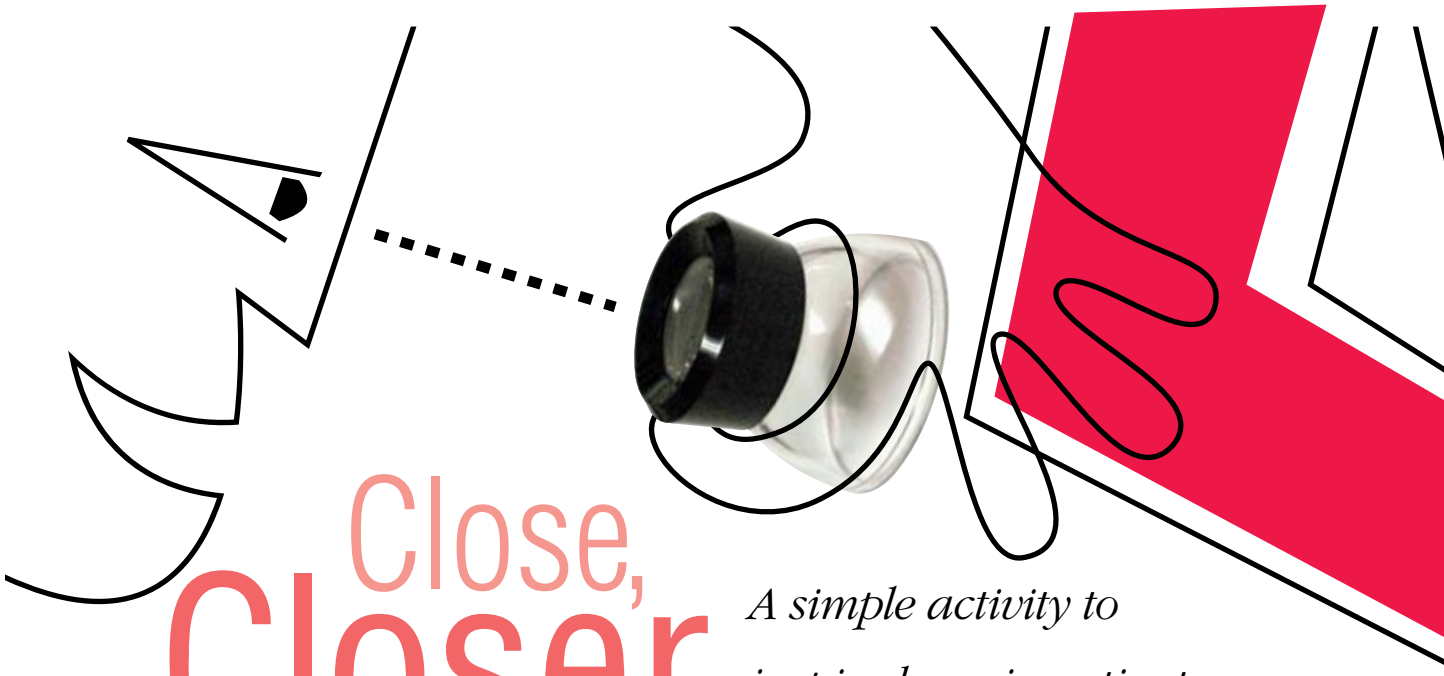


Close, Closer, Closest

A simple activity to inspire keen investigators in your classroom

By Donna Farland

As educators, we are always deciding what experiences we want to give students in order to achieve our goals of developing process skills, attitudes, and knowledge. One of the best ways of teaching about observation was shared with me while I was a participating teacher in a sabbatical at the New England Aquarium. Here is all you need: A student worksheet (Figure 1, p. 42), a hand lens, an illuminated pocket microscope (available from various online retailers), and students in groups of two. The students observe an object at three different levels of magnification. You may be amazed at how surprisingly simple and effective this experience is for teaching young learners to be keen observers.

