Given the opportunity, what kinds of questions would your students ask a scientist or other science professional? Would they inquire about the sun, the planets, space travel, whales, dinosaurs, or the existence of UFOs and aliens? Or, would the students ask the science professionals if they had liked school, what they do, why they became a science professional, or how much money they make?

With the “Writing to a Scientist” activity, students have the opportunity to communicate with “real” science professionals. This activity requires students to develop a science question, select the appropriate scientist(s) and/or science professional(s), draft and send the letter(s), and receive a response. The students choose the science professionals from a resource list compiled by the teacher. While engaged in this activity, the students have an opportunity for reflecting, collaborating, and communicating.

The activity, however, does not have to stop there. This communication could be the beginning of an ongoing dialogue and relationship between the students and the science professionals.

The Resource List
Before starting the class activity, compile a resource list of science professionals who work in various fields and disciplines of science. The list can include individuals working in areas such as agriculture, forestry, pharmacology, chemistry, forensic medicine, health sciences (both human and veterinary), biology, engineering, geology, physics, mathematics, radio and optical astronomy, environmental engineering, and computer technology. The only requirement of a resource science professional is a willingness to participate and respond to students’ letters.

To begin, draft a list of potential science professionals who work in science-related jobs. These professionals can include an exercise physiologist, a meteorologist, a pathologist, a telecommunications worker, an engineer (all fields), a livestock breeder, a dietary scientist, an epidemiologist, a landscape manager, an emergency medical technician, a fire fighter, a recycling worker, and a water and sewage treatment worker. This task can be accomplished alone or by working collaboratively with fellow teachers.

Prospective science professionals can be identified in a number of ways. One method includes searching through local or regional yellow pages and directories from area colleges and universities. When searching these
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directories, identify individuals, businesses, industries, and government agencies that operate in a science-related area and record the names, addresses, and descriptions of the prospective resources. After identifying these resources, contact each place to ascertain the names of any science professionals who work there; add these names to the list.

Searching the Internet and contacting the local Chamber of Commerce helps locate additional resource names (see Internet Resources, page 66). Also add the names of science professionals you know of, have worked with, or may have met while attending professional meetings and conferences.

Another option includes locating names by having students ask their family or neighbors for suggestions and contacting museums or science centers. Names of science professionals can be obtained from the Museum of Science (Science Park, Boston, MA 02114-1099) through the Science by Mail program, which teams children with volunteer scientists.

Once you have identified potential science professionals, draft a letter describing the details of the proposed activity and extending an invitation to participate, and send it to each of the people on your list. Follow the letter with either a personal visit, a phone call, or an e-mail message.

You will find that most of the science professionals are elated that you contacted them, believe the activity is worthwhile, and want to become involved. Once the names on the list have been finalized, prepare a master list that includes the names, addresses, and area(s) of expertise for each person.

Choosing a Question

When the students are first approached with the idea of writing to a scientist, they are unsure of what questions to ask. It doesn’t take long, however, for the children to start generating questions. In fact, once the students get going, one question leads to another and they end up with a list of questions.

Working in groups of three or four, students brainstorm and generate a list of three questions they would ask a science professional. Ask each group to share its questions with the class and record their responses on the board, a transparency, or a large sheet of chart paper. As a class, the students choose their top four questions.

Next, divide the class into four groups, assign each group one of the chosen questions, and have each group draft a letter to a science professional (see Figure 1). After the drafts have been completed, call the groups back together and ask each

Students contact “real” science professionals to learn about science.
with the list of science professionals and help students select an appropriate individual or agency to contact. When mailing the letters, include a cover letter on school stationery reviewing your project.

**Receiving a Response**

Students will anxiously wait for the science professional’s response. After students receive a response, provide each group member with a copy of the letter.

Receiving a response to their letter makes a powerful impression on the students. The fact that a “real” scientist or science professional has written to them and responded to their question(s) is something they will never forget. The students will be ecstatic when they receive a response. They will want to share the letter with you, other students, their parents, and all their friends.

Ask each group to share the contents of the response letter with the class. Use this opportunity as an additional learning experience, and spend class time discussing each group’s question and the response that it received. Follow each discussion by probing the students’ understanding and asking them about any new questions they now have on their topic. Provide the students with opportunities to use a variety of resources and research the new questions. Help the students organize their ideas and compose a follow-up letter to the science professional describing what new questions they have and what they discovered during their research. In this way, the students will engage in exploration while continuing a dialogue with the science professional.

