Teaching and Learning in a
CALIFORNIA PARTNERSHIP ACADEMY

California Partnership Academy Institute
November 2008

"…In the course of their careers in the American schools of today, most students take hundreds, if not thousands of tests. They develop skill to a highly calibrated degree in an exercise that will essentially become useless immediately after their last day in school. In contrast, when one examines life outside of school, projects emerge as pervasive. Some projects are assigned to the individual, some are carried out strictly at the individual's initiative, but most projects represent an amalgam of personal and communal needs and ends." — From The Unschooled Mind by Howard Gardner

"We can and do make sense out of a swirl of events. We can and do learn to identify important goals, cues, and strategies. It's not necessary for schools to chop learning experiences into small parcels to be practiced over brief intervals. We now know that minds learn by constructing elaborate working-memory programs for dealing with important events over long time periods. Formal education should begin, then, with the student's entry into complex, long-range learning situations that genuinely matter." — From Schooling by Sylvia Farnham-Diggory

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Workshop Goals

► Work collaboratively with your Academy team on Project Design; Network with other Academy teaching teams

► Understand how a well-designed curriculum can help students meet several key learning outcomes simultaneously

► Acquire strategies for integrated project design, and project enhancement

► Use a design framework for developing (or enhancing) rigorous and relevant classroom projects

► Use a Project Template to design (or begin to design) an integrated project for your Academy

► Complete a Six A's Poster for your project; Give and Receive Feedback

TIME	TOPIC/ACTIVITY	OBJECTIVE	DELIVERABLES
8:30	Introductions and Overview of Day	Meet presenters; review agenda	
8:35	Success Analysis and Sharing	Reflect, share, and analyze effective teaching and learning strategies	Written reflection on successful (PBL) teaching & learning
8:50	Introduction to PBL: o Video Clip o Mentor Team Presentation o PBL PowerPoint	o View a exemplary model of integrated PBL o Learn from a CPA mentor team about their integrated project work o Review what & why of PBL o Review 6 A's	Completed 6 A's Note Taking Worksheets (for video & presentation)
9:50	*Break*		
10:00	o Introduction to PBL Design Time (what teams will do; what are our deliverables) o Resources available to support your team design work; Review of CPA Binder Resources: Teaching and Learning Section	o Gain clarity on expectations for Team PBL Design Time and deliverables for the day o Peruse resources available in the Teaching and Learning section	
10:10	PBL Design Time for Team Project	o Brainstorm project ideas and Identify/ select one project to	PBL Design Template (begin)

		implement prior to the March CPA Conference; use the PBL Design Template to plan all aspects of your project and develop/enhance your project design ○ Identify how 6A's are incorporated into identified project ○ Identify possible A's for improvement	6As Poster (including project description) 6 A's Tweaking Tool (optional) Project Storyboard (optional)
11:30	Design 6 A's Poster	○ Create a 6 A's Poster to "exhibit" your PBL Design Work in post-lunch Gallery Walk ○ Post your 6 A's Poster in the Gallery prior to 1 p.m. (when Gallery will open)	6 A's Poster
12:00	*Lunch*		
1:00	*Gallery Walk of 6 A's Posters*	○ Learn from the work of other Academy Project Design Teams ○ Give and receive (post-it) feedback	Minimum 10 post-it feedback comments on different CPA team projects
1:30	Scaffolding Jigsaw *(Each team member chooses different PBL resource/s to review & share. Allow 5 minutes to read/review; 1 minute per team member to share.)*	○ Learn about resources to support your PBL design and implementation work; ○ Share information with team members	
1:45	PBL Design Time for Team Project	○ Revise & refine project design; ○ Prepare to share project design (as a work in progress) with another team.	
2:35	Pair/Share *(Two CPA teams share project designs & story boardswith one another; give & receive feedback.)*	○ Share PBL design with another Academy team; each team takes a turn as a presenting team; ○ Each "listening" team asks clarifying and probing questions.	
2:55	Reflection & Closure	○ Reflect on learning from day ○ Next Steps	Completed reflection handouts

Success Analysis Protocol

The Success Analysis Protocol is designed to help teachers analyze the essential elements of successful teaching & learning. Since time is short (only one day), we are using a much abridged, much modified adaptation of a longer, more structured protocol that is usually done in trios. The protocol has been modified for pairs and redesigned as a quick introductory activity.

NOTE: The full Success Analysis Protocol can be powerful professional development activity for staff meetings or adapted to use with students. If you would like a copy of the longer success analysis protocol, please email Patricia Clark at patricia510@gmail.com.

1) POWERFUL TEACHING/LEARNING SUCCESS REFLECTION

All participants reflect on and write about the following:

Think about a time when you were highly successful as a teacher and when students were highly engaged in their learning. (If possible, write about a powerful PBL teaching and learning experience.) Write a short description of this success. Describe the specifics of the success. Be sure to answer the question: "What about this teaching and learning experience made it so successful?" (If you are not a teacher, think about a time when you were in high school and had a powerful learning experience. Describe that powerful learning experience. What about this learning experience made it so memorable? What conditions did the teacher help create, etc.?) (5 minutes)

After everyone has written about a powerful teaching and learning experience, there will be three "rounds" (one for each presenter (rounds 1 & 2) and a third for shared analysis and reflection) of approximately 3 minutes each.

2) SUCCESS STORY SHARED

When the direction is given, find someone in the room you do not know/have never met before with whom to "pair and share."

> Find a partner. Introduce yourselves. Decide who will go first as "presenter." *(1 minute)*

> Round One: When the signal is given, the "presenter" will spend three minutes sharing her/his teaching success and describing this in as much detail as possible while the "listener" actively listens, and takes notes about the elements of success. The "listener" should not speak during this time. *(3 minutes)*

> Round Two: At the end of three minutes, when the signal is given, participants switch roles (the "presenter" from the first round becomes the 2nd round "listener" *and* the "listener" from the first round becomes the 2nd round "presenter.") Repeat the process with the new presenter sharing the story of her/his teaching and learning success in as much detail as possible and the new "listener" actively listening and taking notes about the elements of success. The "listener" should not speak during this time. *(3 minutes)*

> Round Three: Participants have a dialogue about what they heard. They may ask one another any clarifying (factual information) &/or probing (interpretative/analytical/why) questions, but primarily each should reflect on what they heard the other say and discuss any common factors that contributed to teaching and learning successes. Discuss: What common factors contributed to teaching & learning success? Are there underlying principles or processes that made for teaching and learning success? How can we consciously create conditions that lead to success? *(3 minutes)*

Success Analysis Reflection Sheet

REFLECTIONS ON A SUCCESSFUL TEACHING & LEARNING EXPERIENCE

NOTES FROM OTHER PRESENTER'S SUCCESS...

SUCCESS ANALYSIS: COMMON ELEMENTS, CONDITIONS, ETC.

What is Project-Based Learning?

Project-Based Learning grew out of a need to help students make connections between school and life, a need to help students find relevance in academics, a need to help students feel valued and gain deeper understanding of academic and technical concepts. Students and teachers engaged in project-based learning demand greater responsibility for their own learning.

The learning experiences are designed as complex, authentic (real-world) projects. The contexts for many of the projects are found outside the school walls. Projects emerge from needs in the community or home; they arise from social issues, or perhaps physical, emotional, or recreational needs; and from authentic industry or business activities. Fundamentally, the learning of content knowledge and skills is given an opportunity to develop and grow through project-based learning.

Project based learning is a philosophy and a practice; it is what we believe about education and how we act on those beliefs in the classroom.

Project-based learning engages students in complex, real-world problem solving that is:
- ⊙ **academically rigorous**
- ⊙ **relevant** to students and the community; and
- ⊙ empowers students as **active learners**

Classroom emulates high performance work/learning

Academically rigorous projects mean…
- ♦ Students use prior knowledge and research skills
- ♦ Student determine what new academic knowledge and research skills are needed and acquire them
- ♦ Students gather information from a variety of sources
- ♦ Teachers encourage work that is complex

Relevant projects mean…
- ♦ Students choose projects based on interests
- ♦ Student learning has value in the community
- ♦ Curriculum is related to real-life issues helping students understand what they are learning what they are learning and why they are learning it

Active learning means…
- ♦ Students become practitioners using and demonstrating knowledge and not just storing it
- ♦ Students negotiate project ideas and assessment criteria with teachers and community members
- ♦ Students participate in assessment
- ♦ Teachers act as coaches and facilitators

SIX A's NOTE TAKING TOOL *As you watch the video clip of a project-based learning example AND as you listen to a brief presentation on the project-based learning work of one of the CPA Mentor Academies, use the following table to take notes on EVIDENCE OF THE 6 A's.*

	CRITERIA	PBL VIDEO	MENTOR ACADEMY PBL PRESENTATION
AUTHEN-TICITY	Project emanates from a problem or question that has meaning to student Problem or question is one that might actually be tackled by an adult at work or in the community Students create or produce something that has personal & /or social value beyond school setting		
ACADEMIC RIGOR	Students acquire and apply knowledge central to one or more discipline or content area Students use methods of inquiry central to one or more discipline (e.g., to think like a scientist) Students develop higher order thinking skills and habits of mind (e.g., searching for evidence, taking different perspectives)		
APPLIED LEARNING	Students solve a semi-structured problem (e.g., designing a product, improving a system, or organizing an event) that is grounded in a context of life & work beyond school walls Students acquire & use competencies expected in high performance work organizations (e.g., teamwork, problem solving) Work requires students to develop organizational & self-management skills		

Six A's Note Taking Tool – Continued…

	CRITERIA	PBL VIDEO	MENTOR ACADEMY PBL PRESENTATION
ACTIVE EXPLOR-ATION	Students spend significant amounts of time doing field-based work Students engage in real investigations using a variety of methods, media, and sources Students communicate what they learn through presentations		
ADULT RELATION-SHIPS	Students meet and observe adults with relevant expertise and experience Students work closely with at least one adult Adults collaborate on the design and assessment of student work		
ASSESS-MENT	Students reflect regularly on their learning, using clear project criteria that they have helped to set Adults from outside classroom help students develop a sense of the real world standards for this type of work There are opportunities for regular assessment of student work through a range of methods, including exhibitions and portfolios		

PBL Instructional Design Components

PROJECT

Curriculum Design

Simultaneous Outcomes:
- ☐ **Content**
- ☐ **Standards**
- ☐ **Habits of Mind**

What do I want my students to know and be able to do?

