A SUMMER FULL OF SCIENCE

Creating Summer Science Education Opportunities for Elementary Children

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ABSTRACT: Science learning shouldn't stop when school is out for the summer. Opportunities abound to build a presence for science during the summer months (Hymer, 2005). Distances and finances to offer minds-on, hands-on science instruction sometimes restrict those living in rural communities. This article addresses how one small, rural school district successfully developed, planned and carried out a one-day summer science camp by enlisting the help of local high school volunteers. This summer science camp serves as an example of how an idea can grow and touch the lives of many others. *This article promotes National Science Education Content Standard A and the Iowa Teaching Standards 1 and 4.*

The enthusiasm of elementary students for hands-on science activities is not limited to the traditional school year lasting from late August through late May or early June. By enlisting the help of a small group of high school age volunteers, we found a way to incorporate science education activities during the summer for second- and third-grade students in our small rural district.

Our school district offers an eight-week summer school program for kindergarten through seventh grade students. The sessions emphasize reading and math, and are very helpful to the students who attend. We have been involved in the summer school program as reading teachers,

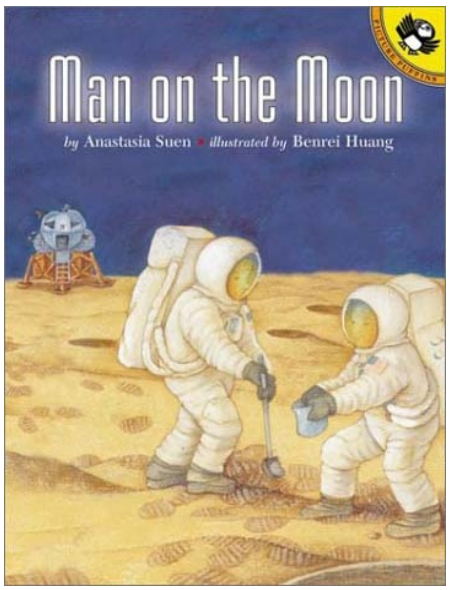
but both thought that incorporating science activities would make it even better. The Science Center, located in Des Moines, Iowa, offered enjoyable summer programs, but the cost and distance would be prohibitive for many students. We decided that if we could not take the students to a science program, we would bring a science program to the students.

Help is Only a Few Grades Away

We enlisted the help of three high school volunteers who were enthused about the idea of conducting a science camp. We met with the volunteers for a brainstorming session. The high school volunteers drew from their own science backgrounds, the Internet, and ideas we shared, to plan a series of hands-on activities appropriate for second-and third-grade students. We offered guidance regarding topics of interest to younger children, age appropriateness of suggested activities, questions that would engage young children, time requirements for each activity, and availability of materials.

An endless number of activities can be chosen to do with young children. Our summer science day was designed around science activities that the volunteer high school students had previously experienced in science classes, and carefully restructured to be appropriate at the elementary level. The high school students orchestrated their activities around physics, earth science and chemistry.

For example, the high school volunteers chose space as one area of interest. With guidance, we developed plans for a rocket building and launching activity. The children's book Man on the Moon by Anastasia Suen, was used to spring board into building the film canister rockets powered by the chemical reaction of alka-seltzer and vinegar. A visit to the Starlab provided a culminating activity for a view and discussion of the night sky. These kinds of exploratory activities introduce children to astronomy and space exploration, and generate interest in science and technology.



Man on the Moon, by Anastasia Suen, is available for review and purchase at: http://www.asuen.com/act.motm.html

Little Scientists….Big Day

Invitations, designed by the high school leaders, were sent out to 2nd and 3rd graders participating in the summer school program. “Super Secrets to Silly Science Camp” was well on its way as we secured the use of the multipurpose room to provide a large air-conditioned area in which to work. All materials needed for the afternoon were prepared and ready to go when the children arrived. With sack lunches in hand, the students started the camp in the nearby park getting acquainted and spending time outside. We chose to do this to help children see that science ideas are helpful for understanding things found in school, in nature, and in the students' own lives…from the sun to the trees to peanut butter and jelly sandwiches!

Continuing on in the multipurpose room, the children were encouraged to share what they already knew about science. Responses varied greatly from “Air takes up space.”, “Everyone has different fingerprints.”, to “The Earth travels around the sun”. These responses were recorded on a poster board and referred to at times during later activities.

Understanding and practicing appropriate safety precautions is important in science and in life, and these are best understood in context. The high school volunteers taught and practiced appropriate safety procedures throughout the day. For instance, the facilitators modeled and explicitly addressed the importance of wearing safety glasses, just as scientists and other people do when a situation calls for such behavior.

Beginning with a problem-solving activity, the students were given a cup of bubbly club soda, and instructed to drop in raisins. Students became excited and curious as the raisins rose to the top, descended and then repeated that behavior. Students spent a couple of minutes making careful observations and recording their findings. They were then grouped into pairs and asked to propose ideas that could explain why raisins rise to the surface of the liquid. The groups were brought back

together and shared their explanations. The role of the high school students during this discussion was to encourage students to offer clear and thoughtful ideas.

Next, a box full of other common objects was then presented to the class, and students were asked, “What other items might rise to the surface?” Each group was given their own box of items, and asked to divide the items into three piles, one consisting of items that they thought would float, a second consisting of items that they thought would sink, and a third for those items they were unsure would float or sink. After sorting the objects into the three piles, students were asked to consider the items in their “float” pile and predict which items would float to the top fastest.

