An Introduction

Most classroom teachers have, at one time or another, used elements of project-based learning (PBL) in their classroom to enhance a particular learning experience for their students. For that reason, when we collected resources for the following section, we hoped to define and capture the full spectrum of what encompasses project-based learning – from class-based, teacher-designed projects to whole school design.

The majority of PBL practitioners agree on a few things that set project-based learning apart from the typical classroom experience.

- PBL is inherently holistic in scope and depth. Students see a project from start to finish in both a linear and cyclical process.
- PBL offers students choice in their learning. Whether the choice begins under the structure of a teacher-developed project or whether the project is entirely student-derived and the teacher provides the support for the student to carry out the project, there are impacting choices being made by the student.

Aside from the above essentials found in all project-based learning, there are many other elements of PBL that small school settings, in particular, have the capacity to offer students to create rich, authentic learning experiences. As you design a PBL program that will work in your school setting, you will find the tools in this section will aid your staff in adding authenticity, constructivism, assessment, reflection, and structure to your choices.

The resources in this section illustrate the myriad ways that PBL can be implemented in small schools, but we acknowledge that infusing project-based learning into the school environment is an evolving process. The process changes and grows incrementally with the amount and nature of choice students are granted in their learning, with the scope of the projects, and with the role of the teacher in project development and execution. To demonstrate this evolution, we have highlighted schools that have had great successes in taking PBL to new levels.

Under the larger umbrella of PBL are two types of project-based learning that warrant illumination and clarification – **place-based learning** and **problem-based learning**. Both include elements of PBL, but have unique assets that set them apart. Place-based learning typically incorporates elements of service learning and environmental education with a project-based structure. Problem-based education, modeled after the medical profession, emphasizes skill building through real-world challenges.

PBL is a natural way to do cross-disciplinary work within your classroom or school. It asks students to look at their learning in a new way and incorporates state and national standards seamlessly by pulling the standards out of the project, not the project out of the standards. PBL builds trust between staff and students because students are given a voice and teachers are put in a place of learning right alongside students. Projects ask students to tap into their prior knowledge, helps them expresses their culture, builds on their strengths, and validates their passions. Learning becomes powerfully fun.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Six A’s of Designing Projects</td>
<td>35</td>
</tr>
<tr>
<td>The Buck Institute of Education</td>
<td>37</td>
</tr>
<tr>
<td>The Big River Watershed</td>
<td>39</td>
</tr>
<tr>
<td>Place Based Learning: [ ] Urban Nutrition Initiative, [ ] Russian Mission</td>
<td>43</td>
</tr>
<tr>
<td>Problem-Based Learning: [ ] Sample units</td>
<td>47</td>
</tr>
<tr>
<td>Rivendell Interstate School District</td>
<td>61</td>
</tr>
<tr>
<td>Minnesota New Country School: [ ] Performance Rubric, [ ] Project Proposal</td>
<td>63</td>
</tr>
<tr>
<td>Poland Regional High School</td>
<td>69</td>
</tr>
<tr>
<td>The PBL Project Handbook</td>
<td>71</td>
</tr>
<tr>
<td>The Giraffe Project</td>
<td>73</td>
</tr>
<tr>
<td>Readings</td>
<td>75</td>
</tr>
</tbody>
</table>
The Six A’s of Designing Projects
Adria Steinberg, *Real Learning, Real Work* (1997)

There are few project criteria as widely used and applicable to a multiplicity of settings as Steinberg’s Six A’s. Her book, *Real Learning, Real Work* demonstrates how students learn to embrace what they learn in the classroom when they are able to use the intellectual tools of the sciences and the humanities to make sense of their outside experience. The following questions are a reflection tool for both project planning and project assessment.

**Authenticity**
- Does the project emanate from a problem that has meaning to the student?
- Is it a problem or question that might actually be tackled by an adult at work or in the community?
- Do students create or produce something that has personal and/or social value, beyond the school setting?

**Academic Rigor**
- Does the project lead students to acquire and apply knowledge central to one or more discipline or content areas?
- Does it challenge students to use methods of inquiry central to one or more disciplines (e.g., to think like a scientist)?
- Do students develop higher order thinking skills and habits of mind? (e.g., searching for evidence, taking different perspectives)?

**Applied Learning**
- Does the learning take place in the context of a semi-structured problem, grounded in life and work in the world beyond school?
- Does the project lead students to acquire and use competencies expected in high performance work organizations (e.g., teamwork, appropriate use of technology, problem solving and communication)?
- Does the work require students to develop organizational and self-management skills?

**Active Exploration**
- Do students spend significant amounts of time doing field-based work?
- Does the project require students to engage in real investigations, using a variety of methods, media, and sources?
- Are students expected to communicate what they are learning through presentation and/or performance?

**Adult Relationships**
- Do students meet and observe adults with relevant expertise and experience?
PROJECT-BASED LEARNING

- Do students have an opportunity to work closely with at least one adult?
- Do adults collaborate on the design and assessment of student work?

Assessment

- Do students reflect regularly on their learning using clear project criteria that they have helped to set?
- Do adults from outside the classroom help students develop a sense of real world standards for this type of work?
- Will there be opportunities for regular assessment of student work through a range of methods, including exhibitions?

---

James Lewicki  
Educator, North Crawford Schools, Wisconsin

Q: How do you move teachers out of existing teacher mode to project based learning?

A: In an existing school what helps is to break the 'business as usual' and learn as a team with a mini-project. Even done once, it demonstrates the power, passion, and potential of project-based learning to experienced teachers. And once teachers see something work, there is an 'action bias' that you can nurture along.

For example, we obtained a $1,000 grant and had an oral history day. We obtained subs for 10 junior high teachers to spend the day on the project. Each teacher had four or five students and visited WWII veterans in their home for an oral history interview. It was terrific to watch the students, in a small group, interview the veterans. One gentleman, a veteran of the 8th Air Force stationed in England, shared stories in the kitchen and farmhouse where he was raised. At one time he jumped up, and searching in a drawer, as if he was looking for a screwdriver lost under scraps of paper, finally pulled out his flight log from 1944. He went over each mission with the kids.

Teachers, given this opportunity, see students in a very different setting, utilizing oral skills seldom seen in traditional settings. I found, for instance, that some of the best interviewers were the 'at-risk' kids.

There seems to be a 'believability quotient' for experienced teachers to overcome. Does this really work? The best way is to create a mini-project and show them through participation.

Once this is accomplished then you can begin to shift the conversation around project scenarios that might fit the existing school structure; or if you're very lucky, shift the existing structure to fit the learning and logistical needs of the projects.
The Buck Institute for Education (BIE) is a research and development organization working to make schools and classrooms more effective through the use of problem and project based instruction. Founded in 1987, they receive permanent funding from the Leonard and Beryl Buck Trust, and funding for specific projects from foundations, schools and school districts, state educational agencies and the federal government.

Their Work

BIE creates curriculum materials, trains teachers in their use, and conducts and disseminates research. Current programs target high school social science. BIE has developed seven research-proven, standards-centered, Problem Based Economics units. These units and a corresponding training program are now available from BIE and several National Training Sites located at National Council on Economic Education Centers. Over the next 5 years, they will provide teachers with additional problem based units for high school government/civics, world history, geography, world cultures, and US history.

BIE also provides training in the more general application of project-based instructional approaches, and has published the well-received Project-Based Learning Handbook used by educators across the U.S. and in several other countries.

BIE curricular materials are developed in partnership with teachers and university educators, and are extensively pilot-tested and evaluated. When appropriate, they integrate computer technology to simplify program implementation and multiply program impact.

Their Vision

BIE’s hopes for high school social science education and for the use of project-based learning begin with teachers engaging students in academically rigorous and personally meaningful problems and projects. This learning is not bounded by classroom walls, and extends into the community and beyond. They envision students using social science concepts to understand the world around them, to make reasoned decisions, and to contribute to society as knowledgeable and thoughtful citizens.