Instructional Delivery

6 A's

of PBL

Teaching and Learning:
- ☐ **Design Framework**
- ☐ **Design Tools**
- ☐ **Instructional strategies**

What instructional strategies will facilitate engagement and learning?

Assessment & Evaluation

Collecting Evidence:
- ☐ **Product**
- ☐ **Process**
- ☐ **Progress**

What evidence will I accept of student progress and what will be the criteria for success?

Adaptations, Resources, and Constraints

How will curriculum and instruction be modified to meet special needs in the classroom?
How do resources such as time, people, energy, capital, materials, and information impact the implementation of the project?

SIMULTANEOUS OUTCOMES

Adapted from the work of Art Costa and Bena Kallick

ACTIVITIES
What do I want to accomplish in this lesson?
- Reading a chapter
- Doing a worksheet
- Having a discussion

CONTENT
What concepts do I want students to understand?
- Local/state standards
- Discipline-based knowledge

PROCESSES
What thinking skills do I want students to practice?
- Hypothesizing
- Comparing
- Contrasting
- Analyzing…

HABITS OF MIND
Which habits of mind do I want students to develop?
- Flexibility in thinking
- Managing impulsivity
- Metacognition
- Persisting…

LIFELONG LEARNER/ COLLEGE SUCCESS SKILLS
What will students ultimately become as a result of this experience?
- Self-managing
- Self-monitoring
- Self-modifying

DEVELOPING A THINKING CURRICULUM:

▶ How do we design for content rigor, processes, and thinking development?

▶ Are we putting sufficient instructional attention and emphasis on processes, habits of mind, and lifelong learning/college success skills?

▶ What do we do to help students understand content standards, processes, and habits of mind? To help all students succeed?

▶ Are students made aware of standards and high expectations from the outset?

▶ How will we know students are developing in each area?

▶ What criteria will we use to make reasonable judgments about what students know and can do? Are our judgments based on multiple measures?

What IS Project-Based Learning?

> *Project-based learning, problem-based learning, constructivist teaching, complex instruction, service learning…it is easy to get lost in the terminology! What IS project-based learning? Here are some definitions from the field.*

"As its name suggests, Project-Based Learning organizes learning around projects (instead of, or in addition to, textbook reading, lectures, etc.). A project involves a number of activities leading to an end point and resulting in a product or presentation." 				 -- *Center for Youth Development and Education*

"Project-based learning is a model that organizes learning around projects. (Such) projects are complex tasks, based on challenging questions or problems, that involve students in design, problem-solving, decision making, or investigative activities; give students the opportunity to work relatively autonomously over extended periods of time; & culminate in realistic products or presentations.... Other defining futures....include authentic content, authentic assessment, teacher facilitation but not direction, explicit educational goals, cooperative learning, reflection, & incorporation of adult skills.... Particular models of PBL add a number of unique features. Definitions of 'project-based instruction' include features relating to the use of an authentic (driving) question, a community of inquiry, & the use of cognitive (technology-based) tools; & [others] add features of comprehensive school improvement, community service, & multidisciplinary themes." -- *Review of Research on Project-Based Learning*

"Project-based learning can be defined as follows:
- learning experiences which engage students in complex, real-world projects through which they develop and apply skills and knowledge;
- a strategy which recognizes that significant learning taps students' inherent drive to learn, capability to do important work, and the need to be taken seriously;
- learning in which the results are not predetermined or fully predictable;
- learning which requires students to draw from many information sources and disciplines in order to solve problems; *and*
- learning which requires students to coordinate time, work schedules, and project outcomes in order to accomplish project goals on a predicted time schedule." 				-- *The AutoDesk Foundation*

"Project-based Learning:
- engages students in complex, real-world issues and problems; where possible, the students select and define issues or problems that are meaningful to them
- requires students to use inquiry, research, planning skills, critical thinking, and problem-solving skills as they complete the project
- provides opportunities for students to learn and practice interpersonal skills as they work in cooperative teams and, wherever possible, with adults in workplaces or the community
- gives students practice in using the array of skills needed for their adult lives & careers (e.g. how to allocate their time & resources; individual responsibility; interpersonal skills; learning through experience, SCANS, etc.)
- includes expectations regarding accomplishments/learning outcomes; these are linked to learning standards and outcomes for the school district and are stated at the beginning of the project
- incorporates reflection activities that lead students to think critically about their experiences and to link those experiences to specific learning standards
- ends with a presentation or product that demonstrates learning and is assessed; the criteria could be decided upon by the students" 				-- *William Diehl, Terry Grobe, Hector Lopez, & Christina Cabral*

"Project-based learning is an instructional strategy in which participants plan, implement, complete, & evaluate a valuable, real-life project. By dealing with the many facets of a complex project, learners are offered multiple opportunities to regularly practice, master, & verbalize an array of important & integrated skills in a variety of situations. In this approach, learning, content, & process are totally integrated....

				-- *Chris Kingsley, Brandeis University*

(PBL Definitions, continued...)

"Project-Based Learning is an innovative model for teaching and learning. It focuses on the central concepts and principles of a discipline, involves students in problem-solving investigations and other meaningful tasks, allows students to work autonomously to construct their own knowledge, and culminates in realistic products. The defining features of Project-Based Learning include content, conditions, activities, and results:

CONTENT: Compelling Ideas
Problems presented in their full complexity
Students finding interdisciplinary connections between ideas
Students struggling with ambiguity, complexity, and unpredictability
Real-world questions that students care about

CONDITIONS: Support Student Autonomy
Students taking part in a community of inquiry and pursuing coursework in a social context
Students being called upon to exhibit task & time management behaviors both individually & as part of group
Students directing their own work and taking control over their own learning
Students simulating professional work of scholar, researcher, engineer, reporter, planner, manager

ACTIVITIES: Investigative and Engaging
Students conducting multi-faceted investigations extending over long periods of time
Students encountering obstacles, seeking resources, & solving problems in response to overall challenge
Students making their own connections among ideas & acquiring new skills as they work on different tasks
Students use "authentic tools" (i.e., real-life resources and technologies)
Students getting feedback about the worth of their ideas from expert sources and realistic tests

RESULTS: Real-World Outcomes
Students generating complex intellectual products that demonstrate their learning (e.g., models, reports)
Students participating in their own assessment
Students exhibiting 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   *-- Buck Institute of Education*

"Project-based learning engages students in complex, real-world issues & asks them to acquire & apply skills & knowledge in a variety of contexts. Over the course of planning & implementing a project, a student proposes, clarifies, organizes, tests, modifies, interprets, & reflects on ideas. Identifying & resolving problems become essential skills as unanticipated issues present themselves & potentially change scope of the work. At the completion of a project, students demonstrate what they have learned by presenting products to members of their school & community. In contrast to traditional classroom instruction, projects give students substantial input in the learning process by encouraging them to negotiate with teachers & employers on the content, timeframe, & assessment criteria for the project. Students' interests & needs become key factors in determining how a project is structured & carried out. The class curriculum is a framework for students to conceptualize & complete their projects."   *-- Northwest Regional Education Lab*

"Project-Based Means Student-Centered
Project-Based Means Hands On
Project-Based Means Active Learning
Project-Based Means Retention of Knowledge."   *-- "Project-Based Learning: A How-To Guide"*

"Quality project-based learning seeks to blend authentic, real-world experiences with rigorous academic study so that students can practice & demonstrate skills that will serve them well in college, career, & life. It advances the notion of what a "project" can accomplish, emphasizing connections between classroom & community.... Quality project-based learning is a pedagogy quite compatible with, & receiving considerable momentum from, two current movements in education reform – the school-to-career (STC) movement & the standards movement."
-- A Portable Action Lab, Jobs for the Future

The Six A's of Designing Projects
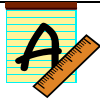
The Six A's constitute a powerful list of features that are present in high quality classroom projects. Many teachers use these six factors as a quality check during the project design process. Developed by Adria Steinberg, Jobs for the Future. Used by permission.

AUTHENTICITY

▶ Project emanates from a problem or question that has meaning to the student.
▶ Project problem or question is actually tackled by adults at work or in the community.
▶ Students produce something that has personal and/or social value beyond the classroom.

ACADEMIC RIGOR

▶ Project leads students to acquire & apply knowledge central to one or more discipline or content area.
▶ Project challenges students to use methods of inquiry central to one or more discipline (e.g. to think like a scientist).
▶ Students develop higher order thinking skills and habits of mind (e.g. searching for evidence, taking different perspectives).

