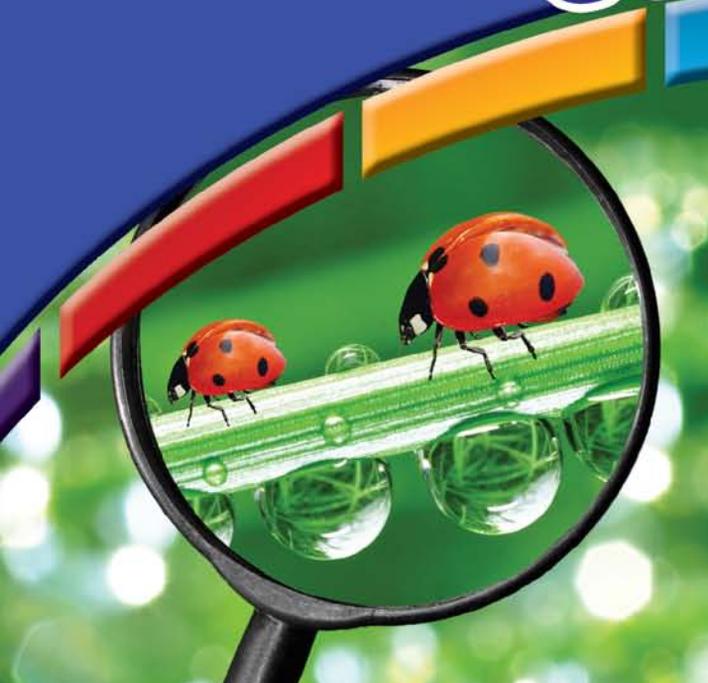


# Using Tools

## To Understand Our World



Level: **S**      Word Count: **553**  
100th Word: **balance** (page 8)

Teaching Focus:

Text Features: Captions

Locate the captions. What information do you get from reading the captions? Find a photo in the book that does not have a caption. Can you write a caption for this photo?

## Tips on Reading This Book with Children:

1. Read the title and make predictions about the story.

*Predictions – after reading the title have students make predictions about the book.*

2. Take a picture walk.

*Talk about the pictures in the book. Implant the vocabulary as you take the picture walk.*

*Have students find one or two words they know as they do a picture walk.*

3. Have students read the first page of text with you.

4. Have students read the remaining text aloud.

5. Strategy Talk – use to assist students while reading.

- Get your mouth ready
- Look at the picture
- Think...does it make sense
- Think...does it look right
- Think...does it sound right
- Chunk it – by looking for a part you know

6. Read it again.

7. Complete the activities at the end of the book.



# Using Tools to Understand Our World

by Kelli Hicks

**Science Content Editor:  
Shirley Duke**

**Rourke**  
Educational Media

[rourkeeducationalmedia.com](http://rourkeeducationalmedia.com)



Teacher Notes available at  
[rem4teachers.com](http://rem4teachers.com)

Science Content Editor: Shirley Duke holds a bachelor's degree in biology and a master's degree in education from Austin College in Sherman, Texas. She taught science in Texas at all levels for twenty-five years before starting to write for children. Her science books include *You Can't Wear These Genes*, *Infections, Infestations, and Diseases*, *Enterprise STEM*, *Forces and Motion at Work*, *Environmental Disasters*, and *Gases*. She continues writing science books and also works as a science content editor.

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# What Tools?

Have you participated in an investigation in science class? Maybe you used a beaker or ruler to help you. Scientists and researchers use many of the same tools you use in school. They use them to measure, to test medicines to find cures for diseases, to learn about how things work in our world, or to invent new **technology**.



