

Project-Based Learning for Health Careers Pathways

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Introduction

Few U.S. citizens graduate from high school without having completed at least one project. All of us can look back on our own school careers and remember a delightful or not-so-delightful project. Replicas of California missions carved from large bars of Ivory soap spring to mind, as do salt-and-flour topographic maps and models of the solar system created from toothpicks, drinking straws and Styrofoam balls. In only rare cases would these projects qualify as project-based learning, however.

In this handbook you will learn about the qualities that distinguish project-based learning from other instructional methodologies. You will find out how to design, carry out and assess projects, and discover how service learning can be implemented effectively using project-based learning strategies. Finally, you will read about a variety of projects that have been successfully carried out by schools like yours across the country.

We hope you will find this information helpful as you continue to shape the future through educating tomorrow's leaders.

What Is Project-Based Learning? Characteristics of Project-Based Learning

Lilian Katz describes a project as “an in-depth investigation of a topic worth learning more about,” and notes that the key feature of a project is “a research effort deliberately focused on finding answers to questions about a topic posed either by the [students], the teacher, or the teacher working with the [students].” Right away we can see that soap-carved missions do not meet the criteria for an effective project!

Advocates of project-based learning do not suggest that this approach be used exclusively but rather as a context for learning, practicing and applying knowledge and skills, an integral part of an instructional plan that also includes what Katz calls “systematic instruction.” The two approaches differ in these ways:

Systematic Instruction

- ① Helps students **acquire** skills
- ② Addresses **deficiencies** in students' learning
- ③ Stresses **extrinsic motivation**
- ④ Allows teachers to direct students' work, use their expertise, and specify the tasks students perform

Project-Based Learning

- ① Provides students with opportunities to **apply** their skills
- ② Addresses students' **proficiencies**
- ③ Stresses **intrinsic motivation**
- ④ Encourages students to determine what to work on and accepts them as experts about their needs

Jobs for the Future, a strong advocate of quality project-based learning, has introduced the approach in workshops across the country. In its recent compilation of methodology and project examples, the group states: “Quality project-based learning is a pedagogy quite compatible with, and receiving considerable support from, two current movements in education reform—the school-to-career movement and the standards movement.”

On its excellent Web site, the Buck Institute for Education describes four defining features of project-based learning:

Content: Compelling Ideas

- Problems are presented in their full complexity.
- Students find interdisciplinary connections between ideas.
- Students struggle with ambiguity, complexity and unpredictability.
- Projects involve real-world questions that students care about.

Conditions: Support Student Autonomy

- Students take part in a community of inquiry and pursue coursework in a social context.
- Students are called upon to exhibit task- and time-management behaviors both individually and as group members.
- Students simulate the professional work of the scholar, researcher, engineer, reporter, planner, manager and other practitioners.

Activities: Investigative and Engaging

- Students conduct multi-faceted investigations extending over long periods of time.
- Students encounter obstacles, seek resources and solve problems in response to overall challenges.
- Students make their own connections among ideas and acquire new skills as they work on different tasks.
- Students use authentic tools (i.e., real-life resources and technologies).
- Students get feedback about the worth of their ideas from expert sources and realistic tests.

Results: Real-World Outcomes

- Students generate complex intellectual products that demonstrate their learning (e.g., models, reports).
- Students participate in their own assessment.
- Students are held accountable for choosing how they will demonstrate their competence.
- Students exhibit growth in frequently neglected areas important for real-world competence: social skills, life skills, self-management skills and dispositions to learn on one’s own.

How Does Project-Based Learning Differ from Other Approaches?

The Buck Institute for Education contrasts project-based learning with what it calls traditional direct-instruction teaching based on ten educational features, detailed in the following chart.

Project-Based Learning and Traditional Instruction Compared

Traditional Instruction

Project-Based Learning

Focus of Curriculum

Emphasizes content coverage, knowledge of facts, learning “building block” skills in isolation

Emphasizes depth of understanding, comprehension of concepts and principles, development of complex problem-solving skills

Scope and Sequence

Follows fixed curriculum, proceeds block by block, unit by unit; narrow, discipline-based focus

Follows student interest, large units composed of complex problems or issues, broad interdisciplinary focus

Teaching Role

Lecturer and director of instruction; expert

Resource provider and participant in learning activities; advisor/colleague

Focus of Assessment

Products; test scores; comparisons with others; reproduction of information

Process and products; tangible accomplishments; criterion performances and gains over time; demonstration of understanding

Materials of Instruction

Texts, lectures, and presentations; teacher-developed exercise sheets and activities

Direct or original sources: printed materials, interviews, documents, etc.; data and materials developed by students

Use of Technology

Ancillary, peripheral; administered by teachers; useful for enhancing teachers’ presentations

Central, integral; directed by students; useful for enhancing student presentations or amplifying student capabilities

Classroom Context

Students working alone; students competing with one another; students receiving information from an instructor

Students working in groups; students collaborating with one another; students constructing, contributing, and synthesizing information

Student Role

Carry out instructions; memorize and repeat facts; receive and complete brief tasks; listen, behave, speak only when spoken to

Carry out self-directed learning activities; discover, integrate and present ideas; define tasks and work independently for large blocks of time; communicate, show affect, produce, take responsibility

Short-term Goals

Knowledge of facts, terms, content; mastery of isolated skills

Understanding and application of complex ideas and processes; mastery of integrated skills

Long-range Goals

Breadth of knowledge; graduates who have the knowledge to perform successfully on standard achievement tests

Depth of knowledge; graduates who have the dispositions and skills to engage in sustained, autonomous lifelong learning

Adria Steinberg of the Rindge School of Technical Arts in Cambridge, Mass., suggests several differences in the teacher's role in project-based as opposed to traditional learning methodologies. The project-based approach involves:

- ⇒ More coaching and modeling; less telling
- ⇒ More finding out; less knowing
- ⇒ More cross-disciplinary thinking; less specialization
- ⇒ More teamwork; less privacy/isolation
- ⇒ More finding multiple sources; less reliance on texts
- ⇒ More multi-dimensional assessment; less testing
- ⇒ More varied materials and media; less paper and pencil
- ⇒ More contact with the community; less closed-door teaching

Contrasting project-based learning with other kinds of instruction that include activities, the Buck Institute for Education uses the theme of sound pollution to point out differences between the two approaches. In what they call activity-based instruction, this theme might be addressed by having students listen to sounds and make a graph identifying features of common sounds that are disturbing to the ear. In contrast, a project-based approach to the topic of sound pollution might involve students in identifying sound pollution problems in their community and forming a task force to investigate the problems and devise technically feasible solutions.

Why Try Project-Based Learning?

On its Web site, the South Central Regional Technology in Education Consortium based at the University of Kansas provides a variety of materials to assist educators in understanding and implementing project-based learning. Discussing motivation, they provide perhaps the most compelling reason for educators to consider using this approach: "Students enjoy learning when learning makes sense." In well-designed project-based learning, students investigate questions and participate in activities in real-world contexts where they are actively involved in the learning process.

The Buck Institute suggests four reasons for educators to consider using project-based learning, based on the four characteristics described above:

- ❶ **Content.** Project-based learning focuses on compelling ideas. Content can be presented realistically and holistically, and investigated in depth. The approach allows learners to form their own representations of complex topics and issues, to pursue aspects of content that match their interests and abilities, to work on current topics that are relevant and of local interest, and to draw content from their daily experience.
- ❷ **Activities.** In project-based learning, students engage in challenging activities that allow them to generate and construct their own knowledge, which aids in transfer and retention. Activities can be accommodated to diverse learning styles.

- ③ **Conditions.** Project-based learning can foster the development of both individual and group learning skills. Many projects involve using the Internet and other electronic tools, thus encouraging the mastery of technological tools.
- ④ **Results.** Project-based learning helps students develop the kinds of skills they will need in further education and careers. In addition to learning specific information, students involved in projects generally learn a variety of people and work-related skills as well as information-gathering skills that contribute to their development into lifelong learners.

The San Mateo County Office of Education, on its Challenge 2000 Multimedia Project Web site, lists several reasons for teachers to try project-based learning:

- ➔ PBL engages students in their own learning, provides opportunities for them to pursue their own interests and questions and decide how they will search for answers.
- ➔ PBL provides opportunities for interdisciplinary learning where students apply and integrate content from different areas in real-world activities.
- ➔ PBL establishes connections to life outside the classroom, aids development of employability skills.
- ➔ PBL provides opportunities for development of teacher-student relationships as teachers play roles of coach, facilitator and co-learner.
- ➔ PBL provides opportunities for teachers to build relationships with one another and the larger community.

Designing Project-Based Learning Experiences

Elements of Successful Project-Based Learning Experiences

Margaret Vickers, writing in the *Harvard Education Letter* about linking the school-to-career and standards movements, set forth a list of essential elements of project-based learning experiences, “The Six A’s.” These have been widely used and adapted. As included in the Jobs for the Future *Portable Action Lab* publication, these are:

The Six A’s of Quality Project-Based Learning

- ① **Authenticity.** Projects use a real-world context (e.g., community and workplace problems) to teach academic and professional disciplines.
- ② **Academic Rigor.** Projects involve students in using methods of inquiry central to academic and professional disciplines, and require higher-order thinking skills. [Bloom defines higher-order thinking skills as knowledge, comprehension, application, analysis, synthesis, and evaluation. Quellmatz defines them as recall, analysis, comparison, inference, and evaluation. In any case, they involve more than memorization.]
- ③ **Applied Learning.** Projects engage students in solving semi-structured problems calling for competencies expected in high-performance work organizations (e.g., teamwork, problem-solving, communication).
- ④ **Active Exploration.** Projects extend beyond the classroom and connect to work internships, field-based investigations, and community explorations.
- ⑤ **Adult Relationships.** Projects provide students with adult mentors and coaches from the wider community.
- ⑥ **Assessment.** Projects involve students in regular exhibitions and assessments of their work in light of personal, school, and real-world standards of performance.

Adria Steinberg of the Rindge School of Technical Arts in Cambridge, Mass., suggests that successful projects:

- Emanate from a problem or question that is meaningful to students;
- Take substantial time, much of which is scheduled into the regular school day;
- Require students to engage in real investigation, using a variety of methods and sources in their exploration;
- Require students to create something—a tangible end-product that takes real effort and has lasting value;
- End with students preparing a presentation of their work for a real audience;
- Include opportunities for students to reflect on their own learning;
- Blur the boundaries between disciplines—the emphasis is on the issues being analyzed, skills mastered and concepts understood;
- Blur the line between “slow” and “fast” learners;
- Create a culture of accomplishment within the classroom, similar to the culture in a sports team where everyone wants and needs high performance from one another.

Four Elements of Project Design

In its *Portable Action Lab*, Jobs for the Future describes four elements for designing high-quality projects; a fifth element in the overall process is refining the project or generating new projects after the completion of a project. They note that the process may be completed using either a scientific or an artistic approach. With the scientific approach, the steps are completed in order, beginning with a central question and concluding with assessment followed by project evaluation. The artistic approach is less structured and can begin at any point but covers the same basic elements. They give excellent examples of how teachers use both approaches to project design.

Project design elements are:

Defining a Central Question or Concept

Teachers working alone or with other teachers and/or community partners can generate these questions, or students can brainstorm during class time. A project can use a single question or several closely related questions. To get the juices flowing, the individual or group deciding upon the question can consider such questions as:

- What things would you like to change in your community?
- Could your experience at a workplace help you to design or create something the community needs?
- Is there an issue that has personal meaning for you that you might address through a project at a workplace?

Jobs for the Future emphasizes that two principles should drive whatever theme is selected:

(1) striving for high academic standards, and (2) creating a relevant context for students.

Reaching Out to Community Members

Many good ideas for projects come from students’ paid work placements, but teachers can establish strong partnerships with other kinds of community groups as well. In an ideal world, teachers would

have sufficient time to experience the kinds of community settings in which their students will be doing paid or unpaid work-based learning and ultimately be employed. Jobs for the Future suggests using the following questions to make working with a community partner productive:

- ❶ What broad skills are needed to succeed in this setting?
 - What basic communication skills are needed?
 - How do workers use resources, technology, and/or information systems?
 - How can these skills be used and reinforced in the classroom?
- ❷ How does the work here connect with other departments, organizations, or entities?
 - Are there other aspects of the work, beyond the primary duties performed within the area being explored, that workers need to succeed?

Designing Classroom and Community Activities

High-quality projects can include activities designed by teachers, community partners and students. Jobs for the Future suggests three advantages to having students design at least some of their own project activities: (1) They will have a richer learning opportunity; (2) Steering the investigation in ways that are relevant to their own experience will help assure authenticity; and (3) Involving students gives teachers additional hands and minds to bring in resources and accomplish logistics more quickly.

To help students write project proposals, the Northwest Regional Education Laboratories and Jobs for the Future suggest that teachers develop templates specifying elements to be included in an activity, including:

- Project theme (including title)
- Project goals
- Partners involved
- How the project will benefit the community
- Project timeline (including milestones and completion date)
- Sources of information or skills required for the project
- Skills and information students will learn in the classroom and community
- How students will be assessed during and at the end of the project

Developing Assessment Mechanisms

In the *Portable Action Lab*, Jobs for the Future notes that “learning is a process that requires continuous improvement” and points out that assessment, which means “to sit alongside,” is a crucial part of any project. Teachers are beside their students throughout the project, providing feedback that keeps the project moving toward a successful conclusion. Adapting from Northwest Regional Education Laboratories, Jobs for the Future describes four different methods of authentic assessment:

- ❶ **Student Self-Evaluation:** A formal, comprehensive evaluation (written or oral) of the project and the project process.

- ② **Teacher-Based Evaluation:** Teachers use assessment tools such as rubrics, scoring guides, paper-and-pencil tests, research papers, and/or content standards to evaluate student achievement through the project.
- ③ **Portfolio:** Collect samples of work throughout the project process to demonstrate mastery of specific skills.
- ④ **Panels of Community Members:** Participating employers, coaches and other interested members of the community evaluate the project from the perspective of the “real world” outside of the school. A student can present the project to them in a variety of ways such as presentation, demonstration or written report.

Things to Consider When Designing a Project

Steinberg suggests taking the following things into consideration when designing a project:

- What you want students to know and be able to do when they finish the career pathway program (not just your course). This includes: knowledge of and experience in all aspects of the industry; specific technical skills, knowledge and experience; habits of mind; work habits and skills; values
- Current interests, competencies, hobbies, and predispositions of your students and teachers
- Contributions that students might be able to make to others in the school, community, or workplace

Using the Six A’s of Quality Project-Based Learning listed above, ask the following questions about each element when designing your project:

Authenticity

- ① Does the project emanate from a problem or question that has meaning to the student?
- ② Is it a problem or question that might actually be tackled by an adult at work or in the community?
- ③ Do students create or produce something that has personal and/or social value, beyond the school setting?

Academic Rigor

- ① Does the project lead students to acquire and apply knowledge central to one or more discipline or content areas?
- ② Does it challenge students to use methods of inquiry central to one or more disciplines (e.g., to think like a scientist)?
- ③ Do students develop higher-order thinking skills and habits of mind (e.g., searching for evidence, taking different perspectives)?

Applied Learning

- ① Are students solving a semi-structured problem (e.g., designing a product, improving a system, organizing an event) that is grounded in a context of life and work beyond the school walls?
- ② Does the project lead students to acquire and use competencies expected in high-performance work organizations (e.g., teamwork, problem-solving)?
- ③ Does the work require students to develop organizational and self-management skills?

Active Exploration

- ① Do students spend significant amounts of time doing field-based work?
- ② Does the project require students to engage in real investigation, using a variety of methods, media, and sources?
- ③ Are students expected to communicate what they are learning through presentations?

Adult Relationships

- ❶ Do students meet and observe adults with relevant expertise and experience?
- ❷ Do students have an opportunity to work closely with at least one adult?
- ❸ Do adults collaborate on the design and assessment of student work?

Assessment

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

In the *Portable Action Lab*, Jobs for the Future suggests using a “scaffolding” process to build the level of support students need for high-quality projects. Envisioning the project process as building a tower, students act as builders while teachers and other adults provide the scaffolding. Jobs for the Future provides the following three-part framework with questions for teachers to use to determine if students have sufficient scaffolding for producing high-quality projects.

Explicit Expectations and Criteria

- ❶ Are there clear guidelines for students to use in planning their project work? (Guidelines differ from instructions in that, rather than telling students what to do, they provide a process for students to use in planning and carrying out their projects.)
- ❷ Do students know how and when their work will be assessed?
- ❸ Were students involved in the establishment of criteria for the assessment?

Access to Essential Resources

- ❶ Are students given the opportunity to review exemplars of work other students have done on similar projects?
- ❷ Do students have a mentor or coach to support the field-based elements of the project?
- ❸ Do students know how to use and have access to the technology necessary to both the research and exhibition phases of the project?

Milestones, Ongoing Assessment, and Continuous Feedback

- ❶ Are there check-in points at the completion of each distinct phase of the work?
- ❷ Are students expected to turn in a series of “deliverables” prior to the final product?
- ❸ Do students engage in periodic, structured self-assessment of their progress?
- ❹ Do they receive timely feedback on their works-in-progress from teacher, mentor, and peers?

Project Phases

Katz and Chard identified three phases of project development: getting started, field work, and culminating and debriefing events.

Getting Started

Students and their teacher select and refine the topic to be investigated, taking into account these considerations:

- ❶ relationship of the topic to students' interests and experience
- ❷ suitability of the topic for the integration of multiple subject areas
- ❸ complexity of topic and length of time needed to explore
- ❹ suitability of topic for in-school exploration

The San Mateo County Office of Education, on its Challenge 2000 Web site devoted to project-based learning with multimedia, suggests the following procedure for selecting a project topic:

- ❶ As a class, discuss the project constraints, such as subject or curriculum requirements, media or format requirements or constraints, scheduled time frame and project scope.
- ❷ Brainstorm to generate many ideas. Students can work as a class or in project groups. The Web site contains a brainstorming activity to facilitate this part of the process.
- ❸ Select a topic. Teachers should consider these issues as they assist students in this phase:
 - Students may need assistance in deciding which topics or questions are most meaningful. The Web site suggests that teachers encourage students to consider how they can add something of themselves to the project, and notes that the process of topic selection could be a good assessment question or journal prompt.
 - Teachers need to maintain a balance between the constraints of the project and what the site calls the students' negotiables—what the students **have to do** and what they **get to do**.
 - The way topics are framed can affect the entire process, from the way research is carried out to what conclusions are drawn. As they research their topics, students may need to revise or reframe their questions or even change their topic. Ongoing feedback from peers, teachers and mentors will help with this process.

The Buck Institute for Education suggests five things to keep in mind during the planning phase of your project:

- ❶ Cover the basics first. Make sure students have the skills and content they need to implement their project.
- ❷ Don't let the activity drive the instructional content.
- ❸ Don't justify a project solely on the grounds that students are exercising their minds. The requirements of the project should prompt students to develop new skills or construct new knowledge.
- ❹ Don't be overconfident in the role project-based learning can play. Students still need to learn and practice basic skills.
- ❺ Don't rely on technology simply because it's available or fun.

Field Work/Implementation

This is the heart of the project and can take anywhere from several class periods to an entire semester or school year depending on the complexity of the project. Students work on their own and in project teams to investigate their topic question by whatever means are feasible, including research with printed and electronic media, field trips, interviews—whatever it takes to get the job done.