APPLIED LEARNING

▶ Learning takes place in the context of a semi-structured problem, grounded in life and work in the world beyond school.
▶ Project leads students to acquire and use competencies expected in high performance work organizations (e.g. teamwork, problem solving, and communications).
▶ Work requires students to develop organizational and self-management skills.

ACTIVE EXPLORATION

▶ Students spend significant amounts of time doing field-based work.
▶ Project requires students to engage in real investigation, using a variety of methods, media, and sources.
▶ Students are expected to communicate what they are learning through a formal exhibition.

ADULT RELATIONSHIPS

▶ Students meet and observe adults with relevant expertise and experience.
▶ Students have an opportunity to work closely with at least one adult.
▶ Adults collaborate on the design and assessment of student work.

ASSESSMENT PRACTICES

▶ Students reflect regularly on their learning using clear project criteria that they have helped to set.
▶ Adults from outside the classroom help students develop a sense of real world standards for the work.
▶ Opportunities exist for regular assessment of student work through a range of methods, including exhibitions and portfolios.

Rubric for the Six As

CATEGORY	UNSATISFACTORY	BASIC	EXEMPLARY
Authenticity	■ The project has little or no connection with the outside world. ■ The problem or question has little or no meaning to the students. ■ There is no audience for the student work.	■ The project simulates "real world" activities. ■ The problem or question has meaning to the students. ■ There is an appropriate audience for the student work.	■ Adults in the "real world" are likely to tackle the problem or questions addressed by the project. ■ Prroblem or question has meaning to students. ■ There is an external audience for the student work.
Academic Rigor	■ The Driving Question is not based on standards. ■ The project demands little specific knowledge of central concepts. ■ Students can complete the project without learning new content. ■ Project does not include habits of mind in outcomes.	■ The Driving Question is based on standards. ■ The project demands specific knowledge of central concepts. ■ Students learn minimal content. ■ Project reinforces previously learned habits of mind.	■ There is a well-defined and clear Driving Question that is derived from specific national, state, district, or school content standards. ■ The project demands breadth and depth of specific knowledge of central concepts. ■ Students develop new habits of mind (e.g., questioning; precision of language and thought; persistence).
Applied Learning	■ Students do not apply new knowledge to a problem. ■ Students are not required to develop collaborative or teamwork skills.	■ Students apply new knowledge to a problem. ■ Students are required to work in teams. ■ Students use self-management skills to improve their performance.	■ Students apply new knowledge to a realistic and complex problem. ■ Students use multiple high-performance work organization skills (e.g., working in teams; using technology appropriately; communicating ideas, collecting, organizing, and analyzing information). ■ Students formally use self-management skills (e.g., developing a work plan, prioritizing pieces of work, meeting deadlines) to improve their team's performance.
Active Exploration	■ No research is required. ■ Students gather information from textbooks or other secondary sources. ■ Students use raw data provided by the teacher.	■ Students conduct their own research. ■ Students gather information from a limited number of primary sources.	■ Students do field-based activities (e.g., interviewing experts, surveying groups of people, exploring worksites). ■ Students gather information from a variety of primary sources and use a variety of methods (interviewing and observing, collecting data, model-building, using on-line services).
Adult Connections	■ Students have no contacts with adults outside of school.	■ Students have limited contacts with adults outside of school (e.g., guest speakers). ■ The teacher uses role-playing or other staff members to simulate "expert" contact.	■ Students have multiple contacts with adults outside of school who have expertise & experience & who can ask questions, provide feedback, & offer advice. ■ Students have the opportunity to observe and work alongside adults in a worksite relevant to the project. ■ Adults outside of school provide students with a sense of the real-world standards for this type of work.
Assessment Practices	■ Students are not provided with explanation of the assessment at early stages of the assignment. ■ The only product is a culminating exhibition or presentation.	■ Students are provided with a clear explanation of the assessment in the early stages of this assignment. ■ Students receive infrequent feedback on their works-in-progress from teachers, mentors, and peers. ■ The project includes multiple products. ■ The final product is a culminating exhibition or presentation that demonstrates their ability to apply the knowledge they have gained.	■ Students help in establishing assessment criteria. ■ Students use a variety of structured self-assessments (journals, peer conferences, conferences, rubrics). ■ Students receive frequent and timely feedback on their works-in-progress from teachers, mentors, and peers. ■ Final product is a culminating exhibition or presentation in front of an informed audience. ■ Project employs multiple products, and all products are aligned with outcomes.

Courtesy of the Buck Institute of Education; Developed by a Group of PBL Practitioners

Integrated Project Design

Here are two helpful tools from Swanson and Cosgrave. First, a three-step process for designing integrated projects is suggested to help you sort out how an integrated project can help meet your course goals. At the bottom of the page there is a tool that helps you think about how closely to connect different subject areas as you design classroom projects.

Three-step Integrated Project Design Sequence

1) List essential academic/career technical concepts and standards from each discipline. Think in big categories & try to prioritize the MOST ESSENTIAL concepts from the core of each academic &/or career/technical area of study. More than simply facts & surface information, these elements should be the "big lessons" or important ideas that emanate from the heart of the discipline. Examples might include concepts of democracy, the scientific method, etc. Refer to your course   syllabus & state standards documents for ideas, but take care not to get lost in the minutiae.

2) List the essential skill standards from each discipline. This is the same process as above, but this time focused on essential skills. Focus on key problem solving, communication, & thinking skills that are transferable to situations beyond the classroom & that cut across disciplines.

3) Look for natural or logical overlaps. Conduct a side-by-side comparison of essential concepts & skills from each subject area & identify natural or logical groupings. Don't try to make everything fit together – it is likely that only a few obvious connections will emerge. As you play with ideas within the initial groupings, you may be able to connect additional concepts & skills.
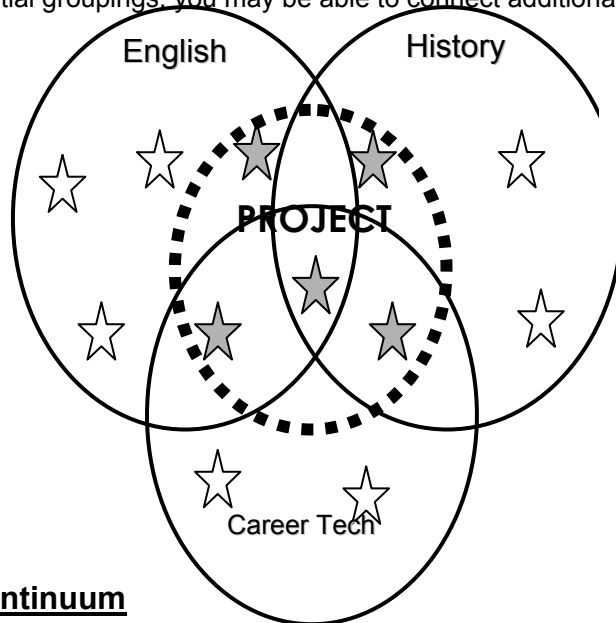
Effective integrated projects require the understanding and use of essential concepts and skills from multiple subject areas.

Integration Continuum

Traditional Projects	Parallel Projects	Interrelated Projects	Integrated Projects
One subject area, connections to other disciplines are haphazard, rare, and unnecessary for completion of project.	Two or more related subject areas aligned or sequenced together, connections are made apparent throughout the project, but products and performances may be separate.	Two or more subject areas aligned and drawn upon during project, knowledge and skills from all areas are used by students to produce quality products or performances.	Two or more subject areas are brought together through the examination of a complex idea, impossible to complete project without knowing & using all areas, nearly impossible to separate out disciplines.

Academy Curriculum Map

Use this tool to map out the big concepts, themes, units, and projects for your Academy this year.

Courses ▼	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Theme or Project ▶				
Essential Skills; Habits of Mind				

DESIGNING FORWARD – FROM LEARNING STANDARDS TO PROJECT

Choose examples of learning standards or existing curriculum that you wish to introduce, directly teach, or reinforce through a project.

Brainstorm problems, issues, questions from your school, community, or workplace that seem related to your discipline and/or career theme and that would involve students in work related to the chosen standards or curriculum.
- Review list from your brainstorming. Identify ones that seem to have most promise for developing into projects.
- Pick one of these projects. If students address the issue or problem, what learning standards (content & performance) would be addressed?

Work with students to develop some possible essential/guiding/driving questions/ problem statements that students might pose and agree to address. (Essential questions should capture the issue, state problems authentically, & lead to involving students in learning by applying content and performance standards.)

Define the project product/service/outcome(s) (including final exhibition/presentation/ demonstration of the work.) Also, define the audience/ stakeholders for the product/service/outcome. What are students' ideas for how they will assess their own learning? How will school/ community/ workplace stakeholders assess the quality of the outcome? Define & refine evaluation criteria. Engage students in the process. (If possible, involve students in designing or co-designing project rubric/s.)

Work with students to decide on specific activities students might undertake. Come up with at least five possible activities & try to predict the sequence & resources needed. Include at least one workplace or community-based learning activity.

Plot potential learning activities on a calendar. Come up with a rough time-frame for completion of this project. Go through the steps & create a one-page project plan. Add project benchmarks. Then using the 6 A's design tool, consider adjustments/ enhancements, etc. Refine your project plan as needed.