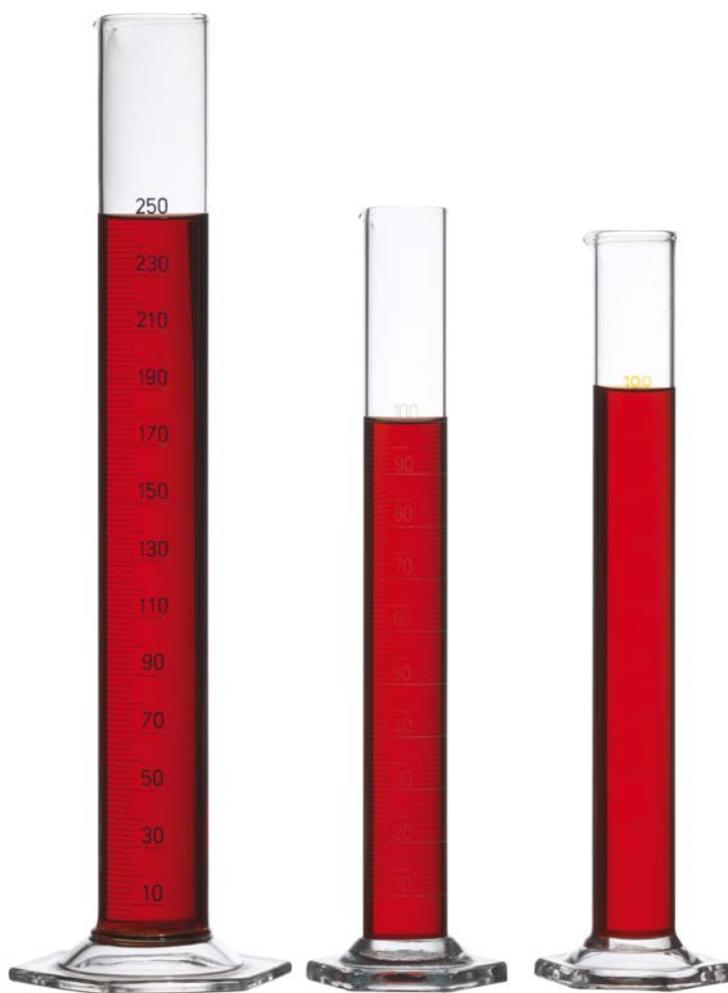
*Both students and scientists wear safety goggles to protect their eyes when using chemicals in the lab.*





# Tools for Measurement

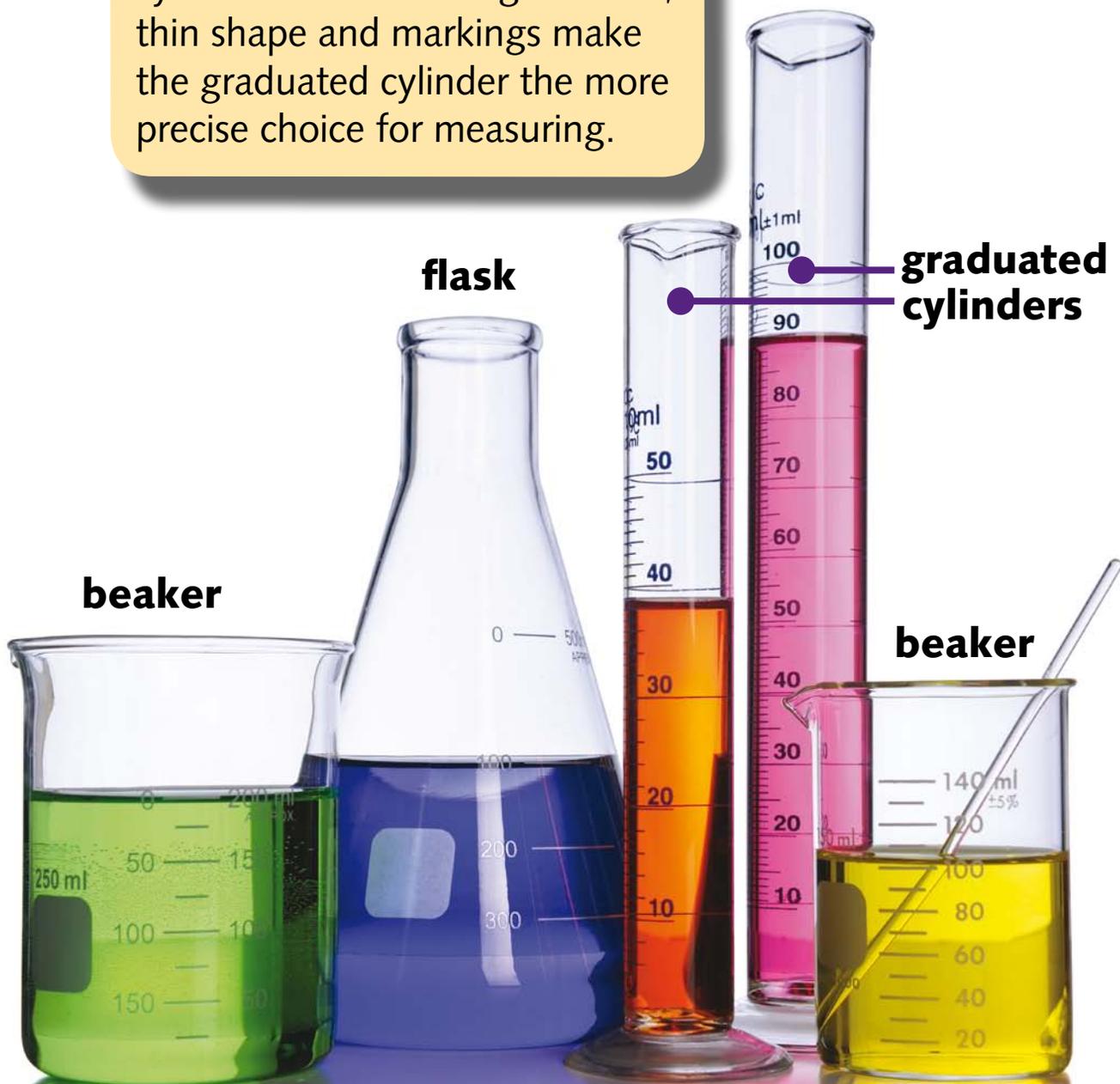
A chemist uses a **graduated cylinder** to measure the volume of different liquids. Lines on the cylinder show exactly how much liquid is in the container.