The San Mateo County Office of Education Challenge 2000 Multimedia Project Web site offers valuable suggestions for how to help students get started on their research and manage their projects. They suggest the following activity for helping students begin the research process:

- ❶ Class discussion on research. Suggested questions:
 - What is research?
 - What is a research plan?
 - What does research mean and involve in different professions?
 - What are some research activities students are already engaging in?
 - What school and community resources are available to students?
 - What additional resources can they think of?
 - What are some specific research requirements they will need to meet for this project?
 - What is a primary source? How many do they need?
 - How many different sources and perspectives do they need to include?
 - Are they required to interview someone?
- ❷ Students brainstorm a list of research ideas. [They include an activity for brainstorming on their Web site.] Students can do this in their project groups, in groups of students working on individual projects, or as a whole class.
- ❸ Students or groups create written plans for conducting their research, in the discussion period following the brainstorming session. They should know that plans are subject to change as they begin their research and reformulate questions or find additional resources or information. Ask the following questions:
 - Are we getting more than one perspective on the subject?
 - What are the advantages of primary sources and secondary sources?
 - Are we using enough/too many different sources?
 - Who else can we talk to about this topic?
 - Have we considered sources on the Web, in books, in newspapers, in journals, anywhere else?
 - How reliable are our resources?
 - Are we straying too far from our topic?
 - Are we asking the right questions?
 - How much work can we get done each day/week?
 - How will we know when we have enough information?
- ❹ Peers and teachers can review or critique research plans using the questions above and add additional suggestions or research leads. Students/groups should feel free to refine their topics as they proceed.
- ❺ Students/groups should chart their progress by keeping records of ideas, plans, completed research, bibliographies, etc.

The Challenge 2000 Multimedia Project Web page suggests three steps students and teachers should take in project management:

- ❶ Students meet in project groups and decide what and how they need to plan to get their projects done successfully. The Web page includes a project management planning page that students or teachers can use. (See Appendix.)

- ② Students meet with their teacher for feedback on their draft plan. Plans should be evaluated both for structure and for content.
- ③ Following this review, students should discuss and revise their plans, documenting changes and additions in their design/idea book, journals or elsewhere. Changes to the plan as the process proceeds should also be documented, explained and justified in this manner.

The Web site contains valuable suggestions for ways groups can share information during the project process. They suggest using a large poster board where students can post questions which other students/groups answer, or which are used to generate class discussion. Information roundtables can be used to share information, or students/groups can post questions and share information via e-mail if the class has computers.

During the implementation phase, keep in mind these suggestions from the Buck Institute for Education:

- ① Beware of bells and whistles. It's easy to get carried away with activities or questions that detract from what students need to know and be able to do at the end of the day.
- ② Don't dumb down the task.
- ③ Beware of trivial activities. Project activities should give students the opportunity to integrate information and engage in rigorous thought processes.
- ④ Beware of the time it takes to get up to speed with technology.
- ⑤ Be wary of dividing student labor. This can mean that not all students are equally committed to the process or learn important information.
- ⑥ Don't underestimate the importance of task- and self-management skills.
- ⑦ Don't sacrifice breadth of content for depth of learning. Both are important.
- ⑧ Beware of hands-on projects that leave minds off.

Culminating and Debriefing Events/Assessment

According to Brown & Campion (Houghton-Mifflin Web page), a driving question and a culminating product are the two essential components of a project. They speak of culminating products or multiple representations as "a series of artifacts, personal communications, or consequential tasks that meaningfully addresses the driving question." Here again we can see that the soap-carved model of a California mission is not part of any meaningful project!

The San Mateo County Office of Education Challenge 2000 Web site discusses the function of assessment in project-based learning, listing the following roles assessment plays in the classroom:

Roles of Assessment

- Assessment helps teachers develop more complex relationships with their students by providing concrete pieces of work for students and teachers to discuss, as well as opportunities for formal and informal conversation about the work.
- Assessment helps students answer the questions: "Am I getting it?" and "How am I doing?"

- Assessment can help make content connections clear. This Web site suggests that teachers use journals and design/idea books, which they explain in detail, to prompt students to make connections between their research and designs and relevant subject matter, as well as to note concepts and connections to carry forward to future activities.
- Assessment engages students directly in the evaluation of their own work.
- Assessment helps teachers plan their next steps.
- Assessment helps students plan their projects.

Characteristics of Authentic Assessment

Everyone these days wants to be caught doing authentic assessment, but the characteristics of “authentic” assessment are not always clear. The San Mateo County Office of Education Challenge 2000 Web site lists the following characteristics of authentic assessment:

- Assessment activities not only capture student understanding of concepts and subject matter, but they also document and promote the development of “real-world” skills that students need outside the classroom (e.g., collaboration, problem-solving, decision-making).
- Assessments reflect student learning over time.
- Assessment takes place in a context familiar to the student; it is embedded in everyday activities and helps to extend these activities and foster learning.
- Assessment standards are well known to the students. This may involve students in creating rubrics, described below, or the use of external criteria that has been explained to students.
- Assessment helps build real mastery of a subject by allowing students to revise their work and incorporate new understandings and constructive feedback.
- Authentic assessment requires an authentic audience.

The San Mateo project organizers emphasize that “Establishing a common understanding of the assessment process and allowing students to participate in creating their own assessment standards are important components of project-based learning.” They recommend using student-created rubrics, and give the following procedure for the rubric-design process:

Designing a Rubric

- ➊ Familiarize students with the concept of a rubric. Provide students with sample rubrics and sample projects to be used for assessment, allowing them time to read through them.
- ➋ Assess the sample projects using the rubrics. In groups, students evaluate the sample projects and decide on an appropriate score, which they will be prepared to explain to the class.
- ➌ Teachers and students, working as a class, prepare a rubric that will be used for their upcoming projects. Teachers will discuss the assessment criteria, constraints and values they would like to have represented in the rubric (e.g., standards, curriculum goals). Questions to address:
 - How can the rubric incorporate or reflect the values and concerns of the school and the community?
 - Should there be one rubric for all projects or several variations for different types of projects or for groups with different goals?
 - Will the rubric have a single score for the entire project, or will there be scores for different aspects of the project?

- How will collaboration and other components of the development process be incorporated in the rubric?
 - How will the rubric be used?
 - Who will be the assessor?
- ④ As the projects get under way and the rubric is put to use, the class may want to assess how well the rubric is working and whether or not it needs to be modified.

In assessing projects, keep in mind these guidelines from the Buck Institute for Education:

- ① Don't use a fuzzy rubric.
- ② Don't avoid evaluating the more intangible parts of the project.
- ③ Don't overemphasize the completion of workable products.

The South Central Regional Technology in Education Consortium provides checklists to be used at specific grade levels for the ongoing implementation and assessment of multimedia presentation projects. Teachers can actually customize this checklist for their students on the organization's site at 4teachers.org. Portions of the high school-level checklist not geared specifically to multimedia presentation projects are shown in this chart:

Preparation
<input type="checkbox"/> I planned my time wisely to assure access to needed materials. <input type="checkbox"/> I made an outline to organize my thoughts. <input type="checkbox"/> I made a storyboard to organize my ideas. <input type="checkbox"/> I prepared a clear research question or topic. <input type="checkbox"/> I brainstormed details that would help support my ideas. <input type="checkbox"/> I used feedback from others to refine my research question.
Resources
<input type="checkbox"/> I used Internet sites in gathering my information. <input type="checkbox"/> I used newspapers, magazines or other printed periodicals. <input type="checkbox"/> I used reference books. <input type="checkbox"/> I used non-reference books. <input type="checkbox"/> I used documentaries or news interviews. <input type="checkbox"/> I used portions of films or television shows. <input type="checkbox"/> I cited my resources. <input type="checkbox"/> I used materials in accordance with copyrights. <input type="checkbox"/> I used my resources appropriately. <input type="checkbox"/> I consulted resources that showed different perspectives.
Organization
<input type="checkbox"/> I prepared a clear answer to my research question or topic. <input type="checkbox"/> I organized my ideas in a meaningful way. <input type="checkbox"/> I supported my ideas with details and explanations. <input type="checkbox"/> I balanced design aspects with content. <input type="checkbox"/> I included an introduction and/or contents. <input type="checkbox"/> I included a satisfying conclusion. <input type="checkbox"/> I used time wisely.

Project Examples

The Health Careers Academy at California High School in Whittier includes projects as a major part of the curriculum in the sophomore, junior and senior years, culminating in a senior project. In the tenth grade, students work individually or in pairs on a career project. Through this project they develop research and multimedia skills. The eleventh grade project, “Changing Roles of Women in Medicine in the Twentieth Century,” involves student teams working for three months researching and preparing a project that culminates in production of a magazine, poster and pamphlet. A synopsis of this project is included in the Appendix for your adaptation. Senior projects extend over the entire semester and conclude with a written paper, portfolio and panel presentation. Some of the outstanding health-related senior projects at California High have addressed AIDS and Adolescents, Fetal Alcohol Syndrome, and The Duties of an Emergency Medical Technician.

Project-based learning is being used in health careers pathway programs across the country. We have included project examples for various grades in the Appendix to stimulate your creativity or for you to adapt to meet the needs of your students. A new health careers film, “The Courage to Succeed in a Changing World,” showcases programs at California’s Palmdale High School Health Careers Academy and Portola High School Focus on Health Careers. Students, teachers and administrators discuss their experiences with project-based learning and how it has made a difference in the educational climate at the two schools. No matter what the size of your school or your community, project-based learning can enrich your program and lead to increased student enthusiasm, learning and retention.

Incorporating Service Learning into Your Health Careers Pathway Program

Service learning is a special type of project-based learning with the added dimension of expanding students’ awareness and experience to include the larger communities of which they and their schools are an integral part. A Massachusetts educator suggests that “Community service learning can be the main vehicle of instruction in any discipline.” (Kinsley & McPherson) Both service learning and project-based learning have their origins in the writings of educational philosophers John Dewey and William Kilpatrick and the progressive movement in the early part of the 20th century.

Witmer and Anderson define service learning as “a process of learning through the experience of rendering service in the school or community and actively reflecting upon the experience.” The reflection aspect is what differentiates service learning from community service. Lankard states: “By combining community service with learning activities and reflecting on their experiences, students realize increased personal, social, and intellectual growth and preparation for work.”

The National and Community Service Trust Act of 1993 defines service learning as a method:

- under which students learn and develop through active participation in thoughtfully organized service experiences that meet actual community needs and that are coordinated in collaboration with the school and the community;
- that is integrated into the students' academic curriculum or provides structured time for a student to think, talk, or write about what the student did or saw during the actual service activity;
- that provides students with opportunities to use newly acquired skills and knowledge in real-life situations in their own communities; and
- that enhances what is taught in school by extending student learning beyond the classroom and into the community and helps to foster the development of a sense of caring for others. (Kinsley and McPherson)

Witmer and Anderson emphasize the importance of guided reflection, including both oral and written follow-through, for making service learning authentic. They state: "Reflection helps students identify their own values, assess personal skills, develop empathy for others, and compare their assumptions to real-world experiences." They note that reflection can be both individual and group, including such activities as daily independent writing, keeping scrapbooks, meeting with teachers or agency supervisors, and group discussion on the service learning experience and underlying social problems being addressed. Written reflection can be an important part of the student's portfolio.

Berman suggests that teachers assist students in their self-evaluation and reflection by having them ask themselves these questions:

- ❶ What was my best service action today, and what are my reasons for picking that action?
- ❷ What was my most valuable insight from today's service, and what are my reasons for focusing on that insight?
- ❸ What did I already know about today's content information? How is that prior knowledge connected to my new learning?
- ❹ What are three other skills or pieces of content learning that I want to remember?
- ❺ What service skill do I most want to improve the next time I do community service? Why is this skill valuable to me?

Service learning is one of the best ways to make their required education relevant to students. When they put their knowledge and skills to work in solving a community problem or meeting the needs of less-fortunate citizens, students experience a direct connection between classroom learning and practical application. A Chicago project, for example, involved students in figuring out how to increase participation in a recycling program. Students worked in eight cross-grade teams, each of which tackled a different aspect of the problem. They conducted telephone interviews, contacted city officials, wrote letters and articles for neighborhood newspapers, designed and distributed fliers, conducted exit polls at local businesses, organized a recycling program at their school, attended a city council meeting and presented recommendations to the environmental committee. (Weinberg, *The Problem Log*)

Principles of Service Learning

At a 1989 meeting sponsored by the National Society for Internships and Experiential Education, the following service learning principles were developed:

- ❶ An effective program engages people in responsible and challenging actions for the common good.
- ❷ An effective program provides structured opportunities for people to reflect critically on their service experience.
- ❸ An effective program articulates clear service and learning goals for everyone involved.
- ❹ An effective program allows for those with needs to define those needs.
- ❺ An effective program clarifies the responsibilities of each person and organization involved.
- ❻ An effective program matches service providers and service needs through a process that recognizes changing circumstances.
- ❼ An effective program expects genuine, active, and sustained organizational commitment.
- ❽ An effective program includes training, supervision, monitoring, support, recognition, and evaluation to meet service and learning goals.
- ❾ An effective program ensures that the time commitment for service and learning is flexible, appropriate, and in the best interests of all involved.
- ❿ An effective program is committed to program participation by and with diverse populations. (Wittmer and Anderson)

Standards for Service Learning

The Alliance for Service Learning in Education Reform suggests these standards for high-quality school-based service learning:

- Effective service learning efforts strengthen service and academic learning.
- Model service learning provides concrete opportunities for youth to learn new skills, to think critically, and to test new roles in an environment which encourages risk-taking and rewards competence.
- Preparation and reflection are essential elements in service learning.
- Students' efforts are recognized by their peers and the community they serve.
- Youth are involved in the planning.
- The service students perform makes a meaningful contribution to the community.
- Effective service learning integrates systematic formative and summative evaluation.
- Service learning connects [a] school and its community in new and positive ways.
- Service learning is understood and supported as an integral element in the life of a school and its community.
- Skilled adult guidance and supervision is essential to the success of service learning.
- Preservice and staff development which includes the philosophy and methodology of service learning best ensure that program quality and continuity are maintained. (Kinsley and McPherson)

Students in the Health Professions Pathway at Seaside High School participate in service learning projects during their sophomore, junior and senior years with the overall goal of extending classroom learning through service to others. In the sophomore year, students work in groups at clearly defined

tasks with a teacher present. The classroom portion of the project includes reading assignments and guest speakers. In their junior year, students work in groups to identify a project. They work with community agencies to organize and carry out their projects, which are evaluated by the agencies and by their peers. Seniors are given a great deal of latitude in designing and carrying out their projects, which are evaluated within the agency in which they work. Service learning venues at Seaside include the Red Cross, Boys and Girls Club, SPCA, Marina Branch Library Homework Center, Marina Children's Center and Seaside Branch Library.

We have included two service learning projects with a health careers focus in the Appendix for your use in incorporating service learning into your career pathway program.

Conclusion

By incorporating project-based learning into their career pathway programs, health careers educators bring an important dimension to the educational process. Like many of the old adages we repeat without really thinking about them, "Experience is the best teacher" is really true. Once a child has been burned by a hot stove, the child is less likely to touch a burner in the future. High school students who research, plan, and conduct a public awareness campaign about TB or sexually transmitted diseases or the importance of hand-washing retain the factual information they have gathered much more effectively than those who learn the same facts through reading or through classroom lectures. When the question, "Why do I have to learn this?" can be answered with the rationale of solving a problem that interests them or providing a service to people who need it, students are much more likely to buy into the effort needed to complete an assignment.

We hope you will find this information and the projects presented in the Appendix useful in implementing project-based learning in your health careers pathway. The Internet provides a wealth of ideas for other projects, as well as a powerful research tool for both students and teachers. Please share your successful projects, whether on the Web or at meetings with other educators. Reinventing the wheel takes time that could be better spent teaching, learning, or even relaxing. Good luck!

Appendix

Project Management Planning

From San Mateo County Office of Education

Challenge 2000 Multimedia Project

Web site: [pblmm.k12.ca.us/PBL Guide](http://pblmm.k12.ca.us/PBL%20Guide)

Components

In creating an overall project management plan, students may wish to create one or more of the following components:

Schedule: A calendar or list of what needs to be completed on the project and the date by which it needs to be completed.

Division of Labor: A description of what needs to be done and who will be responsible for doing each task, or a description of each group member's role and duties.

Budget: A plan for how students will spend a predetermined amount of money, or possibly a real or mock budget proposal that students submit for approval.

Research Plan: Should describe any methods for collecting data and include a list of sources, a schedule for completing the research, and a plan for dividing up the research among group members.

Materials and Equipment List: A checklist of needed resources, the dates they are needed, and who will be responsible for each one.

Releases List: A checklist of releases students may need for published material or photos, video, or audio recordings of people.

Other:

Important Considerations for Students

- 1 In creating their plans, students will need to keep in mind the constraints of the project. They should remember to budget time for set-up and clean-up, and consider the length of class periods, the availability of needed equipment and/or materials, and any other constraints.
- 2 When deciding who will do what, students should consider that it may be good for group members to do what they are best at, or it might be a better experience to try something new and challenging. Students should keep in mind that many tasks will require more than one person and that being responsible for getting something done does not necessarily mean doing it all alone.
- 3 Students should think carefully about how long it will take to do research. Students should remember to budget time for finding and locating the sources, doing the reading, listening, and note-taking, and investigating new sources that come up in preliminary research. If listing dates in their research plans, students should decide what those dates indicate, e.g., merely locating the source or completing the research for that source.
- 4 Students should review their completed plans carefully and make sure they are feasible. They should ask and decide: (a) Can we complete our project using this plan and do a high-quality job? (b) Do we need to scale down or expand our project?
- 5 Students should keep all plans up to date and keep records of any changes made. Instead of erasing old plans, students should keep original plans so they can clearly see and remember the changes that have been made.

The Hospital as a City

Adapted from a project of
The School District of Philadelphia, Education for Employment Office
Jobs for the Future Toolkit

Project Purpose

To provide health careers students with the opportunity to experience all aspects of the hospital industry.

Goals

- ➊ To design a multi-purpose facility specifically for the health-care needs of teenagers.
- ➋ To provide students with opportunities for critical thinking, problem solving, and decision making.
- ➌ To help students transfer the knowledge of how systems work through cooperation and integration of skills and services.

Project Overview

This 10-week project is designed to help you make a smooth transition from school to work. You should gain knowledge of the health care industry that may help you make career decisions. Through your research, you will gain important insights into the systems that combine to make hospitals work. You will have the support of a faculty advisor who will serve as a mentor, coach, and resource person. This is a group project, and you will be organized into teams. You will use the knowledge gained through your career rotations as a basis for beginning this project.

You will be given organizing themes to help you focus on this very broad topic. You should be creative, innovative, and yes—dare to take risks! Your team will be working to develop a plan to create a hospital that will address the needs of the community. The focus will be on medical care for teenagers, but the entire community population should be served in this hospital. The timeline for this project will be determined at each site.

Projects will be assessed by a team of teachers, administrators, partners from business/industry/community, and parents. When appropriate, peers will also be included on the assessment team. The team will receive a group grade that will be reflected in all subject areas. Each team will prepare a written report on the project, which should be _____ typed pages and show the use of current technology. The report should include: scientific information, historical perspectives on selected issues, and graphic presentations (e.g., charts, graphs). As a culminating activity, each team must make a presentation to the entire class. These presentations should include photographs, videos, group activities, and handouts as well as oral presentations.

Subject Integration

Students will need the following subjects to complete the project:

- ➊ **English:** communications, public speaking, public relations, reading, etc.
- ➋ **Math** (Algebra I & II, Geometry, Elementary Functions): design and layout of building, exterior and interior design, billing, accounting, budget development, purchasing, tax structure, etc.

- ③ **History:** labor history, description of type of hospital (profit, not-for-profit), policies, governmental issues, etc.
- ④ **Language:** All documents and forms of communication should be available in languages appropriate for users of hospital services.
- ⑤ **Science (Biology, Anatomy & Physiology, Chemistry, Physics):** supplies needed for operation, laboratory requirements, equipment, technology, staff certifications, etc.
- ⑥ **Computers:** networking departments, accounting procedures, tracking inventory, supply/demand, bookkeeping, communications, etc.
- ⑦ **Health and Physical Education:** certifications, diseases, well-care issues, preventive care, fitness/wellness facility, etc.