- source: Patricia Clark (CASN) and TERC, Jobs for the Future, Center for Youth Development and Engagement, etc.

DESIGNING BACKWARD – FROM PROJECT TO CURRICULUM

(From Project Idea to Learning Standards)

Buck Institute of Education: "PBL Design Principle #1: Begin with the End in Mind"
(see http://www.pbl-online.org)

Consider the school, community &/or workplace for issues or problems that would be engaging (or are already engaging) your students. Ask students what they consider to be important school, community & workplace issues or problems. Help students explore what they are interested in & what they want to learn. Brainstorm possible issues & problems that students could address. Review the list and mark ones that lend themselves to project based learning (PBL). Choose one (or more if they are closely related) to work on.

If students took on this issue or problem, what standards would be addressed? Identify standards both within and across content areas.

Decide on which of the possible learning standards you will choose to address through this project. *(Consider student learning needs, proposed scope of project, time constraints, etc.)*

Work with students to develop some possible essential/guiding/driving questions/ problem statements that students might pose & agree to address. (Essential questions should capture the issue, state problems authentically, & lead to involving students in learning by applying content & performance standards.)

Define the project product/service/outcome(s) (including final exhibition/ presentation/ demonstration of the work & define audience/stakeholders for the product/service/ outcome.) Determine how students will assess their learning & how stakeholders will assess quality of the project outcome. Engage students in this process. (If possible, have students design or co-design a project rubric.)

Brainstorm possible classroom learning activities (come up with at least five and try to predict the sequence and resources needed) that students might choose to address or solve the problem. Brainstorm what additional outside resources could be used to inform and support these activities.

Plot potential activities on a calendar – come up with a rough time-frame for completion of project benchmarks and for the project as a whole.

Go through the steps and create a one-page project plan. Then using the 6 A's design tool, consider adjustments/enhancements, etc. Refine your project plan as needed.

- *Sources: Patricia Clark (CASN) and TERC, Jobs for the Future, Center for Youth Development & Engagement, etc.*

Project Design Template

This design template leads you through key areas to address in designing a new project or modifying an existing project. Refer to supporting materials in the second half of the Academy Instructional Design Packet for more information on key sections of the template. (NOTE: This template is from the work of Michelle Swanson and Theron Cosgrave (Swanson and Cosgrave) and Patricia Clark (CASN).

TEMPLATE DIRECTORY

Section I: PROJECT VITAL STATISTICS

Project title:	
Essential/Driving Question/s	
Academy Name (career pathway/theme) and address	
Grade level(s):	

Subject/Discipline area(s) involved:	
Number of Academy students involved:	
Academy Teacher Team *Teacher names, Academy class taught that is part of the integrated curriculum project, & email (s)*	
Name and work phone for Academy project-lead contact:	
Industry/Community/Post-secondary partner/s involved *(if applicable) (role/s):*	
Use of Technology *(What technology is recommended? How will it be used?)*	
Project duration *(# of wks, months involved?) (if appropriate, include start & end dates)*	
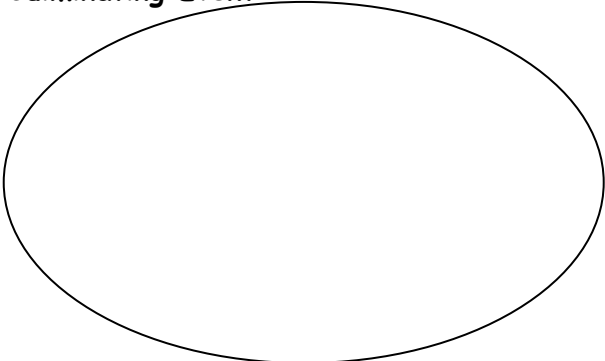
SECTION 2: INITIAL BRAINSTORM OF INTERDISCIPLINARY PROJECT IDEAS FROM CURRICULUM MAP & OTHER SOURCES

Use this space to capture your initial project ideas from your team's Curriculum Map. Your team might also consider the types of projects that professionals in your career-focus area actually do and/or how your Academy curriculum focus might be used to address a community issue or challenge. Use the method that works best for you – draw a "mind map", write a narrative, make a list, etc.

INIITIAL BRAINSTORM OF INTERDISCIPLINARY PROJECT IDEAS:

SECTION 3: INITIAL BRAINSTORM OF IMPORTANT UNDERSTANDINGS, BIG IDEAS, & CORE CONCEPTS

Use this space to describe the "big ideas," "major concepts," "essential understandings" that will be at the heart of your project. What are the important concepts students will understand (and/or grapple with understanding) in each of the disciplines/subjects involved as a result of having done this project.

INITIAL BRAINSTORM OF IMPORTANT CONCEPTS/UNDERSTANDINGS/BIG IDEAS THAT ARE EMBEDDED IN THE PROJECT:

English	Social Science
Project Theme/Essential Question/ Culminating Event	Career/Technical/Lab
Community/Workplace Connections or Other Disciplines	Math/Science

SECTION 4: INITIAL BRAINSTORM OF ESSENTIAL/DRIVING QUESTION/S

*Use this space to capture your initial ideas of the important question/s that will drive your project. Keep in mind that good essential questions are: * open-ended and resist a simple or single right answer; * are deliberately thought-provoking * encourage multiple perspectives * require students to draw upon content knowledge and personal experience; * can be revisited throughout the project to engage students in evolving dialogue and debate * lead to other essential questions being posed by students.*

INIITIAL BRAINSTORM OF ESSENTIAL/DRIVING QUESTION/S (and sub-questions):

ESSENTIAL/DRIVING QUESTION/S (and sub-questions) FOR THIS PROJECT:

SECTION 5: PROJECT DESCRIPTION/SUMMARY

Use this space to write up a description or overview of your project. Include an emphasis on what students will learn and do. NOTE: You may wish to wait to write this section until after you have completed the rest of the project design template.

PROJECT DESCRIPTION/SUMMARY:

SECTION 6: ACADEMIC & TECHNICAL RIGOR – CONTENT STANDARDS

Below, list the national, state, and local standards that are addressed by this project and the evidence you will collect to show that students have met the standard. (Include content, skill, and process standards.)

CONTENT STANDARD	EVIDENCE
Ex: CA State Language Arts Standard 2.2: Prepare a bibliography of reference materials for a report using a variety of documents.	*Ex: Students will create project web sites that include a bibliography page listing at least 20 different published sources.*
Ex: School ESLR #4: Students will use technology effectively to communicate and solve problems.	*Ex: Students will use computers to create project web pages that score a "3" or higher on school web design rubric.*

SECTION 7: ACADEMIC & TECHNICAL RIGOR – THINKING PROCESSES/ HABITS OF MIND

Describe the key thinking processes that students will develop during the project. These processes are generally identified as levels of Bloom's Taxonomy or as thinking processes central to specific disciplines.

THINKING PROCESSES:

List the habits of mind students will develop through this project along with a description of how students will demonstrate these behaviors. While several habits may apply, try to pick 2-4 key habits that can be explicitly taught and emphasized throughout the project.

The 16 Habits of Mind	
1. Persisting.	9. Thinking and communicating with clarity and precision.
2. Managing impulsivity.	10. Gathering data through all senses.
3. Listening with understanding and empathy.	11. Creating, imagining, and innovating.
4. Thinking flexibly.	12. Responding with wonderment and awe.
5. Thinking about thinking (metacognition).	13. Taking responsible risks.
6. Striving for accuracy.	14. Finding humor.
7. Questioning and posing problems.	15. Thinking interdependently.
8. Applying past knowledge to new situations.	16. Remaining open to continuous learning.

HABIT OF MIND	HOW STUDENTS WILL DEMONSTRATE
Ex: Thinking about thinking (metacognition)	Ex: Students will regularly reflect on thinking through project journals. Students will write a self-reflection paper at end of project.

SECTION 8: ADULT & COMMUNITY/WORKPLACE CONNECTIONS

Adult Connections: *Describe how students will work with Academy industry/postsecondary/community partners and/or other adults beyond the classroom as part of the project. (guest speakers/panelists, guest artists, experts, project coaches/mentors, providing feedback on student exhibitions, etc.*

ADULT CONNECTIONS/ACADEMY PARTNERS INVOLVED:

Intent/Purpose: *Describe the reason or purpose for the project, "who" or "what" is the project for? Who or will benefit? Answer the "So what?" question.*

PROJECT INTENT/PURPOSE (answer the "so what"?)

Real-World Context *Describe how student work will emulate actual work done by adults in the world beyond high school, and especially n the actual career area for which Academy students are preparing*

REAL-WORLD CONTEXT FOR STUDENT WORK:

Transferable Skills - *List the skills that students develop through the project that are valued in the community and workplace (especially as related to the career focus of the Academy).*

TRANSFERABLE SKILLS:
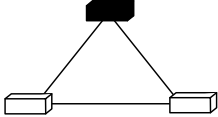
SECTION 9: PLANNING EXHIBITIONS OF PROJECT LEARNING – PRODUCTS, SERVICES & CULMINATING EVENTS
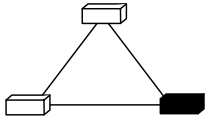
➢ What products, services, and/or events will be outcomes of this project?
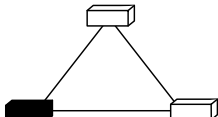
➢ Questions to consider on Exhibitions (based on work of Coalition of Essential Schools):

- ➢ Will students present their exhibitions as individuals or in groups? (If in groups, how will individual knowledge and skills be assessed? If in groups, how will we assure that each group member has an important role/responsibilities?)

