

Scientifically Speaking...

Connecting the Future

How will science affect our lives in the years ahead? A science lending library and a series of at-home experiments help students find out

BY DIANE MCCARTY AND MARIBELLE BETTERTON

This article is the third in a three-part series dealing with how science speaks to us in the past, present and future. Although the authors connected the three parts when presenting the unit to students, each part can stand alone.

The authors suggest that to do the project well in its entirety, teachers will need from four to six weeks of 30- to 45-minute daily science lessons. Part one required about three weeks; part two lasted approximately two weeks; and the final section took only one week because the preliminary set-up was in place.

The overall goal of part three of our “Scientifically Speaking” unit was for students to experience the practical side of science in their everyday lives, no matter what age they are or what careers they choose.

While some students may choose a science-related career (for example, a nurse, biologist, science teacher or meteorologist), other students who choose nonscience-related careers will still experience the relevance and practicality of science. They will discover how science affects each and every one of us!

Since students could impact the future of our world through career roles they may choose in science, it was important that students assumed the roles of scientists in a real way. We accomplished this through two methods: One was the use of a science lending library; the other, take-home science experiments.

Help from families. In preparation for this final segment of our unit, a letter had been sent home to families explaining our overall objectives, introducing the lending library and asking for their assistance in gathering supplies for portable experiment kits.

This particular unit had received \$1000

through a local Excellence in Education Enrichment Grant. This allowed us to purchase a variety of excellent science-related books that could be used as rotating take-home books. Since there are two sections of fourth grade, we doubled the order so each room had its own set of books. Teachers who don't have the funds to purchase books – and that, of course, takes in a lot of teachers – may be able to use a local or school library instead.

Saving money. Our grant money could have been used also to purchase standardized take-home kits, which can be found in a science vendor's catalog. Not only did we save money by accumulating our own supplies, it was also a much more personal way to handle this part of the unit. For example, our students actually got to choose experiments from a variety of books that interested them.

During silent reading time, these books (with suggested pages highlighted) were passed around. Students voraciously read about possible experiments they might consider conducting at home.

Armed with these reference books and their creative ideas, each student chose an experiment that matched his or her interest in a science concept previously studied in fourth grade. The suggested experiments related to weather, electricity, sound, exploring rocks, simple machines and so on. A small Post-It™ note with a student's name was simply at-

tached to a particular experiment in one of these books. This enabled us to compile an inventory of necessary items for experiments.

It was much more difficult to accumulate, assemble and distribute the take-home kits this way, but the students pointed out how beneficial it was for them to have that personal ownership. This is a great way to get parent or community volunteers involved when compiling items and distributing them in individual kits. We included a copy of the experiment in each kit.

Experiments and lending library resources were all related to areas of study that enhanced or enriched our existing fourth grade curriculum. We tried to stay away from topics that were taught or emphasized at other grade levels.

Boosting science. The science lending library rotation of books began as soon as we kicked off our full unit. The exposure to good non-fiction literature continually promoted the importance of science to the students. We discovered that the students couldn't wait until they were able to check out certain books. For example, they thought the idea of reading a book called *Lightning* as homework was great fun.

Each child kept a log of books read in a journal called "My Scientifically Speaking Journal." They also wrote a summary about each book and something they learned about it as part of the entries.

As we entered the final week of our unit, it was evident that the science lending library had impacted our students. We found them to be more aware of science in their daily lives. We noted discussions about lending library literature and increased interest in home experiments. Now we felt it was time to introduce the home-experiment component of our unit.

A major emphasis in this part further promoted individual student awareness by asking students to define science in their own words, identify the importance of science in their daily world and describe ways of sup-

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Students (at left and below) share the results of their home experiments with their classmates on Scientist Blitz Day.



porting science in their world today and in the future.

Defining science. One writing activity involved seeking individual definitions of science. We used an open-ended prompt: "I would define science as..." A few of them read like this:

"I would define science as a work of believing (sic) and you have a problem or equashion (sic) that you think is right so you test and test." (Sarah)

"I would define science as a part of life." (Morgan)

"I would define science as a tool for studying the universe." (Andrew)

"I would define science as fun and scientific (sic) (you never know how it's going to turn out)." (Marta)

Another prompt asked why science was important in our world. One student said that without science, "we wouldn't know much of anything." Barbara wrote that "If we didn't have this sertain (sic) type of nalege (knowledge) we wouldn't know half as much as we do now." Alexander elaborated in his journal that "In areas such as medicine and transportation our lives depend on it."