Their Definition of Project-Based Learning

Project-based learning is a revolutionary way to learn, one that is much different from the traditional way high school students usually pursue an
education (Buck Institute, 2001). Project-based learning emphasizes depth of understanding over content coverage; comprehension of concepts and principles rather than knowledge of facts; development of complex problem-solving skills rather than learning building block skills in isolation. Project-based learning emphasizes student interest rather than following a fixed curriculum; emphasizes a broad, interdisciplinary focus rather than a narrow discipline based focus; uses direct, primary or original sources rather than texts, lectures and secondary sources; emphasizes data and materials developed by students rather than by teachers.

Furthermore, project-based learning completely changes the role of the teacher: from lecturer and director of instruction to that of resource provider and participant in the learning activities; and from expert to advisor/facilitator. Assessment requires processes or performances and tangible accomplishments to be witnessed rather than products or tests, and demonstration of learning rather than reproduction of information.

Project-based learning also re-focuses the use of technology from an ancillary or peripheral use to a central and integral part of the process; from technology administered by teachers to technology directed by students; from technology useful for teacher presentations to technology enhancing student presentations. The student role in project-based learning becomes one of carrying out self-directed learning activities rather than carrying out teacher directed activities; defining their own roles, tasks and time management rather than receiving and completing brief, directed tasks; learning how to communicate, show, affect, produce and take responsibility rather than listen, behave, speak only when spoken to. The short-term goals change from knowledge of facts, terms and content to understanding and application of complex ideas and processes; from mastery of isolated skills to mastery of integrated skills. Long-term goals change from breadth of knowledge to depth of knowledge; from performing successfully on standard achievement tests to acquiring dispositions and skills to engage in sustained, lifelong learning.

The Buck Institute’s Project Based Learning handbook has five components necessary for project work – content, driving questions, components, strategies, and assessment. To illustrate how these categories align with a project, they are juxtaposed here with an actual project, Saving the Big River Watershed in Mendocino, California, which was written by What Kids Can Do (2001). We recommend first reading the components (found in the shaded boxes) and then locating them within the segment of the article below them.

### The CONTENT is selected carefully so that the project addresses important curricular and social goals.

#### Big Ideas.
Projects focus, in general, on ideas that “go to the heart of the discipline.” These ideas are the central, hard-to-teach concepts within or across subject-matter areas.

#### Standards.
Projects are constructed to incorporate national, state, or local curriculum and student performance standards.

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After a northern California timber company announced its harvesting plans for the Big River watershed, the tiny community of nearby Mendocino embarked on a campaign of David and Goliath proportions: saving the pristine acreage of river, estuary, wetlands, and forest by buying the property. Although the logging company was not opposed to selling, the commercial value of the redwoods growing there—upwards of $7 per board foot—made the $25.7 million asking price seemingly prohibitive. Undeterred, the Mendocino Land Trust, a local conservation group, started mobilizing in public and private arenas to raise the staggering sum.

Mendocino students of all ages contributed to “the purchase,” as locals call it. With help from parents, teachers, and local artists, two high school alumni on break from college organized an art sale: hundreds of students K-12 created artwork about Big River, displayed it for five days at the local art center, then donated all proceeds to the purchase. Other students wrote letters to elected officials; middle schoolers made a banner displayed at many Big River events. And students in area high schools did their part, too.
At Mendocino Community High School, a small alternative school, students in Daniel Williford’s biology class set out to survey the Big River Estuary area to determine what species the logging plan would affect. Hiking along ridgetops, the beach, and an old logging road, they compiled a written inventory of the plant, animal, bird, and fish life they encountered. When students discovered the number and variety of organisms living in the area—over 130 species of birds alone, including spotted owls, golden and bald eagles, herons, osprey—they felt the need to go public. After some discussion, the class settled on a poster campaign.

Students first researched and wrote an in-depth report about one of the organisms on their inventory lists. They extrapolated from their report the most salient information—such as identifying features and behavior, habitat and range, reproduction and predation—to present on a poster with an appealing illustration or photograph. Students then tacked up posters of the kingfisher, trillium, coho salmon, and 17 other species all over town and posted them on the school district’s website. They wrote public service announcements published in the local newspaper and aired on radio that encouraged residents to read their posters—and to share the information they contained with a friend, colleague, or neighbor. The Mendocino Land Trust included four of the students’ posters in its Big River fundraising materials.

The **DRIVING QUESTION** focuses student efforts on in-depth investigations and other critical learning experiences.

**Projects include a realistic challenge or puzzle students must resolve.** Projects focus on “essential” or “driving” questions that are provocative, significant, and realistic.

The **COMPONENTS** engage students in rich, realistic work, often with authentic connections to the community.

**Generative, constructive tasks.**
Project activities focus students’ attention on transforming, creating, and constructing ideas and information.

**Complex, multi-faceted investigations.**
Projects tend to be complex rather than straightforward. Projects take place over a protracted period of time.

**Connections to the community and the world of work.**
Projects, by definition, involve “authentic” tasks that are modeled after the work of professionals.
At Mendocino High School, students in the School of Natural Resources (SONAR) program, an advanced placement environmental science course, created an educational video that traced the history of Big River and the need for its protection. They led tours of the estuary for visiting officials from whom locals sought public dollars towards the purchase. And with a grant from the National Fish and Wildlife Foundation, SONAR students conducted a biodiversity study to determine fish species in Big River.

After classroom and field training in identification techniques of the coho and steelhead salmon (both endangered species), students donned wetsuits and snorkels to complete the transect study of four different 100-meter sections of Big River. Accompanied by representatives from the timber company and from California Fish and Game, students stretched in a line across the river to identify and count the numbers of steelhead and coho darting among the eelgrass beds.

Their data proved the existence of both endangered salmon species in Big River—a finding students wrote up in a research report and submitted to Fish and Game and the Mendocino Land Trust, who in turn passed it on to officials in Sacramento. The report is credited with several million dollars worth of the state’s commitment toward the Big River purchase.
This past July, the Mendocino Land Trust finalized the purchase of 7,334 acres in the Big River Watershed from the Hawthorne Timber Company, then transferred ownership to the California state park system. The purchase permanently protects the Big River estuary and bordering forestland. And by joining several adjacent state parks and preserves, it creates 60,000 acres of connected, unspoiled public land.

On October 5, Land Trust officials, state park representatives, politicians, and area residents young and old gathered on a sparkling day at the mouth of Big River to dedicate the new park. A high school bluegrass band played on the riverbank before the ceremony. Elementary school students helped hand out framed photographs given in appreciation to contributors. Teenagers interviewed attendees and videotaped the ceremony—capturing a day and a story worth remembering by us all.
The Value in Place-Based Education:
The Rural School and Community Trust
http://www.seer.org/pages/rsct.html

The information in this section, from the Rural School and Community Trust, is meant to provide a definition and overview of the principals of place-based education, while also highlighting programs that have successfully used this teaching and learning method.

Place-based education is an age-old concept that has been infused into the education system in recent years under the pseudonyms of service learning and environmental education, but as it comes into its own in schools as far reaching as Alaska’s Chugach District and San Diego’s O’Farrell Community School, it takes on distinct characteristics uniquely and pointedly its own.

As Elaina Loveland (2002) describes it,

Although there are several approaches to use a community as context for enhancing student learning, most education reform models have a common desire for students to view learning as relevant to the world around them, to connect with their community and in the process, become concerned and contributing citizens of that community. Using community as the context for educational experiences allows students to reach out to the larger world and place real value in their education as they realize that they too, can make a difference in society. And these programs are getting results. Studies cite better student achievement, revitalized teaching, enhanced youth development, increased citizenship and improved quality of life as reasons to support and implement community-connected education programs. Clearly, it's working.

One of the features that sets place-based education apart is the insistence that student education is a whole community, whole child effort, whereby the design of the program or project should encompass multiple facets of the local community and intersect many learning disciplines. Not meant to be an after school activity, or a field trip for a few select students, place-based education can thrive within the curriculum with a collaborative, holistic effort by staff and students.
**Principles of Place-Based Education**

Place-based education, as practiced by more than 700 schools associated with the Rural School and Community Trust, embraces the following six principles:

- The school and community actively collaborate to make the local place a good one in which to learn, work, and live.
- Students do sustained academic work that draws upon and contributes to the place in which they live. They practice new skills and responsibilities, serving as scholars, workers, and citizens in their community.
- Schools mirror the democratic values they seek to instill, arranging their resources so that every child is known well and every child's participation, regardless of ability, is needed and wanted.
- Decision-making about the education of the community's children is shared, informed by expertise both in and outside the school.
- All participants, including teachers, students, and community members, expect excellent effort from each other and review their joint progress regularly and thoughtfully. Multiple measures and public input enlarge assessments of student performance.
- The school and community support students, their teachers, and their adult mentors in these new roles.