- ➢ What form(s) will the exhibition take? (oral presentation, visual/multimedia element, written products, etc.) Will there be time limits on the presentations? Other criteria?

- ➢ Who should be in the room for the student exhibition of their project learning? How will the audience engage in the process? Where will the exhibition/s occur? When? How will you publicize your event?

- ➢ What sort of feedback will you provide student-presenters about their project/s and presentation/s? How much, when, and in what form(s)?

- ➢ What would a really spectacular exhibition look/sound/be like?

- ➢ What opportunities will students have for formative assessments and other coaching?

- ➢ What are the building blocks of the exhibition? Where are the checkpoints?

- ➢ Does the exhibition you have planned really allow students to demonstrate the knowledge, skills, and understanding that you most value (as expressed in your course outcomes)?

➢ Describe the Student Exhibition of project learning (& products) you plan. Describe your culminating event.

SECTION 10: ASSESSSMENT PRACTICES – FORMATIVE & SUMMATIVE

Briefly describe how you will provide both formative ("dip-stick" assessments along the way, during the project) and summative (final/end of project) feedback for students to evaluate their mastery, growth, and understanding. For example, will you use a project portfolio, use rubrics, etc.?   (NOTE: see next page)

ASSESSING FOR MASTERY

Examples: Quizzes, tests, reports, exhibitions, etc.

FORMATIVE	SUMMATIVE

ASSESSING FOR GROWTH

Examples: Observations, journals, portfolios, etc.

FORMATIVE:	SUMMATIVE:

ASSESSING FOR APPLICATION

Examples: Exhibitions, demonstrations, performance tasks, etc.

FORMATIVE:	SUMMATIVE

Assessment and Evaluation

Tests, Quizzes,
Reports,
Recitations

KNOWLEDGE
(Mastery)

JUDGMENT

UNDERSTANDING
(Application of knowledge)

REFLECTION
(Growth over time)

Exhibitions,
Demonstrations

Portfolios,
Journals,
Observations
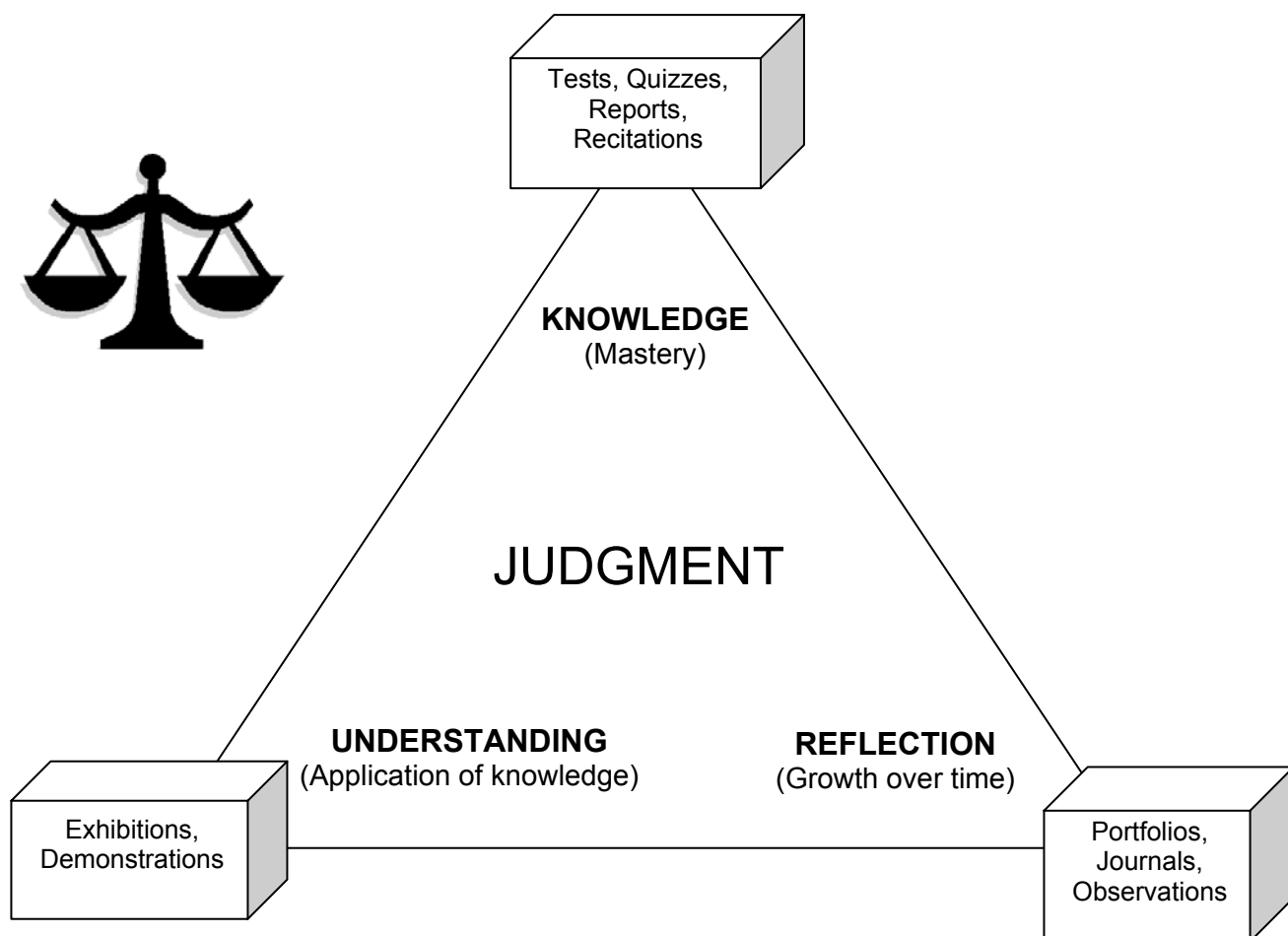
KEY **ASSESSMENT** QUESTIONS

▶ What will I do to help students understand content, develop processes, and habits of mind?

▶ How will I pay instructional attention to helping students gain key knowledge and skills?

▶ How will I give useful ongoing feedback to students?

KEY **EVALUATION** QUESTIONS

▶ What will serve as evidence of learning in student work? (In both processes and products.)

▶ Which assessment tools should be used?

▶ Is there an integrated evaluation, which ties processes and products/demonstrations together?

SECTION 11: SCAFFOLDING – DIFFERENTIATED TEACHING AND LEARNING TO MEET A RANGE OF LEARNING NEEDS/STYLES

Use this part of the template to write down strategies you will use to meet diverse student learning needs.

Learning Needs
► *Students who require structural adaptation.*
► *Students who require adapted instruction.*
► *Students who read/write/calculate significantly below grade level.*

Language / Socio-cultural
► *Students whose primary language is not English.*
► *Students from challenging life circumstances that may impact school achievement.*

Transience
► *Students who enter after instruction/project has begun.*

Enrichment and Extension
► *Students who bring special talents to their project work.*
► *Students who want to explore more deeply or connect additional learning.*

SECTION 12: SCAFFOLDING – RESOURCES

Material Resources:
List the material resources that will be needed to accomplish this project including research materials, technology, production equipment, room space, community resources, and instructional supplies.

MATERIAL RESOURCE NEEDS: (what technology will be used, etc.)

Human Resources:
List the human resources that will be needed to accomplish this project including teachers, classroom aides, guest speakers, mentors, on-line experts, and guest artists.

HUMAN RESOURCE NEEDS:

Financial Resources:
Calculate the capital resources that will be needed to cover the costs of the resources mentioned thus far.

FINANCIAL RESOURCE NEEDS:

SECTION 13: MAP YOUR PROJECT: TIMELINE, ACTIVITIES AND BENCHMARKS

Activities: *In the table below, break your project into major achievable steps or project benchmarks & describe each. Also include project activities, field experiences, etc. that support project work & learning. (Use additional sheets if necessary AND/OR use a different format -- story board, flowchart, timeline chart which follows, etc.)*

Project Steps/Activities: *(Include as well your Project Benchmarks)*	Description/Notes/Evidence of Progress

SECTION 13: PROJECT TIMELINE – (continued)

Chart the flow of your project over time using the graphic organizer below.

INTRODUCTION – INVESTIGATION – BRAINSTORM – PRODUCTION – REVISION – EXHIBITION – EVALUATION – REFLECTION

STANDARDS & HABITS
OF MIND EMPHASIZED

LEARNING ACTIVITIES

WEEKS   1

STUDENT PRODUCT/SERVICE
PRODUCTION PHASE

ASSESSMENTS: FORMATIVE

ASSESSMENTS: SUMMATIVE

TEACHER TASKS/ROLES
INSTRUCTIONAL STRATEGIES

COMMUNITY PARTNER TASKS/ROLES

SECTION 14: Criteria for the 6 A's as Addressed in the Project

For each of the 6 A's, describe how it will be addressed in your project.