Example of Subject Integration: Survey

- ① English class devises the questions.
- ② History class gathers the demographics.
- ③ Language classes translate information into appropriate languages.
- ④ Computer class keys in information, formats, and prints.
- ⑤ Science and Health classes research medical issues for inclusion in survey.
- ⑥ Physical Education class administers the survey.
- ⑦ Math class compiles and analyzes the data.
- ⑧ Team discusses, refines, and applies the information gathered through the survey.

Academic and Industry Skill Standards Addressed in the Project

English/Language Arts, Grades 9 and 10

Writing

- 1.0 Writing Strategies. Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose. Students progress through the stages of the writing process as needed.
- 1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.
- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).
- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.
- 1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.
- 1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.
- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

Writing Applications

- 2.3 Write expository compositions, including analytical essays and research reports.

Listening and Speaking

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations of their own that convey clear and distinct perspectives and solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.
- 1.3 Choose logical patterns of organization to inform and to persuade, by soliciting agreement or action, or to unite audiences behind a common belief or cause.
- 1.4 Choose appropriate techniques for developing the introduction and conclusion.
- 1.5 Recognize and use elements of classical speech forms in formulating rational arguments and applying the art of persuasion and debate.
- 1.6 Present and advance a clear thesis statement and choose appropriate types of proof that meet standard tests for evidence, including credibility, validity, and relevance.
- 1.7 Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations.
- 1.8 Produce concise notes for extemporaneous delivery.
- 1.9 Analyze the occasion and the interests of the audience and choose effective verbal and nonverbal techniques for presentations.

Speaking Applications

- 2.0 Students deliver polished formal and extemporaneous presentations that combine the traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.1 Deliver narrative presentations.
- 2.2 Deliver expository presentations.
- 2.3 Apply appropriate interviewing techniques.
- 2.6 Deliver descriptive presentations.

English/Language Arts, Grades 11 and 12

Reading

- 2.3 Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.

Writing

- 1.0 Writing Strategies. Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose and progression through the stages of the writing process.
- 1.1 Demonstrate an understanding of the elements of discourse (e.g., purpose, speaker, audience, form) when completing narrative, expository, persuasive, or descriptive writing assignments.
- 1.3 Structure ideas and arguments in a sustained, persuasive, and sophisticated way and support them with precise and relevant examples.

- 1.5 Use language in natural, fresh, and vivid ways to establish a specific tone.
- 1.6 Develop presentations by using clear research questions and creative and critical research strategies (e.g., field studies, oral histories, interviews, experiments, electronic sources).
- 1.7 Use systematic strategies to organize and record information (e.g., anecdotal scripting, annotated bibliographies).
- 2.6 Develop multimedia presentations.

Written and Oral English Language Conventions

- 1.0 Students write and speak with a command of standard English conventions.
- 1.1 Demonstrate control of grammar, diction, and paragraph and sentence structure and an understanding of English usage.
- 1.2 Produce legible work that shows accurate spelling and correct punctuation and capitalization.

Listening and Speaking Strategies

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations that convey clear and distinct perspectives and demonstrate solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.
- 1.6 Use logical, ethical, and emotional appeals that enhance a specific tone and purpose.
- 1.10 Evaluate when to use different kinds of effects (e.g., visual, music, sound, graphics) to create effective productions.
- 2.0 Speaking Applications. Students deliver polished formal and extemporaneous presentations that combine traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.4 Deliver multimedia presentations.

History and Social Science, Grades 9-12

Historical and Social Sciences Analysis Skills

Chronological and Spatial Thinking

1. Students compare the present with the past, evaluating the consequences of past events and decisions and determining the lessons learned.
2. Students analyze how change happens at different rates at different times; that some aspects can change while others remain the same; that change is complicated and affects not only technology and politics, but also values and beliefs.

Historical Interpretation

1. Students show the connections, causal and otherwise, between particular historical events and larger social, economic and political trends and developments.
2. Students recognize the complexity of historical causes and effects, including the limitations on determining cause and effect.
3. Students interpret past events and issues within the context in which an event unfolded rather than solely in terms of present-day norms and values.

Health Sciences Core Standards

- 1.0 Socioeconomic, 11th Grade. Students will know the relationships of various health care systems.
- 1.0 Socioeconomic, 12th Grade. Students will know how cost and reimbursement systems impact the delivery of health care.
- 3.0 Safety, 9th Grade. Students will know safety issues as they relate to employer, employee, and patient within the health care setting.
- 4.0 Communication and Decision-Making, 9th and 10th Grade. Students will know key concepts of working cooperatively and assuming leadership roles as they interact among genders, generations and cultural groups.
- 4.0 Communication and Decision-Making, 12th Grade. Students will know how communications and decision-making affect health care delivery.
- 5.0 Ethical Frameworks, 12th Grade. Students will know the principles of accepted ethical behaviors with respect to cultural, ethnic, and social differences within health care.

SCANS Competencies

Resources

- A. Time: Student selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
- D. Human Resources: Student assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

- A. Participates as a member of a team
- D. Exercises leadership
- E. Negotiates

Information

- A. Acquires and evaluates information
- B. Organizes and maintains information
- C. Interprets and communicates information
- D. Uses computers to process information

Systems

- A. Understands systems
- C. Improves or designs systems

Technology

- A. Selects technology
- B. Applies technology to task

Project Organization

Team Building

Students will be required to work in teams. Selected activities will be used to help teams become cohesive units. Some activities from the “Making Me the Best I Can Be” series will be used.

Roles

Each team will organize its members by assigning roles that will help facilitate the group process. Suggested roles: manager, facilitator, encourager, materials manager.

Parent Members

Once the student team is established, team members will seek parental support from their own parents or the parents of other students.

Business Partners

Business partners who have worked with the students on other projects, or new partners, can be invited to assist the teams. Business partners should be provided with information on the project as well as the teams and be allowed to select a team with which to work.

Community Resources

Teams are given a list of approved agencies from which they can seek assistance. The list is compiled by students, teachers, parents, and community partners. The project coordinator must approve any additions to the list.

The Role of the Coordinator

- ① Establish a process to ensure that no student is discriminated against on the basis of race, religion, gender, national origin, or disability.
- ② Inform faculty advisors about changes in the project, availability of learning opportunities, and changes in teams.
- ③ Determine the number of students on each team.
- ④ Provide required forms for the successful completion of the project.
- ⑤ Establish procedures for students who need to withdraw from the project.

The Role of the Faculty Advisor

- ① Advise students of their responsibilities for this project.
- ② Provide a mechanism for the exchange of information.
- ③ Serve as a liaison between students and selected agencies.
- ④ Provide technical assistance.
- ⑤ Arrange assessment presentation and coordinate the training for assessment procedures for all team members.
- ⑥ Place the assessment grade on appropriate records.

The Role of Business, Community, and Parent Partners

- ① Provide professional expertise, allowing students to experience operations at their agency or research site as appropriate under site policies.
- ② Notify the coordinator of any problems that may impair the students' progress.
- ③ Serve on the assessment team.
- ④ Grade the finished project.

The Planning Process and Guidelines

- The project may be given in any grade, 9–12.
- Course work should be designed to support the project. For example:
 - All teachers devote at least one period each week to the project.
 - All classes are devoted to the project for two weeks.
 - Teachers opt to team teach and use double periods for the project.
- Teachers should demonstrate on their lesson plans how they have addressed general academic and vocational concepts related to this project.
- As faculty advisors, teachers will demonstrate specific concepts related to this project.
- The entire team should meet at least twice during the 10-week period.
- Provide guidelines to teams to assist them in beginning the planning process.

Organizing Themes

Planning

Types of strategic and project planning:

- goals and objectives
- needs assessment
- surveys (population to be served/demographic study)
- proposals
- work teams
- What is the hospital?
- departments and services
- plan for growth
- local laws, building codes, federal/state/local requirements and legislation
- medical society, hospital associations, professional organizations, student organizations
- human resources allocation
- public relations, promotion, marketing
- timelines
- purchasing
- accounting, billing
- technology resources
- financing (building, staff, services)
- governing bodies
- housing and dietary
- staff training

Management

Methods typically used to manage enterprises over time, methods for expanding and diversifying workers' tasks and broadening worker involvement in decisions.

- ❶ How will the hospital be governed?
- ❷ What are the staffing policies?

- ③ What will constitute the security system?
- ④ What will the hospital departments be, and how will they be organized?
- ⑤ What kind of hospital will you establish (full-service, teaching, research, self-contained)? Justify your choice.

Technical and Production Skills

(Specific production techniques, alternative methods for organizing production work, including methods that diversify and rotate workers' jobs.)

- ① Determine the type of labor force needed to construct a hospital building.
- ② Develop a plan that will utilize workers in the new hospital to their greatest capacity. Consider (a) production techniques of health-care workers, (b) most efficient equipment for the job, (c) new medical equipment technologies, (d) new workforce skills technology.
- ③ Determine what skills your workforce needs.
- ④ Develop workforce training and education programs.
- ⑤ Describe the work in a hospital in terms of work schedules.
- ⑥ Document trends in multi-faceted workers.

Health, Safety, and Environmental Issues

(in relation to both the hospital workers and the larger community)

- ① Determine safety and environmental issues affecting a hospital and its community.
- ② Describe the impact of the building on the community, including: building codes, zoning codes, union regulations, federal/state/local regulations.

Labor Issues

- ① Address labor issues in the health-care field.
- ② Write a personnel manual including rules and regulations for employees.
- ③ Who is covered by union contracts?
- ④ What items are addressed in union contracts?
- ⑤ Trace the development of hospital unions.
- ⑥ How is the role of hospital unions changing? What is their future?
- ⑦ Learn how work teams and union members are operating quality circles.

Community Issues

- ① Community outreach including schools, community organizations, industry, needs assessment to determine service needs.
- ② Impact of traffic on community.
- ③ Diversity: How will the community recruit employees that represent the diversity of the surrounding community?

Finance

- ① Daily accounting and financial decisions required for effective hospital functioning.
- ② Methods used for raising capital to start and/or expand facilities and services.
- ③ Develop funding strategies to (a) provide funds to build the hospital, (b) provide funds to operate the hospital, (c) provide funds for future expansion.
- ④ Develop a financial records management system.

The Health of a Nation: Controlling a Virus

Project adapted from Prince George's County, Maryland, Career Connections

Found at www.pgcps.pg.k12.md.us

Project Activities

As part of this project, each student will:

- ❶ Read *The Andromeda Strain* by Michael Crichton;
- ❷ Be assigned a virus to research (Ebola, HIV, chicken pox, malaria);
- ❸ Research how viruses are identified, isolated, contracted, spread, and prevented;
- ❹ Interview public health officials and health care providers about the virus under study;
- ❺ Compare and contrast various accounts of infectious disease outbreaks (fictional, non-fictional, tabloid, newspaper, interviews, TV scripts, medical newsletters);
- ❻ Investigate specific protocols for preventing the spread of disease; and
- ❼ Develop a public health awareness campaign (newsletters, brochures and speeches).

Academic and Industry Skill Standards Addressed in the Project

English/Language Arts, Grades 9 and 10

Writing

- 1.0 Writing Strategies. Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose. Students progress through the stages of the writing process as needed.
- 1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.
- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).
- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.
- 1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.
- 1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.
- 1.8 Design and publish documents by using advanced publishing software and graphic design.
- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

Writing Applications

- 2.3 Write expository compositions, including analytical essays and research reports.
- 2.6 Write technical documents

Listening and Speaking

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations of their own that convey clear and distinct perspectives and solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.
- 1.3 Choose logical patterns of organization to inform and to persuade, by soliciting agreement or action, or to unite audiences behind a common belief or cause.
- 1.4 Choose appropriate techniques for developing the introduction and conclusion.
- 1.5 Recognize and use elements of classical speech forms in formulating rational arguments and applying the art of persuasion and debate.
- 1.6 Present and advance a clear thesis statement and choose appropriate types of proof that meet standard tests for evidence, including credibility, validity, and relevance.
- 1.7 Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations.
- 1.8 Produce concise notes for extemporaneous delivery.
- 1.9 Analyze the occasion and the interests of the audience and choose effective verbal and nonverbal techniques for presentations.

Speaking Applications

- 2.0 Students deliver polished formal and extemporaneous presentations that combine the traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.2 Deliver expository presentations.
- 2.3 Apply appropriate interviewing techniques.
- 2.5 Deliver persuasive arguments.
- 2.6 Deliver descriptive presentations.

English/Language Arts, Grades 11 and 12

Reading

- 2.0 Reading Comprehension. Students read and understand grade-level-appropriate material. They analyze the organizational patterns, arguments, and positions advanced.
- 2.3 Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.
- 3.0 Literary Response and Analysis. Students read and respond to historically or culturally significant works of literature that reflect and enhance their studies of history and social science. They conduct in-depth analyses of recurrent themes.

Writing

- 1.0 Writing Strategies. Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose and progression through the stages of the writing process.

- 1.1 Demonstrate an understanding of the elements of discourse (e.g., purpose, speaker, audience, form) when completing narrative, expository, persuasive, or descriptive writing assignments.
- 1.3 Structure ideas and arguments in a sustained, persuasive, and sophisticated way and support them with precise and relevant examples.
- 1.5 Use language in natural, fresh, and vivid ways to establish a specific tone.
- 1.6 Develop presentations by using clear research questions and creative and critical research strategies (e.g., field studies, oral histories, interviews, experiments, electronic sources).
- 1.7 Use systematic strategies to organize and record information (e.g., anecdotal scripting, annotated bibliographies).
- 2.6 Develop multimedia presentations.

Written and Oral English Language Conventions

- 1.0 Students write and speak with a command of standard English conventions.
- 1.1 Demonstrate control of grammar, diction, and paragraph and sentence structure and an understanding of English usage.
- 1.2 Produce legible work that shows accurate spelling and correct punctuation and capitalization.

Listening and Speaking Strategies

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations that convey clear and distinct perspectives and demonstrate solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.
- 1.6 Use logical, ethical, and emotional appeals that enhance a specific tone and purpose.
- 1.10 Evaluate when to use different kinds of effects (e.g., visual, music, sound, graphics) to create effective productions.
- 2.0 Speaking Applications. Students deliver polished formal and extemporaneous presentations that combine traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.4 Deliver multimedia presentations.

Science, Grades 9 - 12

Biology/Life Sciences

1. Fundamental life processes of plants and animals depend on a variety of chemical reactions that are carried out in specialized areas of the organism's cells.

Ecology

6. Stability in an ecosystem is a balance between competing effects.

Physiology

9. As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic), despite changes in the outside environment.
10. Organisms have a variety of mechanisms to combat disease.

Investigation and Experimentation

1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content of the four other strands, students should develop their own questions and perform investigations.

Health Sciences Core Standards

- 2.0 Growth and Development, 12th Grade. Students will know how diseases impact the human body systems.
- 3.0 Safety, 11th Grade. Students will know the principles of asepsis, body mechanics, and protective safety measures.
- 4.0 Communicating and Decision-Making, 11th Grade. Students will know how to use critical and creative thinking, logical reasoning and problem-solving skills using various methods.
- 7.0 Health Maintenance, 11th Grade. Students will know how disease processes affect the maintenance of optimum health.
- 8.0 Health Maintenance, 12th Grade. Students will know various preventive health care practices.

SCANS Competencies

Resources

- A. Time: Student selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
- D. Human Resources: Student assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

- A. Participates as a member of a team
- D. Exercises leadership
- E. Negotiates

Information

- A. Acquires and evaluates information
- B. Organizes and maintains information
- C. Interprets and communicates information
- D. Uses computers to process information

Technology

- A. Selects technology
- B. Applies technology to task

Resources and Materials to Be Used

- Literature and/or films (*The Andromeda Strain*, *And the Band Played On*, *Outbreak*, *The Hot Zone*, *The Diary of the Black Plague*)
- Computer access for writing reports and doing research using databases and the Internet
- Public health officials and health-care providers to present their role in dealing with viruses

Expectations of Students

As a result of this project, students will:

- ❶ Address multiple concepts, such as immunity, mutations and experimentation;
- ❷ Analyze multiple sources of information and incorporate findings into a public health awareness campaign; and
- ❸ Develop a public health awareness campaign that includes newsletters, brochures and speeches.

Roles of Participating Teachers

Allied Health and Biosciences teachers will introduce information on viruses, assign virus to be researched and direct students to appropriate research materials.

English teachers will develop a suggested reading list with sample questions and co-develop, administer and evaluate student progress throughout the project.

Linkages to Industry

A panel of health industry representatives—research doctors, lab technicians, public health/hospice nurses and epidemiologists—will share with students their role in public health and the role they would play in the event of a virus outbreak. An editor from a newsletter, newspaper, television station, radio station or journal will explain his/her role in a public health awareness campaign.

Timeline

The project may take an entire semester or less to complete depending on the extent of student research.

Assessment Strategies

Students will be required to submit ongoing reports of their research, a final oral report and final public awareness materials. Public health officials and health care providers will provide assistance and feedback to students on their final products.

Safety Standards for a Chemical Plant

Project adapted from Prince George's County, Maryland, Career Connections
Found at www.pgcps.pg.k12.md.us

Project Activities

As part of this project, students will:

- 1 Visit a chemical plant to observe safety protocols that incorporate biology and chemistry;
- 2 Work in groups to research existing protocols and to write safety protocols that are based on scientific principles and are easy to understand by visitors and workers in the chemical plant;
- 3 Examine the historical development of safety regulations and protocols for several industries (each group may be assigned to research one industry) and compare them across work settings; and
- 4 Report, by team, on the development of and scientific basis for safety protocols for the industry/work setting researched by the group.

Academic and Industry Skill Standards Addressed in the Project English/Language Arts, Grades 9 and 10

Writing

- 1.0 Writing Strategies. Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose. Students progress through the stages of the writing process as needed.
- 1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.
- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).
- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.
- 1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.
- 1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.
- 1.8 Design and publish documents by using advanced publishing software and graphic design.
- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

Writing Applications

- 2.3 Write expository compositions, including analytical essays and research reports.
- 2.6 Write technical documents

English/Language Arts, Grades 11 and 12

Reading

- 2.0 Reading Comprehension. Students read and understand grade-level-appropriate material. They analyze the organizational patterns, arguments, and positions advanced.
- 2.3 Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.

Writing

- 1.0 Writing Strategies. Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose and progression through the stages of the writing process.
- 1.1 Demonstrate an understanding of the elements of discourse (e.g., purpose, speaker, audience, form) when completing narrative, expository, persuasive, or descriptive writing assignments.
- 1.6 Develop presentations by using clear research questions and creative and critical research strategies (e.g., field studies, oral histories, interviews, experiments, electronic sources).
- 1.7 Use systematic strategies to organize and record information (e.g., anecdotal scripting, annotated bibliographies).

Written and Oral English Language Conventions

- 1.0 Students write and speak with a command of standard English conventions.
- 1.2 Produce legible work that shows accurate spelling and correct punctuation and capitalization.

Science, Grades 9-12

Reaction Rates

8. Chemical reaction rates depend on factors that influence the frequency of collision of reactant molecules.

Cell Biology

1. Fundamental life processes of plants and animals depend on a variety of chemical reactions that are carried out in specialized areas of the organism's cells.

Physiology

9. As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic), despite changes in the outside environment.

Investigation and Experimentation

1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content of the four other strands, students should develop their own questions and perform investigations.

History and Social Science, Grades 9-12

Historical and Social Sciences Analysis Skills

Chronological and Spatial Thinking

1. Students compare the present with the past, evaluating the consequences of past events and decisions and determining the lessons learned.

Historical Interpretation

2. Students recognize the complexity of historical causes and effects, including the limitations on determining cause and effect.

Health Sciences Core Standards

- 2.0 Safety, Grade 11. Students will know the principles of asepsis, body mechanics, and protective safety measures.
- 4.0 Communication and Decision-Making, Grade 11. Students will know how to use critical and creative thinking, logical reasoning and problem-solving skills using various methods.

