

**Science in Elementary Education II : Concepts & Challenges
Lyseth & Hall Elementary Schools, Portland Maine
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General Information

This workshop is especially geared toward the science-phobic and science-challenged Elementary School teacher, in the hope of facilitating their understanding of essential physical science concepts and alerting them to the misconceptions that their students may have relative to these concepts. Participants will engage in classroom ready, inquiry based, hands-on activities. "Resource Toolkits" will be provided to each participant towards helping to remediate the aforementioned issues.

Applications accepted until May 1, 2006. The workshops will start at 3:30 p.m. and end no later than 7:30 p.m. Dinner will be provided.

Though the workshop dates and venues are relatively fixed, I will consider requests by administrators to provide an additional workshop on their home district sites.

For updates for venue locations, date and time, please contact Gary Glick at: science-misconceptions@tufts.edu

Rationale

As a high school science teacher, all too often I experience the frustration of having students stuck in the quagmire of their misconceptions, some of which were inadvertently implanted by their previous teachers.

(I hope that ***I'm*** not guilty of doing the same when I teach!)

Regardless, common sense dictates that while it is much easier to fix a problem when it is caught early, it is best to address it proactively, thereby avoiding the problem in the first place!

Focus

- 1) Identify essential science concepts which elementary school teachers generally have difficulty understanding,
- 2) identify essential science concepts about which elementary school students may have misconceptions,
- 3) create a "toolkit" and traveling workshop for elementary school teachers which will help to remediate the aforementioned issues.

Pro-Actions: September 2004 to June 2005

Besides using the existing research (Driver, Benchmarks, Project 2061 Atlas, etc.), I:

- 1) surveyed high school and middle school science teachers in Maine, Massachusetts, New Hampshire, and Vermont for input as to what misconceptions and conceptual difficulties their students were presenting,
- 2) visited elementary classrooms and listened to elementary school teachers discuss their needs in science education.
- 3) created a Science Education Outreach Program for Elementary Teachers (SEOPET) which was presented at workshops in Lowell (Mass.), Falmouth (Maine), and Portland (Maine) in May 2004.

Survey Response Data

The responses I received from high school and middle school science teachers indicated the following misconceptions and conceptual difficulties were being presented by their students:

- 1) What Science is.
- 2) Relative scales of time, distance, volume, mass, and speed in Quantum, Geologic and Cosmic proportions.
- 3) Invisible phenomena, i.e., most Electromagnetic Radiation, evaporation, air as matter.
- 4) Conservation of mass, i.e. a solid dissolved in a liquid add no mass to the solution.
- 5) Density.
- 6) Mass vs. Weight.
- 7) Gravity, i.e. no air means no gravity.

The feedback I received from elementary school teachers indicated their need for support in the following areas:

- 1) Direct, hands-on instruction in basic science concepts.
- 2) "Test Driving" hands-on labs and classroom activities which support these concepts through inquiry based learning.
- 3) Material and vendor lists for the equipment required by these activities.
- 4) Comparative presentation of pre-packaged curriculum modules and units.

Reaction

Based on the survey response data listed above, a Science Education Outreach Program for Elementary Teachers was developed and presented at workshops in Lowell (Mass.), Falmouth (Maine), and Portland (Maine). This year's workshop is a continuation of last year's presentation work.

Workshop Feedback and Evaluation

The feedback and evaluations for the 2005 workshops were overwhelmingly positive and enthusiastically supportive.

I truly enjoyed the workshop. The hands-on activities helped make the information more real and understandable--for instance, the moon:earth ratio or the distance from our planet to our moon. The dinosaur puzzle enforced the concept that preconceived ideas were sometimes a hinderance. Floating and sinking: I think I had an advantage having taught that unit (and I wish I had taken the workshop prior to working with my students). I liked seeing the activities in action--I had read the lessons and tried implementing them in student friendly, engaging ways, but quicksand footing didn't lend itself to confidence. I was actually learning with the kids at the same time! My mistakes were turned into "teaching moments." The workshop made me feel that my way was okay and was part of the discovery.

Paula Borgasano, Lowell Demonstration School, Lowell, Mass.

As a teacher who has taught 1st, 2nd, and 3rd grades, I have to say that the workshop was very helpful. Understanding the facts, reasons, ideas behind what we do with children is super important. Not only that, you and your co-presenter were fabulous and funny. I know you didn't get to do all you had planned, but the pace of the workshop was perfect. It had been years since I had attended such a well planned, entertaining, and informative workshop. Thank you,

Pilar Fabery, Lowell Demonstration School, Lowell, Mass.

The discussion, problem solving practice/experimentation, humor, and sage advice was all thought-provoking, of practical academic value, and fun. Suffice to say your dog & pony show was DEFINITELY worth attending.

Paul Rosenblum, Plummer-Motz Elementary School, Falmouth, Maine

I wanted to thank you for bringing the workshop/teaching demo to Cliff. Both the kids and I got a lot out of your lessons. They are still raving about that day. Everything was well set up and the different learning styles and attention times were met in your presentation. We used your intro lesson with the in-coming K students and the kids were excited about the upcoming school year and Science. Now, I just have to get some Science lessons together and get prepared myself. Thanks again

Judy MacVane, Cliff Island Elementary School, Portland, Maine

Your workshop was awesome, totally useful and fun. I really think we need more hands-on stuff. .Always get sleepy at the theoretical workshops which we've all had ad nausium. I spoke with Jeff the next day and we both felt it would be very useful to have you return and do something in the Fall. Keep up the good work. Portland needs much more Science and workshops around how to deliver this important curriculum.

Leslie Romanow, Lyseth Elementary School, Portland, Maine

Just to let you know that Hall teachers came back totally energized and excited by your presentation. They said it was one of the most valuable educational opportunities they have experienced - high praise from them.

Deirdre Steiner, Principal, Hall Elementary School, Portland, Maine

Conclusion

This effort to provide science outreach to elementary teachers proved to be a positive, rewarding experience to both the attendees and presenters alike. While one outreach program alone won't make a significant dent in the daunting need for reform and support in Elementary Science education, it can have a profound effect on a local level, and can present an effective model for larger scale efforts.