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SU Affirms Commitment to Sustainable Science with 'Green Chemistry' Workshop

Teachers from 24 area high schools learned about the benefits of sustainable science during the "green chemistry" workshop.

Green chemistry was the focus of a recent teacher workshop in The College of Arts and Sciences. Nearly 30 teachers from 24 area high schools converged at the Life Sciences Complex to learn more about the benefits of sustainable science and how the "12 Principles of Green Chemistry" may be integrated into their classroom curricula.

The workshop was sponsored by the New York State Department of Environmental Conservation (NYSDEC), through a grant from the U.S. Environmental Protection Agency (EPA)-Region 2, serving New York, New Jersey, Puerto Rico, the U.S. Virgin Islands and eight tribal nations. Beyond Benign, a Massachusetts-based organization that promotes green chemistry through scholastic curriculum and training, was contracted to conduct lab experiments during the workshop.

Aida Potter, chief of toxics reduction and green chemistry at NYSDEC, and Deborah Knight, a NYSDEC environmental program specialist, facilitated the workshop. Amy Cannon and Kate Anderson, directors at Beyond Benign, conducted the laboratory experiments and were assisted by Dusti Vincent, a teacher from Skyline High School in Ann Arbor, Mich. Members of SU's chemistry department, chiefly Gary Bonomo, assisted with workshop logistics.

"By implementing green chemistry practices, teachers and students can take pride in learning about and conducting chemistry in an environmentally responsible way that reduces the amount of hazardous materials in the classroom," says Potter, who delivered the workshop's opening remarks. "Using green chemistry encourages everyone to consider the life cycle of the chemicals with which they work and to promote awareness of chemical toxicology by focusing on sustainability and how actions in the lab impact the environment. … Going green also means saving money, which is good for the economy."

It used to be that synthetic chemists—those using chemical reactions to obtain a product—played a secondary role in the environmental movement. All that changed in 1998, when two such

chemists, Paul Anastas and John Warner, coined “green chemistry” in their landmark book by the same name.

Since then, the term has come to embody a set of guidelines, aptly called the “12 Principles,” that reduces or eliminates the use of hazardous substances in the design, manufacture and application of chemical products.

“For educators, green chemistry can be a tool for inspiring students to pursue scientific careers,” says Karin Ruhlandt, Distinguished Professor and chair of SU’s chemistry department. “It can also lead to healthier, safer schools; a well-informed public; greater student engagement and retention; and better preparation for college and the workplace.”

At SU, attendees participated in labs, hands-on activities and technology applications, all within a creative, interdisciplinary framework.

Potter says the goal of the workshop program is to encourage teachers to buy and use more benign chemicals.

"This reduces the purchase of toxic chemicals, improves classroom safety and promotes more inquiry-based activities that allow students and teachers to 'think outside the box,' when dealing with toxic chemicals and their impact on personal safety and the environment," she says. "This is the foundation for future generations of science students."

Knight explains that the idea isn’t to give teachers more things to teach, but to give them a better, safer way to present important concepts.

“Our hope is that students and teachers see the responsible application of science in society, thus increasing their scientific literacy,” she says, adding that attendees at the SU workshop came from as far away as Jefferson and Steuben counties.

Bonomo, a lab supervisor who also teaches a general chemistry lab course, concurs with Knight.

“If teachers receive training in green chemistry, they can prepare students with the skills needed to explore sustainable solutions for global environmental issues,” he says, citing, as an example the use of replacement labs for increased safety and reduction of waste. “Green chemistry enhances other aspects of the curriculum too.”

Already, SU has incorporated green chemistry labs into its general and organic chemistry curricula. Bonomo hopes K-12 schools, as well as other colleges and universities will follow suit.

“At the end of the workshop, more than a dozen teachers expressed interest in partnering with SU on a joint proposal to the National Science Foundation that would enable our graduate students to visit high school classrooms and help teachers present new green experiments," he says proudly. "The goal of this is to generate interest in the sciences."

A recent EPA Region 2 report affirms New York State is poised to be a leader in the green chemistry revolution.

“Building off strong regional collaborations is a key starting place for mobilizing a large set of stakeholders,” states the report, alluding to a recent groundswell of community health campaigns, funding sources, professional societies and collaborative networks. Case in point: the SU workshop was the sixth in a series that is ultimately going to occur in every geographic area of New York State.

But the report also underscores the importance of looking elsewhere for inspiration. For example, Vincent, a resident of Michigan, was one of a quartet of presenters at SU.

“At Skyline, we begin our chemistry course with green chemistry in the forefront,” she says. “We go over the 12 Principles and use them as a guide for the course. We have done replacement labs, as well as essential oil extraction, using dry ice.”

Vincent also uses green chemistry in her advanced placement classes, when presenting such high-minded concepts as cell signaling and biomimicry (i.e., the study of models, systems and elements in nature to help solve complex human problems). “Our lessons are adaptable and realistic for almost any classroom,” she says.

Knight applauds such efforts, adding that green chemistry is an effective way to meet society’s needs, without resorting to toxic chemicals and pollution.

“It’s been said that the moment a chemist puts pen to paper, he or she is making determinations about human health and environmental impacts, associated with chemicals,” she says. “By supporting the advancement of green chemistry, Syracuse University is making a commitment to the three pillars of sustainability: environment, economy and social equity."