DELAWARE GK-12: A PARTNERSHIP FOR IMPROVING SCIENCE EDUCATION IN VO-TECH HIGH SCHOOLS

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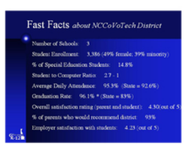
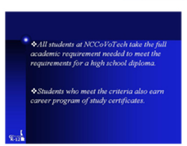
Graduate Teaching Fellows in K-12 Education (GK-12)

Project Description

The University of Delaware and the New Castle County Vocational Technical School District have initiated a GK-12 partnership in which nine UD graduate students in the sciences are selected annually to serve as Fellows. Fellows have been paired with high school science teachers, and these pairs, along with the PIs of this program, have formed a learning community focused on examining and reflecting on current issues in science education while specifically addressing critical needs in teaching science in vocational technical high schools. During summer workshops and in follow-up meetings facilitated by the PIs, the Fellows have been introduced to innovative teaching strategies including problem-based learning and coteaching. Fellow/teacher pairs are developing activities and assessments that are in alignment with state science standards and that support student learning through inquiry. In this GK-12 project, Fellows have enhanced the science classroom experience for high school students while simultaneously gaining insight for themselves into current issues of science education. Fellows gain a better understanding of and appreciation for the complexities and nuances of teaching science in vocational-technical high schools. Furthermore, Fellows have grown in their ability to communicate scientific understandings to an audience with multiple and diverse learning needs.

http://www.udel.edu/GK-12/





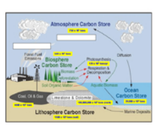
Project Highlights
Lesson Study

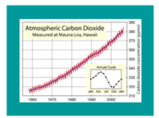
Lesson study is a Japanese approach to instructional improvement. It is a cycle in which teachers work together:

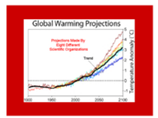
1. To consider their long-term goals for students,
2. Bring those goals to life in research lessons,
3. Conduct the lesson (with one team member teaching and others gathering evidence on student learning and development)
4. Collaboratively observe, discuss, and refine the lessons.
5. Teach the revised lesson in another classroom to study and improve it again.

Participants: Katie Skalak, Richard Donham, Ralph May, Carol Buswell, Tami Lunsford, Fran Smart

Group developed, taught, observed, and analyzed a research lesson on Global Climate Change and Alternative Energy Sources and Fuels. The lesson was conducted over a period of three days in block scheduling. One member of the group taught the lesson while other group members observed student learning and made detailed records of their observations. Lessons were also videotaped for future analysis.







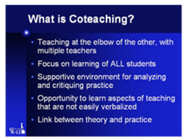
The group is now focusing on developing quantitative reasoning skills and has partnered with the Math department. The goals for the lesson study group for the upcoming semester are:

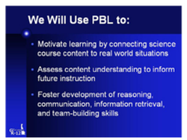
1. Increase classroom research and reflective practice.
2. Develop a body of peer-reviewed lesson which can be shared.
3. Continue to work collaboratively.
4. Increase communication between Math and Science.
5. Increase student understanding of quantitative reasoning skills (i.e. graphical interpretation, equation manipulation).

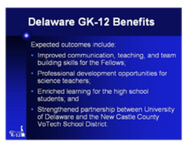
Project Highlights
Incorporating Research

A teacher/fellow pair at Delcastle has developed a web-based semester long activity which integrates the fellow's research into the Physical Science curriculum while addressing the Delaware State Standards. Students will:

1. Conduct their own research on an aspect of hydrothermal vents.
2. Communicate with their research group through a web page that they create to upload images and research.
3. Integrate their research into a poster.
4. Evaluate posters in a poster presentation session at the end of the semester.







Project Evaluation

The planned evaluation includes external and internal activities. The Evaluation and Assessment Center for Mathematics and Science Education (E & A Center) in Ohio will serve as the external evaluator for the proposed project. The Center brings together the strengths of three evaluation groups: the Evaluation Services Center (Dr. Deborah Zorn, Director) at the University of Cincinnati, the Applied Research Center (Dr. Robert Seufert, Director) at Miami University—Middletown, and the Evaluation and Assessment Center (Dr. Jane Butler Kahle, Principal Investigator) at Miami University-Oxford. The Center is the repository of valid and reliable instruments to assess progress in the various science disciplines. It is noted for its effective dissemination of research findings through both scholarly and popular venues.

Based on the goals of the project, the evaluation will be guided by the following questions:

1. Do the project activities deepen and extend science content knowledge for fellows, teachers, and high school students?
2. Do the project activities deepen and extend pedagogical knowledge for fellows and teachers?
3. Do the project activities create learning communities?
4. What elements of the program become institutionalized as a program partnering STEM graduate students and teachers to address critical issues in high school science education?

Multiple sources of quantitative and qualitative data will be gathered from fellows, faculty research advisors, cooperating teachers, and high school students. In addition, artifacts, including PBL and Lesson Study units, will be collected and used to address the evaluation questions. The external evaluation will also review reports conducted as part of internal evaluation activities.