*Graduated cylinders come in different sizes, but they all have a wide base to prevent them from tipping over.*

## Did You Know?

Beakers and flasks are used for mixing, transporting, and creating chemical reactions. They are not as accurate as graduated cylinders for measuring. The tall, thin shape and markings make the graduated cylinder the more precise choice for measuring.



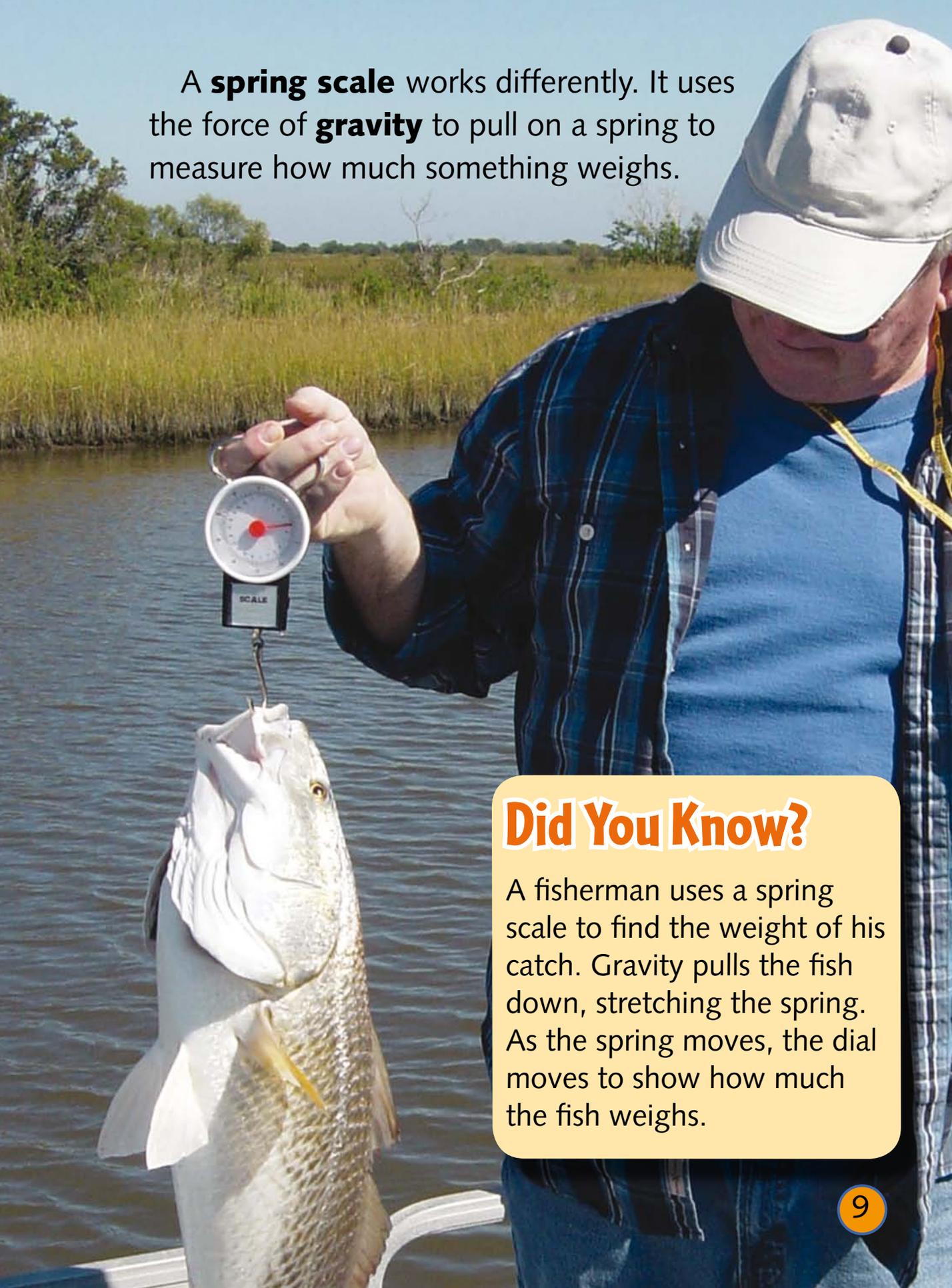
There are different types of scales used in science. A doctor uses a **balance scale** to find out how much you weigh.



