Physical Science with Mathematics Modeling Workshop

Karen Heins
Admire Middle School, USD 251

For the past three summers, I have had the privilege to participate in the Physical Science with Mathematics Modeling Workshop. The sessions were done in conjunction with Fort Hays State University during the month of July. Each year a new instructor is brought to campus to conduct the sessions. All three years we worked with Earl Legleiter, who has taught white boarding for many years.

The sessions began with a pretest of our knowledge. Then throughout the class, misconceptions were addressed through laboratory activities. These investigations involved both discussions through white boarding and lab technology by working with graphing calculators, logger pro and probes from Vernier.

After completing course work on the topic, the teachers were divided into groups to address the Kansas Science Standards. Each group was assigned a standard, then asked to create a pre/post test and a teaching unit centered on that standard. The completed units were shared with classmates. Last summer, a new twist was added. Each Emporia State group was partnered with a Fort Hays State group. Fort Hays worked on one indicator within the standard while Emporia State worked on the other indicator. We would hold video camera conferences with our partners to discuss what our plans, activities, and tests were for the unit as well as how these correlated to their groups.

After our units were developed, the teachers had the opportunity to assess the units with area students who signed up for a science day camp. The standards and students were subdivided into two groups. The teachers then conducted 45 minutes sessions from their unit. Input was given from teacher classmates [who sat in on the sessions with the students] about strengths, areas to clarify, and overall thoughts. From this information, the units were revised, submitted, and posted on a Fort Hays State website to allow access by all class participants. The teachers, at some point in the school year, taught the entire unit from Fort Hays State and Emporia State. Information about the results of that classroom testing was then relayed to the other team.

In addition to the units that were created, participants also toned their skills in white boarding and gained new knowledge about Socratic Circles. A Socratic Circle is a great way to have students discuss. I used this method in my science classes this year with articles that were obtained from newspapers. To explain this method, briefly, the class is divided into two groups. The inner group, who are the only members allowed to talk, discuss the article while the outer group listens and keeps track of how many times each person participates. The roles are then reversed. This method helps prevent domination of the conversation by one student.

The rewards for participating in this three-year class have been many. The obvious ones are meeting and making new friends, sharing teaching ideas within and outside of our assigned topics, and the anticipation of each following summer. We did not believe things could get any better, but they did! Each participant received 3 hours of graduate credit each summer, $500 to purchase technology items for their classrooms, and funding to attend KATS Camp.

I would like to thank everyone who made this learning experience possible. It has been a very worthwhile endeavor that has strengthened my teaching abilities and allowed me to share new knowledge gained with my students!