In many instances, the science professional visits the school or invites the class to schedule a day to come visit him or her.

Once this phase of the activity concludes, all of the letters can be displayed on a bulletin board, in the hall, or in a showcase, which makes a nice display for parents who visit the school during open house, PTA meetings, or parent-teacher conference days. In many instances, the local paper will be interested in running a story describing what the students did.

**One Group’s Experience**

Second-grade students at a school in Wellsburg, West Virginia, wrote to Gerrit Verschuur, an astronomer, asking “How do the stars glow?” and “How and why does the sun shine?” The astronomer responded with the following letter.

Dear Class:

What wonderful questions, “How do the stars glow?” and “How and why does the sun shine?” These ques-
tions keep many scientists busy because no one is totally sure of the answers. But they have some pretty good ideas.

Stars glow because they are hot. Anything that is very hot will shine light, just as a fire in a fireplace produces light. And, of course, a fire also produces heat. So, stars do as well, but they are too far away for us to feel their heat. The sun is close enough (it is the closest star to the Earth) so that we see its light and feel its heat. Most stars send out more light than heat, which is why we can see them so far away but not feel their heat. (Actually some astronomers using very special telescopes do study the heat from stars as well.)

Stars and the sun both glow because they are very hot and the source of their heat comes from deep inside of them. The sun, like all stars, is a ball of gas that is so huge that deep inside of it, the gas particles are forced so tightly together that they get very, very hot indeed.

The air you breathe is made up of gas particles that you can’t see or feel. But deep inside the sun, the gas is so closely bundled that it would appear solid to us, far hotter than anything we can imagine.

When the gas gets hot, some of its particles (called atoms) combine in a special way, which is called fusion. And when gas particles fuse, they create more heat. That is the source of energy for the whole sun. Vast amounts of solar gases are being converted into heat every second and that heat filters out the surface of the sun where the gases glow. It is the same for all stars.

Even though the sun is using up some of its gases through fusion, it is so huge and has so much gas that it will go on shining for billions of years to come.

I think it is great that your class has come up with good questions. If you ever become scientists you will

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find that in order to make discoveries, or to learn anything, you must first ask a question. Sometimes it may take years, even centuries, for people to answer the really tough questions. But by careful searching, someone will find the answers. The two questions you asked have kept astronomers busy for hundreds of years already. The answers I gave are part of the story, but there are details that are not understood yet. That is why some astronomers still work at finding better answers.

It is wonderful to know that you are so filled with curiosity. That is so important for a scientist. That’s what scientific research is all about; asking questions and then searching for answers.

If some of you do become scientists one day, you will learn to search for answers to your questions and what you may learn will not always be what you expected. That’s what makes science so much fun. And it doesn’t matter if the answers cannot be found immediately. It is the search that is fun. But until you risk asking the questions, you won’t be able to find the answers, will you?

People become scientists because of the pleasure they experience in seeking answers to questions like the ones you have asked. So never lose your curiosity, and have lots of fun asking questions and seeking answers.

With Best Wishes,
Gerrit L. Verschuur, Astronomer

Any More Questions?
Elementary students are filled with a sense of wonder about themselves, our planet, and the universe. Today’s students are using textbooks, resource materials, the Internet, computers, and other learning technologies when seeking answers to their many questions. However, nothing can compare to having their questions addressed in a letter from a “real” science professional. In addition to the sense of pride the students will feel from having their questions addressed by a professional, the activity provides an opportunity for reflection, collaboration, and communication.

This letter can be the beginning of an ongoing relationship between the students and the science professional. Perhaps the activity could culminate in a manner similar to that experienced by a group of fifth-grade students at Allison Elementary School in Chester, West Virginia. After exchanging a series of letters, Robert Behling, a geologist from West Virginia University, visited the students. Behling, who traveled many miles to their school, accompanied the students on a field trip in which they explored the schoolyard and the local geology. The experience was rewarding for everyone involved.

The letters and the subsequent relationship with the science professional provides not only answers to students’ questions but also career models for the students—a winning combination.

Also in S&C

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