

It's early Monday morning. You're still in bed. Something is scratching your cheek. You know what it is even before opening your eyes. It's your cat. She is licking your cheek.

Her tongue feels rough. Why? It's because a cat's tongue is covered with tiny bumps. They look like fingers. They shovel her food like a fork. They comb her fur like a brush.

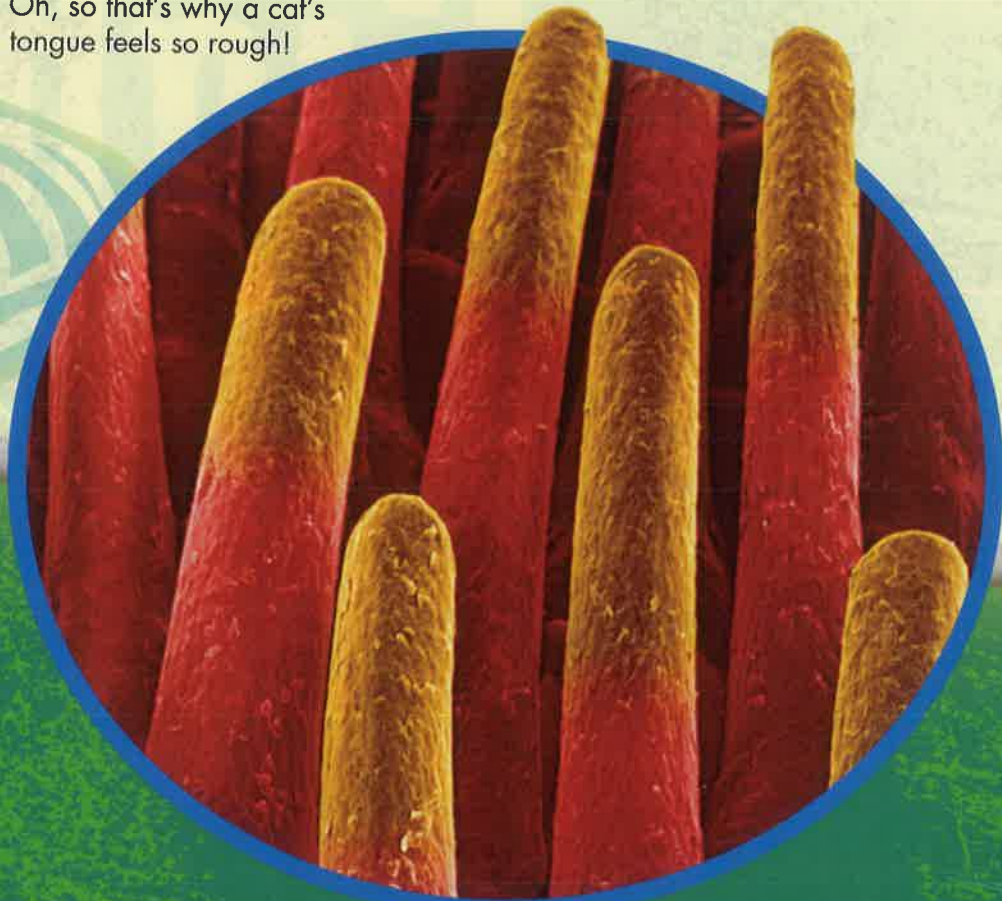
Open your eyes and look. Today you're going to see your world as if you were looking through a **microscope**. It **magnifies** objects.

A Closer Look

Microscopes were invented hundreds of years ago. Over the years, scientists made them better. The most powerful ones can show tiny details, like the hair on a spider's leg. They can take pictures, too. The pictures help scientists study the smallest objects.

Today, you too will see this mini world. Look at the pictures on these pages. They were taken in black and white. Color was added later. Color makes the pictures easier to see. Are you ready? Let's go.

Oh, so that's why a cat's tongue feels so rough!