SCANS Competencies

Resources

- A. Time: Student selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
- D. Human Resources: Student assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

- A. Participates as a member of a team
- D. Exercises leadership
- E. Negotiates

Information

- A. Acquires and evaluates information
- B. Organizes and maintains information
- C. Interprets and communicates information
- D. Uses computers to process information

Technology

- A. Selects technology
- B. Applies technology to task

Resources and Materials to Be Used

- Text: science text and journal articles concerning health and safety, safety manuals
- Computers for research (Internet) and development of a final report/presentation materials
- Funding for field trips and participation of a safety/training director at the plant

Expectations of Students

As part of this project, students will:

- ❶ Create a brochure, paper or Web site page that outlines safety standards for a chemical plant and/or other biosciences setting;
- ❷ Convey career information—specifying the level of training required by those working in different areas of a chemical plant—in their final report; and
- ❸ Demonstrate communication skills, interpersonal skills, thinking skills, technology skills, and learning skills through their research, analysis of data and final report.

Roles of Participating Teachers

Computer Science teachers will assist students in accessing information and developing report materials for their final presentations.

English teachers will assist students in the research and reporting process.

Science teachers will cover scientific principles and provide leadership for the entire project.

Allied Health teachers will provide information concerning a variety of careers in science and health, and will arrange for student visits to a chemical plant.

Linkages to Industry

Students will see first-hand the academic and technical skills at work in a chemical plant. Industry representatives will speak to students about expectations for employment within the industry.

Timeline

This is a semester-long project. During that time, many other activities and content topics will be discussed and completed depending on curricular requirements in English, Science and Computer Science.

Assessment Strategies

Students will be assessed through peer- and self-evaluation and by an industry representative and each teacher based on standards of the curricular area.

Product Analysis: Innovative Products

Roosevelt High School, Minneapolis, Minnesota
Adapted from Jobs for the Future: *A Portable Action Lab for
Creating Quality Student Projects for Health Care Careers*

Project Background

This project is used in science courses at Roosevelt High School, which contains magnet schools in both health and business. The project does not depend upon the use of either magnet's career-related activities. It has been used with both ninth grade science students and older students in advanced courses.

Roosevelt operates on a trimester system, and the project extends through one trimester. Students have one class a week to work on the project as a team; they do the rest of the work outside school hours.

Nature of the Project

Students have the opportunity to select an innovative product currently available in the market that represents a technological innovation. Examples used at Roosevelt include energy-efficient light bulbs, chemical handwarmers, and high-energy/low-calorie foods. For a health careers class, products could be limited to medical- and health-related items such as new drugs or implements (allergy medications, blood pressure monitors, blood glucose testing machines, etc.). Students work in teams to select their product and complete the analysis and reporting.

Project Implementation

To form teams, the teacher can let the student self-select or, as the teacher who developed this project does, have each student fill out a one-page questionnaire asking them to evaluate their team skills, then assign students to teams according to the most advantageous mix of skills, personalities, etc.

Once teams have been formed, students decide what product they want to analyze. The teacher provides a list for brainstorming purposes. Each team submits a brief proposal for its selected product, which must be approved by the teacher before the team proceeds.

When the proposal has been approved, teams divide up responsibilities for research, writing, and presentation. All students are required to make weekly journal notes indicating their contributions, progress, and reflections. One student takes overall responsibility for maintaining the team's journal, which includes the group's work plan, roles and responsibilities, and record of progress.

Students research their product and the science behind it through whatever methods they deem appropriate, including: classroom materials and experiences, library books, Internet, their own experimentation. In addition, the teacher assigns them the task of writing a letter to the company that manufactures the product they have selected, asking about the history of the product and the testing methods and type of science used to create it.

Students have several options for the presentation and assessment of their research. They can contract for a C by completing a well-researched report. To get a B, they complete a well-researched report and a thorough journal. Earning an A requires a report, a journal and a class presentation. Reports include a narrative and graphic description of the product, a clear explanation of the science

behind the product, a bibliography, an evaluation of the product's capabilities and quality, and a self-evaluation of the team and its members. The report is evaluated by the teacher with points awarded for meeting criteria established by the teacher in advance.

Class presentations are scheduled after the completion of the reports. Each team that elects to present a report gets 20 minutes to present and answer questions while being videotaped. Presentations must include an introduction of the team (including roles played) and the product, a showcase of the product and its capabilities, an engaging presentation of the science behind the product, and an analysis of the testing done on the product. The students are evaluated by their peers and by the teacher according to teacher-developed criteria.

Academic and Industry Skill Standards Addressed in the Project English/Language Arts, Grades 9 and 10

Writing

- 1.0 Writing Strategies. Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose. Students progress through the stages of the writing process as needed.
- 1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.
- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).
- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.
- 1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.
- 1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.
- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

Writing Applications

- 2.3 Write expository compositions, including analytical essays and research reports.
- 2.5 Write business letters.
- 2.6 Write technical documents.

Listening and Speaking

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations of their own that convey clear and distinct perspectives and solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.
- 1.3 Choose logical patterns of organization to inform and to persuade, by soliciting agreement or action, or to unite audiences behind a common belief or cause.
- 1.4 Choose appropriate techniques for developing the introduction and conclusion.

- 1.5 Recognize and use elements of classical speech forms in formulating rational arguments and applying the art of persuasion and debate.
- 1.6 Present and advance a clear thesis statement and choose appropriate types of proof that meet standard tests for evidence, including credibility, validity, and relevance.
- 1.7 Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations.
- 1.8 Produce concise notes for extemporaneous delivery.
- 1.9 Analyze the occasion and the interests of the audience and choose effective verbal and nonverbal techniques for presentations.

Speaking Applications

- 2.0 Students deliver polished formal and extemporaneous presentations that combine the traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.6 Deliver descriptive presentations.

English/Language Arts, Grades 11 and 12

Reading

- 2.3 Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.

Writing

- 1.0 Writing Strategies. Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose and progression through the stages of the writing process.
- 1.1 Demonstrate an understanding of the elements of discourse (e.g., purpose, speaker, audience, form) when completing narrative, expository, persuasive, or descriptive writing assignments.
- 1.6 Develop presentations by using clear research questions and creative and critical research strategies (e.g., field studies, oral histories, interviews, experiments, electronic sources).
- 1.7 Use systematic strategies to organize and record information (e.g., anecdotal scripting, annotated bibliographies).

Written and Oral English Language Conventions

- 1.0 Students write and speak with a command of standard English conventions.
- 1.2 Produce legible work that shows accurate spelling and correct punctuation and capitalization.

Science, Grades 9-12

Investigation and Experimentation

1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content of the four other strands, students should develop their own questions and perform investigations.

Health Sciences Core Standards

4.0 Communication and Decision-Making, 11th Grade. Students will know how to use critical and creative thinking, logical reasoning and problem-solving skills using various methods.

SCANS Competencies

Resources

- A. Time: Student selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
- D. Human Resources: Student assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

- A. Participates as a member of a team
- D. Exercises leadership
- E. Negotiates

Information

- A. Acquires and evaluates information
- B. Organizes and maintains information
- C. Interprets and communicates information
- D. Uses computers to process information

Technology

- A. Selects technology
- B. Applies technology to task

Project Analysis

Using the Six A's of Quality Project-Based Learning, Jobs for the Future provides the following analysis of this project. Each number refers to the way the project meets the criteria found on page 9.

Authenticity

- ❶ Students analyze products they see or use regularly.
- ❷ Product analysis has value to many professionals (e.g., scientists, designers, manufacturers).
- ❸ Potential customers for certain products may be interested in some analyses, but no clear intention of audience exists yet.

Academic Rigor

- ❶ The major content area is science (may be one or more within that broad discipline). Communications requirements are also central.
- ❷ Research methods and analysis of scientific concepts are reinforced and checked through journals.
- ❸ The research report takes substantial effort over the entire trimester.

Applied Learning

- ① Product analyses are often conducted in the process of solving real problems (e.g., to create “next generation” products).
- ② Students maintain a journal and must follow a timeline and work plan they set for themselves.
- ③ Teamwork, use of technology, and communications are all critical parts of completing the project and are part of the assessment.

Active Exploration

- ① Some research in the field may be conducted, but little is required beyond traditional research.
- ② Students use an array of media (e.g., library, Internet, manufacturer).
- ③ Students who contract for a higher grade must present to the class.

Adult Relationships

This project is not strong in developing adult relationships. Modifications could be made to enhance this area.

Assessment

- ① Students can contract for the grade they want. Regular assessment points are not specified.
- ② Students reflect through journals; criteria are set by the teacher.

Providing Health Care to Diverse Clients

Project adapted from Prince George's County, Maryland, Career Connections
Found at www.pgcps.pg.k12.md.us

Project Activities

As part of this project, students will:

- 1 Examine issues that may be encountered by a hospital as it attempts to attract more diverse patients. For example: dietary needs for patients from different cultures, language barriers between immigrants/foreign patients and hospital staff, and other issues;
- 2 Review state/local health department standards and their implications on health care for patients from a variety of cultures and religious backgrounds;
- 3 Visit a large metropolitan hospital where these issues are most likely to be faced;
- 4 Work in teams to identify barriers to health care and develop a strategy for better providing health care for different populations; and
- 5 Develop a brochure or report outlining their strategy for addressing a particular health care need (e.g., pamphlets concerning immunization services in Spanish).

Academic and Industry Skill Standards Addressed in the Project

English/Language Arts, Grades 9 and 10

Writing

- 1.0 Writing Strategies. Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose. Students progress through the stages of the writing process as needed.
- 1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.
- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).
- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.
- 1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.
- 1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.
- 1.8 Design and publish documents by using advanced publishing software and graphic design.
- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

Writing Applications

- 2.3 Write expository compositions, including analytical essays and research reports.
- 2.4 Write persuasive compositions.
- 2.6 Write technical documents.

English/Language Arts, Grades 11 and 12

Reading

- 2.3 Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.

Writing

- 1.0 Writing Strategies. Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose and progression through the stages of the writing process.
- 1.1 Demonstrate an understanding of the elements of discourse (e.g., purpose, speaker, audience, form) when completing narrative, expository, persuasive, or descriptive writing assignments.
- 1.3 Structure ideas and arguments in a sustained, persuasive, and sophisticated way and support them with precise and relevant examples.
- 1.6 Develop presentations by using clear research questions and creative and critical research strategies (e.g., field studies, oral histories, interviews, experiments, electronic sources).
- 1.7 Use systematic strategies to organize and record information (e.g., anecdotal scripting, annotated bibliographies).

Written and Oral English Language Conventions

- 1.0 Students write and speak with a command of standard English conventions.
- 1.2 Produce legible work that shows accurate spelling and correct punctuation and capitalization.

History and Social Science, Grades 9-12

Historical and Social Sciences Analysis Skills

Chronological and Spatial Thinking

1. Students compare the present with the past, evaluating the consequences of past events and decisions and determining the lessons learned.
2. Students analyze how change happens at different rates at different times; that some aspects can change while others remain the same; that change is complicated and affects not only technology and politics, but also values and beliefs.

Historical Research, Evidence and Point of View

2. Students identify bias and prejudice in historical interpretations.

Historical Interpretation

1. Students show the connections, causal and otherwise, between particular historical events and larger social, economic and political trends and developments.
2. Students recognize the complexity of historical causes and effects, including the limitations on determining cause and effect.
3. Students interpret past events and issues within the context in which an event unfolded rather than solely in terms of present-day norms and values.

Health Sciences Core Standards

- 3.0 Safety, 9th Grade. Students will know safety issues as they relate to employer, employee, and patient within the health care setting.
- 4.0 Communication and Decision-Making, 9th and 10th Grade. Students will know key concepts of working cooperatively and assuming leadership roles as they interact among genders, generations and cultural groups.
- 4.0 Communication and Decision-Making, 12th Grade. Students will know how communications and decision-making affect health care delivery.
- 5.0 Ethical Frameworks, 12th Grade. Students will know the principles of accepted ethical behaviors with respect to cultural, ethnic, and social differences within health care.

SCANS Competencies

Resources

- A. Time: Student selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
- D. Human Resources: Student assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

- A. Participates as a member of a team
- D. Exercises leadership
- E. Negotiates
- F. Works with diversity

Information

- A. Acquires and evaluates information
- B. Organizes and maintains information
- C. Interprets and communicates information
- D. Uses computers to process information

Resources and Materials to Be Used

- Text: articles on health issues for different populations (ethnic, religious, age, race)
- Computer access for research and development of final product (pamphlet or report)
- Industry consultants—contact person at medical center, dietician, human relations expert, hospital administration representative

Expectations of Students

As part of this project, students will:

- ❶ Work in teams to develop human relations and communication skills;
- ❷ Develop research and problem-solving skills; and
- ❸ Produce a product—paper or pamphlet—to apply concepts to field of study.

Roles of Participating Teachers

Allied Health teachers will direct the project, assist students in research of health care issues for different groups and coordinate student visits to the hospital.

Social Studies teachers will cover health issues as they relate to different demographic groups and cultural barriers in the current health care delivery system.

English teachers will assist students in producing information/reports to be used by community members.

Linkages to Industry

Students will learn about issues in public health and participate in job shadowing and internships at a hospital. The products of student research may be used to enhance health care access for different groups in the community.

Timeline

This project will take at least one month to complete.

Assessment Strategies

Students will be assessed on their ability to identify issues, design problem-solving methods, and work in teams through peer review, self-assessment and teacher assessment.

Policy Analysis: Cost/Benefit Analysis of Health Care Models

Encina Health Careers Academy, Encina High School, Sacramento

Adapted from *Jobs for the Future: A Portable Action Lab for
Creating Quality Student Projects for Health Care Careers*

Project Background

Encina High School serves a largely urban, very transient population. The school has created several academies in an attempt to build a more stable learning community. The Health Careers Academy, a funded California Partnership Academy, was established in 1990 and has strong ties to area hospitals and technical schools.

Nature of the Project

Students spend a full year conducting a thorough cost/benefit analysis of the various health care options faced by the local community in establishing accessible health care. The project is conducted by the entire class working together. As a culminating event, they produce their recommendations as a SWOT (strengths, weaknesses, opportunities, threats) analysis. The recommendations from the pilot year of the project were an important part of the strategic plan of partner Sutter Community Hospitals in dealing with community-based medical clinics.

Project Implementation

Students are simultaneously enrolled in Economics & U.S. Government, English IV, and Health Technology III. All three teachers coordinate their curricula to meet skill development needs of the project. Computer laboratory faculty ensure that students have access to electronic sources of information for their research. A primary research method is conducting interviews with staff at Sutter Community Hospitals. The hospital's human resources department identifies individuals willing to participate; students set their own interviews. They are also encouraged to contact other sources such as the mayor's office and the California Department of Health Services for additional interviews.

Friday sessions of the Health Technology course serve as project day for the class. During this time students bring in industry representatives, discuss project issues and logistics, and reflect on their learning experience. Biweekly benchmark deliverables (a bibliography card catalog, on-line search reports, draft versions of problems statement, procedure/methodology, data gathered, conclusions, and recommendations) give the class the opportunity to check their progress and refine their approach. Industry representatives come to the campus biweekly to hear progress reports, make recommendations for improvement, and approve completed work.

As mentioned above, students produce their recommendations as a SWOT analysis at the conclusion of the project. Each individual student submits a written report, and the class makes a group oral presentation. Hospital partner foundation board members are asked to provide feedback on the quality of work and validity of findings to students at the end of the presentation.

Academic and Industry Skill Standards Addressed in the Project English/Language Arts, Grades 9 and 10

Writing

- 1.0 Writing Strategies. Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose. Students progress through the stages of the writing process as needed.
- 1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.
- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).
- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.
- 1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.
- 1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.
- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

Writing Applications

- 2.3 Write expository compositions, including analytical essays and research reports.
- 2.4 Write persuasive compositions.

Listening and Speaking

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations of their own that convey clear and distinct perspectives and solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.
- 1.3 Choose logical patterns of organization to inform and to persuade, by soliciting agreement or action, or to unite audiences behind a common belief or cause.
- 1.4 Choose appropriate techniques for developing the introduction and conclusion.
- 1.5 Recognize and use elements of classical speech forms in formulating rational arguments and applying the art of persuasion and debate.
- 1.6 Present and advance a clear thesis statement and choose appropriate types of proof that meet standard tests for evidence, including credibility, validity, and relevance.
- 1.7 Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations.
- 1.8 Produce concise notes for extemporaneous delivery.
- 1.9 Analyze the occasion and the interests of the audience and choose effective verbal and nonverbal techniques for presentations.

Speaking Applications

- 2.0 Students deliver polished formal and extemporaneous presentations that combine the traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.1 Deliver narrative presentations.
- 2.2 Deliver expository presentations.
- 2.3 Apply appropriate interviewing techniques.
- 2.5 Deliver persuasive arguments.
- 2.6 Deliver descriptive presentations.

English/Language Arts, Grades 11 and 12

Reading

- 2.3 Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.

Writing

- 1.0 Writing Strategies. Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose and progression through the stages of the writing process.
- 1.1 Demonstrate an understanding of the elements of discourse (e.g., purpose, speaker, audience, form) when completing narrative, expository, persuasive, or descriptive writing assignments.
- 1.6 Develop presentations by using clear research questions and creative and critical research strategies (e.g., field studies, oral histories, interviews, experiments, electronic sources).
- 1.7 Use systematic strategies to organize and record information (e.g., anecdotal scripting, annotated bibliographies).

Writing Applications

- 2.4 Write historical investigation reports.

Written and Oral English Language Conventions

- 1.0 Students write and speak with a command of standard English conventions.
- 1.2 Produce legible work that shows accurate spelling and correct punctuation and capitalization.

Listening and Speaking Strategies

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations that convey clear and distinct perspectives and demonstrate solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.
- 1.5 Distinguish between and use various forms of classical and contemporary logical arguments.
- 1.6 Use logical, ethical, and emotional appeals that enhance a specific tone and purpose.

Speaking Applications

- 2.0 Students deliver polished formal and extemporaneous presentations that combine traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking

demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.

2.2 Deliver oral reports on historical investigations.

Health Sciences Core Standards

1.0 Socioeconomic, Grade 11. Students will know the relationships of various health care systems.

1.0 Socioeconomic, Grade 12. Students will know how cost and reimbursement systems impact the delivery of health care.

4.0 Communication and Decision-Making, Grade 11. Students will know how to use critical and creative thinking, logical reasoning and problem-solving skills using various methods.

4.0 Communication and Decision-Making, Grade 12. Students will know how communications and decision-making affect health care delivery.

5.0 Ethical and Legal Responsibilities, Grade 11. Students will know ethical considerations, legal constraints, and professional codes affecting health care delivery systems.

5.0 Ethical Frameworks, Grade 12. Students will know the principles of accepted ethical behaviors with respect to cultural, ethnic, and social differences within health care.

SCANS Competencies

Resources

A. Time: Student selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.

D. Human Resources: Student assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

A. Participates as a member of a team

D. Exercises leadership

E. Negotiates

F. Works with diversity

Systems

A. Understands systems

Information

A. Acquires and evaluates information

B. Organizes and maintains information

C. Interprets and communicates information

D. Uses computers to process information

Project Analysis

Using the Six A's of Quality Project-Based Learning, Jobs for the Future provides the following analysis of this project. Each number refers to the way the project meets the criteria found on page 9.

Authenticity

- ① About 85 percent of Encina High School students come from families on AFDC support who have a vested interest in proper health care delivery.
- ② The emergence of managed care has created a cottage industry of professionals in policy analysis and provision of health care.
- ③ Recommendations are presented to, and taken seriously by, the hospital foundation board.

Academic Rigor

- ① The project involves work for courses in multiple disciplines.
- ② The full-year duration gives students the opportunity to employ rigorous research methods in conducting a cost/benefit analysis.
- ③ The analysis must blend complex health care delivery issues with neighborhood social issues that engages habits of mind.

