The Early Years

Resources and conversation on PreK to 2 science

Science and Children proudly introduces, The Early Years—a new column dedicated to early childhood science issues. Each month, we'll address one topic, providing a short, age-appropriate activity along with suggested print and online resources to enhance your teaching of that topic. The *National Science Education Standards* (NRC 1996) and The National Association for the Education of Young Children Early Learning Standards (NAEYC 2002) serve as references for the column, ensuring that the ideas presented here reflect best practices in science education.

In addition, we've set up an online blog to accompany the column—*http://science.nsta.org/earlyyearsblog*—to keep the conversation going on early childhood resources and issues. This month Early Years bloggers are talking about—among other things—integrating science and art. Highlights from the online conversations appear at right. Our blog helps us stay current with the needs of early childhood teachers, so in turn, we can create practical, user-friendly material in this column based on your needs. So, hop online and see what your colleagues are saying, and let your ideas be known.

The early childhood years are some of the most important in elementary education, spanning critical transitions from preschoolers to kindergarten, as students begin developing critical-thinking skills and scientific minds. So, what better way to begin this column—and the school year—than with an activity and exploration that addresses a central theme in early childhood science and in this column—What can young children do as scientists?

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

How can students' illustrations help them learn science?

I find that drawing in science is a way to encourage children to focus their attention on details they may not have noticed and to try to capture that detail as carefully as they can. And it is a way to document change over time.

Karen Worth
Senior scientist, Education Development Center
Newton, Massachusetts

I have the kids focus on the drawings and diagrams in the science books we read. I want the children to understand that the images—photos and drawings—extend the meaning of the words and that they need to be "comprehended" in much the same way as the text. Once the kids learn that the purpose of the pictures is information not decoration, then they can achieve the full meaning that comes when visual and written texts are interwoven.

Nancy McDonough
Second-grade teacher
Tenafly, New Jersey

In my classroom, we keep mini-science journals on each topic. It is easy to pull out a journal and check on a student's progress. The illustrations themselves are also assessment tools that yield important information about the developmental levels of each student.

Gioia Jones
Kindergarten teacher
Saginaw, Texas

In one art-related project, we let the children trace each other's bodies,

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What Can Young Children Do as Scientists?

By Peggy Ashbrook

Children come to our classrooms with varying amounts of experience in exploring the natural world and participating in scientific inquiry. The school year's first meeting for science instruction can be a time to take stock of the breadth and depth of your students' experiences with science.

Reading the book *What Is a Scientist?* by Barbara Lehn (1999) is an engaging way to help students understand your expectations of them as scientists and what to expect when it's "Science Time" in the classroom. It's also a gentle reminder to teachers that, for the most part, children can participate fully in the process of inquiry at age-appropriate levels. Simplifying the process, or even the vocabulary, is a disservice to the students' interest and ability to observe closely, ask questions, wonder, use tools, collect data, use logical thinking, consider alternative explanations, record findings, share information, and build on new experiences to develop new ideas about the world.

The book begins with the statement, "A scientist is a person who asks questions and tries different ways to answer them." The photographs on the facing pages are accompanied by descriptions of the pictured inquiry, such as, "Hannah wonders about fruit and vegetables. 'Are there this many peas in every pea pod?' asks Hannah." The two levels of text makes the book appropriate to use across many grade levels. The book concludes with a statement we can all relate to, "A scientist has fun."

One way to use this book is to post pages with each statement from the book around the classroom. As they conduct various science activities in class, children can record the activity on the appropriate page with photographs, writing (or dictating) descriptive paragraphs, or drawings.

(see reverse)

Scientists at Work

Objective

Students relate their work to the work of "real scientists" by looking at many photographs of scientists in action.

Materials

- *What is a Scientist?* by Barbara Lehn
- Photographs of people engaged in scientific work: measuring, looking, writing, using tools, exploring, building, comparing, and talking.

Try to find at least one photograph for each statement in *What Is a Scientist?* Magazines are the best source and can be supplemented with historical photos from internet sites. With careful attention, your collection can include a rainbow of peoples of all ages and many cultures. Lamination will enable the photos to survive frequent handling.

Procedure

1. Hand your students many photographs of people engaged in scientific activities.
2. Ask open-ended questions to get the children talking: What are these people doing? Why are they doing that? Let the children's answers stand without correction. If they ask, give further general information: That scientist is measuring; those scientists might be digging to find fossils to help us understand what Earth was like before there were people; she is trying to find out something about that plant she is looking at, so she can make a medicine from it.
3. Invite the students to reminisce about science activities they have been involved with by asking: Have you done anything like that?
4. Talk about what students might do when they grow up: Maybe when you grow up you will do such activities as (whatever is suggested by their descriptions and the photographs, e.g., write about insects, help grow new plants, find out how to keep people healthy, go to space to learn how to live there, build with materials you invent, study how people lived long ago).

