

New Castle County Vo-Tech teachers lead on new science standards



Hodgson Vo-Tech teacher Rachael Smith presents at a NextGen Teacher Leader convening. Smith said the Next Generation Science Standards force her students to figure things out on their own.

When Delaware adopted the Next Generation Science Standards (NGSS) in 2013, educators in the **New Castle County Vo-Tech (NCCVT) School District** immediately set a plan in motion to align their classroom instruction to the new standards.

For the past two years, NCCVT science teachers have participated in the state's NextGen Teacher Leader program, an intense and on-going professional learning experience that engages teachers from throughout Delaware in the standards and concepts of NGSS so that they can train their colleagues on NGSS practices.

NCCVT also devoted 7 1/2 days of district-wide professional learning to NGSS, further ensuring its teachers and students are comfortable with the new curriculum and learning practices in science instruction.

Brian Heeney, a biological sciences teacher at **Delcastle Technical High School**, said NGSS has transformed his classroom and his students in unexpected ways.

“Students are becoming better writers. They construct explanations in a daily basis both in their notebooks and online through Schoology,” he said referencing the online learning management system. “Students are citing evidence without being promoted to do so, and are taking advantage of the opportunities given to them to revise and edit

their work. They are also learning that failure in science is not a bad thing, and often leads to new evidence and understanding.”

Fully implemented in Delaware science classroom during the 2015-2016 school year, NGSS is an overhaul of the science instruction most of us knew from the 1990s. When DuPont Industries encouraged Delaware’s Science Coalition to develop a statewide science curriculum for Delaware 15 years ago, the motive was to make students successful in an increasingly changing world.

True to form, science and technology have changed significantly since then. Computers have become tablets, cell phones can monitor blood sugars and heart attack risk and saving the environment has become an equally local and worldwide challenge.

NGSS is designed to prepare students not only for these types of world issues but to also provide them the problem-solving and communication skills instrumental in addressing future challenges throughout their personal lives and careers.

Included in NGSS is a framework for what it means for a student to be proficient in science – one that is considered three-dimensional because each standard includes three components: 1) Practices that describe behaviors scientists engage in as they investigate the world; 2) Crosscutting concepts that can be applied across all domains of science; and 3) Disciplinary core ideas that focus curriculum, instruction and assessments on the most-important aspects of science.

Through NGSS, students immerse themselves in hands-on, real-world problems that begin with the presentation of a “phenomenon,” or issue, for students to solve. Through this approach, students make personalized connections with information presented in physical science, life science, earth and space science, and engineering and technology.

Alongside the Department of Education, the Delaware Science Coalition, comprised of district, charter, business and non-profit representatives from throughout the state, has been working hard to lead Delaware’s NextGen Teacher Leaders through the process of not only learning NGSS but also revamping Delaware’s science kits, which are the curriculum materials delivered to every Delaware science classroom that teachers use to present hands-on science instruction. This combined effort provides educators with the resource and curriculum they need to make students more proficient in today’s science and technology, and across multiple subject areas.

“NGSS requires students to figure things out on their own, so teachers have to build a series of lessons that gradually build student understanding,” said Rachael Smith, a science teacher at **Hodgson Vocational-Technical High School**. “Through NGSS, students gather, reason, and communicate this learning much more independently.”

For instance, says Smith, one lesson might incorporate a reading in which students gain information on certain content. Students then participate in a hands-on lab activity about the content, and are then asked to apply their understanding of the content in a project.

Smith coordinates her classroom around the idea that students are scientists. They gather and communicate their own understanding of the science content, and she sees them become more curious about that they are learning along the way.

“I was pleasantly surprised that my student scores on the fall final exam were higher than last spring. I attribute that improvement to the shift to NGSS,” Smith said. “In my opinion, my students are better problem solvers and are able to analyze and better reason because of NGSS.”

Both Heeney and Smith acknowledge it would be easier to stand at the front of the class and give students answers, rather than have students solve science-related problems on their own, but the changes they have seen in their classroom using NGSS have been worth the added effort.

“When my class was in a more ‘stand and deliver’ format, the students only cared about the material long enough to ensure they passed the test,” Smith said. “Now, students are learning out of their curiosity to figure out the answers, not just to pass a test. They retain the content much better than they used to.”