tennis ball or potato chip cans). Use a can opener or scissors to remove both ends of the can, but leave the top rim in place. Smooth any sharp edges with sandpaper or cover the edges with masking tape. Throw the flyer overhead with the rim (heavier side) facing forward.

Glossary

allergy (*AL-ur-jee*) - A bad reaction to something such as a food, an animal's fur, or a chemical. Someone with an allergy might have trouble breathing, start sneezing or get a rash; **allergic** (*al-UR-jik*) - Having an allergy.

alveolus (*al-VEE-uh-luhs*) - A tiny pocket in the lungs where oxygen enters the bloodstream and carbon dioxide leaves the bloodstream.

carbon dioxide (*KAHR-buhn dy-AHK-syd*) - A gas made up of carbon and oxygen. You cannot see or smell it. It is given off when living things breathe and when things burn or decay.

dust mite (*DUHST myt*) - A microscopic animal that eats tiny flakes of skin and other things in dust. Mites are related to ticks and spiders.

lungs (*luhngz*) - Two spongy, bag-like organs located in the chest of humans and many other animals with backbones. During breathing, the lungs take in air, absorb oxygen and give off carbon dioxide.

lung capacity (*LUHNG kuh-PAS-uh-tee*) - The largest amount or volume of air held by the lungs. **Vital** (*VY-tuhl*) **lung capacity** is the amount of air a person is able to blow out. **Total lung capacity** includes air that remains in the lungs after a person breathes or blows air out.

mold (*modal*) - A fuzzy growth on damp or rotting surfaces. Relatives of molds include mushrooms, yeasts and toadstools.

oxygen (*AHK-sih-juhn*) - An invisible, odorless gas that is needed by almost all living things. During breathing, air is taken into the lungs and oxygen is absorbed into the bloodstream. Oxygen also is needed to make things burn.

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

poison (*POY-zuhn*) - A harmful substance that causes sickness or death when swallowed, breathed or absorbed through the skin; **poisonous** (*POY-zuhn-uhs*)
- Containing poison.

pollen (*PAHL-uhn*) - Tiny grains, made by flowering or cone-bearing plants, that are needed to produce seeds. They are carried to other plants by wind, water, and animals such as insects.

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

spore (*spor*) - A tiny cell that can grow into a new individual. Spores are produced by some bacteria, fungi, algae (seaweed and its relatives), and non-flowering plants.

The authors of this story are Judith Dresden, Barbara Tharp 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.

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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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Center for Educational Outreach
Baylor College of Medicine

ISBN: 978-1-888997-71-2
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