

Chemist focuses on education for real-world sustainability challenges

February 18 2011

Introductory college science classes need to improve their coverage of issues related to sustainability, a noted chemistry educator told the American Association for the Advancement of Science today.

"Across the nation, we have a problem," said Catherine Middlecamp, a distinguished faculty associate in chemistry at the University of Wisconsin-Madison. "We are using a 20th-century curriculum, and this is the 21st century."

Students, Middlecamp says, want a curriculum that will prepare them for upcoming challenges related to climate change, pollution and environmental health.

"You can see, from the questions they ask, the volunteer projects they undertake and the papers they write, that they are intensely concerned about the fate of the planet and the living realm. And because many of our students will not be taking another science course, it's vital that our introductory courses prepare them for their future," she says.

Middlecamp discounts the idea that a focus on [sustainability](#) will make courses less rigorous. "The chemical equation I balanced in 1968 is still balanced the same way today, but when I teach about energy, air quality or climate change, the data and the interpretations are changing all the time. They are a moving target," she says.

Rather than being watered down, "teaching in context, teaching that is

connected to the real world is actually tougher," Middlecamp says, "because the curriculum that some consider rigorous actually has most of the answers in the back of the book, whereas we are dealing with issues where we don't know the exact nature of the question, much less what the best answers will be."

Middlecamp supervised the new edition of "Chemistry in Context," a textbook published by the American Chemical Society, and wrote its new chapter on sustainability. She has taught introductory chemistry at UW-Madison for 30 years.

In her courses, Middlecamp must teach the basics about chemical reactions and bonding, but to that she adds key concepts for environmental sustainability, such as the carbon cycle and the nitrogen cycle.

"Here's a key concept: Everything comes from somewhere and goes somewhere," she says.

Elise Niedermeier, who took Middlecamp's introductory chemistry class in 2007 and is now in graduate school at the University of Minnesota, says, "I was struck by the way [Middlecamp] connected her lessons to everyday life. Her enthusiasm and expert teaching made the material she presented on sustainability compelling and easy to link to everyday life."

Middlecamp notes that sustainability allows her to approach standard chemistry topics from new directions. "A class can start by discussing pollution from diesel engines, and still cover bonding and how to balance chemical reactions. At the same time, it satisfies a desire to learn about energy and air quality," she says.

The real world — and its future — are always on Middlecamp's mind as she teaches. "A [chemistry](#) course ought to be the start of a conversation,

not the end of one," she says. "Often, the response I get is, 'Thank you for teaching a course that connects with my life today and the kind of things I will be doing, and for caring about for the rest of my life.'"

Change in the curriculum could be coming faster, Middlecamp says. "It takes time to change a course, especially one that is taught at a large university to thousands of students each semester, but colleagues are definitely thinking about this," she says. "These topics are exciting, timely and urgent, and these changes would benefit not only the discipline, but also our students and the university. It's not a choice between teaching content or teaching in context. We can do both, and we must do both.

"Students are looking to make the world a better place, and we need to do what we can to help."

Provided by University of Wisconsin-Madison

Citation: Chemist focuses on education for real-world sustainability challenges (2011, February 18) retrieved 3 May 2024 from <https://phys.org/news/2011-02-chemist-focuses-real-world-sustainability.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--