Methods & Strategies

# Making Time for Science

## Strategies to increase instructional time for science

By Joanne K. Olson

Even before No Child Left Behind and the standardized testing movement, science received a disproportionately small part of the school day compared to language arts and mathematics (Bayer 1995). After NCLB was enacted in 2001, instructional time for science diminished even further. According to a survey conducted by the Center on Education Policy (CEP), instructional time in elementary schools has shown an additional 140 minutes per week added to reading instruction and an additional 87 minutes per week for mathematics since 2001. Science has decreased by 75 minutes, social studies has decreased by 76 minutes, and other subjects have declined as well—art is allocated 57 fewer minutes per week, and physical education receives 40 fewer minutes per week (CEP 2007). The result is very limited class time devoted to science instruction. A recent study of teachers in the San Francisco Bay Area found that 80% of elementary teachers spend fewer than 60 minutes per week on science, and 16% report doing no science at all (Dorph et al. 2007). A nationwide survey of teachers indicated that the main reason so little time is devoted to science is the emphasis on other subjects (Bayer Corporation 1995).

Given how current testing pressures have influenced instructional time, questions have been raised about the future of science education. "Although this picture seems to reflect the current status of elementary school science, I am left wondering what will happen to our science classrooms now that NCLB will require a standardized test in the areas of science beginning this year. Will schools see this as a way to improve the quality of science instruction in elementary classrooms? Will schools increase the amount of instructional time currently devoted to the teaching of science? Will the teaching of science become reacquainted with the way science is actually done?" (Smolleck 2007).

Some may argue that little can be done to improve the amount of time available for science until policy makers and administrators provide support. Such support is certainly needed. However, individual teachers can make important changes that maintain the integrity of the other subject areas while making time for science. The following effective strategies are being used by several teachers and school districts to create time for science instruction.

## Time-Making Strategies

**1. *Conduct long-term investigations.*** Science instruction does not have to begin and end in a single block of time. One lesson time might be used to ponder an

important scientific question and another used to help students design and establish tests to answer their questions. Then, over several days, students may need only 5–10 minutes to gather ongoing data. Such data collection could occur when children arrive to class in the morning, after recess, or before lunch. Another lesson time can then be used for consolidation of data and concept development. Many phenomena children study in the elementary years occur over time and can lend themselves well to long-term data collection. For example, students can measure plant growth, monitor bird feeders, measure shadows, or record weather data. Blocks of time are still necessary for children to make decisions about what is being tested or measured and also for important sense-making of the data and development of the concept. However, these blocks of time do not have to be on consecutive days—students can have several days where science needs only a few brief minutes.

**2. *Overlap your disciplines.*** *Overlapping disciplines* means that concepts in each subject are taught separately, but whenever possible, a science context is provided for the skills in language arts or mathematics that we want students to practice. This differs from the term *integration,* which often implies teaching two or more subject matters simultaneously.

For example, after teaching graphing concepts, rather than having students use the examples from the math textbook to make graphs, students can use data they collected in science to make their graph. That graph now has more meaning to the students and is used again during science time when we try to make sense of the trends that we see. If students are learning how to use rich description in their writing, students can observe the classroom aquarium to write about the changes that they see occurring in the tank that they are studying in science.

I have found that complete integration is very difficult because one subject is typically emphasized while the other takes on a secondary role or becomes neglected altogether. For instance, I have seen some units that claim to integrate language arts and mathematics with science, but students are doing math and language arts with a science-topic theme, such as bears. The result is that students count bears, write bear poems, and read stories about bears, but meaningful science concepts are nowhere to be found. The key to overlapping disciplines is to focus on the overarching objective for one discipline and use a skill or concept students are developing in another discipline to help accomplish that objective. In this manner, teachers can extend the application of what students learn in science to other disciplines.

**3. *Employ science homework.*** In the early grades, students are often required to have a parent or guardian read to them for 15 minutes a day, and eventually they do independent reading as homework. Yet science is rarely assigned as homework despite the fact that the natural world is even more accessible than books! A future "Methods and Strategies" column will address many ways to assign science homework, but consider that the journey to and from school, a backyard, the kitchen window, and a local park can be great places for students to make observations of natural phenomena. Assigning time in nature can be an important way to build an experience base that you can use as a basis for your science instruction.

