Observing With Magnifiers

By Peggy Ashbrook

PHOTOGRAPHS COURTESY OF THE AUTHOR

Teachers want students to pay attention, to notice patterns in mathematics and language arts, to make observations, and become astute observers of the natural world. Acknowledging the practice or products of observation encourages this. With a classroom of students it can be difficult to let each child know that you see or hear their discovery. Young children's observations may not follow the lesson plan, but they are important to recognize even if they are off-topic.

One way to keep the discussion in context without squashing enthusiasm for noticing is to set up a silent signal. Tell the students, "Sometimes there are many people who want to show me their work. I may not be able to talk with each one, but I do hear you and will give you a nod (thumb's up, pinky wave, or "okay" gesture) to let you know." The silent signal will acknowledge children's observations without extended conversation.

Established silent signals work well to acknowledge those children who hear the distant fire engine in the middle of roll call or see a fly during group instruction at the board and are unable to wait to share their observation. The children have satisfied their need to communicate, and the teacher has encouraged observation without disrupting the direction of the class.

Inspired by Details

Inspire your students to become detailed observers by encouraging the use of magnifiers. Magnification can make us see an object with new understanding and is especially helpful for children with low vision. Do you remember the first time you saw the tiny hooklets on the barbules of a barb on a bird feather and understood how the feather can separate and come back together? Rachel Carson said, "Some of nature's most exquisite handiwork is on a miniature scale, as anyone knows who has applied a magnifying glass to a snowflake" (Carson 1965). Using magnifiers to make observations is part of the National Science Education Content Standards A (Science as Inquiry, Abilities necessary to do scientific inquiry) and B (Physical Science, Properties of objects and materials). Students will understand that the material of the magnifier changes what they see, gaining experience that is the foundation for later learning about refraction of light.

Be aware that a child's lack of interest in using a magnifier may be due to preference (other interests prevail), difficulties in near vision or hand–eye coordination, or a short attention span. Using hand-held magnifiers requires steady hands and good hand–eye coordination, especially for high-power lenses, so magnifications of 3×–6× are most appropriate for young children. The following activity uses interesting objects to give children a reason to learn to use a magnifier. Keep magnifiers in all areas of the classroom to enlarge the area where observations are made—next to the insect collection, hanging near a mirror, and on the library shelf—and keep one in your pocket to use anytime the class is outside. ■

Peggy Ashbrook **(scienceissimple@yahoo.com)** ***is the author of Science is Simple: Over 250 Activities for Preschoolers and teaches preschool science in Alexandria, Virginia.***

Resources

Carson, Rachel. 1965. *A sense of wonder*. New York: Harper & Row.

National Research Council (NRC). 1996. *National science education standards*. Washington, DC: National Academy Press.

Internet

Sparking the Sense of Wonder in Young Children: Using a Hand Lens (p. 2)
www.enaturalist.org/resources/pdf/pjt/PJ-T_v4n2.pdf

Exploring Magnifiers

Objective:

To introduce the hand lens or magnifier and explore its properties and to become so comfortable using magnifiers that students will use them throughout the year.

Materials:

- Large columnar clear container, such as a jumbo-size pickle jar, a 2-liter bottle with the top cut off, or an acrylic ice bucket.
- Towels
- A variety of magnifiers, including round lenses, "bar" magnifiers, and flat Fresnel "page" magnifiers (Most should be 2–3×, but include a few with 6× power.)
- Interesting objects to look at using magnifiers, such as (purchased, sterile) feathers, leaves, tree bark, hair, cloth, pictures from magazines and newspapers, grains of salt, etc.

Procedure:

1. To introduce the idea of magnification, fill a large clear columnar jar with water and put it on a table where students can easily view it. Put it in an area of bright light for best viewing.
2. Drop a coin, key, marble, or other desirable object that will sink into the jar, then reach in to retrieve it. As you reach into the water, the children will see that your hand appears larger in the water.

   They may say, "Your hand got bigger." Ask them if your hand "grew bigger" or if it "looks bigger." They may be unsure of what happened and will need additional experience with the water-filled jar to understand that what they are seeing has changed, not the size of your hand itself.
3. Provide a setup where the children can repeat this activity themselves with a minimum of spillage. The jar may need to be lowered and put on a towel or tray. Children will be more interested in additional "doing" than viewing but while waiting for a turn they will also observe and have time to do a drawing of "what I see."
4. Next, provide a variety of magnifiers and a set of interesting objects, and have the children practice using magnifiers to examine the details of the objects.

5. Tell the children (depending on their age) that the magnifiers are "tools for looking" not for "drumming, hitting, digging, poking, or eating."
6. Some children may need direct instruction on how to get a clear, in-focus view using a magnifier. Tell them, "By moving the magnifier closer to yourself and then farther away, you can find the point where you can see best. Somewhere in the middle is a clear image." As children develop hand-eye coordination, it is easier for them to view clearly and steadily through a magnifier.
7. After an unstructured period of magnifying the objects, ask open-ended questions about the magnifiers to encourage thoughtful examination of the magnifiers: *What do the magnifiers have in common? How do they look and feel?* Suggest that the children pinch their fingers over the lens, move them from one side to the other, and tell what they feel. Most children describe the magnifier by function, saying "It makes everything bigger," and "You look through it." Only a few children will say that the lenses are clear and not flat but curved. Suggest additional observation using two magnifiers stacked together. Say, "How does (the object) look now?"