**The Urban Nutrition Initiative**

http://dolphin.upenn.edu/%7Euni/green_029.htm

The Urban Nutrition Initiative in Pennsylvania is noteworthy because of the integration of place-based education principals and the program’s needs-based origin within the school.

The Urban Nutrition Initiative (UNI), formerly called the Turner Nutrition Awareness Project, emerged from a partnership between Turner Middle School and an undergraduate anthropology seminar in 1990. Initially, college students began collecting dietary data on middle school children. Rather than the middle school children serving as "guinea pigs" in the project, they actively participated with the college students in research and data collection. By 1994, students were beginning to realize that inner-city school-age children were not getting all the recommended dietary requirements due to poor access to fresh fruits and vegetables (caused in part by the lack of full-service grocery stores in inner city Philadelphia). As a result, students took action to improve nutrition in West Philadelphia. Today there are several student-run operations at three area schools to promote good nutrition in the community. These include an after school fruit and vegetable stand; a farmers' market open on the weekends; school gardens; a community fitness program free to parents and community members; and an urban agriculture and micro-business development at the high school.

UNI connects University of Pennsylvania undergraduate courses with courses in an elementary, middle, and high school in West Philadelphia,
Creating a pre-K through 16+ curriculum focused on improving community health. The project is focused on researching and developing integrated approaches that will create substantial and broad community participation. Accordingly, changing the curriculum is at the core of UNI's school-based school and community improvement approach. UNI has developed and implemented a curriculum that teaches core subjects (math, social studies, language arts). (Loveland, 2002)

The Russian Mission School
http://www.lysd.gcisa.net/~rmission/subsistence/highschoolsubsiste.htm

The Russian Mission School, in Russian Mission, Alaska in the Lower Yukon School District, has an impressive place-based subsistence education program.

Subsistence activities have long been an essential component of the traditional and spiritual lifestyle of the residents of Russian Mission. While getting the students to experience their culture was encouraged, school personnel and community members felt an overriding need to try to meet national standards and proficiencies. Over the course of the last seven years, however, the Russian Mission School has begun to take advantage of the environment through subsistence projects at the middle and high school levels. Since the fall of 2001, they have begun to use these activities and experiences as a springboard for student learning and cultural awareness. Activities also provide students, staff and community members with the opportunity to communicate and cooperate on a different level than the typical classroom setting. Recognizing this importance, the school and community have worked together to offer programs and activities that not only teach a cultural and environmental awareness, but increase student enthusiasm and morale in the classroom setting. The Russian Mission School does an excellent job of weaving in all elements of place-based education into their subsistence education program. One of the many projects, ranging from a girls’ moose hunt to building a smokehouse, is teaching the students about the importance of fishing.

PROJECT: SUBSISTENCE FISHING

Drifting for salmon on the Yukon River is more than an activity; it is a way of life. For countless generations, the people of Russian Mission looked to the bounty of the river to sustain them during the summer and through the long Alaska winter. Today, while people still rely on the annual salmon runs to fill their freezers and feed dogteams, the skills of subsistence fishing often go unlearned by the school age students in the community.

Students that participated in subsistence fishing learned many important life skills:

- Driving a boat
- Setting a net
Pulling a net
Extracting fish from the net
Cutting strips
Cutting flat fish
Caring for curing fish

We set aside two afternoons in early September to drift for coho and chum salmon. With the help of several community volunteers, all of the 36 high school students participated on one day or the other. As a group we netted about 120 salmon. Seventy fish were cleaned and frozen for the school while the other 50 were cut and smoked. This class project was a great success thanks to the help of many volunteers who contributed nets, boats, advice and sweat cutting fish.
The Center for Problem-Based Learning (CPBL) was established by the Illinois Mathematics and Science Academy (IMSA) to engage in problem-based learning research, information exchange, teacher training, and curriculum development in K-16 educational settings.

The Illinois Mathematics and Science Academy is a learning enterprise that builds the capacity of students, teachers and policymakers to improve and transform mathematics and science teaching and learning. IMSA's residential education program serves Illinois students (grades 10-12) talented in mathematics and science; its professional development Centers (mathematics and science, problem-based learning) serve schools, educational systems, teachers and students in Illinois and beyond. The Academy's academic building includes state-of-the-art science, mathematics, computing, instructional technology and video production laboratories, an inventors' workshop and a telecommunications classroom.

The mission of the Illinois Mathematics and Science Academy, a pioneering educational community, is to transform mathematics and science teaching and learning by developing ethical leaders who know the joy of discovering and forging connections within and among mathematics, science, the arts, and the humanities by means of an exemplary laboratory environment characterized by research, innovative teaching, and service. To advance IMSA's mission, the Academy established the Center for Problem-Based Learning in 1992.

**What is Problem-Based Learning?**

Problem-based learning (PBL) is an educational approach that organizes curriculum and instruction around carefully crafted "ill-structured" problems. Students gather and apply knowledge from multiple disciplines in their quest for solutions. Guided by teachers acting as cognitive coaches, they develop critical thinking, problem solving, and collaborative skills as they identify problems, formulate hypotheses, conduct data searches, perform experiments, formulate solutions and determine the best "fit" of solutions to the conditions of the problem. Problem-based learning enables students to embrace complexity, find relevance and joy in their learning, and enhance their capacity for creative and responsible real-world problem solving. (CPBL)
Perhaps the best way to gain an understanding of problem-based learning is by looking at project samples that have been used by educators. The following problem-based learning projects went through all of the planning stages found in the article, Designing and Developing a Problem-Based Learning Unit (CPBL), found in this section.

**Examples of problems used in problem-based learning:**

You are:

- a scientist at the State Department of Nuclear Safety. Some people in a small community feel their health is at risk because a company keeps thorium piled above ground at one of their plants. What action, if any, should be taken? - *Summer Challenge 1992, IMSA*

- a consultant to the Department of Fish and Wildlife. A first draft of a plan for the reintroduction of wolves to Yellowstone has received strong, negative testimony at hearings. What is your advice regarding the plan? - *John Thompson, Ecology, IMSA*

- a science advisor at NASA. A planet much like the earth has experienced massive destruction of elements of its biosphere. What is causing the destruction of plant life? Can new plants from earth be successfully introduced to help save the planet's environment? - *Bill Orton, 2nd grade, Williamsburg, VA*

- a thirty-six year old single working mother with a five year old daughter. Upon your husband's death, you receive $20,000 in worker's compensation and $10,000 in stock option shares. How can you invest this money so that by your daughter's 18th birthday, its growth is maximized? - *LuAnn Malik, Community College of Aurora, Aurora, CO*

- invited to participate in a special session of your school board to determine whether *Huckleberry Finn* should be taught in your school district given its inclusion on a state censorship list. - *Ed Plum, American Literature, District #214, Barrington, IL*

- a stockholder of a major oil refinery in Louisiana which has mined oil from wetlands in the southern part of the state. You have received pressure from publicity about the wetlands to make it property of the federal government so that it can be protected. What will you do? - *Christine Vitale, 4-5 multi-grade, Arlington Heights, IL*
The following information from the Center for Problem-Based Learning explains the benefits and parameters of PBL, and how the classroom setting will shift with the infusion of PBL.

**Problem-Based Learning causes a shift in roles...**

<table>
<thead>
<tr>
<th>Teacher as coach:</th>
<th>Student as active problem-solver:</th>
<th>Problem as initial challenge and motivation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asking about thinking</td>
<td>Active participant</td>
<td>Ill-structured</td>
</tr>
<tr>
<td>Monitoring learning</td>
<td>Engaged</td>
<td>Appeals to human desire for resolution/ stasis/harmony</td>
</tr>
<tr>
<td>Probing/ challenging students' thinking</td>
<td>Constructing meaning</td>
<td></td>
</tr>
<tr>
<td>Keeping students involved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring/ adjusting levels of challenge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managing group dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keeping process moving</td>
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</table>
What are the benefits of Problem Based Learning?

