

# UMass scientist, teacher team up to develop plant experiments for middle schoolers

By DUSTY CHRISTENSEN  
@dustyc123

Saturday, August 26, 2017

AMHERST — Amherst-Pelham Regional Middle School science teacher Elliott Kelly held the rapt attention of everyone in his classroom on Friday, demonstrating to his colleagues and scientists from the University of Massachusetts Amherst an experiment he designed for use in the middle school this fall.

By growing various varieties of plants in different conditions — soil with high levels of salt or heavy metals, for example — Kelly hopes the experiment can teach kids about how plants respond to environmental changes.

“So what do you do if the whole thing is a bust?” someone from the group asked — always a possibility with any science experiment, but something no teacher wants their classroom to experience.

“You say, ‘Hey, science is hard!’” fellow middle school science teacher Norman Price chimed in to laughter. “Real science is hard.”

The plant experiment is one of several that Kelly developed, and are the product of the inevitable cross-pollination of scientists teaching at all educational levels in Amherst. Elliott designed the different experiments during six weeks this summer at UMass, where he worked with leading molecular biologist Elizabeth Vierling as part of her National Science Foundation grant to study how plants respond to environmental stresses.

“Without this summer, I wouldn’t have done them,” Kelly said of the experiments, which clearly drew his colleagues’ intrigue.

Without weeks to design the experiments, Kelly said he wouldn’t have had the confidence he now has to run them with students.

Those plant experiments are particularly germane for seventh-graders, Kelly said. At that grade level, students study life sciences but don’t have any living organisms they can actually experiment on.

What’s more, in an era of climate change, widespread pollution and the increasing potential for ecological catastrophe, Kelly said it’s a valuable



lesson for students to be learning how plants react to different conditions.



“What’s cool to me is these are the plants scientists are using to study drought tolerance,” Kelly said of the plants being used in his student experiments to study those exact same conditions. “They’ll have a concrete experience to go with what they’re hearing in the news.”

That concrete experience also held the attention of everyone in the room, who engaged in intelligent conversation about the experiment’s design, practiced transplanting plants and working out any kinks before students run the experiment in the fall. The only one not intimately engaged and excited about the opportunity was science teacher Jennifer Welborn’s dog, Bari, who lay lazily on the floor looking on.

“In three hours, it was a master class,” Price, the science teacher, said after Kelly’s presentation.

“That’s brilliant,” Welborn said, looking at how the plants in one experiment are watered by placing them in a tray full of water and discussing with fellow teacher Jonathan Newman how that will cut down on cleanup.

Kelly himself worked through the same experiments over the summer at UMass, developing techniques like growing plants in film canisters, which students can then grow facing sideways, upside-down or any which way to see how they react to gravity and different orientations.

Kelly was designing those experiments in Vierling’s lab as part of the outreach that the NSF requires of those who win the foundation’s grants.

“My outreach was to try to convince a teacher to work in the lab,” Vierling joked.

Kelly was more than willing to be that teacher. In addition to bringing Kelly into the lab, Vierling also wrote supplemental funds into the grant to purchase the shelving, lights, pots, plants and other equipment the middle school needed for the experiments.

Also on hand to help facilitate the experiments were UMass Amherst graduate students Corinne Herlihy, who is studying education and will be working as a student teacher at the middle school, and Sam Corcoran, who studies plant biology and will be volunteering to help with any setup, cleanup or questions that might arise when the teachers run the experiments.

“I’m hoping to be an extra set of hands,” Corcoran said.

The project is like many that feature collaborations between local educators and scientists. In Welborn’s after-school science class, for example, UMass professors help students solve real-world problems with science.

“It’s sort of crazy that we have a whole university of scientists just a mile away,” Vierling said, talking about the importance of scientists working together as she did this summer with Kelly developing the experiments.

Because the science teachers rotate grade levels each year, however, Kelly won’t actually get to run the experiments with his own class of eight-graders next semester. That grade level studies the physical sciences.

In other words, the new experiments — Kelly's brainchildren — will germinate in the hands of the school's other science educators.

"I'm going to try and figure out how to be helpful without driving them crazy," Kelly said of his colleagues. "Or drive myself crazy."

Dusty Christensen can be reached at [dchristensen@gazettenet.com](mailto:dchristensen@gazettenet.com).

---