## Did You Know?

On a balance scale, a doctor slides a known mass down a beam until it is balanced with the mass on the other side.

A **spring scale** works differently. It uses the force of **gravity** to pull on a spring to measure how much something weighs.

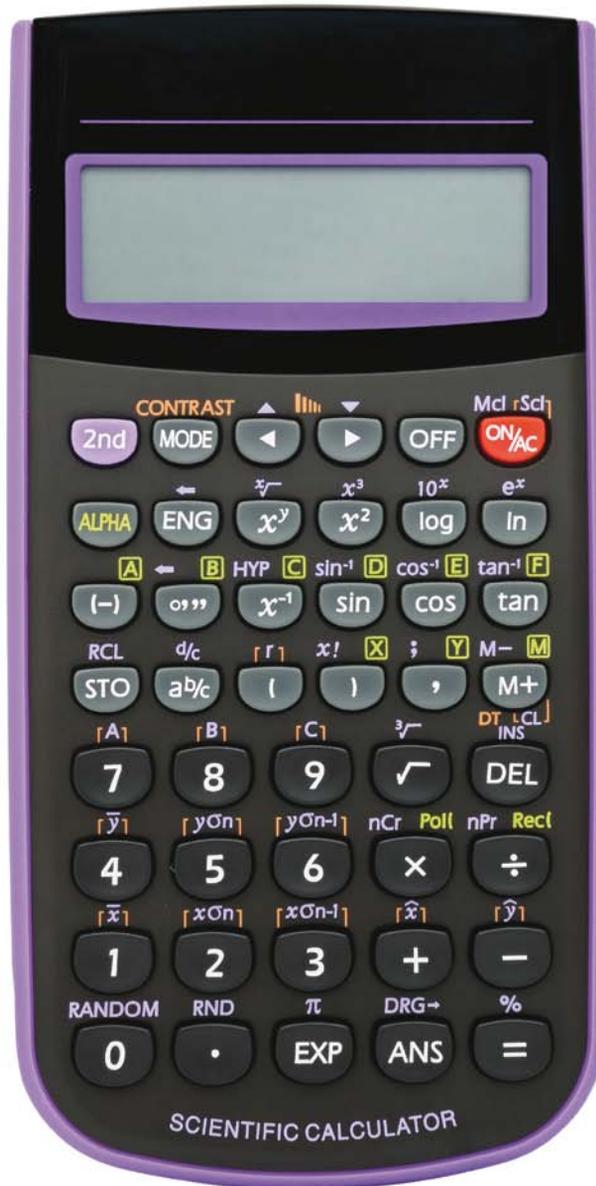


## Did You Know?

A fisherman uses a spring scale to find the weight of his catch. Gravity pulls the fish down, stretching the spring. As the spring moves, the dial moves to show how much the fish weighs.