Problem Based Learning promotes:

MOTIVATION

PBL makes students more engaged in learning because they are hard wired to respond to dissonance and because they feel they are empowered to have an impact on the outcome of the investigation.

RELEVANCE AND CONTEXT

PBL offers students an obvious answer to the questions, "Why do we need to learn this information?" and "What does what I am doing in school have to do with anything in the real world?"

HIGHER-ORDER THINKING

The ill-structured problem scenario calls forth critical and creative thinking by suspending the guessing game of, "What's the right answer the teacher wants me to find?"

LEARNING HOW TO LEARN

PBL promotes metacognition and self-regulated learning by asking students to generate their own strategies for problem definition, information gathering, data-analysis, and hypothesis-building and testing, comparing these strategies against and sharing them with other students' and mentors' strategies.

AUTHENTICITY

PBL engages students in learning information in ways that are similar to the ways in which it will be recalled and employed in future situations and assesses learning in ways which demonstrate understanding and not mere acquisition. (Gick and Holyoak, 1983).
What are the parameters for Problem Based Learning?

While there are many possible formats for presenting problem-based learning units, the following principles remain consistent:

1. In a PBL unit, the problem is presented first and serves as the organizing center and context for learning.

2. The problem on which learning centers:
   - is ill-structured in nature
   - is met as a "messy" situation
   - often changes with the addition of new information
   - is not solved easily or formulaically
   - does not always result in a "right" answer

3. In PBL classrooms, students assume the role of problem-solvers; teachers assume the role of tutors and coaches.

4. In the teaching and learning process, information is shared but knowledge is a personal construction of the learner. Thinking is fully articulated and held to strict benchmarks.

5. Assessment is an authentic companion to the problem and process.

6. The PBL unit is not necessarily interdisciplinary in nature but it is always integrative.

<table>
<thead>
<tr>
<th>Curriculum as Prescription, or Direct Instruction</th>
<th>Curriculum as Experience, or Problem-Based Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>From the perspective of teacher:</em></td>
<td><em>From the perspective of student:</em></td>
</tr>
<tr>
<td>Linear and rational</td>
<td>Coherent and relevant</td>
</tr>
<tr>
<td>Part to a whole organization</td>
<td>Whole to part organization</td>
</tr>
<tr>
<td>Teaching as transmitting</td>
<td>Teaching as facilitating</td>
</tr>
<tr>
<td>Learning as receiving</td>
<td>Learning as constructing</td>
</tr>
<tr>
<td>Structured environment</td>
<td>Flexible environment</td>
</tr>
</tbody>
</table>
Designing and Developing a Problem-Based Learning Unit for Grades K-16

Presented by:
Center for Problem-Based Learning
(630) 907-5956/5957
(630) 907-5946

Illinois Mathematics and Science Academy
1500 West Sullivan Road
Aurora, Illinois 60506

One: Establish The Context For Problem Design

List:
The Conceptual/Skills-Based Outcomes that will be achieved through the PBL

- understand biodiversity
- design and conduct experiments
- interpret data
- use graphs to illustrate probability
- communicate effectively with given audience
- understand economic impacts

List:
Significant Characteristics of the Learners –i.e. 12 year olds

- want to be independent – yet be child-like
- are critical toward society
- are ready to refine reasoning skills
- begin to understand abstract concepts
- develop hero-worships
- can be self-conscious about new tasks
Two: Identify several complex issues, conflicts, puzzles, decisions, or circumstances from your teaching materials or from real-world experiences which are attractive on the basis of maximum integrative curricular yield and learner appeal.

Map out:
Conceptual complexities and learning opportunities within these issues, conflicts, puzzles, decisions, or circumstances.

- Waste management
- Wetland ecology
- Holocaust
- Ben Franklin’s impact on society

Three: Identify those mapped complex issues, conflicts, puzzles, decisions, or circumstances which are problematic and ill-structured in nature.

Select:
The “problematic center” which is most attractive in terms of maximizing the learners’ interest and engagement and yielding curricular benefits. (Conduct a preliminary information search to determine the accessibility of critical pieces of information.)
Four: Develop a focus for the chosen problematic center by experimenting with possible roles and situations, identifying in some way what one needs to know and do in order to bring the problem to an acceptable state of closure, decision, resolution, or understanding.

- You are a stockholder of an oil refinery
- You are an EPA official
- You are a writer for a major city newspaper
- You are a member of the state senate
Five: Select the role and situation of most promise and flesh out the map further by looking for opportunities to produce curricular yield not immediately evident in the problem center itself.
Six: From the map construct a statement which defines the problem you see as a designer.

How can we ... come to a decision about ownership of the wetlands ... in such a way that we address ...

- the jobs of refinery workers
- revenue to the state
- ecology of the wetlands
- clear cutting of the wetlands
- laws protecting the wetlands
- political pressure
- political votes
- political jobs

Seven: Define in greater detail the role students will assume, the complex situation which will introduce them to this problem, and an authentic ending to the problem which will assess intended outcomes.

You are a member of the Louisiana State Senate. For the past year a major oil refinery has been mining oil from the wetland area located in the southern part of the state. Because of the press surrounding the wetlands, and the Swamp Beaver in particular, the Senate will convene on Friday, August 11, to decide if the Louisiana wetlands should become property of the Federal Government so that the wetlands can be protected. You have received a number of calls from interest groups that would like to speak at these hearings. The officials from the existing mining field wish to speak as well.

Eight: Create the actual speech, film, documents, script for drama, etc. which creates a hook for learners that compels them into the messiness of the situation and suggests the essence of the problem.

[No Sample]
Nine: Reviewing the meet-the-problem materials you have created with the learner's eyes, anticipate what your learners will construct as a statement of the problem. (Ideally, your problem statement as a designer and the students' anticipated problem statement will be similar in their dimensions.) Refine the meet-the-problem materials as needed.

*Should we (the Louisiana State Senate) give ownership of the wetlands to the Federal Government given:*

- the jobs of refinery workers
- revenue to the state
- ecology of the wetlands
- clear cutting of the wetlands
- laws protecting the wetlands
- political pressure
- political votes
- political jobs

Ten: Conduct a thorough information search, identify potential professional mentors, and anticipate and develop essential instructional processes to be used in the teaching and learning sequence as needed.

Eleven: Develop periodic assessments, which allow you to check learners’ understanding throughout the teaching and learning sequence.
Twelve: Re-map the problem according to its curricular landscape. Build a teaching and learning template which anticipates and supports learners’ thinking throughout the process of their inquiry.
Thirteen: Plan for the teaching and learning events of the PBL experience.

- Prepare students for PBL (optional).
- Meet the Problem.
- KNK (Know, Need to Know).
- Define Problem Statement.
- Gather and Share Information.
- Gather and Share Information.
- Generate Possible Solutions.
- Evaluate Fit of Solutions.
- Performance Assessment
- Debrief the Problem Experience.

Fourteen: Implement with an eye toward reflection and refinement.

When running the problem consider these questions:

Is the situation problematic?

Is the situation ill-structured?

Do students have an appropriate role?

Do students have a stake, which is compelling?
Below are some problems (from CPBL, http://www.imsa.edu/team/cpbl/whatis/model.html) that schools have had success with.

MODEL PROBLEMS FROM THE CENTER FOR PROBLEM-BASED LEARNING

Using a prototype landfill problem as a model, teachers designed units and prepared accompanying teaching and learning plans taking into account the school's culture, the students' learning needs and abilities, and district outcomes (Finkle, et al., 1994). Units which emerged placed students in the midst of wide-ranging, authentic, problematic situations from reducing waste at school to community recycling; from large-scale incineration in their neighborhood to the location of county landfills; and from reusing items when appropriate to the safe and legal disposal of biohazardous waste dating from 1939 located in the basement of an inner-city hospital.

A proposal has been made to build a new super-theme park in southern Illinois, to be called SuperLand!. A group of investors from the United States and Japan have joined together on this venture to design and build the largest theme park in the world. It is planned that SuperLand! be built on 1500 acres located just outside of Metropolis, Illinois. The land is situated near the Ohio River, and the amusement park will be accessible by a new proposed highway, monorail from the local airport (which will need to be enlarged), high-speed rail from major cities, and by riverboat.

