

## Promising Practice in Action: *Science and CTE Teachers Collaborate to Enrich Student Learning*

**Bath Regional Vocational Center (BRVC)<sup>1</sup>  
Bath, ME**

**Jon White, former Director (recently retired)  
Merton Dearnley, Director**

- **Location:** Integrated locations on both sides of Morse High School.
- **Student population:** 220 (others take some classes but are not enrolled in CTE programs)
- **Sending schools/districts:** 4
  - ▶ **Program focus:** Partnership with Morse High School to integrate science into four CTE program areas—health/sciences, auto technology, computer-assisted design (CAD), and building construction. Students receive one half-credit science elective each year and can fulfill the 3<sup>rd</sup> year of the science requirement in two years.

Jon White, the former director, said he was a little hesitant to apply to be a *promising practices* site because the project at BRVC was just getting underway. But he was excited about what was happening and wanted to “get it out there.” He thought it was impressive that one of Morse science department’s listed accomplishments for the year was a focus on academic integration into CTE classes. He thought that the enthusiasm of the CTE teachers was worth noting.

### Getting Started

Two years ago, some BRVC teachers attended Alan Dearborn’s session at the Maine Association Vocational Education Administrators (MAVEA) conference and got inspired. Soon after, there was a Wednesday morning curriculum meeting and CTE instructors were told to join one of the academic departments. The science department welcomed the CTE teachers and the conversation began. CTE teachers from different program areas (auto technology, building construction, health occupations, drafting technology, and computer technology) met with members of the Morse science department and compared notes on what they were each doing in their courses.

### What It Looks Like in Action

During the 2005–06 school year, several curriculum-related events took place that involved collaboration between the science department and the CTE teachers. All freshmen explored the science of airbags; academic students learned how to do CAD representations of molecules and catapults; and automotive classes worked with the physics of hydraulic lifts. The CTE health sciences instructor and the teachers of biology and health classes at Morse High School also collaborated on some lessons. In addition, the science department and BRVC co-wrote and received a GIS grant for \$40,000 worth of mapping software. Science credits were negotiated for selected BRVC courses.

The teachers know the program needs to evolve—and they want it to. Two teachers would like to co-teach the pre-engineering class. The auto technology teacher said he would like to go to a physics or chemistry class and “see how they teach ‘specific gravity’ and come up with a lab.

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<sup>1</sup> This mini-case study is based on conversations with BRVC and Morse High School staff, review of documents, and data collected during an onsite visit in May 2006.

And then my kids could go to class and their kids could come to my lab.” The building trades teacher has been discussing an interdisciplinary project for next year: designing a super-insulated house. According to the teachers on both sides, willingness to collaborate was not an issue, but finding meeting and planning time was a challenge.

CTE and science department teachers indicated they would like to define what types of science experiences should take place each year with each class, and how these experiences would help students address the Maine Learning Results. They would like to make sure events that do occur are as rich as possible for all of the students. For example, in automotive technology earlier this year, freshmen science classes imploded air bags, took a variety of measurements, and made deductions about chemical reactions. “The lesson was good,” said the science teacher, “but we should have had the CTE classes learning more of the science instead of just setting up the lab.” The CTE teacher agreed: “We wired up the airbags but we didn’t work on the academic side; and they didn’t do the set-up. We have to figure out ways to have more impact for both groups of kids.”

Lastly, CTE teachers indicated they want to make sure that, where applicable, students will get the credit they deserve for the integrated academic content they learned in their CTE classes. The group of BRVC teachers involved with this project recognized that preparing students for the 21<sup>st</sup> century workplace means integrating rigorous academic content and literacy skill development into CTE program offerings. If they commit to making sure this occurs, they want students to receive academic credit and not have to repeat the same content in another setting. “There is too much to learn to be duplicating efforts. It shouldn’t matter which side they learn it on—they should get the same credit if it is the same content.”

### **Sustaining the Work**

Institutionalizing the work will require four steps (as outlined by the BRVC Advisory Board and Student Services Advisory Council):

- Integrate core benchmarks within BRVC programs.
- Establish a timeline to address further integration implementation.
- Propose a method of updating processes as needed.
- Evaluate process in order to promote relevance and rigor.