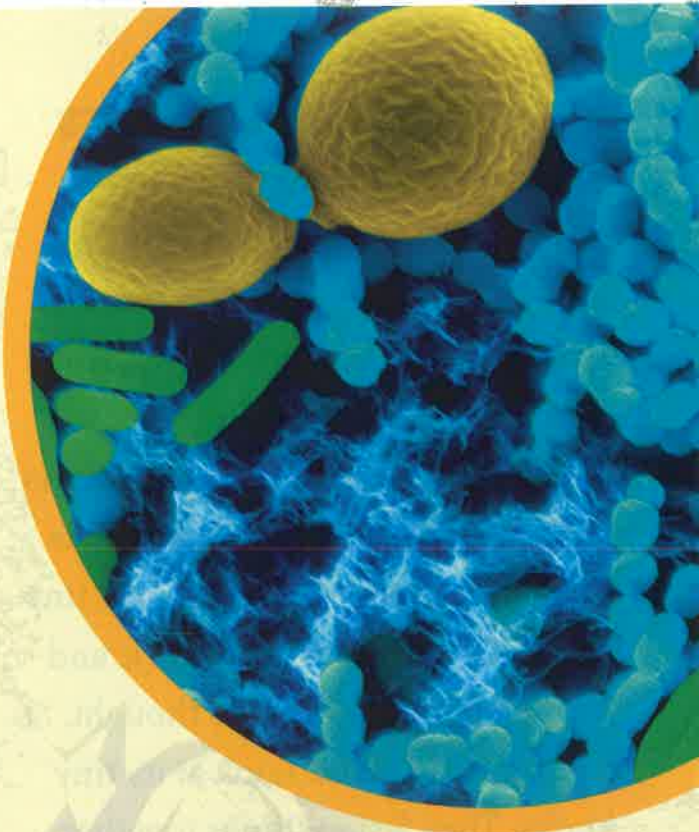


Dust Mites and Dental Care

Wait! What's that in your bed sheets? It's a million tiny dust mites. Two thousand of them would fit onto the face of a dime. Look closely. They won't look back. They have no eyes.

What are they doing in your bed? They are eating dead skin cells. Humans are always shedding skin cells. That's a feast for tiny mites.

Hungry? Okay, eat your breakfast. Then grab your toothbrush. Clean your teeth well. You never know what's living in your mouth.



Get out your toothbrush. Bacteria like these can cause tooth decay and gum disease.



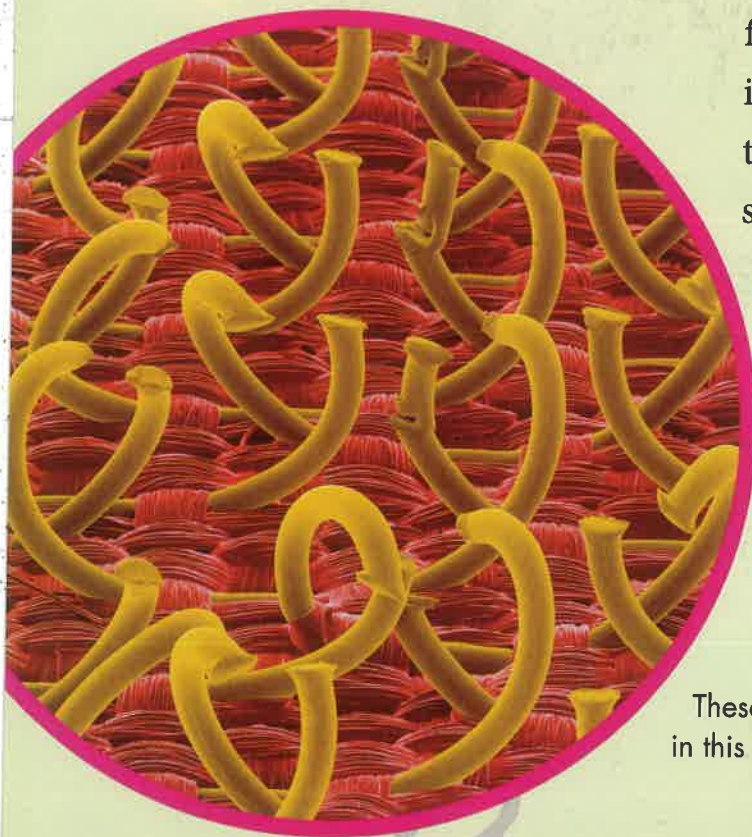
These dust mites might be sharing a pillow with you.