SU astronomer Dr. Carl Wenning has asked for help in evaluating the risk associated with Near Earth Objects (NEOs) colliding with the earth. His studies over the past several years have included observations of comets and asteroids with orbits which bring them close to the earth. The urgency of Dr. Wenning's interest in NEOs has been heightened by a very recent and startling discovery that the earth has a companion asteroid, which has an orbit influenced by our gravitational field. Although this asteroid poses no immediate threat, Dr. Wenning fears that there may be many more such asteroids which have yet to be discovered, perhaps with the potential to impact the earth and cause a global catastrophe. Dr. Wenning points out that two spectacular NEO impacts have occurred in Siberia and Brazil during this century alone. For this reason, Dr. Wenning is writing a proposal for increased funding for the search for NEOs and is asking for an observational facility to be built in the Midwest.
As Head of Schools for a small, new interstate district in rural Vermont and New Hampshire, Ms. Noelle Vitt and her staff have taken on the challenge of integrating project-based learning into their three schools. “At the onset, project-based learning was very confusing to some teachers, especially in the sciences. They thought it was open-ended and unstructured but it is very intentional, inquiry-based work,” Noelle commented. The following article gives a glimpse into Rivendell’s conversion process.

The process toward project-based learning began when the staff sat down for a professional development session. “We asked ourselves as a staff, what do we want students to know and be able to do, and what will have the highest level of engagement for a diverse set of learners. We felt that if students understood where they were going and the concepts surrounding their goals that they could develop projects with some parameters that would also have high engagement. We used the Understanding by Design planning backwards method to really get at the core of what we wanted to create at our schools.” According to Noelle, “people who better understood the backwards planning method, but still allowed for students’ engagement, did the best and had the easiest time adjusting.”

There was also an adjustment period for students that was made easier by the shared vision of the staff. The students who struggled most with the new mode of learning were those that were interested only in finding the “right answer”. Noelle said that those issues ceased as time went on because, “those students who had been around for a while familiarized new students with the way things work here.” It became an informal mentoring process by seasoned students.

Since the conversion began three years ago, the projects that students have done have exceeded the expectations of staff and the community. The school has a long-term goal for creating a cross-Rivendell trail (spanning four towns). One student’s work on the trail was above and beyond most. The student mapped the trail using a GPS system and presented his work to the community. “The map now sits in the academy building and is what we base all of our other work for the trail on,” says Noelle. Another group project included working with veterans at a local VA hospital on media impact issues. The students viewed war-related films with the veterans and then had discussions about them. They would talk about politics, realism, and accuracy and then students would branch off of those discussions and do another project based on what they had learned.

The community had great buy-in to the schools, as well, because when the school began its transformation “we had a series of group discussions between towns to see what schools should look like and to set priorities.”
With real vision, they [community and staff groups] convinced parents that students need a high-quality education without getting bogged down by focusing on what the program would look like.” The emphasis was initially placed on the vision, instead of the design, when introduced to the community.

After three years of successful project-based learning, Noelle Vitt has some suggestions for schools courageous enough to take on the task. “A school needs leadership that believes in project-based learning and will stay committed to it. The leadership team needs to look at the advantages of every aspect of the current school and ask themselves, what is the return in sustained learning? Look at the research as a team and make unified decisions. What will go and what will stay? How will it be introduced? Are we ready?”

The Rivendell Interstate School District has proven that they are ready, and they give a glimpse into the process of deliberate, sustainable change that is possible in our schools.
As it is sometimes difficult to direct students toward meaningful projects, we sought advice from the Minnesota New Country School, one of the most experienced schools in the country at guiding student interests towards great project ideas.

Unconventional in almost every regard, MNCS is a teacher-owned, public charter school in its ninth year of operation, part of a Minnesota-based education collaborative called EdVisions. Approximately 110 students, grades 7 - 12, travel as far as 100 miles roundtrip to attend this modern, one-room, 17,000-square-foot “schoolhouse.”

Though students create their own academic programs built around projects, the daily schedule includes required periods of quiet reading, math, group projects and individual projects. Students keep a daily log of how they spend their time and complete detailed self-assessment rubrics. They also clean the school every day.

Teachers act as Advisors at MNCS, and part of their job is to anticipate and respond to what students need to get their work done. It also requires helping students develop project ideas based on their personal interests and academic needs. Kevin Kroehler has worked as an advisor at MNCS since 1997. Kevin spoke about project development in the on-line portfolio Student Learning in Small Schools, by What Kids Can Do (http://www.whatkidscando.org/home.html), with support from the Bill & Melinda Gates Foundation.

**Kevin Kroehler, on helping students turn interests into projects:**

Some students burst with project ideas. Others need coaxing. I find that as I go around each day, checking in with my advisees and asking, “What are you working on?” ideas for a project proposal just creep out. A kid will say, “Well, I’ve been thinking about X, or reading Y, or thinking about doing a project on Z.” You learn to seize these moments, helping the student envision how to turn X or Y into a project proposal.

Pegging what students do in a project to their maturity as a learner—and then pushing them some more—can sometimes be a challenge. Say you have a student who wants to do a project involving the Simpsons. If they’re a seventh grader and this is their first project, they may start by writing a report that includes pictures downloaded from the Internet. But then you’d press them on some additional questions: “Are the Simpsons contributing to tearing down the moral fabric of the country?” “What is and is not available on the Internet for research?” You push them to add depth to what might otherwise look like just a “dumb” project.
However, if the student is a third-year student with an interest in the Simpsons, their project might take the form of writing a half-hour script or creating their own short animation using characters from the Simpsons. Your expectations for them would be much higher.

Occasionally, a student’s interest becomes all-consuming. There’s a student here who four years ago started with “light wave”—a form of computer animation—and has followed it year after year. He has become so good at it that he’s going to spend a full year in Orlando, Florida studying computer animation with Disney. There’s an interesting twist to his story, though. When you hold up his work to our performance rubrics, he comes out on top. But when you hold it up to the [state] Profiles of Learning, the fact that he’s been so single-minded means his work doesn’t hit all of the required content areas—for example, in social science research or writing. So he will not be leaving with a diploma. But he’ll leave Disney with a diploma that will make him one of the youngest “certified” computer animators in the country.

[Note: This student did return to MNCS in December 2002 to complete his high school diploma.]

**On making project planning a formal, team effort:**

Although meeting one of Minnesota’s Profiles of Learning is certainly not the spark that lights all projects, let’s take an example that uses this as a starting place. Say you have a student who needs to meet the profile involving civics. You are in a meeting with the student and his parents, and he lands on the idea of “doing something on the U.S. Constitution.” For 20 minutes you might brainstorm, together, on what the student might “do” in relation to the Constitution. For example, he might re-write the Constitution in his own words or pick out pieces of the Constitution and see how his life would be different without it. Or he might write a new amendment, or key the Constitution to today’s most important issues. When the meeting ends, the student leaves with, say, eight ideas.

The student then fills out a project proposal form that builds on one or several of these ideas. I review and approve it (or suggest adjustments before approving it), the parents review and approve it, and then the student takes the completed proposal to the project planning team.

The project planning team consists of two advisors, plus one or two other staff people, such as a teaching assistant. When one of my own advisees comes before the group, I’m their advocate, their interpreter to the rest of the team. I also negotiate in advance with my advisees how much credit I feel comfortable supporting, although students are free to make a pitch to the team for more credit than I feel comfortable giving.
Why formalize this process? The project proposal form and the presentation to the proposal team, however brief, create a contract between the student and the school and team. It defines the amount of credit the student hopes to earn and the scope of the work the student will undertake. It puts legitimacy into the project, and it brings other people in who may have suggestions for strengthening the student’s plan. Plus it allows MNCS advisors to work together as a team.

**MNCS Performance Rubric**

MNCS has become synonymous with project-based learning, and offers key insights into how to transition students, schools, and communities into rich, multi-faceted learning.