Applied Learning

- ① The issue of access to health care is complex and all too real to many people.
- ② The blend of group and individual work gives students ample opportunity to develop complex project management skills.
- ③ Working together as a whole class, developing quality recommendations in a presentable format, and grappling with the complex problem at the root of this project all provide skills needed in high-performance work organizations.

Active Exploration

- ① Students conduct a series of interviews, but class time to pursue this project more fully is limited.
- ② Students conduct interviews, use the library and Internet, and plan and execute presentations.
- ③ In addition to the final report to the hospital foundation board, students report on progress biweekly to teachers and industry representatives.

Adult Relationships

- ① Students meet with adults who act as consultants to the project, but they do not necessarily have an opportunity to observe these adults at work.
- ② The hospital partner puts considerable effort into brokering interviews and other exposure to the worksite. However, the project is not structured to create intensive one-on-one student/adult relationships, especially beyond the hospital.
- ③ At the outset of the project, students, faculty, and industry representatives meet together to design the project and its scope. As part of this process, objectives and outcomes are established that all parties agree to.

Assessment

- ① Milestones using a variety of assessment media are clearly established.
- ② Reflection is one ongoing activity of the project, but students do not appear to engage in regular self-assessment. Student input into criteria for assessment is limited.
- ③ Community experts are part of the panel presentations. Other industry representatives provide ongoing assessment throughout the year.

Health Care Scenarios Regarding Religious and Cultural Diversity

Project adapted from Prince George's County, Maryland, Career Connections
Found at www.pgcps.pg.k12.md.us

Project Activities

As part of this project, students will:

- ➊ Address a religious or cultural diversity issue through research, role plays and interviews;
- ➋ Review a patient's profile and role play how to conduct an intake interview that reflects respect for the patient's religious beliefs and culture;
- ➌ Learn how cultural and religious beliefs impact health care practices; and
- ➍ Develop a handbook for health care providers concerning religious and cultural differences as they relate to providing health care services.

Academic and Industry Skill Standards Addressed in this Project English/Language Arts, Grades 9 and 10

Writing

- 1.0 Writing Strategies. Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose. Students progress through the stages of the writing process as needed.
- 1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.
- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).
- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.
- 1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.
- 1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.
- 1.8 Design and publish documents by using advanced publishing software and graphic design.
- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

Writing Applications

- 2.3 Write expository compositions, including analytical essays and research reports.
- 2.6 Write technical documents.

Listening and Speaking

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations of their own that convey clear and distinct perspectives and solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.
- 1.3 Choose logical patterns of organization to inform and to persuade, by soliciting agreement or action, or to unite audiences behind a common belief or cause.
- 1.4 Choose appropriate techniques for developing the introduction and conclusion.
- 1.5 Recognize and use elements of classical speech forms in formulating rational arguments and applying the art of persuasion and debate.
- 1.6 Present and advance a clear thesis statement and choose appropriate types of proof that meet standard tests for evidence, including credibility, validity, and relevance.
- 1.7 Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations.
- 1.8 Produce concise notes for extemporaneous delivery.
- 1.9 Analyze the occasion and the interests of the audience and choose effective verbal and nonverbal techniques for presentations.

Speaking Applications

- 2.0 Students deliver polished formal and extemporaneous presentations that combine the traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.1 Deliver narrative presentations.
- 2.2 Deliver expository presentations.
- 2.3 Apply appropriate interviewing techniques.
- 2.5 Deliver persuasive arguments.
- 2.6 Deliver descriptive presentations.

English/Language Arts, Grades 11 and 12

Reading

- 2.3 Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.

Writing

- 1.0 Writing Strategies. Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose and progression through the stages of the writing process.
- 1.1 Demonstrate an understanding of the elements of discourse (e.g., purpose, speaker, audience, form) when completing narrative, expository, persuasive, or descriptive writing assignments.
- 1.3 Structure ideas and arguments in a sustained, persuasive, and sophisticated way and support them with precise and relevant examples.

- 1.6 Develop presentations by using clear research questions and creative and critical research strategies (e.g., field studies, oral histories, interviews, experiments, electronic sources).
- 1.7 Use systematic strategies to organize and record information (e.g., anecdotal scripting, annotated bibliographies).

Writing Applications

- 2.6 Deliver multimedia presentations.

Written and Oral English Language Conventions

- 1.0 Students write and speak with a command of standard English conventions.
- 1.2 Produce legible work that shows accurate spelling and correct punctuation and capitalization.

Listening and Speaking

- 2.0 Speaking Applications. Students deliver polished formal and extemporaneous presentations that combine traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.4 Deliver multimedia presentations.

History and Social Science, Grades 9-12

Historical and Social Sciences Analysis Skills

Chronological and Spatial Thinking

1. Students compare the present with the past, evaluating the consequences of past events and decisions and determining the lessons learned.
2. Students analyze how change happens at different rates at different times; that some aspects can change while others remain the same; that change is complicated and affects not only technology and politics, but also values and beliefs.

Historical Research, Evidence and Point of View

2. Students identify bias and prejudice in historical interpretations.

Historical Interpretation

1. Students show the connections, causal and otherwise, between particular historical events and larger social, economic and political trends and developments.
2. Students recognize the complexity of historical causes and effects, including the limitations on determining cause and effect.
3. Students interpret past events and issues within the context in which an event unfolded rather than solely in terms of present-day norms and values.

Health Sciences Core Standards

- 4.0 Communication and Decision-Making, 9th and 10th Grade. Students will know key concepts of working cooperatively and assuming leadership roles as they interact among genders, generations and cultural groups.
- 4.0 Communication and Decision-Making, 12th Grade. Students will know how communications and decision-making affect health care delivery.
- 5.0 Ethical Frameworks, 12th Grade. Students will know the principles of accepted ethical behaviors with respect to cultural, ethnic, and social differences within health care.

SCANS Competencies

Resources

- A. Time: Student selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
- D. Human Resources: Student assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

- A. Participates as a member of a team
- B. Teaches others new skills
- C. Serves clients/customers
- D. Exercises leadership
- E. Negotiates
- F. Works with diversity

Information

- A. Acquires and evaluates information
- B. Organizes and maintains information
- C. Interprets and communicates information
- D. Uses computers to process information

Systems

- A. Understands systems
- C. Improves or designs systems

Resources and Materials to Be Used

- Text: health care issues across different cultural, ethnic, religious groups; articles on alternative health care models used by different groups
- Human resources: health care providers to provide information on where, when and why certain issues are faced in providing health care to diverse groups
- Cultural representatives: religious leaders, family members, government representatives, etc.

Expectations of Students

As a result of this project, students will:

- Conduct a cultural health fair;
- Observe intake interviews at a health care facility and conduct intake interviews, observed by a health care worker;
- Develop a handbook for health care professionals concerning religious and cultural practices; and
- Make a multi-media presentation on an individual culture's beliefs as they relate to health care.

Roles of Participating Teachers

Social Studies teachers will set up the project, address law and ethics and other issues.

Foreign Language teachers will present health concerns related to different cultures.

Allied Health teachers will assist students in performing duties at a health care site and arrange for student observations.

Science teachers will cover biology and health aspects of the project.

Linkages to Industry

Students will work with health care providers and will visit health centers to see projects in action.

Timeline

This project will take at least two weeks to complete.

Assessment Strategies

Students will be assessed on the handbook developed to help teach health care professionals how to address and understand ethical practices with respect to cultural, social, religious and ethnic differences and on their oral and written communication skills.

Clinical Studies: Topics for Health Peer Educators

Oakland Academy of Health & Bioscience

Adapted from *Jobs for the Future: A Portable Action Lab for Creating Quality Student Projects for Health Care Careers*

Project Background

The Health & Bioscience Academy, a California Partnership Academy, is a program within Oakland Technical High School that involves students in grades 10 through 12, with a few ninth grade students. Most classes are presented in three-hour blocks, and students spend about 80 percent of their time in interrelated academic and lab classes with heavy emphasis on project-based learning. Students progress from short-term teacher-directed projects to complex long-term projects that integrate several disciplines and involve employer and community partners.

Nature of the Project

Teams of eleventh grade students, working primarily in their physiology class, select health issues or problems that interest them, research the problems, and produce newsletters on their selected problems. Each team gives a presentation to a group affected by the problem it has researched. The year-long project emphasizes the importance of connecting research with its application in helping people improve their health.

Project Implementation

Before beginning the project, students develop the knowledge and skills necessary to complete the project. Students divide into teams to select a health issue or problem. They submit a proposal specifying the scope of the problem, research strategies and a list of potential resources. Following their research, each team creates a newsletter. Project benchmarks include the newsletter, a team summary of the role of each member in the writing and production of the newsletter, the planning and rehearsal for their group presentation to an audience affected by the problem they have studied, and the actual presentation. Students are graded on both their health education strategy and their mastery of facts.

Academic and Industry Skill Standards Addressed in the Project

English/Language Arts, Grades 9 and 10

Writing

- 1.0 Writing Strategies. Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose. Students progress through the stages of the writing process as needed.
- 1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.
- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).
- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.

- 1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.
- 1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.
- 1.8 Design and publish documents by using advanced publishing software and graphic design.
- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

Writing Applications

- 2.3 Write expository compositions, including analytical essays and research reports.
- 2.4 Write persuasive compositions.
- 2.6 Write technical documents.

Listening and Speaking

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations of their own that convey clear and distinct perspectives and solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.
- 1.3 Choose logical patterns of organization to inform and to persuade, by soliciting agreement or action, or to unite audiences behind a common belief or cause.
- 1.4 Choose appropriate techniques for developing the introduction and conclusion.
- 1.5 Recognize and use elements of classical speech forms in formulating rational arguments and applying the art of persuasion and debate.
- 1.6 Present and advance a clear thesis statement and choose appropriate types of proof that meet standard tests for evidence, including credibility, validity, and relevance.
- 1.7 Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations.
- 1.8 Produce concise notes for extemporaneous delivery.
- 1.9 Analyze the occasion and the interests of the audience and choose effective verbal and nonverbal techniques for presentations.

Speaking Applications

- 2.0 Students deliver polished formal and extemporaneous presentations that combine the traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.1 Deliver narrative presentations.
- 2.2 Deliver expository presentations.
- 2.3 Apply appropriate interviewing techniques.
- 2.5 Deliver persuasive arguments.
- 2.6 Deliver descriptive presentations.

English/Language Arts, Grades 11 and 12

Reading

- 2.3 Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.

Writing

- 1.0 Writing Strategies. Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose and progression through the stages of the writing process.
- 1.1 Demonstrate an understanding of the elements of discourse (e.g., purpose, speaker, audience, form) when completing narrative, expository, persuasive, or descriptive writing assignments.
- 1.6 Develop presentations by using clear research questions and creative and critical research strategies (e.g., field studies, oral histories, interviews, experiments, electronic sources).
- 1.7 Use systematic strategies to organize and record information (e.g., anecdotal scripting, annotated bibliographies).

Writing Applications

- 2.6 Deliver multimedia presentations.

Written and Oral English Language Conventions

- 1.0 Students write and speak with a command of standard English conventions.
- 1.2 Produce legible work that shows accurate spelling and correct punctuation and capitalization.
- 1.3 Reflect appropriate manuscript requirements in writing.

Listening and Speaking Strategies

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations that convey clear and distinct perspectives and demonstrate solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.
- 1.5 Distinguish between and use various forms of classical and contemporary logical arguments.
- 1.6 Use logical, ethical, and emotional appeals that enhance a specific tone and purpose.

Speaking Applications

- 2.0 Students deliver polished formal and extemporaneous presentations that combine traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.4 Deliver multimedia presentations.

Science, Grades 9-12

Investigation and Experimentation

1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content of the other four strands, students should develop their own questions and perform investigations.

Health Sciences Core Standards

- 2.0 Growth and Development, Grades 9 and 10. Students will know health issues that are commonly associated with each developmental stage.
- 2.0 Growth and Development, Grade 11. Students will know the concepts and principles of human body system structure and function in relation to human growth and development.
- 2.0 Growth and Development, Grade 12. Students will know how diseases impact the human body systems.
- 7.0 Health Maintenance, Grade 11. Students will know how disease processes affect the maintenance of optimum health.
- 8.0 Health Maintenance, Grade 12. Students will know various preventive health care practices.

SCANS Competencies

Resources

- A. Time: Student selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
- D. Human Resources: Student assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

- A. Participates as a member of a team
- B. Teaches others new skills
- C. Serves clients/customers
- D. Exercises leadership
- E. Negotiates
- F. Works with diversity

Information

- A. Acquires and evaluates information
- B. Organizes and maintains information
- C. Interprets and communicates information
- D. Uses computers to process information

Project Analysis

Using the Six A's of Quality Project-Based Learning, Jobs for the Future provides the following analysis of this project. Each number refers to the way the project meets the criteria found on page 9.

Authenticity

- ❶ Students choose their own topics and are strongly encouraged to work in areas of personal interest.
- ❷ A major criterion for topic selection and the various products is their importance to the community and their social value.
- ❸ Both the newsletter and the final presentation must be created for a population affected by the issue.

Academic Rigor

- ① While this project is part of a science course, students must demonstrate oral and written communication skills.
- ② Students spend in-depth time exploring principles of life science, as well as historical and social factors, relevant to their issue.
- ③ Students blend life and social sciences in a way that strongly reinforces good habits of mind.

Applied Learning

- ① The problem of how to present health education on a particular issue so as to change actual behavior is one faced by health educators.
- ② The complex products require both self-management and teamwork skills.
- ③ Teamwork and communications skills are central to the project. Problem-solving and use of technology, especially in the production of the newsletter, are also key.

Active Exploration

- ① The amount of field-based research varies across projects, but all projects require it to some degree.
- ② Students use interviews, library research, the Internet, etc., in their investigation.
- ③ All students present to community audiences and/or peers.

Adult Relationships

- ① Adult coaches participate in the research phase, newsletter production, and presentation planning.
- ② Students have several meetings with their coaches, but the intensity of the relationships varies across projects.
- ③ The classroom teacher serves as the liaison between the various coaches and the students for design, assessment, etc.

Assessment

- ① There are “benchmark deliverables” established for the project.
- ② Students must submit journals describing and reflecting on their personal contributions to the team products.
- ③ Adult coaches provide feedback to the classroom teacher.

Microscope Review: Hunting for Signs of Infection

Project adapted from Prince George's County, Maryland, Career Connections
Found at www.pgcps.pg.k12.md.us

Activities

As part of this project, students will:

- 1 Participate in a scavenger hunt for single-cell organisms to mount on slides;
- 2 Illustrate a dichotomous sort using Venn diagrams;
- 3 Observe yeasts—stained and unstained—and sort dead and living samples;
- 4 Communicate with a laboratory to collect information on patients with yeast infections;
- 5 Research issues in health care as they pertain to yeast infections (jigsaw activity);
- 6 Present patient data to student groups for analysis; and
- 7 Report on safety, hygiene, lab procedures and patient factors as they relate to infection.

Academic and Industry Skill Standards Addressed in the Project English/Language Arts, Grades 9 and 10

Writing

- 1.0 Writing Strategies. Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose. Students progress through the stages of the writing process as needed.
- 1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.
- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).
- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.
- 1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.
- 1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.
- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

Writing Applications

- 2.3 Write expository compositions, including analytical essays and research reports.
- 2.6 Write technical documents.

Listening and Speaking

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations of their own that convey clear and distinct perspectives and solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.

- 1.3 Choose logical patterns of organization to inform and to persuade, by soliciting agreement or action, or to unite audiences behind a common belief or cause.
- 1.4 Choose appropriate techniques for developing the introduction and conclusion.
- 1.5 Recognize and use elements of classical speech forms in formulating rational arguments and applying the art of persuasion and debate.
- 1.6 Present and advance a clear thesis statement and choose appropriate types of proof that meet standard tests for evidence, including credibility, validity, and relevance.
- 1.7 Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations.
- 1.8 Produce concise notes for extemporaneous delivery.
- 1.9 Analyze the occasion and the interests of the audience and choose effective verbal and nonverbal techniques for presentations.

Speaking Applications

- 2.0 Students deliver polished formal and extemporaneous presentations that combine the traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.1 Deliver narrative presentations.
- 2.2 Deliver expository presentations.
- 2.3 Apply appropriate interviewing techniques.
- 2.6 Deliver descriptive presentations.

English/Language Arts, Grades 11 and 12

Reading

- 2.3 Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.

Writing

- 1.0 Writing Strategies. Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose and progression through the stages of the writing process.
- 1.6 Develop presentations by using clear research questions and creative and critical research strategies (e.g., field studies, oral histories, interviews, experiments, electronic sources).

Written and Oral English Language Conventions

- 1.0 Students write and speak with a command of standard English conventions.
- 1.2 Produce legible work that shows accurate spelling and correct punctuation and capitalization.

Listening and Speaking Strategies

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations that convey clear and distinct perspectives and demonstrate solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.

1.5 Distinguish between and use various forms of classical and contemporary logical arguments.

1.6 Use logical, ethical, and emotional appeals that enhance a specific tone and purpose.

Speaking Applications

2.0 Students deliver polished formal and extemporaneous presentations that combine traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.

2.2 Deliver oral reports on historical investigations.

Science, Grades 9-12

Cell Biology

1. Fundamental life processes of plants and animals depend on a variety of chemical reactions that are carried out in specialized areas of the organism's cells.

Physiology

10. Organisms have a variety of mechanisms to combat disease.

Investigation and Experimentation

1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content of the four other strands, students should develop their own questions and perform investigations.

Health Sciences Core Standards

2.0 Growth and Development, 12th Grade. Students will know how diseases impact the human body systems.

3.0 Safety, 11th Grade. Students will know the principles of asepsis, body mechanics, and protective safety measures.

3.0 Safety, 12th Grade. Students will know the potential hazards to employers, employees, and patients within various health care settings.

7.0 Health Maintenance, 11th Grade. Students will know how disease processes affect the maintenance of optimum health.

SCANS Competencies

Resources

A. Time: Student selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.

D. Human Resources: Student assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

- A. Participates as a member of a team
- D. Exercises leadership
- E. Negotiates

Information

- A. Acquires and evaluates information
- B. Organizes and maintains information
- C. Interprets and communicates information
- D. Uses computers to process information

Resources and Materials to Be Used

- ☞ Microscopes, slides, stains, yeast culture and other laboratory equipment
- ☞ Texts and computer resources for research, including Internet access
- ☞ Teacher-made scenarios, protocols, models, samples and graphic organizers
- ☞ Presenters from health care settings to discuss patient care as it relates to yeast pathogen

Expectations of Students

As a result of this project, students will:

- ❶ Prepare yeast slides, using staining techniques on onion root slides;
- ❷ Write a lab report on creation of slides and comparison of normal and cancerous skin cells;
- ❸ Draw a Venn diagram;
- ❹ Report orally to the class on infections based on research and patient information; and
- ❺ Interview health care professionals about the use of sterile and safety procedures.

Roles of Participating Teachers

Allied Health and **Biology** teachers will work together to cover materials, conduct laboratory exercises and provide students access to health care professionals and laboratory settings.

Linkages to Industry

Students will visit and/or interview representatives from laboratories and health care facilities.

Timeline

This project includes basic skills (scopes, staining, lab skills, diagnostic skills) covered in four days, group research conducted in four days, and simulation/assessment in two days.

Assessment Strategies

Students will complete laboratory exercises and reports, a research paper and interview and/or observations from a health care setting.

Devising an Action Plan for an Unknown (Radioactive) Contaminant

Project adapted from Prince George's County, Maryland, Career Connections
Found at www.pgcps.pg.k12.md.us

Project Activities

As part of this project, students will:

- 1 Learn about a variety of contaminants and potential environmental problems;
- 2 Visit an industry, research or medical laboratory to learn about precautions and procedures for dealing with contaminants;
- 3 Conduct laboratory experiments;
- 4 Research and report—as a group—on a particular contaminant and its effects; and
- 5 Determine and assign roles to members of the class for dealing with a contaminant.

