



MICROSCOPY

A New Look

Hey, want to know something? There is an invisible world all around you. It's true! Miniature forms of life and particles that can't be seen by the human eye are everywhere. Thanks to the **microscope**—an optical device that uses lenses to bend light to enlarge or **magnify** things to make them appear bigger than they really are—scientists have discovered an enormous and amazing **microscopic** universe to explore. Sounds a little crazy, doesn't it?

How small is too small for your eyeball?

Pull a strand of hair out of your head and look at it closely. (Ouch, just kidding!) Because the human eye has limitations, even if you squint, the tiniest thing your eye can detect is about 100—**micrometers**—about the width of a hair. This boundary is called the **resolution limit** of the eye. Microscopes have incredible resolution limits and allow humans to see details hundreds of times better! Watching the microscopic world is so exciting that there is an entire field devoted to the science of **microscopy**!

Did you see that?

There are zillions of mini-things to look at through a microscope. Ready for this? There are microorganisms we can't see such as **bacteria** that actually move around and reproduce. With a microscope you can watch bacteria clump together like teenagers watching a video on a smart phone. E. Coli, the bacteria that cause food poisoning, actually swim around using rotating tails. Whoa!

How a glow-in-the-dark jellyfish put microscopy in the limelight.

Figuring out how our invisible world works has been a quest for humans for centuries. But one day a green, glow-in-the-dark jellyfish really caused a revolution in microscopy. No kidding! Researchers learned that certain jellyfish have a special **fluorescent** protein that causes them to glow when illuminated with **ultraviolet light**—a form of light not visible to the human eye. (Yes, there really is light that we cannot see!)

Well, scientists figured out a way to capture this green fluorescent protein and place it inside other living creatures to make them glow, too. Now scientists can see how the brain works by using the protein to **illuminate** or “light up” cells called **neurons** to map out brain connections. Isn't that awesome?

Would you like to become an explorer of the unseen world?

Microscopy may be the field for you! Many doctors, engineers and scientists who work in optics and microscopy started out looking through microscopes when they were kids your age. You can, too.

Explore your unseen world.
Ask your teacher about microscopes
or visit www.optics4kids.org today.