One of the strongest components of the MNCS program is the familiarity students have with the Profiles of Learning (Minnesota’s State Standards) and with the MNCS curriculum. The staff has spent a great deal of time developing and refining their performance rubric, which is used to assess all student projects. The rubric is well known to the students, who evaluate themselves based on the rubric, as well.
<table>
<thead>
<tr>
<th><strong>Basic Project Skills</strong> (Evaluate with each project)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Documentation of Time and Learning</strong></td>
</tr>
<tr>
<td>All learning efforts and time completely documented with journals, pictures or other methods including description of activities, problems and successes</td>
</tr>
<tr>
<td>More than 1/2 of the learning efforts and time documented</td>
</tr>
<tr>
<td>Less than 1/2 of the learning efforts and time documented</td>
</tr>
<tr>
<td>Basically no learning efforts and/or time documented</td>
</tr>
<tr>
<td><strong>Tasks</strong></td>
</tr>
<tr>
<td>The student will generate a thorough list of specific tasks for project completion</td>
</tr>
<tr>
<td>Student generates over 1/2 of the tasks necessary for project completion</td>
</tr>
<tr>
<td>Student generates less than 1/2 of the tasks for project completion</td>
</tr>
<tr>
<td>Advisor generated task list for project completion</td>
</tr>
<tr>
<td><strong>Project Assessment</strong></td>
</tr>
<tr>
<td>Student is able to assess his/her own work and generate rubrics/assessments for his/her own work</td>
</tr>
<tr>
<td>Student is able to assess his/her own projects, but needs help creating or just doesn’t create rubrics for assessing</td>
</tr>
<tr>
<td>Student needs help in determining the quality/understanding of their own work</td>
</tr>
<tr>
<td>Student shows little concern for work quality and is just doing the work to get it done</td>
</tr>
<tr>
<td><strong>Project Quality</strong></td>
</tr>
<tr>
<td>Professional Quality</td>
</tr>
<tr>
<td>Professional Quality</td>
</tr>
<tr>
<td>Acceptable Quality</td>
</tr>
<tr>
<td>Acceptable Quality</td>
</tr>
<tr>
<td><strong>Resources</strong></td>
</tr>
<tr>
<td>Use at least three different types of specific resources including one live (primary) expert.</td>
</tr>
<tr>
<td>Use at least two different types of resources that includes a live (primary) expert.</td>
</tr>
<tr>
<td>Use at least one resource.</td>
</tr>
<tr>
<td>No resources used.</td>
</tr>
<tr>
<td><strong>Ownership</strong></td>
</tr>
<tr>
<td>Generated own idea, model, process, and product.</td>
</tr>
<tr>
<td>Adapted model to own interest and idea came from elsewhere.</td>
</tr>
<tr>
<td>Independently followed the model as given and made some personal choices. Followed model with supervision.</td>
</tr>
<tr>
<td>No personal interest reflected in project. Others gave student idea for project.</td>
</tr>
<tr>
<td><strong>Task Completion</strong></td>
</tr>
<tr>
<td>Deadlines are set and completed within time goals for more than 1/2 of the project tasks.</td>
</tr>
<tr>
<td>Deadlines are set and completed within time goals for less than 1/2 of the project tasks.</td>
</tr>
<tr>
<td>Deadlines are set and completed within time goals for less than 1/2 of the project tasks.</td>
</tr>
<tr>
<td>No deadlines are set and/or tasks completed on time.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Critical Thinking Skills</strong> (Evaluate with each project)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comprehension</strong></td>
</tr>
<tr>
<td>New facts gathered when needed, gathering those facts provides leads to getting more information needed.</td>
</tr>
<tr>
<td>Realizes the need to gather more information, but needs prompting to get more information when needed.</td>
</tr>
<tr>
<td>Gathers facts when told to.</td>
</tr>
<tr>
<td>No new information gathered to produce a quality project.</td>
</tr>
<tr>
<td><strong>Competency</strong></td>
</tr>
<tr>
<td>New things were created or new thoughts developed based on the new information.</td>
</tr>
<tr>
<td>The new information is applied to at least one new situation.</td>
</tr>
<tr>
<td>Much of the new information is remembered/monitored.</td>
</tr>
<tr>
<td>New information is gathered but very little or none is retained.</td>
</tr>
<tr>
<td><strong>Context</strong></td>
</tr>
<tr>
<td>Information/knowledge used in multiple &quot;real&quot; contexts.</td>
</tr>
<tr>
<td>Information/knowledge used in one &quot;real&quot; context.</td>
</tr>
<tr>
<td>Information/knowledge used in a controlled context/situation.</td>
</tr>
<tr>
<td>No context is applied to learning.</td>
</tr>
<tr>
<td><strong>Life Performance Skills</strong> (Evaluate with each project)</td>
</tr>
<tr>
<td><strong>Leader &amp; Organizer</strong></td>
</tr>
<tr>
<td>&quot;Others Fellow&quot; Has Vision &quot;Guts results &quot;Others Respect &quot;Effective use of time &quot;Effective prioritizing &quot;Follows through &quot;Delegates</td>
</tr>
<tr>
<td>&quot;Starting a following &quot;Visions has influence &quot;Leadership efforts with little success</td>
</tr>
<tr>
<td>&quot;Vision starting &quot;No followers &quot;No real attempt at leading &quot;Goals&quot; no follow through</td>
</tr>
<tr>
<td>Negative effect on others &quot;No goals</td>
</tr>
<tr>
<td><strong>Mediator &amp; Negotiator</strong></td>
</tr>
<tr>
<td>&quot;Is sought out to help resolve a problem &quot;Articulates the sides/issues that lead to a solution &quot;Demonstrates respect (open-minded, active listener)</td>
</tr>
<tr>
<td>&quot;Listens &quot;Knowledge of subject matter &quot;Fast based communications &quot;Motivated to find practical solutions</td>
</tr>
<tr>
<td>&quot;Attempts solutions without all the facts &quot;Has facts but unable to implement in a useful negotiation &quot;Doesn't get involved</td>
</tr>
<tr>
<td>&quot;Agitates the situation</td>
</tr>
<tr>
<td><strong>Coach &amp; Facilitator</strong></td>
</tr>
<tr>
<td>&quot;Assists others to meet goals &quot;Sticks to goals &quot;Encourages others</td>
</tr>
<tr>
<td>&quot;Mentors by example &quot;Willing to coach, but still developing skills to engage others.</td>
</tr>
<tr>
<td>&quot;No mentoring, coaching or facilitating happening</td>
</tr>
<tr>
<td>&quot;Interferes with other students' learning</td>
</tr>
<tr>
<td><strong>Advocate &amp; Supporter</strong></td>
</tr>
<tr>
<td>&quot;Go to bat stand up for someone publicly &quot;Handles confidential information wisely</td>
</tr>
<tr>
<td>&quot;Other centered &quot;Support others individually</td>
</tr>
<tr>
<td>&quot;Indifference &quot;Self-centered</td>
</tr>
<tr>
<td>&quot;Not confidential &quot;Gossiping/leaking/malicious &quot;Not accepting of other's ideas</td>
</tr>
<tr>
<td><strong>Implementer &amp; Performer</strong></td>
</tr>
<tr>
<td>&quot;Positive effect on environment &quot;Demonstrates high achievement and effectiveness in presentation &quot;Must to accept and apply constructive criticism &quot;Creates relationship with community</td>
</tr>
<tr>
<td>&quot;Demonstrates discipline in preparing for successful presentation &quot;Fulfills requirements of presentation right adequately &quot;Able to accept constructive criticism</td>
</tr>
<tr>
<td>&quot;Can demonstrate learning &quot;Needs more preparation or practice for public &quot;Difficulty accepting constructive criticism</td>
</tr>
<tr>
<td>&quot;Unwilling or unable to demonstrate learning</td>
</tr>
<tr>
<td><strong>Problem Framers/Solver</strong></td>
</tr>
<tr>
<td>&quot;Demonstrates ability to solve complex (real) life problems</td>
</tr>
<tr>
<td>&quot;Solves simple problems &quot;Offers solutions that don't work</td>
</tr>
<tr>
<td>&quot;Perceives a problem but there is no attempt to personally solve the problem</td>
</tr>
<tr>
<td>&quot;Doesn't see the problem.</td>
</tr>
<tr>
<td><strong>Innovator &amp; Designer</strong></td>
</tr>
<tr>
<td>&quot;Original Work &quot;Creates/invents something new/unique &quot;Willing to take a risk even if you fail</td>
</tr>
<tr>
<td>&quot;Modifying existing plans &quot;Try new ideas sometimes with no final product</td>
</tr>
<tr>
<td>&quot;Use someone else's plan/design &quot;No inventing or designing &quot;Adapted in someone else's invention/design</td>
</tr>
<tr>
<td>&quot;Magnifies &quot;Stealing other's ideas &quot;Mom or dad did it for you</td>
</tr>
<tr>
<td><strong>Producer &amp; Contributor</strong></td>
</tr>
<tr>
<td>&quot;Professional quality products &quot;Few perceived/noticeable flaws &quot;Perfectly consistent making positive contributions to community/school</td>
</tr>
<tr>
<td>&quot;High school quality products &quot;Generally provides positive contributions</td>
</tr>
<tr>
<td>&quot;Product quality needs help but shows hope &quot;Little or no contribution</td>
</tr>
<tr>
<td>&quot;Student shows little concern for quality &quot;Provides negative contributions to groups or community</td>
</tr>
<tr>
<td><strong>Skills not necessarily related to specific projects</strong> (Evaluate at least twice per year)</td>
</tr>
</tbody>
</table>