Academic and Industry Skill Standards Addressed in the Project

English/Language Arts, Grades 9 and 10

Writing

- 1.0 Writing Strategies. Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose. Students progress through the stages of the writing process as needed.
- 1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.
- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).
- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.
- 1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.
- 1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.
- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

Writing Applications

- 2.3 Write expository compositions, including analytical essays and research reports.

Listening and Speaking

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations of their own that convey clear and distinct perspectives and solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.

- 1.3 Choose logical patterns of organization to inform and to persuade, by soliciting agreement or action, or to unite audiences behind a common belief or cause.
- 1.4 Choose appropriate techniques for developing the introduction and conclusion.
- 1.5 Recognize and use elements of classical speech forms in formulating rational arguments and applying the art of persuasion and debate.
- 1.6 Present and advance a clear thesis statement and choose appropriate types of proof that meet standard tests for evidence, including credibility, validity, and relevance.
- 1.7 Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations.
- 1.8 Produce concise notes for extemporaneous delivery.
- 1.9 Analyze the occasion and the interests of the audience and choose effective verbal and nonverbal techniques for presentations.

Speaking Applications

- 2.0 Students deliver polished formal and extemporaneous presentations that combine the traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.2 Deliver expository presentations.
- 2.3 Apply appropriate interviewing techniques.
- 2.6 Deliver descriptive presentations.

English/Language Arts, Grades 11 and 12

Reading

- 2.0 Students read and understand grade-level-appropriate material. They analyze the organizational patterns, arguments, and positions advanced.
- 2.3 Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.
- 3.0 Students read and respond to historically or culturally significant works of literature that reflect and enhance their studies of history and social science.

Writing

- 1.0 Writing Strategies. Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose and progression through the stages of the writing process.
- 1.1 Demonstrate an understanding of the elements of discourse (e.g., purpose, speaker, audience, form) when completing narrative, expository, persuasive, or descriptive writing assignments.
- 1.6 Develop presentations by using clear research questions and creative and critical research strategies (e.g., field studies, oral histories, interviews, experiments, electronic sources).
- 1.7 Use systematic strategies to organize and record information (e.g., anecdotal scripting, annotated bibliographies).

Written and Oral English Language Conventions

- 1.0 Students write and speak with a command of standard English conventions.
- 1.2 Produce legible work that shows accurate spelling and correct punctuation and capitalization.

Listening and Speaking Strategies

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations that convey clear and distinct perspectives and demonstrate solid reasoning. they use gestures, tone, and vocabulary tailored to the audience and purpose.
- 1.5 Distinguish between and use various forms of classical and contemporary logical arguments.
- 1.6 Use logical, ethical, and emotional appeals that enhance a specific tone and purpose.

Speaking Applications

- 2.0 Students deliver polished formal and extemporaneous presentations that combine traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.2 Deliver oral reports on historical investigations.

Science, Grades 9-12

Cell Biology

1. Fundamental life processes of plants and animals depend on a variety of chemical reactions that are carried out in specialized areas of the organism's cells.

Reaction Rates

8. Chemical reaction rates depend on factors that influence the frequency of collision of reactant molecules.

Physiology

9. As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic), despite changes in the outside environment.

Nuclear Processes

11. Nuclear processes are those in which an atomic nucleus changes, including radioactive decay of naturally occurring and man-made isotopes, nuclear fission, and nuclear fusion.

Investigation and Experimentation

1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content of the four other strands, students should develop their own questions and perform investigations.

History and Social Science, Grades 9-12

Historical and Social Sciences Analysis Skills

Historical Interpretation

1. Students show the connections, causal and otherwise, between particular historical events and larger social, economic and political trends and developments.
2. Students recognize the complexity of historical causes and effects, including the limitations on determining cause and effect.

Health Sciences Core Standards

- 3.0 Safety, 9th and 10th Grade. Students will know safety issues as they relate to employer, employee, and patient within the health care setting.

SCANS Competencies

Resources

- A. Time: Student selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
- D. Human Resources: Student assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

- A. Participates as a member of a team
- D. Exercises leadership
- E. Negotiates

Information

- A. Acquires and evaluates information
- B. Organizes and maintains information
- C. Interprets and communicates information
- D. Uses computers to process information

Resources and Materials to Be Used

- Government and industry regulations/safety procedures for dealing with hazardous materials
- Computer access: Internet and review of news articles for research, collecting information and examples of contamination
- Examination of events and effects of nuclear contamination (Hiroshima, Chernobyl, Three-Mile Island)
- Literature and film resources on the topic (*China Syndrome*, *Pandora's Box*, *Book of Genesis*)

Expectations of Students

As a result of this project, students will:

- ❶ Increase their knowledge of radioactivity (bioeffects, physics);
- ❷ Use a variety of tools/sources, including the Internet, to research a topic;

- ③ Conduct data collection and analysis; measure contamination level and project impact;
- ④ Analyze information, make decisions, synthesize data and interpret a variety of evidence; and
- ⑤ Write and present a plan of action based on research, including specification of protective gear, controlling/sealing an area, notifying authorities and clean-up procedures.

Roles of Participating Teachers

Biology, Chemistry and Physics teachers will introduce concepts and direct the students' data collection, laboratory experiments and data analysis.

Work-based Learning Coordinator will arrange for laboratory site visit and information on industry safety regulations and protocol.

English teachers will assist students in researching and writing reports.

Linkages to Industry

Students will visit an industry, research or medical laboratory. Prior to the visit, students will prepare questions for scientists and laboratory technicians. Industry and health representatives will present issues as they relate to their work (OSHA, NRC, etc.)

Timeline

This project will take two weeks to one semester to complete.

Assessment Strategies

Students will conduct a mock trial with visiting professionals and present a final research report and action plan.

Disease Detectives: HIV

Project adapted from Prince George's County, Maryland, Career Connections
Found at www.pgcps.pg.k12.md.us

Project Activities

As part of this project, students will:

- 1 Form into groups to research a designated topic related to HIV: biology of the virus, prevention, transmission and treatment, history and social implications;
- 2 Learn about the role of different health care providers in dealing with HIV prevention and the treatment of HIV patients;
- 3 Design a creative method of presenting their information that includes graphs and charts showing the results of statistical analysis;
- 4 As a class, create a “risk scale” that plots personal risk on a chart, taking into account research on transmission and other factors contributing to the spread of HIV; and
- 5 Individually, write a personal reflection paper about what they have learned about HIV.

Academic and Industry Skill Standards Addressed in This Project

English/Language Arts, Grades 9 and 10

Writing

- 1.0 Writing Strategies. Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose. Students progress through the stages of the writing process as needed.
- 1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.
- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).
- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.
- 1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.
- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

Writing Applications

- 2.3 Write expository compositions, including analytical essays and research reports.

Listening and Speaking

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations of their own that convey clear and distinct perspectives and solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.

English/Language Arts, Grades 11 and 12

Reading

- 2.3 Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.

Writing

- 1.0 Writing Strategies. Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose and progression through the stages of the writing process.
- 1.1 Demonstrate an understanding of the elements of discourse (e.g., purpose, speaker, audience, form) when completing narrative, expository, persuasive, or descriptive writing assignments.
- 1.6 Develop presentations by using clear research questions and creative and critical research strategies (e.g., field studies, oral histories, interviews, experiments, electronic sources).
- 1.7 Use systematic strategies to organize and record information (e.g., anecdotal scripting, annotated bibliographies).

Written and Oral English Language Conventions

- 1.0 Students write and speak with a command of standard English conventions.
- 1.2 Produce legible work that shows accurate spelling and correct punctuation and capitalization.

Math, Grades 8-12

Probability and Statistics

8. Students organize and describe distributions of data using a number of different methods, including frequency tables, histograms, standard line and bar graphs, stem and leaf displays, scatter plots, and box and whisker plots.

Science, Grades 9-12

Cell Biology

1. Fundamental life processes of plants and animals depend on a variety of chemical reactions that are carried out in specialized areas of the organism's cells.

Health Sciences Core Standards

- 3.0 Safety, 9th and 10th Grade. Students will know safety issues as they relate to employer, employee, and patient within the health care setting.
- 3.0 Safety, 11th Grade. Students will know the principles of asepsis, body mechanics, and protective safety measures.
- 3.0 Safety, 12th Grade. Students will know the potential hazards to employers, employees, and patients within various health care settings.
- 4.0 Communication and Decision-Making. Students will know how communications and decision-making affect health care delivery.
- 5.0 Ethical and Legal Responsibilities, 9th and 10th Grade. Students will know the basic concepts regarding laws, guidelines, and professional codes of health care.

5.0 Ethical and Legal Responsibilities, 11th Grade. Students will know ethical considerations, legal constraints, and professional codes affecting health care delivery systems.

6.0 Legal Responsibilities, 12th Grade. Students will know issues of accountability and the legal responsibilities of health care workers.

8.0 Health Maintenance, 12th Grade. Students will know various preventive health care practices.

SCANS Competencies

Resources

- A. Time: Student selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
- D. Human Resources: Student assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

- A. Participates as a member of a team
- D. Exercises leadership
- E. Negotiates

Information

- A. Acquires and evaluates information
- B. Organizes and maintains information
- C. Interprets and communicates information
- D. Uses computers to process information

Resources and Materials

- ⇒ Computer/Internet access for research and production of report and presentation materials
- ⇒ Video camera, videotapes, VCR, monitor for presentations
- ⇒ Reference books/journals (social issues resource series)
- ⇒ Human resources: HERO, health care providers, public health officials, etc.

Expectations of Students

As a result of this project, students will:

- ❶ Increase their knowledge of the biological and social factors surrounding HIV;
- ❷ Use a variety of resources including the Internet and human resources to research a topic;
- ❸ Use scientific principles and math skills to conduct data collection and analysis;
- ❹ Develop communication/presentation skills;
- ❺ Reflect on the impact of HIV on themselves, their families and communities; and
- ❻ Use a group process to conduct a project.

Roles of Participating Teachers

Allied Health teachers will coordinate the project: make group assignments, monitor group progress, arrange for guests speakers, provide resources for research.

Mathematics teachers will direct student data analysis and production of graphs and charts.

English teachers will provide the format for the student reflection paper and evaluate written work.

Linkages to Industry

Students will contact the following business and community partners to accomplish their project: health care providers, social services and health facilities, HEROs, pharmacology businesses and public health officials.

Timeline

This project will take four to six weeks during the semester or during the HIV unit in a health-bioscience course.

Assessment Strategies

Students will be assessed on their ability to collect data, graph, interpret, write and present research.

Ethnocentricity/Ethics and the Spread of AIDS

Project adapted from Prince George's County, Maryland, Career Connections

Found at www.pgcps.pg.k12.md.us

Project Activities

As part of this project, students will:

- 1 Investigate the history of the World Health Organization and its role in global health issues;
- 2 Research and report on the symptoms, transmission and variation in treatment of AIDS;
- 3 Discuss the cultural and social ramifications of the spread of AIDS;
- 4 Analyze a case study on AIDS and give an oral report on findings; and
- 5 Learn about the role of health care professionals and industry in combating the spread of AIDS and the treatment of those infected (guest lecture).

Academic and Industry Skill Standards Addressed in This Project

English/Language Arts, Grades 9 and 10

Writing

- 1.0 Writing Strategies. Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose. Students progress through the stages of the writing process as needed.
- 1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.
- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).
- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.
- 1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.
- 1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.
- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

Writing Applications

- 2.3 Write expository compositions, including analytical essays and research reports.

Listening and Speaking

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations of their own that convey clear and distinct perspectives and solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.
- 1.3 Choose logical patterns of organization to inform and to persuade, by soliciting agreement or action, or to unite audiences behind a common belief or cause.

- 1.4 Choose appropriate techniques for developing the introduction and conclusion.
- 1.5 Recognize and use elements of classical speech forms in formulating rational arguments and applying the art of persuasion and debate.
- 1.6 Present and advance a clear thesis statement and choose appropriate types of proof that meet standard tests for evidence, including credibility, validity, and relevance.
- 1.7 Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations.
- 1.8 Produce concise notes for extemporaneous delivery.
- 1.9 Analyze the occasion and the interests of the audience and choose effective verbal and nonverbal techniques for presentations.

Speaking Applications

- 2.0 Students deliver polished formal and extemporaneous presentations that combine the traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.2 Deliver expository presentations.
- 2.3 Apply appropriate interviewing techniques.
- 2.6 Deliver descriptive presentations.

English/Language Arts, Grades 11 and 12

Reading

- 2.3 Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.

Writing

- 1.0 Writing Strategies. Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose and progression through the stages of the writing process.
- 1.1 Demonstrate an understanding of the elements of discourse (e.g., purpose, speaker, audience, form) when completing narrative, expository, persuasive, or descriptive writing assignments.
- 1.3 Structure ideas and arguments in a sustained, persuasive, and sophisticated way and support them with precise and relevant examples.
- 1.5 Use language in natural, fresh, and vivid ways to establish a specific tone.
- 1.6 Develop presentations by using clear research questions and creative and critical research strategies (e.g., field studies, oral histories, interviews, experiments, electronic sources).
- 1.7 Use systematic strategies to organize and record information (e.g., anecdotal scripting, annotated bibliographies).

Written and Oral English Language Conventions

- 1.0 Students write and speak with a command of standard English conventions.
- 1.1 Demonstrate control of grammar, diction, and paragraph and sentence structure and an understanding of English usage.
- 1.2 Produce legible work that shows accurate spelling and correct punctuation and capitalization.

Listening and Speaking Strategies

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations that convey clear and distinct perspectives and demonstrate solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.
- 2.0 Speaking Applications. Students deliver polished formal and extemporaneous presentations that combine traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.

Math, Grades 8-12

Probability and Statistics

8. Students organize and describe distributions of data using a number of different methods, including frequency tables, histograms, standard line and bar graphs, stem and leaf displays, scatter plots, and box and whisker plots.

History and Social Science, Grades 9-12

Historical and Social Sciences Analysis Skills

Chronological and Spatial Thinking

1. Students compare the present with the past, evaluating the consequences of past events and decisions and determining the lessons learned.
2. Students analyze how change happens at different rates at different times; that some aspects can change while others remain the same; that change is complicated and affects not only technology and politics, but also values and beliefs.

Historical Research, Evidence and Point of View

2. Students identify bias and prejudice in historical interpretations.

Historical Interpretation

1. Students show the connections, causal and otherwise, between particular historical events and larger social, economic and political trends and developments.
2. Students recognize the complexity of historical causes and effects, including the limitations on determining cause and effect.

Science, Grades 9-12

Cell Biology

1. Fundamental life processes of plants and animals depend on a variety of chemical reactions that are carried out in specialized areas of the organism's cells.

Ecology

6. Stability in an ecosystem is a balance between competing effects.

Physiology

9. As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic), despite changes in the outside environment.

Health Sciences Core Standards

- 3.0 Safety, 9th and 10th Grade. Students will know safety issues as they relate to employer, employee, and patient within the health care setting.
- 3.0 Safety, 11th Grade. Students will know the principles of asepsis, body mechanics, and protective safety measures.
- 3.0 Safety, 12th Grade. Students will know the potential hazards to employers, employees, and patients within various health care settings.
- 4.0 Communication and Decision-Making. Students will know how communications and decision-making affect health care delivery.
- 5.0 Ethical and Legal Responsibilities, 9th and 10th Grade. Students will know the basic concepts regarding laws, guidelines, and professional codes of health care.
- 5.0 Ethical and Legal Responsibilities, 11th Grade. Students will know ethical considerations, legal constraints, and professional codes affecting health care delivery systems.
- 6.0 Legal Responsibilities, 12th Grade. Students will know issues of accountability and the legal responsibilities of health care workers.
- 8.0 Health Maintenance, 12th Grade. Students will know various preventive health care practices.

SCANS Competencies

Resources

- A. Time: Student selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
- D. Human Resources: Student assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

- A. Participates as a member of a team
- D. Exercises leadership
- E. Negotiates

Information

- A. Acquires and evaluates information
- B. Organizes and maintains information
- C. Interprets and communicates information
- D. Uses computers to process information

Resources and Materials

- ⇒ Texts, including books on AIDS, case studies and periodicals
- ⇒ Computer access for report writing and Internet research
- ⇒ Health care professionals to present on their role in preventing and treating AIDS
- ⇒ Video on AIDS and examples of public information aimed at reducing the spread of AIDS
- ⇒ Maps, graphs and charts depicting the spread of AIDS among different ethnic groups
- ⇒ AIDS test

Expectations of Students

During this project, students will:

- ❶ Research and prepare an oral and written presentation of the topic;
- ❷ Analyze a case study in order to solve the problem presented;
- ❸ Prepare notes and informed questions to ask guest speakers; and
- ❹ Graph and chart the global spread of AIDS.

Roles of Participating Teachers

Science teachers will prepare a lab exercise concerning the transmission of disease.

Social Studies teachers will have students read data and maps to chart the spread of AIDS.

Mathematics teachers will have students graph the economic feasibility of developing a cure.

English teachers will assist students with written reports and oral presentation skills.

Linkages to Industry

Health care professionals, public health officials and members of the legal community will discuss their role in dealing with AIDS and the ethical dilemmas they face in their work. In particular, health care procedures for AIDS patients and legal issues concerning AIDS patients will be discussed.

Timeline

This project will take three weeks, allowing one week for student presentations.

Assessment Strategies

Students will submit a portfolio that includes notes from all presentations, peer grading of other groups, a solution from the case study and an analysis of the spread and treatment of AIDS in another country.

The Hot Zone

Project adapted from Prince George's County, Maryland, Career Connections
Found at www.pgcps.pg.k12.md.us

Project Activities

As part of this project, students will:

- 1 Utilize lab skills to study bacterial cell cultures. Groups of students in a bacterial cell lab will address variables of temperature, time, light sources (suggest culture of Staph. Aureus);
- 2 Collect and analyze data and communicate results with other students and teachers through “ER” simulation game for debriefing;
- 3 Visit a working medical, research or industry laboratory to view safety procedures;
- 4 Relate what they are learning to health care practices that are designed to inhibit bacterial cell growth; and
- 5 Devise an action plan for dealing with a potential contamination.

Academic and Industry Skill Standards Addressed in the Project

English/Language Arts, Grades 9 and 10

Writing

- 1.0 Writing Strategies. Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose. Students progress through the stages of the writing process as needed.
- 1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.
- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).
- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.
- 1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.
- 1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.
- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

Writing Applications

- 2.3 Write expository compositions, including analytical essays and research reports.
- 2.6 Write technical documents.

English/Language Arts, Grades 11 and 12

Writing

- 1.0 Writing Strategies. Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose and progression through the stages of the writing process.
- 1.3 Structure ideas and arguments in a sustained, persuasive, and sophisticated way and support them with precise and relevant examples.
- 1.7 Use systematic strategies to organize and record information (e.g., anecdotal scripting, annotated bibliographies).

Written and Oral English Language Conventions

- 1.0 Students write and speak with a command of standard English conventions.
- 1.1 Demonstrate control of grammar, diction, and paragraph and sentence structure and an understanding of English usage.
- 1.2 Produce legible work that shows accurate spelling and correct punctuation and capitalization.

Math, Grades 8-12

Probability and Statistics

8. Students organize and describe distributions of data using a number of different methods, including frequency tables, histograms, standard line and bar graphs, stem and leaf displays, scatter plots, and box and whisker plots.

Science, Grades 9 - 12

Biology/Life Sciences

1. Fundamental life processes of plants and animals depend on a variety of chemical reactions that are carried out in specialized areas of the organism's cells.

Ecology

6. Stability in an ecosystem is a balance between competing effects.

Physiology

9. As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic), despite changes in the outside environment.
10. Organisms have a variety of mechanisms to combat disease.