You will know that children are fully comfortable with magnifiers and aware of their purpose when they recognize by themselves that they need to get and use a magnifier to further their exploration or answer their question. In time, you'll soon be having conversations with your students like this: "What are those black dots in the rock?" asks a student. "What could they be?" you reply. "I don't know. I need a magnifier to find out!"

What's happening at *http://science.nsta.org/earlyyearsblog.*

Creative Uses of Magnifiers

I run the science materials center for our district, and one of our preK science kits is Magnets & Magnifiers. There are two ideas we use for this kit that involve magnifiers as a science tool.

Set up a center using hand lens magnifiers and large "bug box" magnifiers. On the table we have a collection of materials for students to view including table salt; newsprint; plant seeds; textured cloth such as burlap, flannel, or denim; cocoa powder; sugar; popped popcorn, string; and a fingerprint slide.

Another activity is to go on a "scavenger hunt" in the schoolyard looking for items such as playground sand, dirt, small rocks, bird feathers, assorted leaves, bugs, twigs, tree bark, ants, bricks or stucco surfaces on walls, spider webs, grass or weeds, flower petals, etc. Emphasis is placed on seeing things that would not ordinarily be noticed by using this science tool that helps our eyes see better.

Carol Harbushka
Science Materials Center Manager
Litchfield Park, Arizona

I use magnifiers for math lessons on money. When I'm teaching each coin we look at all the details on both sides of the coins using the magnifiers. The children love looking at all the different dates and trying to find a coin that was made during their birth year. Any child that finds a penny with their birth year gets to keep it.

C.J.Colon
Teacher
Bronx, NY

Teacher's Picks

Nancy Tooker is a teacher who feels observation is especially important in the preschool years. She uses these books to get the kids thinking about looking carefully and honestly at objects for the first time.

Print

The Jumbo Book of Hidden Pictures. 1992. Boyds Mills Press.
Young readers will eagerly search each picture for the items listed by name.

A House Is a House for Me. Mary Ann Hoberman. 2007. Puffin.
This book opens up lots of conversation among students and lays the foundation for students building their own analogies by making careful observations about the relationship between animals (and inanimate objects) and their "homes" in the text and illustrations.

Look-Alikes: The More You Look, the More You See! Joan Steiner. 2003. Little, Brown Young Readers.
This book invites young readers into, "the land of look-alikes, where the more you look, the more you see!" An amazing journey into a world of everyday objects used in ingenious ways, the illustrations compel close observation.

MoonLight™ 2008 Moon Calendar of Daily Moon Phases. 2007. Celestial Products.
This poster-size calendar shows the phase of the moon each night of the year. Looking for the Moon every night is a great opportunity for students and their parents to make observations and study a pattern over time.

Where's Waldo. Martin Handford. 2007. Candlewick.
Use this series when introducing camouflage and the importance of looking carefully to truly see something close at hand. Magnifiers can be used to ease viewing details.

Internet

Cornell Lab of Ornithology, Feather Structure
www.birds.cornell.edu/AllAboutBirds/studying/feathers/feathers
On the "Feather Structure" page students can see an illustration of the details of a hooklet on a barbule on a barb on a vane on a feather.

Jewelers Loupe Mini LED Magnifying Glass Handheld Magnifier for Stamps Jewelry Loupe Illuminated Handheld Jewelry Magnifier Led#. US $2.19. 5.0 (1).Â Product Description. 10X Portable Pocket LED Mini Magnifier Loupe Magnifying Glass with Scale for Observing. Feature: 1. With 10x LED magnifying optical glass, enlarge the object to 10 times its size. 2. Extremely bright LED lights, brighten the the items you are examining even in the darkness. A magnifying glass (called a hand lens in laboratory contexts) is a convex lens that is used to produce a magnified image of an object. The lens is usually mounted in a frame with a handle. A magnifying glass can be used to focus light, such as to concentrate the sun's radiation to create a hot spot at the focus for fire starting.Â A sheet magnifier consists of many very narrow concentric ring-shaped lenses, such that the combination acts as a single lens but is much thinner. This arrangement is known as a Fresnel lens. Magnifier.js is a Javascript library enabling magnifying glass effect on an images. Features. Zoom in / out functionality using mouse wheel.Â Magnifier.js can be used for both single and multiple images, as well as galleries using dynamic option setting on gallery navigation: Birds of America. by John James Audubon. < > At a glance. Include magnifier.css in the head section of the HTML document. . Let's create sample HTML markup. A screen magnifier is a software application that increases the size of text and graphics on your computer screen. When installed on your computer, a screen magnifier is like having a magnifying glass hovering over your screen, enlarging everything around your cursor for easy reading. You can use the mouse or keyboard shortcuts to position your cursor where you want to increase the text or image size for better visibility.