| **Time Usage** |
| Working on legitimate school stuff more than 6 hours per day with no prompting from advisor |
| Working on legitimate school stuff more than 6 hours per day, but with prompting to be a task from advisor |
| Working Less that 6 hours per day on school stuff |
| Off task more often than on. Look for different type of learning environment. |

| **Project Progress** |
| Project credit total is ahead of schedule. |
| Project credit total is right on schedule. |
| Project credit total is 1 to 5 credits behind schedule (up to 6 months behind). |
| Project credit total is more than 5 credits behind schedule (more than 6 months behind). |

| **Helping at School** |
| Student helps with regular chores, and will notice things that need to be done and just do them. |
| Student eagerly and without excessive prompting helps out with regular chores and cleaning. |
| Student will do chores, but requires some prompting and will usually grumble along the way. |
| Student may or may not help with chores. She'll help it if a much prompting. She just doesn't seem to care. |

| **Appreciation for School** |
| Student is active in showing what MCNS has done for him/her and displays an appreciation for MCNS. |
| Student understands what MCNS is all about and can see the potential for themselves and others, and that appreciation extends to others. |
| Student attends school and can see what MCNS could do for them. The respect for education doesn't extend beyond him/her. |
| Student looks at MCNS as just another school. She really doesn't know what MCNS could do for them. |

| **Outside of School** |
| Represents MCNS well when out in the community. Speaks well of MCNS and promotes the school in a positive manner. |
| Represents MCNS well when out in the community and attempts to promote the school in a positive way. |
| Displays appropriate behavior when in the community. |
| Does not represent MCNS well when out in the community. (Inappropriate language, actions, etc.) |
The MNCS project proposal form is an important part of the project process. This form must be complete and compelling before a student presents it to a project proposal team (consisting of three staff members) for approval or further considerations. This tool is an excellent representation of the planning and structure that is involved in creating an academically challenging project.

MNCS
Project Proposal Form

Name: ____________________________ Date: ____________________________

Names of others, if group project:

________________________________________________________________________

Title of the project:

________________________________________________________________________

I. Identify the topic to be researched and/or investigated:

II. List at least three basic information/fact questions you would like to answer concerning your project.
   1. ____________________________
   2. ____________________________
   3. ____________________________
   4. ____________________________

III. How does your project apply to life outside of school? What makes this project important to the community/world around you? (At least two reasons)
   1. ____________________________
   2. ____________________________
   3. ____________________________

IV. Brainstorming (May choose between A and B or do both)
   A. Develop a Web (Attach)
   B. Design an Outline (Attach)

V. Tasks/Activities to complete this project:
   Date to complete by: ____________________________

   (Cont. on separate sheet)
VI. List a minimum of three different types of resources you will use. At least one of these must be a primary source (living person).
   1.
   2.
   3.
   4.

VII. List the Profiles that will be validated after project completion. (Need to have the applicable profiles copied, highlighted and attached to the proposal form.)

VIII. Number of Proposed Project Credits (Must have documented hours/work to receive credit.)

IX. Initial Proposal Approval:
   Parent/Guardian: ____________________________ Date:
   Advisor: ____________________________ Date:
   Project Planning Group:
   ____________________________
   ____________________________
   ____________________________
Poland Regional High School
Derek Pierce, Principal
www.poland-hs.u29.k12.me.us/

Poland Regional High School serves 550 students from three small, working-class towns in Maine. When principal Derek Pierce made project-based learning a major component of the school’s curriculum the school went through a transformation like nothing they had experienced before. I had a chance to chat with Derek about the process and why he was so passionate about bringing project-based learning to the students at Poland.

Q: What elements of PBL do you think are most beneficial to students and why?

A: PBL is learning that lasts, it is a chance for kids to do high stakes, memorable, quality work. There is a higher investment from students, there is quality, and it fits better with our larger learning purposes.

Q: What resources most influenced the development of the PBL model?

A: We looked at the Coalition of Essential Schools as a model for our curriculum and community connections. We have found that our faculty are our greatest resource. If you were to ask staff whom they gain the most insight from they would say their colleagues.

Q: Can you tell me a little about the process of shifting to project-based learning?

A: It was a big transition but we maintained a shared vision about our philosophy. The process for teachers has evolved more organically through seeing the result of the collaborative learning environment. The staff all participate in critical friends groups [a component of the Coalition of Essential Schools], there are 15 staff development days a year, and teachers maintain portfolios for staff development, which are factored in for their yearly reviews. Student transition has seen more resistance surrounding two areas (big traumas!); the pass/no pass grading system and the fact that we no longer track students. There was also resistance from students about the senior project (called a “celebration”) because it is so much work and so different than what is expected of them at a traditional school. There was resistance but we just kept going and then after one year the former students teach the new students that that is just what is expected at Poland.
Q: How was the PBL program introduced to and received by parents?

A: The project stuff is less difficult to sell because it can help the town solve real-world problems. How it ties to state standards is also hard to refute. We also ask kids to talk about their work with the community and their parents so that no one is in the dark. Poland is not an affluent community so parents were not advocating for their children in the same way. They were not demanding AP courses and the memorization of the periodic table so they just wanted to know if their kids were going to succeed. Last year 82% of our students went on to some post-secondary education.

Q: How has the introduction of PBL changed the learning environment of your school?

A: There has been great progress in “kids-as-researchers”. They are such thoughtful students. They know how to create and use rubrics. They can carry on independent research. The kids even EXPECT meaningful assessment.

Q: How do you address issues of equity in your school, and what role, if any, does PBL play in that area?

A: We have no tracking. We have an honors challenge course that is open to all. Our teachers are sensitive to that. We give opportunities for kids to show their talents, and we respect their diverse talents.

Q: What recommendations do you have for educators who want to introduce PBL into their existing programs?

A: One thing is finding a couple of interested teachers to do a practice project with a group of students and putting in a public element. The project should be supported by the administration. If it goes well, the bug will spread from there. I would tell them to visit schools where it is working. Remember, the first time is the worst time – you can’t get to year two without year one. And don’t succumb to death by anecdote, otherwise known as the student who did his/her project on his/her favorite rap group. Focus on the process and all of the good projects.
Written by John W. Thomas, Ph.D., this comprehensive overview provides a useful summary of observations conducted with teachers and students involved in Project Based Learning at four schools.

“Project Based Learning as described in this Handbook engages students in rigorous academic work because they find relevance and meaning in the project and the learning.”

Bob Lenz, Teacher
Sir Francis Drake High School
San Anselmo, CA

This Handbook is designed to guide and support middle and high school teachers as they conceive, plan, and conduct project and problem based learning.

The Project Based Learning Handbook guides teachers through six planning stages, represented by the diagram on the right.

The planning guide presents guidance for the design of effective and provocative project-based learning activities. The table of contents below will provide a clear picture of what the guide offers.