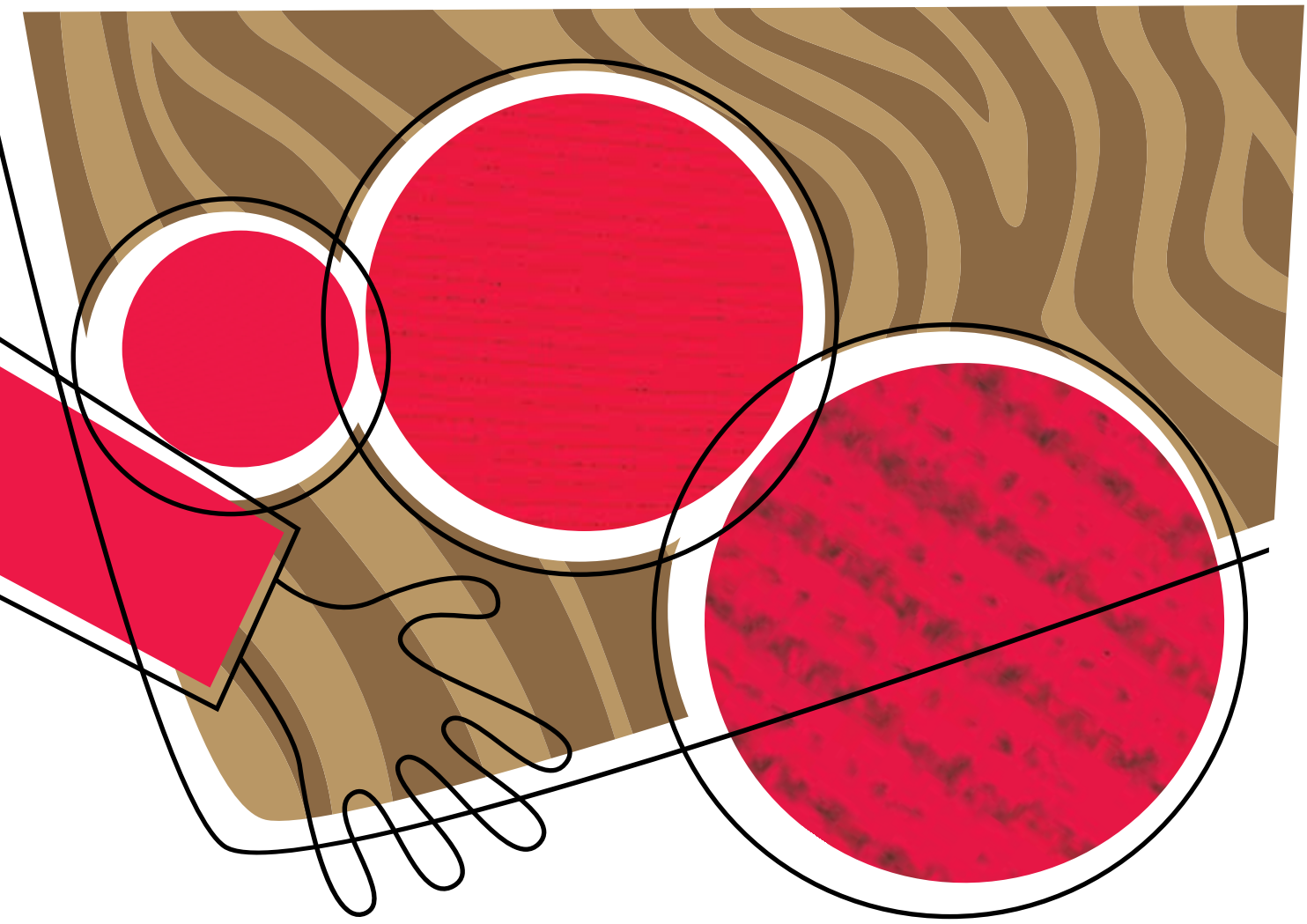
The ideas that emerge from the activity will depend not only on the way in which it is taught but also on the way the children reason about the experience and process the information while using their process skills. For example, for young learners, skills in observing will progress from making simple observations of very obvious characteristics to specific attention to discriminating detail. I have done this activity with third through eighth graders and have been pleased with the results.