At issue is the right of students to access quality learning in CTE settings that will adequately prepare them for the 21<sup>st</sup> century workplace. BRVC educators have worked on this—but recognize there is a lot of work left to do.

### **Reciprocal Teaching**

While talking to the science and CTE teachers, there was a clear respect for one another’s knowledge and work. It was not about science teachers teaching in CTE classes, but, instead, bringing the classes together and co-teaching the concepts from two perspectives. Some science teachers brought their academic classes to the “labs” (shops) on the CTE side to learn. “Well, really, it’s to play with all of the cool stuff!” laughed one science teacher. Relationships developed between CTE and academic teachers. Both the former CTE director and the high school principal talked about a vision where the divide between the two continues to diminish and rigorous motivating contexts for learning are found as the norm on both sides. The high school principal said she is very excited about the partnership and hopes it expands to other departments.

Teachers on both sides noticed what has happened thus far. Meetings were planned with the English and math departments and CTE teachers to explore opportunities for similar types of academic integration with those departments and specific CTE program areas. Students noticed, too. Many more showed interest in CTE classes since the academic classes began “going over to the other side.” One student mentioned she plans to take the CAD class next year because of her experience with doing the molecular modeling in chemistry class this year. She said she did not even know there were classes like that offered at the high school level. In fact, enrollment in the next year’s CAD classes was up 250% according to the science department chair who attributed this to greater exposure through the science classes and the opportunity to earn science credit by taking selected BRVC courses.

### **Improving Literacy Development**

Two of the teachers at BRVC participated in the CTE Literacy Mentor Project, tried out and adapted literacy support strategies in their classrooms, and were responsible for presenting content-area literacy workshops to their colleagues at school. One of the mentors mentioned the importance of modeling for students how they read and how they use vocabulary because “they might not have those models at home.” He talked about how using the strategies has made a difference in how students make connections in really simple things like teaching the vocabulary before he assigns the reading: “It makes a big difference!” In the other mentor’s classroom, students read using a graphic organizer with an article about a war veteran who is an amputee and has to get a car with an automatic rather than a manual transmission. A variety of trade magazine covers and articles were posted on the bulletin board. The former CTE director indicated that he wants the CTE center to be a resource for the sending high schools so they can see how literacy development can and should be integrated into all content areas: “It’s so important, it’s really critical.”

In the health sciences classroom, the teacher explained, “It’s all about the fact that you have reading material in your professional trade or technical area, stuff that you need to know.” She mentioned that the CTE context is a good place to work on literacy because of the relationships teachers have with students and the interest students have in the content. The teacher described the clinical review papers students were asked to do using a specific format each Monday to reflect on what was learned at their clinical placement. If students missed a day at their placement, they were asked to read and respond to a relevant article. Periodically, the whole class was assigned an article to review and evaluate in light of what they know. A specific template was provided to ensure that students responded to the reading thoughtfully. The health sciences classroom was filled with student-made and commercial posters. Students were quizzed one another on vocabulary terms; there was a medical terminology jeopardy board on the wall.

### **Next Steps**

- Define what types of science learning will be expected to occur in each CTE class and what types of activities will help students develop that understanding.
- Establish ways to measure whether students are learning the science concepts that are being integrated into their program area.
- Develop similar avenues and supporting credit systems to allow English and math integration to also take place and be valued as part of BRVC program offerings.
- Ensure that literacy-rich environments, with trade magazines and knowledge and application of literacy support strategies, to develop reading, writing, speaking/presenting, and critical thinking skills are occurring regularly in all CTE programs.

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- Review program expectations to ensure they are uniformly high and publish the relevant literacy habits and skills students will work on in each CTE program area.
- Resolve articulation and credit agreements with all sending schools.
- Select a reading assessment or ask all sending schools for data on students' reading levels.
- Discuss collaboratively how sending schools could better prepare students for upper level work at the CTE center or at their home high schools.

*For more information, contact Bruce Scally, Student Services Coordinator; Peter Gagnon, Cindy Harris, or Dean Emmerson, BRVC teachers.*