Six A's & Criteria	How the Project Addresses Each A
AUTHENTICITY Project emanates from a problem or question that has meaning to the student Problem or question is one that might actually be tackled by an adult at work or in the community Students create or produce something that has personal and/or social value beyond the school setting	
ACADEMIC (& Technical) RIGOR Students acquire and apply knowledge central to one or more discipline or content area Students use methods of inquiry central to one or more discipline (e.g., to think like a scientist) Students develop higher order thinking skills and habits of mind (e.g., searching for evidence, taking different perspectives)	
APPLIED LEARNING * Students solve a semi-structured problem (e.g., designing a product, improving a system, or organizing an event) that is grounded in a context of life & work beyond the school walls * Students acquire and use competencies expected in high performance work organizations (e.g., teamwork, problem solving) * Work requires students to develop organizational & self-management skills	
ACTIVE LEARNING * Students spend significant amounts of time doing field-based work * Students engage in real investigations using a variety of methods, media, and sources * Students communicate what they learn through presentations	
ADULT CONNECTIONS * Students meet and observe adults with relevant expertise and experience * Students work closely with at least one adult * Adults collaborate on the design and assessment of student work	
ASSESSMENT * Students reflect regularly on their learning, using clear project criteria that they have helped to set * Adults from outside the classroom help students develop a sense of the real world standards for this type of work * There are opportunities for regular assessment of student work through a range of methods, including exhibitions and portfolios	

Keeping it Real
(or Designing for Authenticity)

While all of the 6 A's are important, "authenticity" arguably has the greatest potential to transform instruction. Below you'll find useful definitions of the concept, examples of how it can transform instruction, and tips for making student work more "real."

WHAT IS AUTHENTICITY?

▶ Authentic project work emanates from issues that have meaning to students.

▶ Authentic project work embodies problems or questions actually tackled by adults in the "real world."

▶ Students engaged in authentic project work create products that have personal and/or social value beyond the school setting.

HOW DOES IT WORK?

The grid below contains several examples of assignments that were reworked to build in greater authenticity. As you look over the samples, imagine the impact on student engagement and work quality.

ORIGINAL ASSIGNMENT	REFINED ASSIGNMENT
Geometry students calculate the area and perimeter of shapes on a handout in math class.	Students calculate surface area of school gym exterior in order to determine how much paint is needed for upcoming parent volunteer work day.
Biology students examine teacher-prepared slides of organic substances under microscope as part of lab assignment.	Students collect water samples from wells, streams, and lakes in the community; make comparative analysis of their findings; and present their findings & recommendations to city council.
Foreign language students create skits to simulate conversational situations.	Students each complete a service learning project in which they act as interpreters at local non-profit agencies.
Students in P.E. class study nutrition and complete short-answer questions on an end-of-unit test.	Students incorporate into their nutrition unit a review of school lunch menus & snack bar offerings & make a formal proposal to school board, suggesting healthy (& tasty) changes.
Students in an English/Language Arts course, while learning about persuasive writing, write essays defending their favorite movie.	Students chose community issues, do action research, & write persuasive letters to local public officials suggesting policy changes that they recommend in their community.
Students learning how to make web pages in a computer class create sites on their favorite bands and sports teams.	Students work with adult "clients" in the community to create real web pages for businesses and non-profit agencies.
Government students participate in an in-class elections simulation, complete with candidates, party platforms, budgets, and campaign advertisements.	Students produce video campaign ads based on real candidates & issues, & show work to real voters on day before the election.

WHERE CAN WE START?

So you're interested in incorporating more authenticity into your assignments and project work? Great! Below are several suggestions of where to begin.

Build Upon Existing Success

Assignments or projects that you already consider to be successful are probably well structured, have clear expectations, and are engaging for students. It's likely that these tasks need only minor adjustments to make them more "real." For example, that great science lab probably answers a question that already has relevance in the real world – you may only need to make a minor adjustment to truly transform the lab into an authentic experience for students.

It's A Beautiful Day in the Neighborhood

Many of the most authentic project ideas emerge from real issues facing the school community. Local issues – political, social, environmental, artistic, etc.– may provide powerful curricular connections. There are possibilities all around you: traffic problems, health fairs, school facilities issues, local retailers, etc.

Making School More Like Work

Another approach to developing authentic assignments is to consider the skills that students develop in your subject area and where those skills are used in the professional world. For example, the computational skills students gain in their algebra class are also used by carpenters and architects. This may lead a teacher to design an authentic assignment that asks students to apply their skills to a real-life construction problem.

Focus on Products and Audience

Only two people – the student and the teacher, see much of the work we ask students to do. However, by asking students to produce products that will be seen by a broader audience (ideally by adults in the community beyond the school), we can raise the stakes for the work and make it much more authentic. While not every assignment needs to be displayed publicly, the products and performances that are developed through student project work are certainly appropriate for outside eyes.

Authenticity Loves Company

Designing new projects is exciting and challenging. To get the most out of your planning time, try collaborating with a partner as you plan. Fellow teachers (as well as industry partners) can help you consider new ideas and think about possible real-world applications for student learning. Another approach is to ask students to propose individual or group projects that take their learning to the real world.

AUTHENTICITY DESIGN TEMPLATE

1) ACADEMIC CONCEPT OR SKILL

2) STUDENT INTEREST

▶ What are related issues that students find interesting or engaging?

3) REAL WORLD APPLICATIONS

▶ Where does the topic find its application in the world beyond the classroom?

▶ How do adults in the community engage in work that incorporates these skills and concepts?

4) PRODUCTS AND AUDIENCES

▶ What real-world products or services can students produce?

▶ Who can serve as an authentic audience for student work?

5) AUTHENTIC PROJECT IDEAS

Bringing Adult Connections to Academic Coursework

CONNECTIONS

Adults can provide connections to resources that enable students to:

► Widen their world by showing them careers that link to their interests
► Deepen their knowledge of the real applications that make academic learning essential
► Enrich their experience by providing opportunities for students to meet and interact with adult professionals and to ask questions about careers
► Provide career related learning opportunities and activities as a context to build understanding of the skills and knowledge needed to pursue careers of interest

CONTRIBUTIONS

How adult professionals contribute to academic instruction:

► Discuss- provide insight into the real value of academic learning
► Demonstrate - career links to academic area
► Mentor – become a 'resource consultant' for students
► Authenticate – provide voice of real-world assessment and quality evaluation

CONTEXT

Suggestions of roles that outside adults can play in the project (arranged in order of time and involvement generally associated with this collaboration):

► Meet with instructor to authenticate content and/or collaborate on curriculum
► Speak to classes about academic connections, workplace skills, career opportunities
► Provide site visit (field trip to real workplace environment)
► Provide professional practices experience ("job shadow")
► Collaborate on career exploration project
► Serve as project advisor or mentor for individual student or student group (email and phone may be used in addition to personal contacts)
► Provide students with appropriate (academically related) internship experience
► Partner with school to provide work-based learning (academy) site

CONTACT AND COMMUNICATION

How to find adults to collaborate with your class:

► Send a parent newsletter and have an information night – parents frequently can provide, or can connect you with someone who can provide, good course connections
► Ask you friends and colleagues for suggestions – issue invitations to the same information night
► Contact local businesses related to your academic context or project design. Note: Human Resource Departments in larger businesses & agencies often are very helpful and have access to more employees with flexibility & opportunity to share time with students
► Create an advisory committee to expand the contact base and develop ideas
► Follow up, write thank you notes, keep contacts fresh and personal

Essential/Driving Questions

 Whether they are called "essential," "focus," or "driving" questions, many teachers find unifying queries to be useful organizers for project work. (Based on materials developed by the Buck Institute for Education, a nationally recognized leader in PBL instruction and training materials.)

The Essential Question is what makes a project intriguing, complex, and problematic. Although typical classroom assignments like story problems and essays pose questions that students must answer, an Essential Question is more complex: it requires multiple activities and the synthesis of different types of information before it can be answered. An Essential Question brings coherence to disparate project activities. In addition, an Essential Question promotes student interest and propels students toward the project's goals and objectives. Although it is usually easier to focus students' attention on a single question, some topics will require multiple Essential Questions.

When writing an Essential Question, there are a number of things to keep in mind:

- Essential questions are provocative. They must sustain students' interest during the project and challenge students to go beyond superficialities.

- Essential Questions are open-ended. They do not lead to easy answers. Instead, Essential Questions engage students in higher-level thinking and require them to integrate, synthesize, and critically evaluate information.

- Essential Questions go to the heart of a discipline or topic. They can focus on controversies central to a field and debated by the experts within them.

- Essential Questions are challenging. They encourage students to confront difficult issues and try out unfamiliar behaviors.

  A 12th grade history teacher developed a project to address national standards associated with conflict and revolution as well as historical inquiry. One of the driving questions for the project was "When are people justified in revolting against an established government?" Students studied revolutions and revolutionary movements in Central America, Russia, Spain, and Africa looking for common patterns and principles.

  A Vermont science teacher wanted her students to understand how rocks are formed and to learn about the sources, properties, and mineral compositions of indigenous Vermont rocks. She created a project by asking students: "How could be build a new community center using only materials that are native to the state?" This Driving Question focused students' attention on identifying the structural elements and features of as community center and evaluating the strength and durability of natural and manufacture materials available in the state. More important, this driving question led students to make careful decisions about why, for example, slate is appropriate for roofs, but not for playgrounds.

- Essential Questions arise from real world situations and problems that students find interesting. They encourage students to pay more attention to the world around them and become involved in concerns that affect their community and society in general.

- Essential Questions are consistent with curricular standards and frameworks. It is not enough for a question to be provocative. It must also lead students to master the agreed upon skills, knowledge, and processes that define a course of study.

- Essential Questions must be feasible. They must be conceived with an eye toward available resources and student skills.