Children will begin to relate their own science activities and experiments to the pursuit of scientific knowledge by adults. Photographs of doctors examining people and of other scientists working in the field may surprise students who have become accustomed to scientists being represented by the image of a white man wearing a white lab coat in a laboratory. Through discussion about the photographs, a teacher can broaden the children's ideas of what constitutes science and what a scientist looks like.

Extension

Use this sorting activity to learn what students understand about the process of scientific inquiry.

Have the students each choose one photograph and match it with one of the activities listed in *What Is a Scientist?* Ask the students to share why they grouped it that way. Or, have the students sort the photographs into other groups of their own choosing to learn what the students think science is all about.

Resources

Lehn, B. 1999. *What Is a Scientist?* Brookfield, CT: Millbrook Press.

National Association for the Education of Young Children (NAEYC) and the National Association of Early Childhood Specialists in State Departments of Education (NAECS/SDE). 2002. *Early learning standards: Creating the conditions for success.* Washington, DC: Author.

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

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

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then fill in their own inner organs into the life-sized tracings. We did not direct their interpretation of the internal organs, although we had discussed body systems and organs before this project. The body concepts revealed (and gaps in their knowledge) were fascinating.

Sarah Glassco
Science resource teacher
Alexandria, Virginia

It's fascinating to hear young (and old) kids talk about their reasons for choosing colors, shapes, sizes, positions on the page relative to other entities, etc. Asking kids to briefly explain their pictures and how and why they put the "things" they did in them, lets me understand more their thinking and the connections they're making (or attempting to make) in the perceived or imagined world.

Maria Varelas
Professor of science education
Chicago, Illinois

Read more at *http://science.nsta.org/earlyyearsblog/comments.aspx?blogid=1&articleid=20.*

Online, your colleagues are also addressing these questions about ways to get the school year started:

- "How do I grab interest and enthusiasm at the very beginning of the year?"
- "What are specific guidelines for kids to follow when they're in your classroom—or are new to science?"
- "What are your favorite resources for teaching science?"

Read more and join the conversation at *http://science.nsta.org/earlyyearsblog.*

Teacher's Picks

Charlene K. Dindo, a marine and environmental science enrichment teacher at Pelican's Nest Science Lab at the Fairhope K–1 Center in coastal Alabama, starts her year with a field excursion to nearby Mobile Bay where students comb the beach for shells, crab claws, barnacles, and snails for further study in the science lab.

Here are her favorite resources:

Books

Everyone Is a Scientist. Lisa Trumbauer. 2001. Capstone Press.
Written for emergent and early-level readers with photographs that show an adult scientist at work and a student scientist at work, this book is a good lead-in to many activities:

- Make a list of what things a scientist could study. What kind of tools do scientists use?
- Make a list of what a scientist could measure. Ask students to choose something they are interested in and write science facts in their journal or draw a picture.
- Take photographs of students using a tool, looking at things closely, measuring, writing down facts, and asking questions. Use the photographs to make a class book titled "Everyone Is a Scientist" to share with their families.

Dancing on the Sand: A Story of an Atlantic Blue Crab. Kathleen M. Hollenbeck. 1999. Soundprints.
The life cycle of the blue crab is explained with detailed illustrations. A companion cassette recording with sound effects is great for capturing the attention of young scientists!

The Seaside Naturalist. Deborah Coulombe. 1992. Fireside.
This book has great black-line drawings and easy-to-understand text on sea creatures. Field guides are valuable for nonreaders or emerging readers because they can match shapes, look for similar colors, patterns, and compare animals. Using field guides, the internet, and books helps to validate the learning experience and confers ownership in what young children "discover!"

Internet

Seascape Video
www.seascapevideo.com/stock_footage/VideoClips.html

These 15–30 second clips demonstrate movement, camouflage, and color patterns of sea creatures such as flounder, sea turtle, and sea fans. Easy repeated viewing on the internet reinforces perception skills and offers a real-life connection to the topic or animal.

NOAA library, National Marine Fisheries Historic Image Collection
www.photolib.noaa.gov/historic/nmfs/sea1.html

Download an exquisite scientific illustration of the blue crab (and many other sea animals) from this collection of historic etchings from the 1880s. Students will easily notice similarities and differences between animals with the degree of detail in these images.