Investigation and Experimentation

1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content of the four other strands, students should develop their own questions and perform investigations.

Health Sciences Core Standards

- 3.0 Safety, 9th and 10th Grade. Students will know safety issues as they relate to employer, employee, and patient within the health care setting.
- 3.0 Safety, 11th Grade. Students will know the principles of asepsis, body mechanics, and protective safety measures.
- 3.0 Safety, 12th Grade. Students will know the potential hazards to employers, employees, and patients within various health care settings.
- 8.0 Health Maintenance, 12th Grade. Students will know various preventive health care practices.

SCANS Competencies

Resources

- A. Time: Student selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
- D. Human Resources: Student assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

- A. Participates as a member of a team
- D. Exercises leadership
- E. Negotiates

Information

- A. Acquires and evaluates information
- B. Organizes and maintains information
- C. Interprets and communicates information
- D. Uses computers to process information

Resources and Materials to Be Used

- Text: biology and health, OSHA guidelines, Taber's Medical Dictionary
- Lab equipment (microscopes, Petri dishes), bacterial cultures, bleach
- Computers: access to Internet for research, use of computers for producing reports
- Video camera and videotapes
- Health care professionals for guest speakers and laboratory visit

Expectations of Students

As a result of this project, students will:

- ① Develop scientific research skills and learn about laboratory procedures;
- ② Relate lab experience and concepts in science to applications in health and industry;
- ③ Devise an action plan to resolve conflicts/contamination in a mock situation; and
- ④ Develop a plan for a better hygiene regimen.

Roles of Participating Teachers

English teachers will assist students in research and writing a final report.

Mathematics teachers will cover procedures for data analysis, graphs, and charts.

Biology/Science teachers will instruct students in laboratory procedures and concepts in biology and chemistry as they relate to contaminants.

Biotech/Allied Health teachers will cover concepts in science, OSHA guidelines and medical terminology.

Linkages to Industry

Students will connect academic and technical skills through information from guest speakers from government (Center for Disease Control) and industry (health care) and through job shadowing, internships and work study opportunities in industry.

Timeline

This project will take two weeks to complete.

Assessment Strategies

Students will be assessed on (pre-test) daily health habits and bacterial culture growth variables and (post-test) on their plan for a better hygiene regimen and on their action plan to eliminate a potential contamination.

Topics Out of the Hot Zone: Contaminants and Their Effects

Project adapted from Prince George's County, Maryland, Career Connections
Found at www.pgcps.pg.k12.md.us

Project Activities

As part of this project, students will:

- 1 Demonstrate specific techniques for using microscopes, slide preparation and staining;
- 2 Create team-based projects on the effects of contaminants in the environment and the continuation of life on Earth;
- 3 Conduct research in which they identify contaminants, collect samples, generate and record data, evaluate data, communicate results and conduct ongoing assessment;
- 4 Relate their research to community- and work-related applications using business or public policy representatives as sources of information and feedback; and
- 5 Present findings and implications of their research to class and community representatives.

Academic and Industry Skill Standards

English/Language Arts, Grades 9 and 10

Writing

- 1.0 Writing Strategies. Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose. Students progress through the stages of the writing process as needed.
- 1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.
- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).
- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.
- 1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.
- 1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.
- 1.8 Design and publish documents by using advanced publishing software and graphic design.
- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

Writing Applications

- 2.3 Write expository compositions, including analytical essays and research reports.

Listening and Speaking

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations of their own that convey clear and distinct perspectives and solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.
- 1.3 Choose logical patterns of organization to inform and to persuade, by soliciting agreement or action, or to unite audiences behind a common belief or cause.
- 1.4 Choose appropriate techniques for developing the introduction and conclusion.
- 1.5 Recognize and use elements of classical speech forms in formulating rational arguments and applying the art of persuasion and debate.
- 1.6 Present and advance a clear thesis statement and choose appropriate types of proof that meet standard tests for evidence, including credibility, validity, and relevance.
- 1.8 Produce concise notes for extemporaneous delivery.
- 1.9 Analyze the occasion and the interests of the audience and choose effective verbal and nonverbal techniques for presentations.

Speaking Applications

- 2.0 Students deliver polished formal and extemporaneous presentations that combine the traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.1 Deliver narrative presentations.
- 2.2 Deliver expository presentations.
- 2.3 Apply appropriate interviewing techniques.
- 2.5 Deliver persuasive arguments.
- 2.6 Deliver descriptive presentations.

English/Language Arts, Grades 11 and 12

Reading

- 2.3 Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.

Writing

- 1.0 Writing Strategies. Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose and progression through the stages of the writing process.
- 1.1 Demonstrate an understanding of the elements of discourse (e.g., purpose, speaker, audience, form) when completing narrative, expository, persuasive, or descriptive writing assignments.
- 1.3 Structure ideas and arguments in a sustained, persuasive, and sophisticated way and support them with precise and relevant examples.
- 1.5 Use language in natural, fresh, and vivid ways to establish a specific tone.

- 1.6 Develop presentations by using clear research questions and creative and critical research strategies (e.g., field studies, oral histories, interviews, experiments, electronic sources).
- 1.7 Use systematic strategies to organize and record information (e.g., anecdotal scripting, annotated bibliographies).

Written and Oral English Language Conventions

- 1.0 Students write and speak with a command of standard English conventions.
- 1.1 Demonstrate control of grammar, diction, and paragraph and sentence structure and an understanding of English usage.
- 1.2 Produce legible work that shows accurate spelling and correct punctuation and capitalization.

Listening and Speaking Strategies

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations that convey clear and distinct perspectives and demonstrate solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.
- 1.6 Use logical, ethical, and emotional appeals that enhance a specific tone and purpose.
- 2.0 Speaking Applications. Students deliver polished formal and extemporaneous presentations that combine traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.

History and Social Science, Grades 9-12

Historical and Social Sciences Analysis Skills

Chronological and Spatial Thinking

1. Students compare the present with the past, evaluating the consequences of past events and decisions and determining the lessons learned.
2. Students analyze how change happens at different rates at different times; that some aspects can change while others remain the same; that change is complicated and affects not only technology and politics, but also values and beliefs.

Historical Research, Evidence and Point of View

4. Students construct and identify hypotheses; collect, evaluate and employ information from multiple primary and secondary sources; and apply it in oral and written presentations.

Historical Interpretation

1. Students show the connections, causal and otherwise, between particular historical events and larger social, economic and political trends and developments.
2. Students recognize the complexity of historical causes and effects, including the limitations on determining cause and effect.

Math, Grades 8-12

Probability and Statistics

8. Students organize and describe distributions of data using a number of different methods, including frequency tables, histograms, standard line and bar graphs, stem and leaf displays, scatter plots, and box and whisker plots.

Health Sciences Core Standards

- 3.0 Safety, 9th and 10th Grade. Students will know safety issues as they relate to employer, employee, and patient within the health care setting.
- 3.0 Safety, 11th Grade. Students will know the principles of asepsis, body mechanics, and protective safety measures.
- 3.0 Safety, 12th Grade. Students will know the potential hazards to employers, employees, and patients within various health care settings.
- 8.0 Health Maintenance, 12th Grade. Students will know various preventive health care practices.

SCANS Competencies

Resources

- A. Time: Student selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
- D. Human Resources: Student assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

- A. Participates as a member of a team
- B. Teaches others new skills
- D. Exercises leadership
- E. Negotiates

Information

- A. Acquires and evaluates information
- B. Organizes and maintains information
- C. Interprets and communicates information
- D. Uses computers to process information

Systems

- A. Understands systems

Technology

- A. Selects technology
- B. Applies technology to task

Resources and Materials to Be Used

- Microscopes and materials for slides; other laboratory equipment
- Alcohol or other contaminants
- Business/industry representatives to present their role in dealing with contaminants
- Computer access for research on contaminant and development of presentation materials
- Biotech Council to judge students' acquisition of skills

Expectations of Students

As a result of this project, students will:

- ❶ Know the effects of contaminants on the environment and continuation of life;
- ❷ Demonstrate knowledge of data collection, research methods, reporting and presentation; and
- ❸ Demonstrate the ability to use a microscope and other laboratory equipment.

Roles of Participating Teachers

Science teachers will cover laboratory techniques, salinity, contaminants and other concepts.

English teachers will focus on written reports and communication skills.

Technology/Library/Media teachers will assist students with research and Internet searches.

Mathematics teachers will have students calculate and graph the impact of contaminants.

Social Studies teachers will cover the history and impact of epidemics and pandemics.

Cooperative Education teachers will arrange for industry visits and guest presenters.

Allied Health teachers will have students read and analyze public health information.

Linkages to Industry

The project may encompass the work of numerous health and industry groups including the Environmental Protection Agency, Department of Health, Department of Natural Resources, Biotechnology Council and Chesapeake Bay Foundation.

Timeline

To be determined.

Assessment Strategies

Students must meet established business criteria. The Biotechnology Council will evaluate projects to insure standards.

Designer Genes

A Problem-Based Learning Project

Adapted from Robin Fogarty, *Problem-Based Learning and Other Curriculum Models for the Multiple Intelligences Classroom*

As distinguished from project-based learning, of which it might be considered a subset (although Fogarty does *not* consider it as such), problem-based learning “is a curriculum model designed around real-life problems that are ill-structured, open-ended or ambiguous.” Fogarty states that “one of the most distinctive elements of true problem-based learning is the students’ ownership of the problem and the natural, student-directed way the problem unfolds.”

Meet the Problem

Geneticists today are able to locate particular genes and change their coding. While the scientific benefits are many in terms of eliminating genetic defects and undesirable hereditary traits for future generations, there are moral and ethical issues to consider. Who decides when to use genetic engineering? How are decisions made about genetic engineering? How is the process regulated to ensure human rights and individual rights? Consider the following scenario:

You are the head of a team of scientists investigating genetic engineering. Your research is conclusive that a particular gene determines a predisposition to alcoholism. Brenda Moss is pregnant. Both she and her husband have a legacy of alcoholism that has devastated both of their families. While neither of them seem to be affected, through genetic counseling they have been cautioned about the possibility of their children being alcoholics. They have been informed of the genetic team researching the problem and are considering becoming part of the study. The results of the genetic engineering will not be known for years. How might you convince them to allow your team to intervene?

Define the Problem

- How is genetic engineering beneficial to us? Or
- Are the results of genetic engineering worth the risks? Or
- What are the risks of genetic engineering? Or
- Is genetic engineering a viable option for pregnant women? Or
- How might Brenda and her husband make an informed decision?

Gather the Facts

Use a KND chart or list (what we **K**now, what we **N**eed to know, what we need to **D**o)

What We Know

- ❶ Genetic engineering is a reality.
- ❷ The research on genetic engineering is long-term.
- ❸ Genetic engineers need to investigate all avenues of the research on genetic engineering.
- ❹ There are many unknowns about genetic engineering.
- ❺ There are moral and ethical issues that surface with the concept of genetic engineering.
- ❻ We don’t know much about genetic engineering. But we know there is information about it on the Internet.

What We Need to Know

- 1 What is genetic engineering?
- 2 What are the risks? Benefits?
- 3 Who is researching this and why?
- 4 How much do scientists know about actual experimentation with humans?
- 5 What are the alternatives?
- 6 How do Brenda and her husband feel about the experiment?
- 7 What is the prognosis for success?
- 8 How critical is the decision for the health and well-being of the child?
- 9 What factors are most crucial to making a sound decision?

What We Need to Do

- 1 Research genetic engineering on the Internet and in the library.
- 2 Interview research scientists who know the facts.
- 3 Visit or write to an institution participating in genetic counseling.
- 4 Review the science fiction literature for scenarios of genetic engineering.
- 5 Diagram the genetic information to understand recessive and dominant genes.
- 6 Gather data on studies completed.
- 7 Investigate the alternatives.
- 8 Evaluate possible results.

Generate Questions

Using the KND chart, revisit the information found and form questions for the investigation. For example:

- 1 What is genetic engineering?
- 2 How do we find out about genetic engineering?
- 3 Is there someone we can talk to?
- 4 Do we know how to find a genetic scientist on the Internet?

Without repeating all the information listed above in the KND chart, have students generate a new chart of questions they need to address.

Hypothesize

- What if genetic engineering were better understood? Would that guide the decision? Or
- Is this a decision of the head or the heart? Or
- How might genetic engineering become a viable option?

Research

The actual research data will vary depending on what questions drive the investigation, but the emerging information is certain to uncover future paths of interest. For example, as students think about the

moral and ethical issues connected to genetic engineering, they might gather newspaper articles that highlight the issues and concerns families face with new technology. They might also accumulate personal interest stories on how families cope with genetic engineering and life-and-death decisions.

Rephrase the Problem

Refine the original problem statement.

- Is genetic engineering a reality for our families? Or
- What are the moral, ethical, and practical issues that surround the concept of genetic engineering? Or
- Will families elect to engineer the genetic structure of their children?

Generate Alternatives

Generate ideas and code them as probable, possible, or preferable. (The stakeholder is the couple being asked to join the research study.)

- ❶ Brenda and her husband opt to become part of the genetic research team. (Possible)
- ❷ The couple reject the opportunity for genetic engineering. (Probable)
- ❸ The family decides to continue to study about alcoholism and its prevention, but does not elect to be part of the research. (Preferable)

Advocate Solutions

Based on the generated solutions and their coding, each student declares a preferable solution and justifies it with facts and feelings. For example:

Preferable Solution

The couple decides against genetic engineering, but pledges to each other to learn and understand about alcoholism.

Justification

While alcoholism is a possibility in their child's genetic makeup, the unknowns are too great to proceed as part of the research. If the genetic disorder were of critical proportions, such as mental retardation, perhaps the risk factors would be worth it. But, in this case, since some do not become affected with alcoholism even though they carry the gene, the decision to defer from the research study seems sound.

The Changing Roles of Women in Medicine during the Twentieth Century

Project adapted from California High School Health Careers Academy
Whittier, California

Project Description

Students will work individually and in groups to research a woman involved in the health care field in the twentieth century. Each student researches one woman, and students work in nine-person groups to compile their individual research into magazine format. Each group divides responsibilities among an editor-in-chief, copy editors, publishers, graphic designers, copy writers, researchers and typists. They work together to promote the magazine with posters and pamphlets. Groups present their magazines and visual aids during a formal panel presentation. Panel judges may include parents, teachers and other adults from the community.

Project Timeline

The project takes three months. Finished products are on display at a health fair held near the end of the school year.

Project Activities

History

- Collect and word process information for a magazine on the changing roles of women, particularly in health care.
- Demonstrate biographical form for magazine articles.
- Develop a magazine on the changing roles of women in the United States during the twentieth century.

Language Arts

- Read related literature to gain background knowledge.
- Prepare a literature review presentation for peers.
- Read a book or watch a video on a related topic and write a review.
- Write a variety of articles, e.g., creative, evaluative, fictional, that can be used in the project.
- Analyze how language and symbols are used to persuade an audience.
- Create persuasive advertisements for the culminating product.

Health Careers

- Research background information on health care changes to add to the history timeline.
- Collect historical data on five health care professions for math statistics.

Science

- Develop a timeline that demonstrates the increasing role of women in providing health care in the United States.

- ⇒ Research and profile specific women to illustrate contributions, using an example mode.
- ⇒ Research and provide information for articles to showcase in the magazine.

Mathematics

- ⇒ Use statistical measurements on the data collected by the Health Careers class. Present results graphically in the magazine for comparison and prediction regarding the number of women versus men in health care occupations.

Project Outcomes

- ⇒ Magazine: This includes an article researched and created by each team member on one woman. Students are required to use at least five references in researching their articles, including one each from the Internet, a CD-ROM, a book and a periodical. In addition to the articles, the magazine includes graphics and advertisements created by teams to promote health-related services or products.
- ⇒ Poster and pamphlet promoting the magazine
- ⇒ Journal kept by each student throughout the project addressing what the student has done, what remains to be done, and how the student feels the project is progressing
- ⇒ Final group presentation before a panel, with each student to present for up to five minutes

Academic and Industry Skill Standards

English/Language Arts, Grades 9 and 10

Writing

- 1.0 Writing Strategies. Students write coherent and focused essays that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose. Students progress through the stages of the writing process as needed.
- 1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.
- 1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).
- 1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives in each medium.
- 1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.
- 1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals.
- 1.8 Design and publish documents by using advanced publishing software and graphic design.
- 1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.

Writing Applications

- 2.3 Write expository compositions, including analytical essays and research reports.
- 2.4 Write persuasive compositions.
- 2.6 Write technical documents.

Listening and Speaking

- 1.0 Students formulate adroit judgments about oral communication. They deliver focused and coherent presentations of their own that convey clear and distinct perspectives and solid reasoning. They use gestures, tone, and vocabulary tailored to the audience and purpose.
- 1.3 Choose logical patterns of organization to inform and to persuade, by soliciting agreement or action, or to unite audiences behind a common belief or cause.
- 1.4 Choose appropriate techniques for developing the introduction and conclusion.
- 1.5 Recognize and use elements of classical speech forms in formulating rational arguments and applying the art of persuasion and debate.
- 1.6 Present and advance a clear thesis statement and choose appropriate types of proof that meet standard tests for evidence, including credibility, validity, and relevance.
- 1.7 Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations.
- 1.8 Produce concise notes for extemporaneous delivery.
- 1.9 Analyze the occasion and the interests of the audience and choose effective verbal and nonverbal techniques for presentations.

Speaking Applications

- 2.0 Students deliver polished formal and extemporaneous presentations that combine the traditional rhetorical strategies of narration, exposition, persuasion, and description. Student speaking demonstrates a command of standard American English and the organizational and delivery strategies outlined in Listening and Speaking Standard 1.0.
- 2.1 Deliver narrative presentations.
- 2.2 Deliver expository presentations.
- 2.3 Apply appropriate interviewing techniques.
- 2.5 Deliver persuasive arguments.
- 2.6 Deliver descriptive presentations.

English/Language Arts, Grades 11 and 12

Reading

- 2.3 Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.

Writing

- 1.0 Writing Strategies. Students write coherent and focused texts that convey a well-defined perspective and tightly reasoned argument. The writing demonstrates students' awareness of the audience and purpose and progression through the stages of the writing process.
- 1.1 Demonstrate an understanding of the elements of discourse (e.g., purpose, speaker, audience, form) when completing narrative, expository, persuasive, or descriptive writing assignments.
- 1.3 Structure ideas and arguments in a sustained, persuasive, and sophisticated way and support them with precise and relevant examples.

- 1.5 Use language in natural, fresh, and vivid ways to establish a specific tone.
- 1.6 Develop presentations by using clear research questions and creative and critical research strategies (e.g., field studies, oral histories, interviews, experiments, electronic sources).

History and Social Science, Grades 9-12

Historical and Social Sciences Analysis Skills

Chronological and Spatial Thinking

1. Students compare the present with the past, evaluating the consequences of past events and decisions and determining the lessons learned.
2. Students analyze how change happens at different rates at different times; that some aspects can change while others remain the same; that change is complicated and affects not only technology and politics, but also values and beliefs.

Historical Research, Evidence and Point of View

4. Students construct and identify hypotheses; collect, evaluate and employ information from multiple primary and secondary sources; and apply it in oral and written presentations.

Historical Interpretation

1. Students show the connections, causal and otherwise, between particular historical events and larger social, economic and political trends and developments.
2. Students recognize the complexity of historical causes and effects, including the limitations on determining cause and effect.

Health Sciences Core Standards

- 4.0 Communication and Decision-Making, 9th and 10th Grades. Students will know key concepts of working cooperatively and leadership roles as they interact between genders, generations and cultural groups.
- 4.0 Communication and Decision-Making, 11th Grade. Students will know how to use critical and creative thinking, logical reasoning and problem-solving skills using various methods.