INITIAL ESSENTIAL QUESTION	IMPROVED ESSENTIAL QUESTION
What is radiation fog and how can it be dangerous? *Good beginning. The question requires students to focus on central scientific principles.*	**How can we reduce traffic accidents associated with radiation fog?** *Good expansion. Students will still have to understand the principles of radiation fog. In addition, they will have to apply this understanding to generate solutions.*
What have been the most popular 20th century novels among teenagers? *Good beginning. The question integrates the curriculum topics of genres, plots, and characters in a way that teenagers might find appealing.*	**What instructions would you give a computer so it could create a book combining the plot features, characters, and genre features popular with teenagers in this century?** *Good reframing. This question covers the same content as the initial question, but adds a generative and challenging culminating activity.*
What is global warming? *Good beginning. The topic is central to both the earth science curriculum and current events.*	**Should we be worried about global warming in our town?** *This rewording brings the Driving Question home. With this statement, students can anchor their investigations in local geography, climate, and ecosystems.*
Was Truman's decision to drop the bomb justified? *Powerful question. It forces student to confront the dilemmas and consequences of war. Students will not only learn history, but will also learn about issues that remain relevant today.*	**Can the use of nuclear weapons be justified?** *Broadening the question increases its power. The project can now focus on a number of different decisions about the use of nuclear force, require students to compare these situations, and lead students to develop and justify their own decision criteria.*
What does it mean to live at a subsistence level? *Good beginning. This Driving Question focuses on a central concept and prompts students to learn about poverty, survival, and economic development.*	**Could my family live at a "subsistence level"?** *A better wording for the question. Students will learn about poverty, survival, and economic development, but will now be required to apply what they have learned to their own family and daily life.*
How has robotics and automation changed our society in the past century? *Good question. The question prompts students to learn about economics and automation, and it also leads students to apply what they have learned.*	**How might robotics and automation change our community & its businesses in the next century?** *A better question. Students will probably learn how society has changed to date from automation and robotics. They might also learn about anticipated technological changes and their possible effects, and they are sure to find this project more engaging because it is relevant to their present and future lives.*
What happened to the Anasazi? Create an exhibit using words and pictures. *Good question. The question prompts students to learn what life was like in pre-Columbian America and appeals to their interest in mysterious phenomenon.*	**Why did the Anasazi/Inca/Aztec civilizations disappear? Put together a presentation that supports our case and is suitable for an archeology convention**. *A better question. The use of multiple civilizations may increase students' learning of pre-Columbian civilizations as well as increase the breadth of their explanations. Making them work towards a professional presentation may increase their sense of authenticity and realism.*

Project Scaffolding

 How can teachers ensure their students will succeed in complex project work? Part of the answer lies in providing them with the time, training, and tools needed to complete their assigned tasks. In our training, this type of support is referred to as "scaffolding." The descriptions and examples below help flesh out this important PBL concept.

What is Project "Scaffolding"?

One of the keys to the success of any project is the "scaffolding" that teachers provide for students as the project is implemented. Like real scaffolds that support people who work on buildings high above the ground, "project scaffolding" refers to the various types of support that teachers provide for students during the actual business of project work. Essentially, through scaffolding teachers provide the time, tools, & training students need in order to succeed in the project. As you design scaffolding for projects in your classroom/Academy, consider how you might provide the following types of support for students
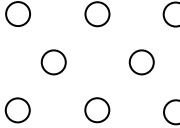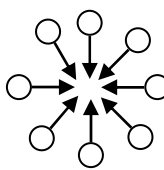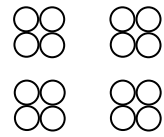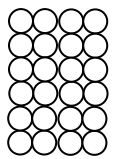
Types of Project Scaffolding

TYPE	DESCRIPTION	EXAMPLES
Structure	Critical organizing features of the project that determine who does what and when	☐ Students split into project teams or groups ☐ Each team investigates a different health topic but all create a public service video
Content	Any classroom activity that covers the foundational topics, concepts, and standards that students need to know for the project	☐ Interactive lecture on force and motion ☐ Reading and discussion on the impact of WWII on local history
Training	Explicit skill-building for students in group work and all required production areas	☐ Modeling of key steps in a lab experiment ☐ Practice oral presentation videotaped and reviewed for feedback ☐ Explicit group communication training
Expertise	Professional-level training and consultation provided by outside experts or adults in the community	☐ Guest artist teaches students how to draw political cartoons ☐ Biologist trains students in water sampling techniques
Oversight	Structured times for teachers to meet, motivate, and mentor student teams	☐ Teacher informally interviews each student team during project work days ☐ Project teams give progress report to teacher half way through project
Documents	Handouts to help explain and organize project	☐ Project descriptors and calendars ☐ Project rubrics, deadlines, check sheets ☐ Handouts on "presentation tips"
Tools	The technological resources necessary to produce required products	☐ Computers, software, printers, internet access ☐ Display boards, scissors, glue, paper
Time	In-class opportunities for students to meet, research, produce, exhibit, and evaluate	☐ ½ hour of project time each day ☐ Designated "project days" – extended periods of time for student project work

Project Structures
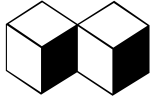
Just like students, project structures come in many shapes, sizes, and styles. The grid below highlights four common approaches to dividing up the work, along with some of the pros and cons of each format.

STRUCTURE	FORMAT	EXAMPLE	PROS	CONS
INDIVIDUAL	All project tasks are designed to be completed by students on their own, including research, production, and exhibition	Oral reports Research papers	Easy to see who did what and assign grades Students required to take initiative if work is to be done	Students don't learn to work together Final products must be limited in size and scope
INDIVIDUAL TO ENSEMBLE	Students complete project tasks individually but collaborate on a final whole-class exhibition	Science fair Class poetry book project	Easy to see who did what and assign grades Cooperative exhibition requires some group skills and problem solving	Limited learning of group collaboration skills Final exhibition format must be conducive to displaying many small parts
GROUPS/TEAMS	Several small groups or teams (generally 4-8 members) complete project tasks and produce products that are similar in content or format	Group documentary video project Amusement park ride design project	Teamwork allows for substantial work to be completed Communication, collaboration, and leadership skills are learned Cooperative learning and peer teaching work well for many learners	It is challenging to get all students to share group work equally Assigning credit for group products can be difficult
WHOLE CLASS	The entire class works together on a common problem or challenge in a "committee of the whole", usually facilitated by the teacher	Class stage play Class garden project	Only one topic, focus, or product needed Easy for teacher to control focus, direction, and flow of project work	Often relies too heavily upon teacher direction Not necessarily the most efficient structure for completing work Difficult to find tasks that all students can do simultaneously

Great Groups, Terrific Teams

Most effective PBL experiences involve student teams or groups. While there are many different ways to create and manage student groups, the teacher-tested suggestions below will help you to make thoughtful grouping decisions and to set up effective project teams.

CREATING GROUPS

<u>Elements of Effective Learning/Work Teams</u>: Positive Interdependence, Face-to-Face Interaction, Individual and Group Accountability, Interpersonal and Group Skills, Group Processing

Questions to Consider
Creating project groups is both an art and a science. Teachers need to be thoughtful about creating groups and should be able to support their choices with instructionally sound arguments. When creating groups, be sure to consider the following questions:

<u>Number of groups:</u>
- ► Are there sufficient resources and materials to supply all groups?
- ► Will there be enough time to have all groups exhibit or present their work?
- ► Should the number of groups be adjusted in order to produce a desired group size?

<u>Size of groups:</u>
- ► Is there enough work to keep all group members occupied? Is there too much work? How will you assure that the "job size" of the work required fosters positive interdependence?

<u>Membership of groups:</u>
- ➢ What strategies will you use to assure heterogeneous groups with diverse talents and skills?

Pros and Cons of Primary Grouping Methods
Most teachers create groups using one of the three methods below. Each has its limits:

GROUPING METHOD	PROS	CONS
Students select their own groups	Students generally get along with their group members	Students aren't challenged to work with different people, unbalanced size likely
Students select groups based on interest in topics	Topic of interest likely to result in greater degree of student engagement	Unbalanced size likely, some students may make selections based on their friends rather than topics
Teacher selects groups	Teacher can create heterogeneous, balanced groups	Student buy-in is compromised due to lack of input

Two Effective Grouping Strategies
The two grouping strategies below attempt to combine a student choice element with ultimate teacher discretion.

Students first submit the name of 1-2 people who they really want to work with, and then the teacher assembles pairs or trios into larger teams, taking into consideration all appropriate grouping factors.

This strategy works well when teams will be focusing on different topics:
1) Teacher creates a "ballot" that lists all possible project topics.
2) Students rank the options based on their preferences on the "ballot."
3) Teacher sorts the ballots into piles based on students' first choice.
4) Teacher moves students to different piles to balance group size, gender, skills, etc.
5) As much as possible, students are moved to their next highest choice.

MANAGING GROUPS: BALANCING THE WORKLOAD

Teachers (and some students) often complain that project teams result in an unbalanced division of labor where the top students wind up doing the majority of the work and the "slackers" ride their coattails. While there is no way to completely eliminate this problem, groups can improve time on task and move closer to a healthy workload balance through the strategies below:

Increase the Engagement   Some students remain unmotivated in group settings because they are not interested in the group's task. The power of PBL is that a well-crafted project that incorporates the Six A's of PBL design can result in higher student engagement, and thus a more balanced group workload. If some students "check out" of your group project, reexamine the project design and pay special attention to the authenticity, active learning, and adult relationship dimensions.

