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Down to a science

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WRENTHAM - What high school students like most about biology is hands-on activities and lab work.

So says King Philip Regional High School science teacher Loreen Meyer, who now sits atop the food chain of her peers.

Meyer recently became president of the Massachusetts Association of Biology Teachers, which seeks to "provide biology and life science teachers with the support and up-to-date information necessary to teach biology," its website states. The group's membership ranges from elementary school to college.

"I just finished the year with the opportunity for my sophomores at KP to design their own experiments related to plant nutrition," Meyer said, noting that a Toshiba America Foundation grant she received funded the work. "They really demonstrated how much they had learned over the year and how the various topics related to each other.

"In general, students don't like vocabulary, studying for tests, reading the textbook and MCAS testing."

Meyer, who came to KP in September 2003, is spending the summer in a laboratory, herself.

She is working with Clark University professor David Hibbett and his research team "sequencing part of the fungi kingdom" through a National Science Foundation Research Experience for Teachers grant.

"The overall goal is for me to have the research experience, and then bring it back into my classroom and get my students involved in the process," said Meyer, 50, of Franklin.

"This will be especially targeted toward my AP Biology class. The details of how this will translate into the



Loreen Meyer, King Philip HS biology teacher. (Staff photo by MARK STOCKWELL)

classroom will be part of my summer assignment, so I will be better able to answer this in September."

This interview was conducted by e-mail.

SUN CHRONICLE: Many school budgets are struggling to keep up with the times. How has this affected high school biology instruction?

LOREEN MEYER: I think that the biggest issue is class size.

Once your classroom exceeds 24 students, you have gone beyond the safety guidelines issued by OSHA, the National Science Foundation, the Massachusetts Department of Education and numerous science-based professional societies such as the National Association of Biology Teachers and the National Science Teachers Association.

This forces the elimination of many lab activities because there are too many students to safely run the activity and you begin to run into a whole host of liability issues. So, what gets cut first is the No. 1 thing that students like best about biology and, studies have shown, that this is also the most effective teaching tool we have.

Materials for these labs are also very costly and that will be a limiting factor as to how many activities get done. Field trips are becoming more and more rare.

Biology is a rapidly changing science. New information is being published daily.

A 10-year-old book is not only dated, it's wrong. Budgets can't keep up with that. Teachers supplement with other materials, but the copying time and expense can also challenge that. Teachers are also known for purchasing what they need out of their own pockets. They are not able to do that as much in this economy.

Going back to the class size issue, if a teacher has 30 students in a class and teaches five classes, that is 150 students. It becomes impossible to provide quality individual attention to each student and to thoroughly grade lab reports, literature reviews, open response questions and essays.

These are the assignments that allow students to demonstrate that they can apply the concepts that they have learned. For example, if it takes 10 minutes to evaluate a lab report and the teacher has 150 students, it will take 1,500 minutes, or 25 hours, to correct those reports. This is not effective for either the teacher or the student.

SC: Biotechnology is growing in Massachusetts. How are high school biology teachers preparing students for jobs in this field?

MEYER: The biotechnology industry solves problems in the biological sciences using the tools of science. Both high school and middle school teachers provide classroom situations that allow students to solve problems in biology using the tools of science.

Of course, our tools are not nearly as cool as the tools found at our local biotech companies.

That being said, there are a number of initiatives in the state that bring biotechnology into the classroom and bring the students into the biotechnology companies or into the local colleges and universities with strong science programs.

Once again, MABT provides our membership with workshops in these areas. We also alert teachers to programs being offered, opportunities for student internships, grants and other sources of support.

SC: How do you see high school biology classes evolving over the next five to 10 years?

MEYER: Assuming that the class size issue can be addressed, I think that you will see a move toward increased independent and activity based learning and less lecture. This is a trend that we are seeing in education in all disciplines. It's often referred to as student-centered learning.

Personally, I would like to see more of a focus on organisms and less of a cellular and chemical focus in an introductory biology course.

Fifteen-year-olds are not very interested in a chloroplast but are in awe of a 100-year-old tree towering above them. Eventually, you can make the connection between the two but there's not much time to get through the standards that will be tested in the biology MCAS to do both well, so the focus tends to be on the chloroplast and not the tree.

In an introductory course, I would like to have the students have the awe factor first.

These kids are growing up with Planet Earth and Life and they are fascinated with these shows but the research shows that they are not spending much time exploring their environment.

Start with the living and get them excited, then move to the cellular and molecular. If they are excited about biology and want more, offer them electives in cellular and molecular biology and break out those biotech tools. But this is where the budget rears its ugly head.