Creating a Passion for Science

BY JOHN STRAND, *Park Parent Editorial Board*

After nearly two years, Park is nearing completion of a top-to-bottom review of its science program. According to Karen Manning, Chair of the Science Department and Grade VI and VII science teacher, the most important motivator for the review was the recognition that in repeated worldwide surveys, the U.S. places disturbingly low relative to other developed countries in how its students perform in math and science. (For instance, the World Economic Forum's 2009-10 survey placed the U.S. 52nd among 138 countries surveyed.) Science educators noticed this trend and recognized that the way science was being taught had to change so that students would be better prepared for the challenges facing them in the 21st century.

Park's administration also took notice. According to Karen, a desired outcome of this program review was to "make the Park School a leader among its peer schools in science and technology. We want Park to be the school you send your child to get the best science education."

Upper Division students dive into hands-on science.

The final motivation for conducting a thorough review of the science program came from finally having a comprehensive set of national science and engineering teaching frameworks (developed by a Committee on Conceptual Frameworks for New K-12 Science Education Frameworks, established by the National Research Council (see http://www.nap.edu/catalog.php?record_id=13165#toc). Karen Manning states that "these frameworks identify the core and cross-cutting ideas in science, engineering and technology for use in the development of curriculum standards. They also provide guidance for the implementation of these core ideas across the grades."

BEST PRACTICES

For the past 18 months, the members of the Science Department immersed themselves in an intense evaluation of their own teaching methods, as well as a review of established "best practices" and core scientific ideas. Several changes are now becoming noticeable. Karen explains, "One change that has emerged as a result of the review process is our approach to teaching science. We are moving toward making science more inquiry-based and student-driven as we continue to challenge the students to think more independently and critically, which ultimately will get kids excited about science."

Other general themes are emerging as well. For instance, Karen notes, "students are becoming more facile at generating and evaluating ideas based on scientific evidence and their own observations." Brian Cassie, Park's science teacher for Grades I-III and the 2011 MAST (Massachusetts Association of Science Teachers) Norfolk County Science Educator of the Year, reinforces the point: "We must encourage students to follow their own scientific interests. We need to get the kids excited about sciences. I have 168 students all with different passions. Each of those kids helps elevate the passion level with everything we do."

BACKYARD SCIENCE

One of the practical ways that Brian promotes passion about science is to keep some of his teaching, at least at some level, local, so that science can become part of a student's everyday life. On Mr. Cassie's door is a sign that says "life is three-dimensional." Brian explains, "Not everything can be done on the computer. There are really good hooks right in Park's 'backyard.' Every opportunity to engage students is important." For instance, he notes that because of the preceding warm and wet summer, this past fall was one of the best in memory for mushrooms. Despite the fact that mushrooms are not necessarily normally part of his curriculum, he

continued on next page

Science, continued from page 5

challenged his classes to collect 100 types of mushrooms – they returned with over 350! Such local phenomena help elevate kids' passion, but as Brian points out, it helps that we have a "fantastic parent community that is also passionate about science."

Inquiry-based learning is part of the new approach of "trying to get the kids to understand enduring concepts that can be applied to many different circumstances," says Karen. "Instead of just learning when the dinosaurs went extinct, we try to teach why the dinosaurs went extinct. The students can then apply that information to help figure out the cause of current day extinctions. Focusing more on the 'why' as opposed to the 'what' and 'when' is a way to get the students to think independently, to ask questions, and to learn the ways and processes necessary to get answers."

In addition, the department also determined that relying solely on unit tests is not the best way to assess a student's level of understanding because it may be "too little too late." Instead, Karen explains, teachers "take more frequent mini-assessments of the students' level of understanding, either through a review of the students' scientific notebook entries or through periodic 'Jumpstart' mini-quizzes, to know when to slow down, or what to expand upon before moving onto the next concept. The emphasis is on the student's level of understanding, not on getting through the material."

Although the main focus of the review has been on adjusting the teaching approach to encourage greater enduring learning, there are other important goals that may result in recommendations on staffing requirements, facility improvements, professional development opportunities, and concrete steps for continued review and renewal.

The written report of the progress to date is expected to be completed this spring, but the review process is by no means over. In order to continue to provide the best level of science education, Karen concludes, "we must stay abreast of the current research and practices in science education. We will have to continuously tweak and adjust our curriculum to meet the ever-changing needs of our students as they prepare for the job market of the 21st century."