Sticky Velcro and Spiky Grass

After you brush your teeth, you'll need to find your sneakers for the walk to school. Look at the Velcro straps. Use your micro-vision.

What is Velcro? In the 1940s, a man saw burrs in his dog's fur. Burrs are prickly seed cases. He looked at a burr under a microscope. It had tiny hooks. They caught onto fabric and fur. *What a great idea*, he thought. So he invented Velcro. Look at its tiny hooks. They fasten things together.

On your walk to school, use your micro-vision to see the blades of grass. They look rough, jagged, and hairy.



The Trek to School

The walk today is like being in a science project. What are those spiky balls floating in the air? *Achoo!*

It's **pollen**. Plants release pollen. The pollen moves from plant to plant. It helps new plants grow. *Achoo!*

When you breathe in pollen, your nose starts to itch. You sneeze to clean your air passages. The pollen sometimes bothers your eyes, too. You try to blink it out. Then you look. Something is coming at you.

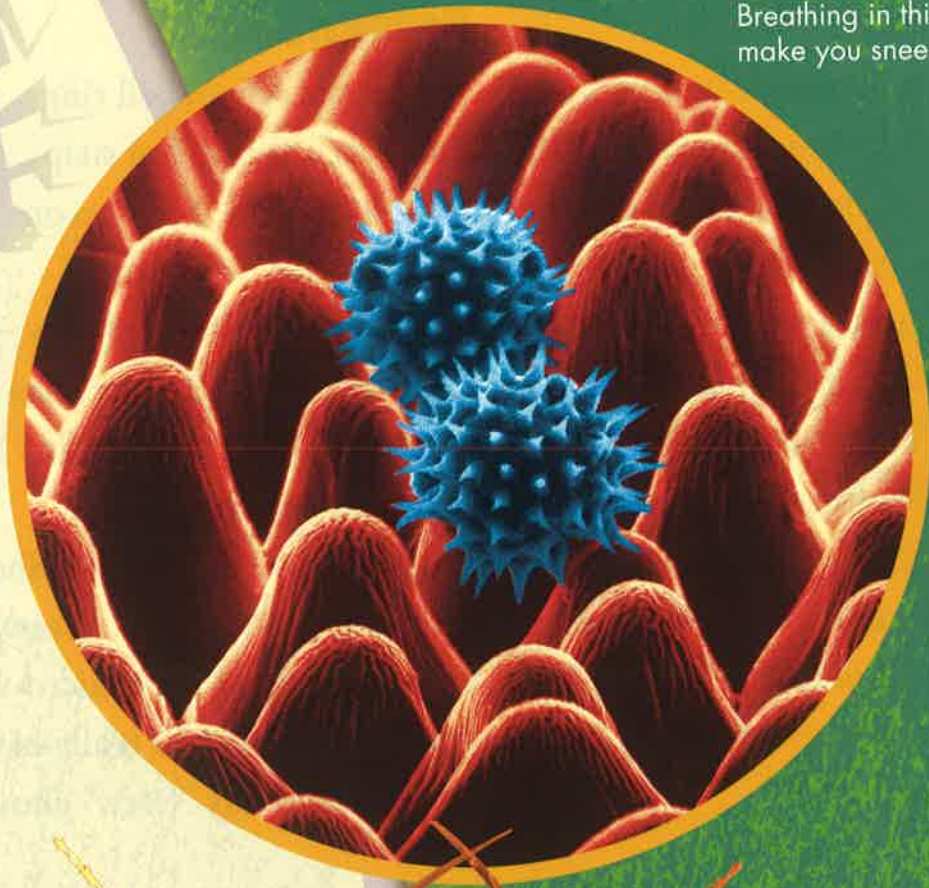
The Fly and Its Eyes

Now you see it. It's a fly. The fly sees you, too. It has two large **compound eyes**. They nearly cover its head. A fly's eye looks like a beehive. Each eye is made up of about 4,000 lenses. All these lenses work together. The fly can see in every direction at once. Don't even try swatting at it. It'll always be one step ahead of you.