Students were then challenged to test these items to determine how accurately they had divided their piles and to see which objects in their “float” pile went to the top fastest. Connections were made to experiences that 2nd and 3rd graders could relate to such as swimming with a life jacket! Other interesting activities followed, such as making plastic milk (Figure 1), separating pigments found in markers (Figure 2), and the space activities mentioned earlier.

The children particularly enjoyed designing and launching Alka-Seltzer rockets. Each student was paired with a helper during the rocket building part of the activity. Rockets were made by rolling a piece of construction paper around a film canister (Clear canisters with lids sealing inside work best). Children enjoyed decorating the paper with markers and crayons. Using a previously pattern, our students traced and cut out a nose cone, and taped it on top of the construction paper tube. Older elementary students might be challenged to investigate the effect of fins and their effect on the stability of the rocket's flight. They can be further challenged to investigate the effect of the number and placement of fins on the rocket's flight.

Figure 1. *Students make plastic milk.*

Figure 2. *Chromatography using markers.*

Before heading outside, have students observe soda in a clear capped plastic bottle (a clear soda works best for students to see the many bubbles). Vigorously shake the bottle of soda and ask students, “What do you now notice about the bubbles?” Drawing from students' previous experience, ask them, “What will happen if the soda is opened after having been shaken?” Students will enjoy seeing the soda erupt out of the bottle. Now have the students carefully observe the Alka-Seltzer and vinegar. Having observed no bubbles, children will be surprised and enjoy the bubbling wonder that results when you mix the two together. Ask questions such as, “What did you observe happening?” and “Where did the bubbles come from?” Draw students' attention to how, unlike the soda example, the bubbles produced were not in the vinegar or Alka-Seltzer, but were produced in a reaction between the two substances. Finally, draw students' attention to what they observed when the trapped bubbles in the soda bottle were released and ask, “What do you think will happen if our mixture of vinegar and Alka-Seltzer were trapped in the film canister?”

Now have students go outside with their film canisters, many which will look like mini space shuttles. The film canister rockets will be propelled into the air resulting from the rapid release of bubbles resulting from the reaction between vinegar and Alka-Seltzer. With the excitement building, we

headed outside for a launch. Everyone was wearing safety glasses to prepare for launch. Students were given a tablet of Alka-Seltzer. Students poured vinegar into the canister, dropped in the tablet and with assistance from the leaders, snapped on the canister lid. Students were asked to step back behind a pre-drawn line for safety. As our rockets sailed toward the sky, students responded with cheers! Afterwards show students a video of a space shuttle launch. Draw students' attention to the fiery reaction and note how the reaction that propels the space shuttle is far more violent than the reaction between vinegar and Alka-Seltzer.

After our time in the sun, students headed back in to the cool building where a portable Starlab was set up. After a short session on safety, students and leaders removed their shoes and crawled into the dome area with projected stars and moon. To set the atmosphere, quilts and pillows were scattered around. Students found a comfortable position to view the constellations. Leaders gave background information of life hundreds of years ago when people spent more time outside and made up stories about imaginary pictures found in the starry sky. Two common constellations that appear in the night sky, the Big Dipper and Draco the dragon, were used to explain sky locations and ancient history. Once again, the science content targeted was related to students' everyday world. Who doesn't like a summer night sleeping under the starry sky! This was a big hit, requiring "Show and Tell" time upon the parent's arrival. What a great way to make the home-science connection.

The End of a "Super Science Day"

Following the completion of the activities, the high school volunteers asked the young scientists questions such as, "What did you learn when we made Plastic Milk?" and "What made the rockets fly?" The children's responses were listed on chart paper and were used to conduct a discussion summarizing the concepts and vocabulary presented. Students' answers provided evidence that they had learned a great deal during the day. Perhaps more importantly, these children saw science as interesting and as something they can do and understand. To wrap up the afternoon, the students decorated brown paper bags filled with take home items, including a set of directions for each activity so that they could replicate the experiences at home and share their new knowledge with their families and friends.

During the following weeks, the young students commented how much they enjoyed the camp and the opportunity to do investigations like scientists. Parents were enthusiastic and supportive, sharing with us that their children had shown them the activities at home. The camp was a success for the young students, our high school volunteers, and us. This first summer science camp was a win-win situation for everyone, and the beginning of something more.

Now What??

Our first thought is expanding the camp to include more time, more activities, and more children. The possibilities seem endless. In the coming summers, we hope to expand to a week of science incorporated into success of the district's summer school program. We hope to bridge the programs with reading material linked to science activities. With the support of our school district, the expanded program will mean more opportunities for high school students to contribute to the community through interaction with young children.

References and Resources

Hymer, V. (2005). Bitten by the science bug. *Science and Children*, 42(8), 26-29.
National Aeronautics and Space Administration (2007). http://www.nasa.gov/audience/foreducators/index.html
Redmond, A. (2000). Science in the summer. *Science Scope*, 24(4), 28-33.
Suen, A. (2002). Man on the moon. Puffin Books, New York.
Zoomsci (2006). *Plastic Milk*. http://pbskids.org/zoom/activities/sci/plasticmilk.html

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