- **Getting Started**: Initial considerations when planning a project.
- **Content**: Defining the general goals and outcomes students will master.
- **Driving Questions**: Developing a challenging problem that students can use to focus their effort.
- **Components**: Identifying the products, learning activities, and instructional supports that make up the work of the project.
- **Strategies**: Establishing a learning environment and identifying resources that will support student learning.
- **Assessment**: Designing a balanced and integrated plan for assessment and evaluation.
- *Project Planning Sheets* to be used in conjunction with the Planning Guide when planning.
- *Project Based Learning Toolbox* containing a collection of forms, templates, tools, and handouts that can be used in Project Based Learning units.
- *Implementation Tips* from experienced teachers to help make your project successful.
- *Project Ideas* from middle and high school teachers in a variety of subject areas.
The Giraffe Heroes Program for High Schools
The Giraffe Project
www.giraffe.org

For those educators who want to begin to infuse project/problem-based learning into their existing program in a structured, guided format through service-learning, the Giraffe Heroes Program is a great place to start. The lively paperback guide lets students develop the driving question and make the project as focused or comprehensive as they would like, while keeping the emphasis on community connection, action, and reflection.

The high school edition of the Giraffe Heroes Program is organized around *It's Up to Us*, a one-per-student paperback that can be used in classes and clubs, or by students working independently. The book gives readers stories and photos of Giraffe Heroes, concepts for leading a meaningful life, action planning tools, reflection questions and inspiring quotes. The accompanying Resource Guide gives the facilitator step-by-step ideas for implementing the Program.

In the book’s foreword, Giraffe Patch Adams calls *It’s Up to Us*, “the golden ticket to meaning—giving you the ABC’s of making your life count.” *It’s Up to Us*, written by Giraffe Project Executive Director John Graham, inspires teens to lead meaningful lives. It assumes that kids have concerns about the world they’re living in and that, given the chance, they want to have a positive impact on that world. It shows kids how to pick a problem that concerns them and to carry out their own service projects to address that problem. It helps them build the personal courage they need to stick their necks out for the common good, even when that means they might be embarrassed or criticized—or might fail.

Some of the chapters deal with profound topics—meaning, courage, compassion and responsibility—in words and graphics that appeal to teens. Other chapters build specific skills, such as handling stress and conflict, planning, making decisions and giving presentations. *It’s Up to Us* is for the full spectrum of kids in high school, no matter how they've been categorized or stereotyped.
"The Giraffe Program utilizes all the best of modern education—group interaction, consensus, outreach. It's metaphorically sound. It's more than community service—it brings out the best side in kids, the side we all need to see. There is so much violence in this culture; Giraffe stories give an alternative. " —High school teacher, Seattle

"This is an excellent resource to develop a school-wide curriculum of public services. Students are inspired to recognize their own potential." —From a formal review by Fairfax County VA Public Schools

### Six Elements That Most Excite and Motivate Students

1) Education that takes place out of the building  
2) Students really want to do it and have a choice in what they pursue  
3) Students have an opportunity to collaborate with others  
4) Students produce something. There is a product and an audience beyond the teacher  
5) Students efforts are useful to others  
6) Students have an opportunity for reflection and refinement

(Joe Nathan, Director, Center for School Change, Humphrey Institute at the University of Minnesota)
The following books were recommended by school practitioners and are reviewed in the words from the book jackets, publishers, and web sites.

**Earth Matters**  
The Population Connection  
http://www.populationconnection.org/  

Now in its second edition, *Earth Matters* continues to explore some of the most pressing environmental, social and economic issues of our time for the high school classroom.

Through 12 new readings and 34 innovative teaching activities, students can begin to understand the complexities of population pressures, global climate change, natural resource use, wildlife endangerment, distribution of wealth and food, gender equity, economic progress and how all these issues are interrelated.

Most importantly, *Earth Matters* helps prepare students to be "global citizens," using critical thinking and creative problem-solving techniques.

**Passion for Learning**  
Ronald J. Newell  
http://www.scarecroweducation.com/Catalog/  

The Minnesota New Country School's award-winning project-based model is capturing the attention of administrators and educators across the country. This book explains the theory and practice behind making a project-based system work. It covers learning theory, the role of teachers in such a system, what a school building and school day would look like, examples of student projects and how they are assessed, and a chapter on steps to take to create a school of this nature.

Educators, parents, and students who feel oppressed by the system or are unsatisfied with their present situation; people who are in danger of losing a school to consolidation; or small school movements in urban areas will want to read this book and discover a different outlook on what learning is, how learning takes place, and how to keep young people interested and enthused about learning.

The author, **Ronald J. Newell**, spent 27 years as a high school history teacher and coach, 4 years in teacher preparation programs at the university level, helped begin the Minnesota New Country School, and now works with the Gates-EdVisions Project replicating the project-based model.
The Self-Directed Learning Handbook: Challenging Adolescent Students to Excel
Maurice Gibbons
http://www.josseybass.com/

*The Self-Directed Learning Handbook* offers teachers and principals an innovative program for customizing schooling to the learning needs of individual students—and for motivating them to take increasing responsibility for deciding what and how they should learn. Whether the students are struggling or proficient, the program is designed to nurture their natural passion for learning and mastery, challenging them to go beyond the easy and familiar so they can truly excel.

The program can be introduced in stages in any middle or high school classroom and enables students of diverse abilities to design and pursue independent course work, special projects, or even artistic presentations, community field work or apprenticeships. Using this approach, the students take on an increasingly autonomous, self-directed role as they progress. The heart of the program is the action contract (or learning agreement) whereby the student sets challenging yet attainable goals, commits to a path for achieving them, and evaluates the results. Special emphasis is placed on developing skills and competencies that can serve the student well in his or her academic and career endeavors.

The author, **Maurice Gibbons**, is education professor emeritus, Simon Fraser University, British Columbia and a former teacher of grades 4 through 13. In his university position he specialized in the development of innovative educational programs, including the internationally celebrated Walkabout program for the transition of youth to adulthood. He has written books and journal articles on innovative education and self-directed learning and currently speaks and consults throughout Canada and the United States.

Creating Highly Motivating Classrooms for All Students: A Schoolwide Approach to Powerful Teaching with Diverse Learners
Margery B. Ginsberg, Raymond J. Wlodkowski
http://www.josseybass.com/

"Ginsberg and Wlodkowski each bring a lifetime of knowledge and experience to this book. Their passion for the learning of all students and teachers and their commitment to equity shine through its chapters. They clearly understand the challenges of teaching an increasingly diverse student body and they provide teachers and principals with practical, proven ways to
motivate the learning of both students and teachers."
--Dennis Sparks, Executive Director, National Staff Development Council

"There is nothing so useful as good theory informed by years of great teaching and a commitment to empowering education for all students. Ginsberg and Wlodkowski bring all that and more to this very useful and hopeful resource. Highly recommended to any educator!"
--Beverly Daniel Tatum, dean and professor of psychology and education, Mount Holyoke College, Massachusetts, and author of Why Are All the Black Kids Sitting Together in the Cafeteria?

This volume is based on the dual notion that all students are motivated to learn and that the role of teachers is to encourage, elicit, and support this desire to learn. Now education professionals have a practical guide to teaching students of different cultures and ethnic backgrounds. Whether you are a teacher, administrator, staff developer, teacher educator, or district officer, this comprehensive resource provides tools for developing, implementing, and maintaining a culturally responsive system of teaching in any classroom or school.

The authors draw from a synthesis of research and literature on learning theories, cultural studies, and teaching practice to describe the components of a culturally responsive school and pedagogy. They also develop practical strategies for applying The Motivational Framework for Culturally Responsive Teaching. In addition to case studies, sample lessons, and field-tested activities, the book presents guidelines to help organize school improvement initiatives, design professional development agendas, and conceptualize an effective method of evaluation.

Margery B. Ginsberg is an educational researcher, author, and consultant who currently advises states and school districts on federal program initiatives and issues related to instructionally focused school renewal. She has developed comprehensive school improvement initiatives in Germany, Japan, Texas, and California. She has also served as a member of the Region E Technical Assistance Team for the U.S. Department of Education.

Raymond J. Wlodkowski is a licensed psychologist and an award-winning teacher. The author and coauthor of numerous books and professional development videos, he currently serves as research professor in the School for Professional Studies at Regis University in Denver, Colorado.