SCANS Competencies

Resources

- A. Time: Student selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
- D. Human Resources: Student assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

- A. Participates as a member of a team
- D. Exercises leadership
- E. Negotiates

Information

- A. Acquires and evaluates information
- B. Organizes and maintains information
- C. Interprets and communicates information
- D. Uses computers to process information

Systems

- A. Understands systems

Technology

- A. Selects technology
- B. Applies technology to task

Assessment Strategies

Each student keeps a journal during the project; this is checked every week or two. As the project proceeds, teachers check off the completion of project requirements. Groups complete a project evaluation sheet noting the number of days each student was present or absent and his or her contributions to the magazine. Student groups are assessed on their completed magazines, posters, pamphlets and oral group presentations, which last 25 to 45 minutes per group.

Oral presentations, which are graded by a panel that may include parents, teachers and other adults from the community, are graded according to a rubric covering content, application of learning stretch, delivery, question and answer, research paper, poster and pamphlet, and PowerPoint presentation or video. Groups are judged “distinguished,” “commendable,” “adequate,” or “not yet there” on each of these elements. The rubric is included on the following pages.

Final Group Presentation Rubric

California High School Health Careers Academy, Whittier

Content

Distinguished (A+/B+, 10-9)

The distinguished presentation creates an emotionally and intellectually satisfying experience that engages and informs the listener. The presentation typically has the following characteristics:

- Employs a dynamic attention-getting device
- States or implies clearly the purpose of the presentation
- Supports all main ideas and points with accurate and appropriate details
- Uses a sophisticated and vivid vocabulary
- Uses formal language throughout
- Is highly organized and achieves a logical connection of ideas

Commendable (B/C+, 8-7)

The commendable presentation creates an emotionally and intellectually satisfying experience that engages and informs the listener, although to a lesser degree than the distinguished presentation. It typically has these characteristics:

- Employs an interesting attention-getting device
- States or implies the purpose of the presentation
- Supports most ideas and points with accurate and appropriate details
- Uses a vivid vocabulary
- Uses formal language for the most part
- Shows organization and a discernable logical connection of ideas

Adequate (C/D, 6-5)

The adequate presentation informs the listener. It typically displays these characteristics:

- Employs an attention-getting device
- States or implies the purpose of the presentation
- Supports some ideas and points with details
- Uses an appropriate vocabulary
- May lapse occasionally into informal language
- Displays some organizational pattern and logical connection of ideas

Not Yet There (D-/F, 4-0)

This presentation presents an unsatisfying experience for the listener that neither engages nor informs. The listener is keenly aware that the speech is missing key components. Characteristics include:

- Lacks an attention-getting device
- Fails to state or imply the purpose of the presentation
- Few ideas or points supported by details
- Uses inappropriate vocabulary
- Uses informal language exclusively/almost exclusively
- Displays little organization; no apparent logical connection of ideas

Application of Learning Stretch

Distinguished (A+/B+, 10-9)

Communicates a learning stretch that reflects significant personal growth

Commendable (B/C+, 8-7)

Communicates a learning stretch that reflects relevant personal growth

Adequate (C/D, 6-5)

Communicates a learning stretch that reflects some personal growth

Not Yet There (D-/F, 4-0)

Fails to communicate a learning stretch that reflects personal growth

Delivery

Distinguished (A+/B+, 10-9)

- Maintains constant eye contact
- Rarely makes errors in these non-verbal areas: poise, posture, gestures, volume, rate, clarity of voice
- Dresses neatly and appropriately
- Integrates audio-visual component effectively and creatively

Commendable (B/C+, 8-7)

- Maintains constant eye contact
- Makes few errors in these non-verbal areas: poise, posture, gestures, volume, rate, clarity of voice
- Dresses neatly and appropriately
- Enhances presentation in an integrated manner with audio-visual component

Adequate (C/D, 6-5)

- Makes occasional eye contact
- Makes some errors in these non-verbal areas: poise, posture, gestures, volume, rate, clarity of voice
- Dresses neatly and appropriately
- Uses an audio-visual component

Not Yet There (D-/F, 4-0)

- Maintains little or no eye contact
- Makes frequent errors in these non-verbal areas: poise, posture, gestures, volume, rate, clarity of voice
- Dresses inappropriately
- Uses no audio-visual component, or AV component fails to enhance presentation

Question and Answer

Distinguished (A+/B+, 10-9)

Answers directly and confidently. Answers demonstrate exceptional knowledge of research and project process.

Commendable (B/C+, 8-7)

Answers directly. Demonstrates knowledge of research and project process.

Adequate (C/D, 6-5)

Answers demonstrate adequate knowledge of subject.

Not Yet There (D-/F, 4-0)

Answers demonstrate limited or virtual lack of knowledge of subject.

Research Paper

Distinguished (A+/B+, 10-9)

Fulfills in an aesthetically pleasing manner all of the required components

Commendable (B/C+, 8-7)

Fulfills in an aesthetically pleasing manner most of the required components

Adequate (C/D, 6-5)

Fulfills some of the required components

Not Yet There (D-/F, 4-0)

Fulfills few of the required components

Poster and Pamphlet

Distinguished (A+/B+, 10-9)

- Fulfill in an aesthetically pleasing manner all of the required components
- Are well thought-out
- Are organized

Commendable (B/C+, 8-7)

- Fulfill in an aesthetically pleasing manner most of the required components
- Are well thought-out
- Are organized

Adequate (C/D, 6-5)

- Fulfill some of the required components
- Are organized

Not Yet There (D-/F, 4-0)

- Fulfill few of the required components or components create a visually displeasing experience
- Lack organization

PowerPoint Presentation or Video

Distinguished (A+/B+, 10-9)

- Expands on evidence of the information gained from the research paper. Project demonstrates that students have overcome obstacles of time, resources, materials, etc.
- Greatly exceeds the required five hours of outside class time
- Well organized, thought-out and edited
- Presentation displays consistency in color, text style, etc.

Commendable (B/C+, 8-7)

- Gives evidence of the information gained from the research paper. Project demonstrates that students have overcome most obstacles of time, resources, materials, etc.
- Exceeds the required five hours of outside class time
- Organized and edited
- Presentation displays consistency in color, text style, etc.

Adequate (C/D, 6-5)

- Gives evidence of the information gained from the research paper. Project demonstrates that students have overcome some obstacles of time, resources, materials, etc.
- Achieves the required minimum five hours of outside class time
- Organized and edited
- Presentation displays some consistency in color, text style, etc.

Not Yet There (D-/F, 4-0)

- Gives little or no evidence of information gained from the research paper. Project demonstrates that students have made little attempt to overcome obstacles of time, resources, materials, etc.
- Shows evidence of less than the required five hours of outside class time
- Little or no organization or editing
- Presentation displays little or no consistency in color, text style, etc.

Bonus Points for an Exceptional Paper

Up to 4 points for a paper that demonstrates creativity and quality including:

- Innovation
- Passion
- Uniqueness
- Excitement
- Craftsmanship

Letter to Potential Community Project Partner

Adapted from California High School Health Careers Academy
Whittier, California

Dear Community Member,

Have you ever wanted to make a difference in a young person's life? Would you like to get involved with the education of your community's teens? The California High School Health Careers Academy is offering you the opportunity to do both.

The health care industry frequently expresses concern over the lack of academic and/or job skills of applicants. We in the Health Careers Academy are addressing these concerns by implementing a project at both the tenth- and eleventh-grade levels. A health-related career is the focus of the tenth-grade project, while academy juniors are focusing on the changing roles of women in health care during the twentieth century. We believe that these projects will not only help students prepare for their senior project, but will also help them learn more about health care.

The requirements for the sophomore project include a typed research paper, which must include information gained through an oral or written interview; a poster and pamphlet; a video or multimedia component; and an oral presentation. Students will also be responsible for organizing and hosting a health fair at which their material will be on exhibit to students, parents and community members. The junior project requires students to work individually and as a group to produce a magazine that includes articles they have researched and written on women in health care, as well as advertisements they create for medical-related services and products.

How can I help? you ask. We need community members who are willing to volunteer their time and expertise as interviewees, judges, readers or any combination of these. As an interviewee, you could expect to be contacted by a student who will set up and carry out an interview pertaining to your career. Judges could expect to assist in evaluating student performances during the oral presentation part of the project. Readers will help determine the accuracy of the written portion of both projects. All participants could also expect to receive some guidance in the area(s) in which they assist. As a reader or a judge, you do not need to have a prior knowledge of medicine, only the willingness to help and a few hours out of your busy schedule.

If you are interested in assisting, please either fill out the enclosed form or call me at the number above. If you would like further information, please call or e-mail me. I look forward to hearing from you and working with you. Thank you for investing in the future of our students.

Sincerely,

Community Partner Project Volunteer Form

Adapted from California High School Health Careers Academy
Whittier, California

Yes, I would like to make a difference in the life of Health Careers Academy student. I am able to help by (Please check all that apply.):

Being a Judge for 10th grade 11th grade

This would take approximately _____ hours. If you can assist for more than one session, we would appreciate it. You will receive guidelines prior to the presentation for which you are to serve as a judge.

Being a Reader for 10th grade 11th grade

We will provide guidelines and a rubric to assist you in reading student papers for content, not grammar and spelling.

Being an Interviewee

My career: _____

I am unable to participate at this time but would like to be notified for the next project.

Name _____

Position/Profession _____

Work Location and Address _____

Phone _____

E-mail _____

The best time for reaching me by phone is: _____

Please mail or fax the completed form to:

The Hygiene Tree

A Consumer Education and Health Service Learning Project

Adapted from Sally Berman, *Service Learning for the Multiple Intelligences Classroom*

Project Description

As students do this project, they will brainstorm a list of health-care products they consider necessary for good personal hygiene, purchase enough items of each product to make up fifty personal hygiene kits, package the kits, put the kits on a “tree” (a device for holding or displaying them) which they have designed. This display will ideally be placed with a local social service organization for distribution to the homeless or to low-income community residents.

The Project Process

1. The teacher contacts local social service agencies or service clubs to find a community partner. When a partner agency or group has been arranged, the teacher gets the name of a person who will serve as a liaison for the project.
2. The teacher describes the reasons for the project to the students.
3. Students might be given the assignment of determining how great the need for this service is in their community, through such activities as discussing it with their parents and other community members and watching/listening to/reading local news coverage.
4. The teacher may begin the brainstorming process by asking students which personal hygiene actions or routines they or the adults in their home do every day (e.g., bathing, tooth-brushing), expanding to include occasional, as-needed actions (emergency treatments).
5. When they have compiled a list, the group studies the list to determine what kind of personal hygiene products would be needed to facilitate those actions (e.g., toothpaste, soap, bandages).
6. The teacher could ask students which of the suggested items would be essential and which could probably be omitted. When the class has decided on its list, each student makes a copy for his or her project portfolio.
7. To help them focus on the importance of personal hygiene and its implications for wellness, students are assigned to write essays on their personal hygiene routine and practices, based on teacher questions. Essays go into the project portfolio.
8. The teacher introduces the idea that the class will be assembling hygiene kits to be used by a local social service agency.
9. Students and teacher decide how to fund their project (e.g., student contributions, PTA, fund-raiser).
10. Students will visit a store selling personal hygiene products to determine how much the kits will cost. This could be a class field trip or be done by small groups with parent support. Before the visit, students are grouped in teams and given a copy of the products list. A parent or other adult supervisor will escort each team. One person on the team will be the scout who locates products in the store. A second person will be the clerk who reads the price of a few different brands and different sizes of each product to teammates. The third member of the team will be the bookkeeper who records the names and prices of the products on the team’s copy of the products list. When the list is finalized, each student will have a copy in his or her portfolio.

11. Each student calculates the cost of making one personal hygiene kit and the cost of making fifty kits, including sales tax. Calculations should decide how many people will use the products in a single kit and how long it is intended to last. For example, they could decide each kit should last one month for a single user, decide on the appropriate size of each product, and calculate the cost of the kit accordingly. During a whole class discussion, teams will compare their answers and determine the bottom-line cost for each kit. Each student will include a copy of the calculations in his or her portfolio.
12. Students decide how to make the actual display tree or receptacle, figuring the cost of the materials for this project into their calculation of overall project costs.
13. At some point during this process, the money for the project will be raised. When this has been done, the teacher or parent volunteers will visit the store and purchase the products and kits/bags.
14. Students make up the bags and prepare them along with the tree for delivery to the social service organization on a date scheduled by the teacher.
15. Students, teacher and chaperones deliver the finished project.
16. Throughout the project, students keep a reflective log, making entries after each project milestone (e.g., selecting products, visiting store for pricing, delivering finished project). See sample questions on a following page.

Assessment and Evaluation

Each student will complete a project portfolio that includes:

- The reflective log
- An essay on the student's personal hygiene routine and practices
- Notes on the need for this kind of service; information gathered from parents, news media
- Brainstormed list of personal hygiene products for the kit
- List of store prices for products
- Calculations of total cost of kits
- Greatest "Aha!" and personal service goal
- Quiz and test scores
- Three other evidences of learning selected by the student

Possible selections include photos of the student involved in project work, videos, audio-taped interviews with community service people, etc. Each student will share his or her portfolio with teammates during the project celebration.

The following pages provide tools for aligning service and education goals in the project, managing the project, and sample questions for the reflective log.

The Hygiene Tree: Aligning Service and Educational Goals

Major Subject: Consumer Education

Learning Goals

- wellness issues
- hygiene routines that promote wellness

Life Skills

- maintaining wellness through personal hygiene and first-aid routines
- being an informed consumer

Big Ideas

- wellness
- healthy lifestyles

Service Actions

- brainstorming the product list
- raising funds
- purchasing products

Major Subject: Health

Learning Goals

- health-promoting products
- preventing the spread of disease

Life Skills

- awareness of health-promoting and first-aid products

Service Actions

- personal hygiene
- becoming aware of the problems of homeless/poor

Major Subject: Language Arts

Learning Goals

- clear writing
- precise use of language

Life Skills

- clear, precise communication

Big Ideas

- wellness
- empathy

Service Actions

- writing essays and journals
- discussing issues with community service liaisons

Major Subject: Mathematics

Learning Goals

- precise calculation using percents, fractions and decimals

Life Skills

- predicting amounts
- precision in calculating

Service Actions

- calculating amounts/sizes of products to use in kits
- calculating cost of kits

The Hygiene Tree: Reflective Log

My thoughts about:

hygiene and wellness or disease/empathy/sharing/service;

some specific personal hygiene ideas, skills, or disease facts I learned:

What I learned about the impact of social problems on the community:

The life skill learning that I most want to remember:

I can use this life skill again when I:

My greatest insight about the importance of doing community service:

My thoughts and feelings about my role as a member of this community:

My thoughts and feelings about community needs:

The personal strengths I brought to the project today:

Next time I want to strengthen:

The Hygiene Tree: Project Management Plan

Phase 1

Planning

- Contact social service organization to arrange partnership.
- Discuss project with students.
- Write a letter asking for parent helpers.
- Write project description for parents and students, plans for reflective logs, assignments, and assessments.
- Send home letters to parents, including written permission slips and project calendars.

Monitoring

- Maintain contact with service organization liaison.
- Have students and families evaluate the need for hygiene tree.
- Collect signed parent permission slips.
- Make a list of parent helpers with phone numbers.

Evaluating

- Discuss student and family evaluations of project.
- Confirm project selection.

Phase 2

Planning

- Brainstorm list of hygiene products for kit.
- Discuss “My Personal Hygiene Routine and Practices” writing assignment and reflection logs.
- Assign base teams.
- Assign collecting information from news media about homeless/low-income families in this town.
- Begin the hygiene unit.

Monitoring

- Read and score essays.
- Discuss need for hygiene kits based on homeless/low-income family information collected from news sources.

Evaluating

- Revise calendar as needed.
- Do content learning assessment: quizzes, tests, class discussion.

Phase 3

Planning

- Visit store to get price information.
- Decide on plans for the tree—box, artificial tree, or one made of wood.
- Focus on impact of personal hygiene on community wellness (preventing spread of infection/contagion, for example).
- Arrange fund-raising.

Monitoring

- Do most calculations.
- Raise funds for purchase of hygiene products and tree materials.
- Spot-check reflective logs.

Evaluating

- Students self-evaluate progress and discuss in base teams.
- More content learning assessment—math skills and impact of hygiene on community wellness.
- Share reflective log insights in base teams.

Phase 4

Planning

- Buy hygiene products.
- Make hygiene kits.
- Put everything together to deliver to the social services organization.

Monitoring

- Check hygiene kits for completeness.
- Arrange for delivery of hygiene tree.
- Deliver the tree.
- Spot-check reflective logs.

Evaluating

- Final hygiene content test.
- Share reflective log insights in base teams.

Phase 5

Planning

- Celebrate project completion by writing a “will” asking future classes to continue the project.
- Share portfolios in base teams.
- Write whole class letter to the service organization liaison saying “Thank you for your help.”
- Students and teacher each write one goal for future personal service work.

Monitoring

- “Eavesdrop” on portfolio sharing.
- Ask students to tell each other their greatest learning AHA!, their most burning unanswered question, what they liked most about the project, what they found least comfortable, what they felt they did best, and what they would do differently (and better) next time.

Evaluating

- Students and teacher discuss projects strengths and areas for improvement.
- Each person shares with whole class his or her greatest AHA! and personal goal for future service work.

Old Folks' Tales to Tell

Service Learning Project

Adapted from Sally Berman, *Service Learning for the Multiple Intelligences Classroom*

Project Summary

As part of an interdisciplinary project, students in English 10 write biographies of people living in a nursing home, who have interesting stories to tell. Students combine their study of geriatrics in health class and their computer skills for word processing and graphic design. This makes the service learning project a meaningful experience for high-school students. The students present their biographies (in book form) at a Christmas Tea that they sponsor at the nursing home.

Selecting the Need for Service

Possibilities:

- Brainstorm ideas in class.
- Survey families in the school for ideas.
- Discuss a teacher-generated idea.
- Repeat a project from a previous year. (This project lends itself to this approach, as the teacher would have an established partnership with the nursing home.)

Evaluate the ideas using a rubric that rates interest, need, accessibility, appropriateness and time frame. This project is designed to take place in the fall semester, culminating at Christmas.

Finding a Community Partner

In the project on which this is based, a nursing home near the school is an enthusiastic partner. Residents are reported to be much interested in the project.

Aligning Service and Educational Goals

Major Subject/Discipline Focus and Goals

- Health/Geriatrics: ages, stages of life
- Social Studies: demographics, aging, society
- Literature/Biography: reading, appreciating
- Writing: style, genre
- Communication Arts (interview): interview questions, face-to-face communication, interpreting
- Big Ideas: loneliness, aging process
- Life Skills: relating to others

Managing the Project

Phase 1

Planning

- Confirm with nursing home.
- Introduce project to students.

Monitoring

- Prepare students for proper behavior, etc., in nursing home.

Evaluating

- Review concerns of students.

Phase 2

Planning

- Coordinate health, technology, and English.
- Begin appropriate units/skills.

Monitoring

- Elicit discussion of how to interact with old folks; geriatric knowledge, etc.

Evaluating

- Evaluate and reflect on biography as a genre.

Phase 3

Planning

- Set up partnerships with students and old folks.
- Schedule first interview.

Monitoring

- Encourage multiple interviews.

Evaluating

- Review notes and generate new questions for old folks.

Phase 4

Planning

- Plan first drafts and other critical due dates.

Monitoring

- Monitor student interview progress and student notes, outlines, writing.

Evaluating

- Review stages of biography.

Phase 5

Planning

- Set up tea with nursing home.
- Plan with students.

Monitoring

- Solicit help as needed for tea.

Evaluating

- Review biographies (final stages now or soon).

Phase 6

Planning

- Plan how to orchestrate “The Day”

Monitoring

- Encourage interaction between students and nursing home residents.

Evaluating

- Debrief the whole experience.

Fostering Reflective Learning

Develop a storyboard that illustrates the construction process for building a biography for this project. Students create a storyboard of the process they experienced as they met with their assigned nursing home resident and created the biography.

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