Scientists use calculators to add or subtract amounts and keep track of measurements used in experiments.

Scientists also use computers to process information or store their data. Sometimes they use supercomputers. A supercomputer is similar to a regular computer, but it works much faster and stores larger bits of information. Supercomputers can perform complex scientific calculations in a minimal amount of time.



*Scientific calculators have extra functions to solve complex problems in physics, algebra, and geometry.*

Scientists use these specialized computers to create simulations for tracking environmental changes, exploring the universe, creating new chemical substances, and developing new technology.



*A supercomputer, like this one found at the Argonne National Laboratory in Illinois, provides scientists access to large amounts of information quickly.*

# Can You See It?

Sometimes we need tools to study and understand objects that are small. Looking through a hand lens lets you see the details of an object more closely. Hold the hand lens close to the object you want to observe. As the light shines through the glass of the lens, it bends, making the object you are observing look larger.

Sometimes, the object you want to observe is too far away to use a hand lens. Binoculars might be the right tool for the job. Binoculars work like small **telescopes**. The light bends and magnifies the object, making the details appear larger. This tool helps biologists identify species of animals without disturbing their habitat.





*You can count the legs on a bug or see the number of eyes on a spider when you use a hand lens.*

Some objects are too small to see even with a hand lens. We can't see a germ or a **cell** with just our eyes. We need a tool called a **microscope** to see the object clearly. A microscope magnifies an object, making it look much larger than it actually is.



*Scientists use a microscope to see how many fungal spores are present and how quickly they multiply.*

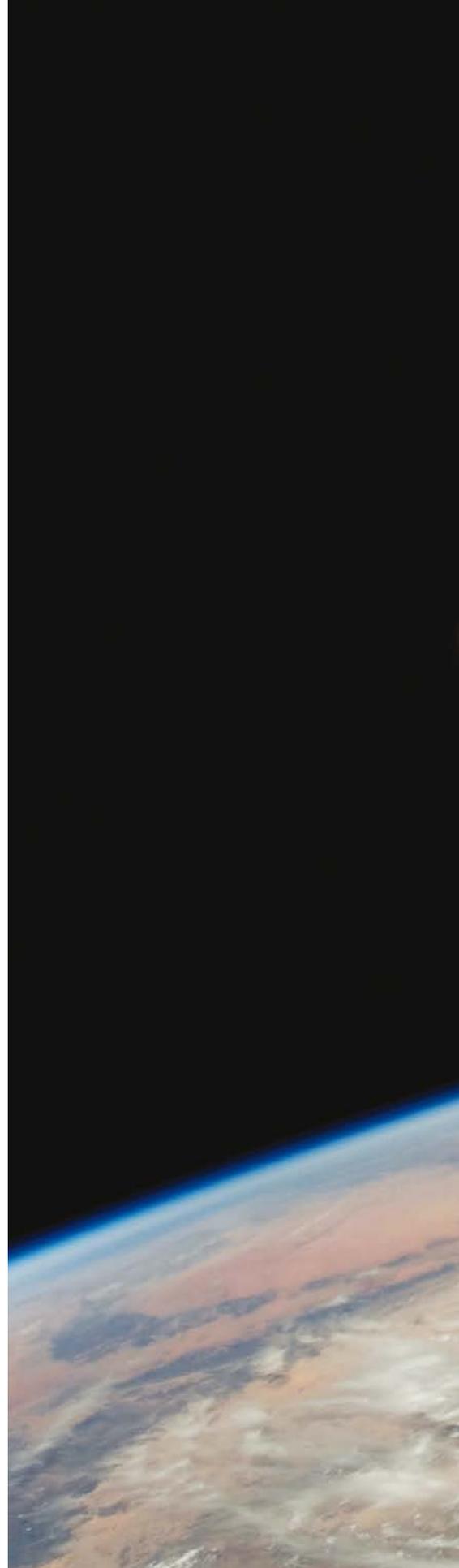


*Studying germs and cells with a microscope can help scientists understand why people get sick and help them find a treatment for a disease.*