Your head is spinning. You are seeing too much. Slow down. There's your school. It's time to get focused.

These hooks are ready to grab in this close-up view of Velcro.

Breathing in this pollen might
make you sneeze.



This fly's eyes can catch
any sudden movements
you make.

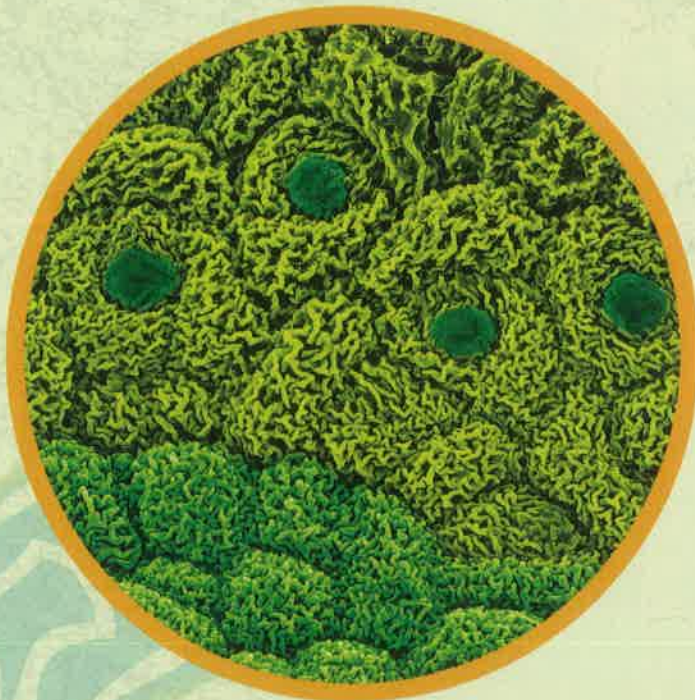


Lunch and More

It's lunchtime. Oh, no! Mom packed broccoli spears. One close look ruins your appetite. The broccoli looks like scrubbing pads.

After lunch, you return to class. You see a spider. It's spinning a web. Spider webs are made from a liquid silk. The spider forces the silk from openings in its body. The openings are called **spinnerets**. The silk comes out like strands of glue. Watch. It quickly hardens into threads as the spider weaves its web.

Broccoli looks a little less appetizing this close up.