**4. *Consider semidepartmentalization.*** In some schools, elementary teachers are responsible for teaching their "homeroom" students language arts and mathematics and one other core subject—either

social studies or science. Students then switch classes to a partner teacher for the other core subject. This means that a teacher who is the science teacher will teach science to his or her students and then teach another group of students. Numerous advantages exist with this model. The main advantage is that it reduces the number of lessons that a teacher has to prepare and the number of subjects for which a teacher is responsible. This increase in time can be used to develop specialized expertise, including materials management and more focused professional development (such as belonging to NSTA). Another advantage to this model is that science and social studies receive dedicated blocks of time in the school day rather than being scheduled if time is available at the end of the day.

**5. *Remove wasted class time.*** Streamlining classroom procedures can result in a substantial gain of instructional time. How much classroom time is spent doing lunch counts, listening to announcements, taking attendance, putting away materials, putting on coats, standing in line, settling noisy students, packing bags, and getting ready for lunch or recess? If a teacher spends the first 10 minutes of the school day dealing with procedures that could have been reduced or eliminated, this results in a loss of five entire days of instructional time over the course of a school year. When this is added to a typical loss of five minutes after each recess/lunch and 10 minutes at the end of the school day, the result is a loss of 20 days—equal to one month of school!

Some procedures will always be necessary, but many can be streamlined or eliminated. Transitions between subjects, rooms, and breaks are prime spots where time can be saved. Get students started quickly when they return to the room. Take attendance while students are working on an academic task. When possible, show relevant clips of videos rather than the entire program. Have smooth procedures for collecting and distributing paperwork. Decide if "free time" or "homework time" at the end of the day is worth the cost to your science or social studies programs. Even a few minutes adds up to a significant amount of time over the course of the school year.

**6. *Remove or reduce classroom interruptions.*** Defend your right to teach in uninterrupted blocks of time. When the Third International Mathematics and Science Study research team videotaped classrooms in Germany, Japan, and the United States, a striking finding was the number of interruptions that occurred in American classrooms (Schmidt et al. 1999). These interruptions not only disrupt the teacher's train of thought, they also disrupt students' focus and learning. To reduce the number of messages and papers delivered to my room, I taped a large envelope to the outside of my classroom door. On the envelope, I wrote, "Learning in progress. Please do not disturb. If you have a message or delivery, please place it in this envelope, and I will check it during recess. Only knock in case of emergency." I found this worked quite well—handouts for students to take home, phone messages, and other noncritical items went into the envelope rather than into my instructional time. Work closely with special education teachers or others who run "pull-out" programs to ensure seamless transitions for those students and minimize disruptions. Another difficult source of interruption is the school PA system or telephone. If I received consistent interrupting messages or phone calls, I scheduled a meeting with the individual making the calls. Keep such conversations with secretaries or administrators very professional, but assert your desire to keep your children focused and

seek ways to work together to reduce interruptions. This may be as simple as making your daily schedule available to the school secretary so that nonemergency announcements get to you during appropriate times. Make sure your own cell phone is turned off during school hours and check school e-mail only at specified times during the day, such as before school or when students are with another teacher.

**7. *Consider a science specialist.*** Many schools have a physical education teacher and a technology teacher, but fewer have a dedicated science teacher. Science specialists are elementary teachers who teach only science in a room equipped for science instruction. Classes receive scheduled times for science and rotate through the science room in the same way that many classes have scheduled time for physical education, computer education, art education, etc. The advantage to this model is that the school can hire a person with significant science background and preparation for teaching science—something most elementary teachers do not have (Bayer Corporation 2005). Because students see a single science teacher, the curriculum can be very coherent from year to year. The room can be stocked with science materials that do not have to be rotated to multiple classrooms, and safety equipment can be installed in a single location.

## Worth the Effort

Some of the strategies above can be done alone, while others require a partner teacher or administrative support. Even if you can only make small changes to increase the time you have for science, such steps are positive ones and will benefit students. The key is to be committed to a quality science program and to be creative within the context of your school. Keep in mind that all of us, including administrators, care about children's education and want to make decisions that will help them succeed.

***Joanne K. Olson* (jkolson@iastate.edu) *is an associate professor in science education at Iowa State University in Ames, Iowa.***

## Connecting to the Standards

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

### Teaching Standards

**Standard D**

- Teachers of science design and manage learning environments that provide students with the time, space, and resources needed for learning science.

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