Zooming In on Science

Whether you do lots of observations in your elementary science class or not, sometimes the observations can become routine as students work quickly thorough them and the process of identifying key details becomes just too familiar. When such a situation arises, it is time for a closer look at any object from three very different perspectives: Close, Closer, Closest!

First, students are asked to work in groups of two and observe their partner's sleeve. (Yes, *sleeve*.) The simplicity of this experiment is what makes it remarkable. Students draw their observations in the space provided on the worksheet (Figure 1) in the space labeled "close." Once all of the students have had a turn observing the sleeve and recording five observations, they share their observations with the class. At this point most of the observations refer to the color or feel of the sleeve. It is this first set that is the most simplistic and general.

Second, students are given a hand lens and asked to once again observe the *same* sleeve of their partner and record their observations in the space on the worksheet labeled "closer." They share their observations with the class, and the general sense is that the sleeves now



look a bit more detailed when viewed using the tool of a scientist, the hand lens.

Third, each group is given an illuminated pocket microscope, and the students are asked to record their observations in the space labeled "closest." They record and communicate their observations as they did in the previous parts of the activity. Here is the neat part: Students will spontaneously call out "Wow, that is so cool!" The teacher then has the opportunity to discuss not only the similarities and differences in the three observations but also to discuss the tools that scientists use to observe. The teacher leads the discussion by asking, "What were the similarities in all three observations? What were the differences?" "How can you account for the differences?"

The conclusion I am trying to get students to reach is that scientists purposely use different tools for different reasons. When I ask for an example, students will tell me that if a scientist wants to learn more about the features of the Moon, then they would need to use a tool that allows them to see things that are far away close up. Allowing the children to have the opportunity to discuss their surprises and test the pocket microscopes on other objects in the room is the lesson wrap-up. After all, don't the best science lessons lead to further questions?

The Importance of Observation

Driven by content standards, teachers can spend all year covering content without using process skills such as questioning, predicting, and interpreting. Likewise, even if teachers use effective instructional strategies for engaging students in the questioning techniques of science, they may feel guilty about spending their precious quality science minutes on such events. Attempts to develop scientific ideas without employing the process skills lead only to rote learning and knowledge that is confined to the situation in which it was learned (Harlen 2000). The *National Science Education Standards* call for K–12 students to "investigate aspects of the world around them and use their observations to construct reasonable explanations for questions posed" (NRC 1996, p. 121).

Elementary students can be guided to produce high-quality observations when prompted properly. Quality observations are detailed, accurate, and often conjure up an image in the mind of the person

hearing the observation for the first time. For example, "It's small" is a frequent observation made by young scientists commenting on a pebble. But if I hear, "It's smaller than a quarter and larger than a dime," I conjure up an image immediately based on my prior knowledge. The details of the observations become extremely important if we expect to foster the understanding of concepts taught and to have students form valid observations based on a series of true statements. In addition, children also need to be reminded about the difference between observation and inference.

Because children are naturally curious about their world, they should be encouraged to ask as many questions about as many things as possible. I frequently start out the school year with this lesson because it is a wonderful introduction to how I hope to help my scientists "see" throughout the year, and, ideally, throughout the rest of their lives. It gives me a reference point for reminding them about being keen observers when their observations become all too commonplace. ■

Connecting to the Standards

This article relates to the following *National Science Education Standards* (NRC 1996).

Content Standards

Grades K–4

Standard A: Science as Inquiry

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

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Resources

Harlen, W. 2000. *The teaching of science in primary schools.* London: David Fulton Publishers.

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

Figure 1.

Student worksheet.

NAME_____

CLOSE, CLOSER, CLOSEST

Observation in words (sentences).
1._____
2._____
3._____
4._____
5._____

Observation in words (sentences).
1._____
2._____
3._____
4._____
5._____

Observation in words (sentences).
1._____
2._____
3._____
4._____
5._____