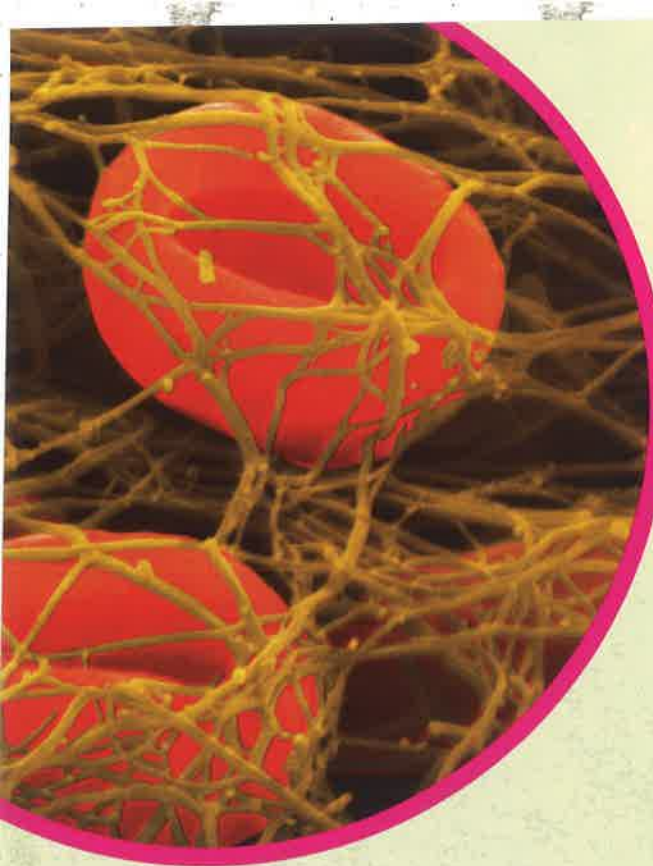
Homeward Bound

At last, the school bell rings. You hurry home. You snap on your helmet. You hop on your scooter. You're off.

Oops! Your scooter hits a crack and you fall. Your knee is bleeding. The blood cells look like tiny red donuts.

Your sister runs to help. She sees your bloody knee. "Eew," she says. She doesn't have micro-vision. If she did, she might really have something to say "Eew" about.





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Dennis Kunkel took the amazing photos on these pages. He is a scientist and a microscopist. Dennis grew up in Iowa. He loved exploring the countryside. He began to learn about nature. When Dennis was ten years old, he got a gift. His parents gave him a microscope. They knew he loved studying nature. The gift changed his life.

Today, Kunkel still loves microscopes. He has learned how to take photographs with them. He now has more than 23,000 pictures. He can't imagine stopping. "There's always something new to look at," he says. "There's always something new to learn."

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Are these giant red donuts?
No! They are red blood cells.

Wordwise

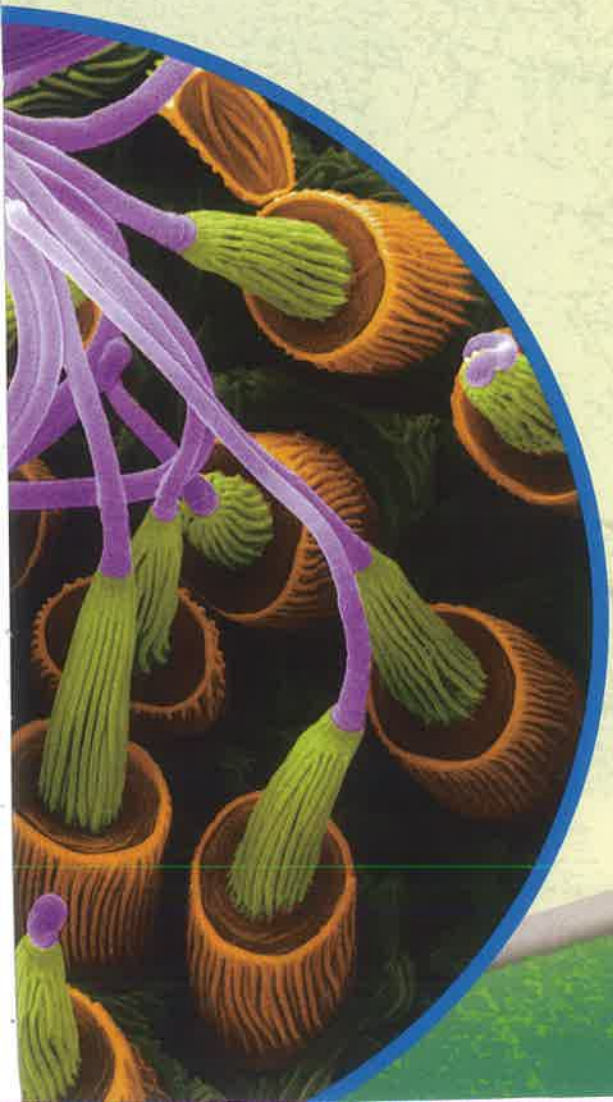
compound eye: eye with many little lenses

magnify: to make something appear bigger than it really is

microscope: instrument with a special lens that makes small objects appear larger

pollen: tiny grains that help plants produce seeds

spinneret: silk-spinning organ found on spiders



A spider's spinnerets
shoot out silk for a web.

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Cover: Don't let the bedbugs bite! Here's a
 close-up view of a bedbug.

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