Helen Hurgin.

Windham Middle School math and science teacher, planned and implemented a three week student-centered inquiry unit on energy conservation. Drawing from elements of problem-based learning, expeditionary learning and service learning, the students worked collaboratively and independently to come up with solutions to the challenge and presented their findings to an audience.

As a result of this unit, Hurgin’s students have progressed with Maine Curriculum Guiding Principles and 21st Century Skills, they learned and will retain content knowledge, and their concept of themselves as lifelong, capable, self-directed learners has been strengthened.

Choosing the Topic

Energy conservation at the Middle School was chosen as the topic based on curriculum standards, relevancy to students, and potential resources in the school community and wider community.

Getting Ready

Before beginning the unit, Mrs. Hurgin provided direct instruction of some of the reasoning skills students would use - for example, experimental inquiry, understanding diverse perspectives and logical decision-making. The students already knew how to effectively work in small groups, as they were used to performing experiments collaboratively. Also, they already had some experience in presenting to audiences.

Hurgin provided a lesson to students on creating slide show presentations, which was a new skill for many of the students.

In addition, before the unit, Mrs. Hurgin sent a letter to families with an overview of the unit, and the rationale for this kind of learning, including research findings. In the letter, families were asked whether they have resources they would like to share.

Students’ Engagement

To ensure students’ interest, Mrs. Hurgin began the unit with three hooks. Students used a process for generating and testing hypotheses to analyze which appliances in their
Problem Question
Once the students were motivated, the challenge was framed in the question “How can we reduce energy usage at Windham Middle School to address both environmental and economic costs?”

Connecting to Prior Knowledge
Individually and then together, the class filled out a Know, Need to Know, Ideas chart. This activity encouraged students to tap into prior learning, and analyze to determine information needed to solve the problem, form research categories and identify information sources.

Choices
Using the information listed in the Know, Need to Know, Ideas chart, groups of four-six students were formed. Students were placed in groups based on their energy saving interests. Examples of the groups’ topics are quiet time (without lights), motion sensors, energy monitor, solar panels and power strips.

Teacher as Facilitator
In keeping with problem-based learning process, Mrs. Hurgin facilitated students’ learning by actively listening, analyzing the direction of discussions and asking open-ended questions to encourage the students’ reflections and deeper thinking. The students, themselves, determined what further questions needed to be researched in order to solve the original challenge. Individually and collaboratively, the students searched for information on the Internet using both links Hurgin provided and relevant information sites of their choosing.

Scaffolding
Mrs. Hurgin provided supports to students such as the list of experimental inquiry steps, cooperative group roles chart, energy sources web, and reminders about best interdependent work process.

Students’ Presentations
The groups of students presented their findings to an audience that included Mrs. Hurgin, the rest of the class, Mr. Jaronczyk, and an additional evaluator. Groups had the option of including a computer slide show or other visuals in their presentation. In their presentations, students cited research findings including statistics they had analyzed to substantiate their conclusions.

One group concluded their presentation with an oral quiz of audience members.

Service to the School Community
Towards the end of the unit, some of the students began implementing their groups’ solutions, for example by putting up signs to remind people to shut off lights when not in use.
Formative Assessments
Mrs. Hurgin continuously assessed students’ progress and needs. As she went around to each small group, she noted whether they were on track and whether they had questions for her.

By analyzing students’ discussions, groups’ end of period reported out statements, students’ Thinking Log journal entries, their Noteshare (Apple application) notes, and their small group process self-assessments, Mrs. Hurgin gained data she used to determine further information and scaffolding students needed.

Summative Assessments
Formative assessment data contributed to summative evaluation. Moreover, at the end of the unit, students wrote essays in response to the prompts, “Write what you know about how we can save energy at the Middle School,” “Write how your learning can transfer into your life at home and in the future” and prompts that elicited positives and challenges of working with their group. A substantial part of the summative evaluation was the groups’ presentations of their findings, which were assessed with a rubric the students had helped to develop.

Technology
Relevant video, the Internet, Apple Noteshare, and students’ digital slide shows were used to support learning goals.

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“I felt their enthusiasm for their unit. I saw the students were engaged. This unit seemed more meaningful to them. I enjoyed seeing students’ purposefulness in this unit. I could feel a difference in the class between the usual hands-on activities we do and this unit.”

- Helen Hurgin

Extended, Personalized Learning
After the unit concluded, a group of students wanted to write a grant proposal to the Maine Energy Education program. Mrs. Hurgin noted students’ strong focus, as they worked to complete the application within the deadline.

The students’ care was rewarded - they received a $500 grant for motion sensors to turn lights on and off in their classrooms.

Factors that Contributed to Success
Helen Hurgin’s professional learning, her determination and efforts to provide best learning opportunities for her students, combined with administrative support and a workplace culture that facilitates lifelong professional growth, through both on-site collegial exchange and outside learning - produced positive results.

For Next Implementation
In keeping with her professionalism, during and after the unit, Hurgin reflected on how it could be enhanced and devised plans for refining it the next time it is implemented. Her plans for future implementation include connecting her students to an energy professional who will respond to students’ questions, so that students have access to an expert. Another plan is to have students engage in a debate.

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Lee Anna Stirling
Your classroom, school or district instructional, organizational and supervisory/workplace professional development strategies are of interest to our readers. Please submit an article (approximately 200-400 words) describing a strategy or program. Provide your name, job title, school, district, your e-mail address and other contact information. E-mail to Lee Anna Stirling at leemandu@earthlink.net with Maine ASCD News in the subject line.

Your feedback and suggestions for newsletter topics also are welcome.

Books

Web Sites
- Maine Curriculum Guiding Principles
- Partnership for 21st Century Skills
  http://www.p21.org
- Common Core State Standards
  http://www.corestandards.org/
- Buck Institute
  www.bie.org
- Edutopia
  www.edutopia.org
- ASCD 21st Century Skills
  http://www.ascd.org/research-a-topic/21st-century-skills-resources.aspx
- ASCD Integrated Curriculum
  http://www.ascd.org/research-a-topic/integrated-curriculum-resources.aspx
- ASCDEDge Problem-Based Learning
  http://groups.ascd.org/groups/detail/112574/problem-based-learning-pic/
- ASCDEDge Student-Based Inquiry Learning
  http://groups.ascd.org/groups/detail/134044/student-based-inquiry-learning/