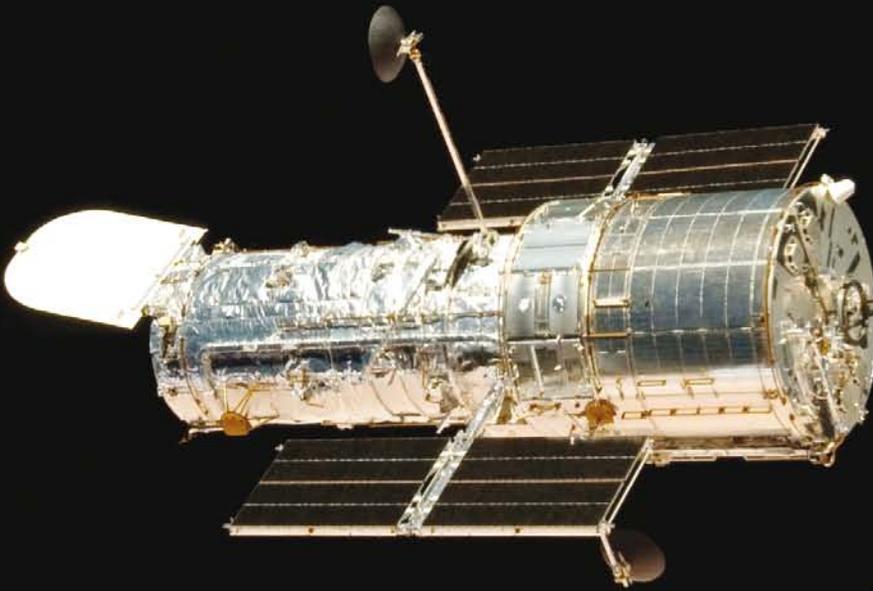
Astronomers are scientists that study **outer space**. They need a tool to see things that are very far away. A refracting telescope works like a magnifying glass. It uses light and a curved piece of glass to make objects appear larger.



**refracting  
telescope**



*The Hubble telescope drifts over Earth in May 2009 after being serviced and released by the crew of the Space Shuttle Atlantis.*



**Hubble  
telescope**

## **Did You Know?**

A reflecting telescope, like the Hubble telescope, uses two curved mirrors to collect light which helps us to see things that are very far away. Antennae on the telescope sends and receives information from Earth. The images collected show stars, nebulae, and even other galaxies.

# Tools Used for Communication

Do you know any tools that help us communicate? Technology helps us understand what is happening in our world and creates many opportunities to learn more. **Satellites** send and receive messages and images and can transfer them quickly from one place to another. Cell phones, the Internet, and television all rely on satellite technology.

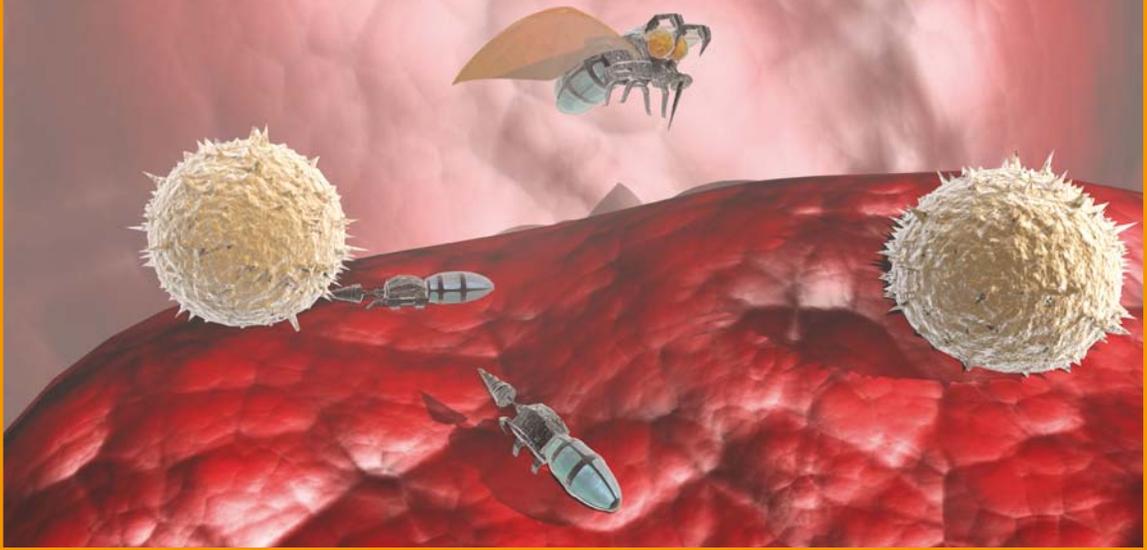
Satellite dishes on Earth send signals, called uplinks, to satellites in outer space. Satellites in outer space send signals, called downlinks, back to Earth.