Insights and reflections such as the above

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To Dig Deeper...

Students were enthusiastic about having a rotating take-home library. Some of their favorite titles were:

- 50 One-Minute Science Games* by Robert Bell (Golden, 1997)
- Be a Scientist: Electricity & Magnets*, developed and written by Flying Pages, Inc. Science Consultant: Pauline Lang (Scholastic, 1995)
- Bubble Gum Science* by the editors of Klutz (Klutz Press, 1997)
- Lightning* by Seymour Simon (Morrow, 1997)
- Science - Just Add Salt* by Sandra Markle (Scholastic, 1994)
- Stinky Smelly Hold-Your-Nose Science* (Scholastic, 1997)

For more book choices, see next page.

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To Dig Deeper...

The students were able to choose experiments from a variety of books that included:

175 Science Experiments by Brenda Walpole (Random House, 1988)

Bill Nye – The Science Guy's Big Blast of Science by Bill Nye (Addison-Wesley, 1993)

Science for Fun Experiments by Gary Gibson (Millbrook, 1996)

Science Is... A Source Book of Fascinating Facts, Projects and Activities by Susan Bosak (Scholastic, 1992)

Science Wizardry for Kids by Margaret Kenda and Phyllis Williams (Barron, 1992)

showed how far the students had come in their thinking about science. It was time to begin the home experiments.

Science blitz. The previously assembled kits were ready for students to take home and use. The science experiment blitz had begun!

Given two evenings to conduct their experiments at home, the students were encouraged to apply the principles of the scientific method to this authentic learning activity. The steps include: identifying and making a clear statement of the problem; gathering information about the problem; and testing the hypothesis by making observations and drawing a conclusion. This information was recorded on a Scientific Home Experiment Sheet, which was included in each kit.

By the end of the week, students were ready for "Scientist Blitz Day," when they shared their home experiments with their classmates. Stations were set up so students could verbally describe their observations and demonstrate the results of the experiments. They were encouraged to refer to their experiment sheet as they presented their data. Students gathered around peers as they listened to each "scientist." Questions were posed and answered as the experiment's conclusions were shared.

Supporting science. A debriefing period was conducted at the end of this time. The value of the experiments was discussed as well as the



Scientist Blitz Day gave students an opportunity to discuss their experiments with their peers.

knowledge that was gained through this activity. Various ways students could support science were also included in the discussion.

Some of the fourth graders' ideas were: "becoming a scientist," "learning more about science," "taking the subject seriously," "being more aware of what's going on in the world," "talking about scientific events with my family," "knowing that science supports my world," "trying new things," "doing experiments that could lead to new inventions," "exploring and reading more about science" and realizing that "science is everywhere!"

This final classroom display concluded our "Scientifically Speaking...Connecting the Past, Present and Future" unit. We gained new understanding of ourselves by connecting to scientists of the historical and recent past through our biographical studies which was explained fully in part one of this series.

Students could relate to the viability and necessity of science and scientific studies through current event discussions and involvement in a community need. This was shared in the second article of this unit which connected us to the present.

Finally, science will continue to speak to us in the future through the printed word, through conducted research and through students' chosen careers that might influence our world.

Hopefully, such scientific connections from the past and present have impacted our students to empower their thinking in the future.✚

INTERNET CONNECTIONS

TOPIC: SCIENTISTS AND EXPERIMENTS

- 1 WHELMERS:** www.mcrcel.org/whelmers/ Science experiments that will awe and inspire. Detailed directions with National Science standards for all grade levels.
- 2 SCIENCE IS FUN:** <http://scifun.chem.wisc.edu/scifun.html> Lots of science experiment resources. <Experiments You Can Do at Home> gives materials and background information.
- 3 THE HALL OF SCIENCE:** www.achievement.org/autodoc/halls/sci Biographies and interviews profiling real-life scientists such as Robert D. Ballard, discoverer of the Titanic, Donna Shirley, scientist with the Mars Exploration Program, Sir Edmond Hillary, the first person to conquer Mt. Everest and more. Site features audio, pictures and video clips.