# New Tools

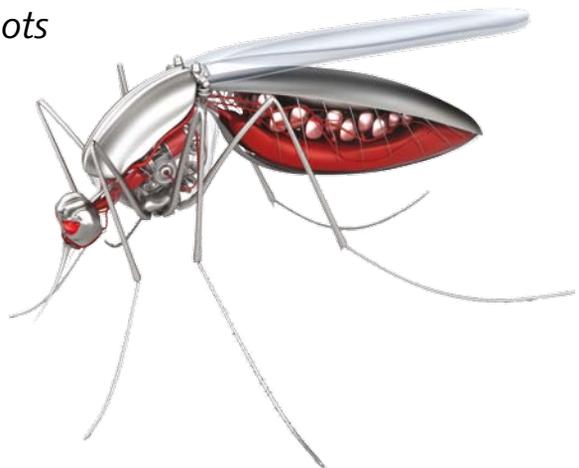
Specialized researchers are developing new tools that have the potential to improve our world. Nano-technology research looks at matter that is one-billionth of a meter. They are using this technology to create materials that will keep food fresher longer, improve computer and digital equipment parts, and even produce more efficient renewable energy sources.

## computer simulation of nanorobots



▲ Researchers are working on nanorobots that, in the future, could be inserted into the body to destroy invaders or make repairs to the cells.

The army is using micro audio ► bugs and video nanotechnology to keep track of terrorist activity.





*When surgeons use lasers to correct eye problems, patients can usually experience improved vision almost immediately.*

Scientists working with lasers have made some important discoveries, too. We use lasers when we scan items in the grocery store, but scientists have now created laser technology that can detect cancer cells before the cells develop into tumors. Laser technology can also be used to predict harmful weather conditions and to monitor the effects of global warming on our planet.

Scientists work to develop better technology every day. Imagine what will be invented next that will change our world!

## Show What You Know

1. Can you compare a tool you use in science class with one used by scientists?
2. Explain how tools help you with math or science.
3. How do tools improve communication around the world?

# Glossary

**balance scale** (BAL-uh-nss SKALE): a tool used to measure how much something weighs

**cell** (sel): a basic, microscopic part of a living organism

**graduated cylinder** (GRAJ-oo-ay-tid SIL-uhn-dur): a tall, narrow container used to measure liquids

**gravity** (GRAV-uh-tee): the force that pulls objects towards the Earth and keeps them from floating away into space

**microscope** (MYE-kruh-skope): an instrument with powerful lenses that helps to make small objects appear bigger

**outer space** (OU-tur SPAYSS): the area beyond Earth's atmosphere, including stars, planets, and galaxies

**satellites** (SAT-uh-litez): crafts sent into space that orbit the Earth, Moon, or other bodies and send and receive signals from Earth

**spring scale** (SPRING SKALE): a type of scale that uses gravity and a spring to measure weight

**technology** (tek-NOL-uh-jee): the use of science and engineering to make practical things more efficient or improved

**telescopes** (TEL-uh-skopes): tools that make distant objects seem larger and closer

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## Websites to Visit

[www.teachthechildrenwell.com/science.html](http://www.teachthechildrenwell.com/science.html)

[www.softschools.com/science/](http://www.softschools.com/science/)

[www.learningscience.org](http://www.learningscience.org)

## About the Author

Kelli Hicks lives in Tampa with her two children Mackenzie and Barrett, her husband, and her golden retriever Gingerbread. She is not very good with science tools, but enjoys using tools for measurement in the kitchen.



**Ask The Author!**

[www.rem4students.com](http://www.rem4students.com)

## Comprehension & Extension:

- Summarize:

*Identify how scientists use tools. List some of the tools used by scientists. What is the purpose of each tool?*

- Text to Self Connection:

*Scientists use many different tools. Are there some tools that scientists use that you have used? How did you use them?*

- Extension: Compare and Contrast

*Choose two different types of tools from the book. Compare and contrast the two tools.*

### Sight Words I Used:

container

cure

investigation

measure

perform

process

simulation

tools

### Vocabulary Check:

*Use glossary words  
in a sentence.*

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