Build Community   Groups and teams function more effectively when there is at least a trace of affinity between the members. Many teachers begin group project experiences by investing in the group's interpersonal relationships through fun (and often project-related) community-building activities. Scavenger hunts, trust walks, and friendly group competitions can pay big dividends over the course of a long-term project.

Teach Group Skills   Many students can learn to help include and motivate their peers if taught to do so. Consider explicit instruction on topics such as group dynamics and active listening. In one academy program, students in new group experiences are required to share their strengths, weaknesses, AND are asked to share with the group one strategy to help get them back on track when they exhibit their weakness. It sounds like this: "I'm a good writer, but I have trouble with procrastination. If you see me procrastinating during this project, remind me verbally and help me come up with a deadline for my work."

Assign Group Roles   While experienced PBL students can be expected to manage their own workload and create any necessary group roles, students new to the approach should be provided with more structure in this area. As suggested by much of the formal cooperative learning training, groups can be assigned specific roles (facilitator, liaison, recorder, etc.) to ensure that each member makes a significant contribution. If you use this approach, be sure to provide adequate training and explanation for each role, and make sure students rotate through different roles from one project to another.

Include Individual Accountability Checks   If carrots don't work, try some sticks. Many veteran PBL practitioners incorporate both group and individual responsibilities in their project work. For example, while groups are working to create web sites about native plant species, each student is required to research and write a paper about a related topic. If properly sequenced, this individual work can be incorporated into the overall group product.

Conduct Frequent Check-Ins   Countless group project disasters have been averted through timely interventions of savvy teachers! When students are given class time to work in their groups, teachers often sit in on group discussions to gauge group progress, coach students towards solutions, & determine which students need prodding. Reviews of progress in which each group shares with one or two other groups & written check-ins are also effective ways to gather information on group efforts & progression. Project portfolios which include evidence of progress -- both individual & group work -- can document the group process.

   Other approaches ask older students to provide feedback on the efforts of their group members. A simple "brag sheet" format (as seen below) can be used to collect valuable information about individual participation.

GROUP PARTICIPATION "BRAG SHEET"

Directions: Write the names of each group member/s in appropriate box and comment on their contributions to the group. On the back, describe IN DETAIL your own contributions to the project.

LEVEL	DESCRIPTION	NAMES
Excellent	Worked extremely hard, provided essential contributions to group, served as a leader and model for all, completely responsible	Chris – was a leader, helped others do their best
Good	Worked hard, provided important contribution to group, a "team player", responsible	Pat – always on task and organized
Satisfactory	Usually worked well, helped group complete tasks	Jo and Terry – OK, did what was asked
Unsatisfactory	Frequently off task, absent, and/or disinterested, made the group efforts more difficult	

6-Week Project Calendar

Giving students a detailed project calendar not only provides them with important details about due dates, it also models an important organizational skill. The calendar below is a generic template that traces the typical sequence and flow of a six-week project.

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
1	Introduce unit and project, hand out descriptor, rubrics, and calendars	CONTENT	CONTENT	Project Day: Fill out group preference ballots, view examples of last year's work	Project Day: 1st team meeting, plan & map back from exhibition
2	CONTENT	Project Day: Research & skill building (interviewing)	CONTENT	CONTENT	Project Day: Guest speaker – reporter talks about interviews
3	CONTENT	Project Day: Skill building and team time	CONTENT	CONTENT	Project Day: Reflection and process report due
4	CONTENT	Project Day: Team product production time	CONTENT	Project Day: Team product production time	CONTENT
5	Project Day: Teacher/team conferences and work time	CONTENT	Project Day: Teacher/team conferences and work time	CONTENT	Project Day: In-class "dry run" of exhibition
6	Exhibition at local foundation	Library displays mounted, school exhibition with Q&A session	Written evaluation due, oral debrief w/ whole class	Work samples prepared for portfolios, exam review	Final Exam

Providing Oversight

While all teachers seek to produce students who self-manage, self-monitor, and self-modify, the reality is that most students still need a fair amount of guidance during the course of a project. Below are several ideas about how to ensure that your students receive adequate "oversight" as they navigate their way through challenging project work.

Oversight provided by experienced teachers is a key component of student success on complex project work. Oversight essentially involves three key aspects:

Error!

OBSERVATION
(Collecting information about student progress)

DIAGNOSIS
(Determining what needs to be done to help students succeed in the situation)

INTERVENTION
(Taking positive action to help students solve the problem)
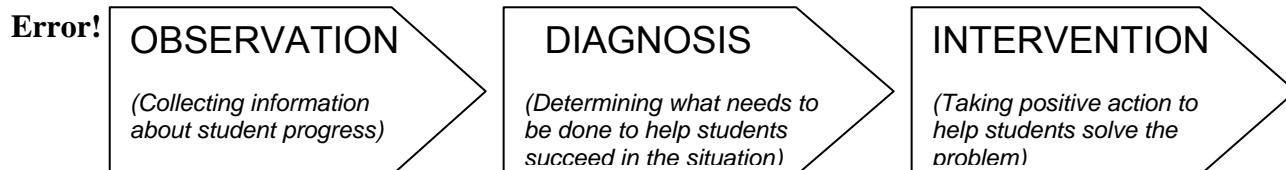
Consider an example from the classroom. Imagine that during project work time, a teacher approaches a group of students trying to decide on a project topic. The teacher sees that several students are frustrated with the group's inability to select between two possible alternatives (the "observation"). After listening to their conversation for a while, the teacher determines that the group could benefit from using a simple "cost-benefit analysis" decision-making tool (the "diagnosis"). The teacher then makes an "intervention" with the students by stating her observations and briefly sharing the cost-benefit tool.

While the process seems relatively straightforward, teachers often miss opportunities for this mid-process coaching for a variety of reasons. Below are several suggestions for providing excellent project oversight.

OBSERVATION TIPS

Keeping track of an entire class of students engaged in a project is a tall order. In addition to time pressures and logistical hurdles, students who are "lost" often don't know they are off track (or know it but don't want you to know they're falling behind). Here are some ideas for how to make sure you're collecting the necessary information about student progress throughout the project.

Work the room
Sometimes called the "management by walking around" method, this strategy simply requires you to physically move from one student or one group to the next during in-class project time. Studies show that classroom geography (the physical arrangement of furniture in the room) has a significant impact on teacher movement – so make sure you can get to everyone. In addition, off-task students and groups tend to soak up the majority of teacher observation time. Make a point of getting to everyone within a given class period.

Make a list
Some teachers find "observation checklists" to be helpful tools for ensuring that all students or groups are seen during class. Checklists can range from simple grids to elaborate forms that align with grading criteria. The main idea here is that a formal tool is used to help you keep careful records of who you have checked with and what their progress is at key junctures during the project. Here's a simple group check-in form:

PROJECT DAY CHECK-IN SHEET

DATE: 3/11	GROUP A	GROUP B	GROUP C
Research deadline met?	Yes	No	Yes
Use of class time	Good	Mostly off task	Excellent
Teamwork and communication	Conflict solved today	Key members absent	No problems

Another alternative is to have students or student teams complete "check-in sheets" and self-report their progress to you. It is recommended that this method be supplemented with direct teacher observations to ensure that reporting is accurate.

Schedule check-in "interviews"

A more formal approach is to create a schedule for mini-interviews with the teacher. For example, a teacher may plan to meet with student groups at 10-minute intervals throughout a class period. A list of times and groups is written on the board, and student groups not meeting with the teacher are given time to work on their project tasks. During the "interviews," each project teams is asked three key questions about progress, obstacles, and teamwork. Follow-up questions and suggested solutions are discussed as well. By requiring each group to go through the interview process, teachers ensure that nobody "slips through the cracks."

DIAGNOSIS TIPS

You've collected careful observations about where each student and group is in the project process…now what? Once you know where students are, you need to determine if they are on target or not. And you'll need to figure out how to get them where they need to go. Diagnosis is the most challenging aspect of project oversight. Here are some general guidelines:

► **Find out where they are.** Gather information using some of the "observation tips" above.

► **Discover how they got there.** Ask questions about the process that students followed to get where they are. Try to avoid assumptions, and, if possible, hear from each member of the group. In this step you're attempting to uncover the misunderstandings, obstacles, or distractions that have impeded progress.

► **Know where they need to go.** Think about what progress or success will look like for the student or group in the given situation. To do this, you'll need to have a sense of the big picture: project timelines, the steps involved in completing each project task, student capabilities, etc.

► **Figure out how to get them there.** Here is where you're selecting the appropriate item from your "toolbox" of strategies and interventions. Most teachers learn this step through trial-and-error. Remember: not all situations are best fixed with a hammer!

INTERVENTION TIPS

Once you've decided how to assist students in their project work, you'll need to take action to provide that assistance. Here are some general tips for intervening in student project work.

► **Don't solve it for them.** If you truly want students to become good problem-solvers, you need to resist the temptation to fix everything for them. As much as possible, try to facilitate a process by which students solve their own problems. At times this will require you to ask strategic questions that push students' thinking and leads them to consider possible solutions. At other times you'll need to model a problem-solving strategy. In general, you shouldn't do anything for students that they can do for themselves.

► **Connect students with resources.** Project work requires you to reconsider your role in the classroom. Instead of being the "provider of information," think of yourself as a liaison or facilitator as you seek to connect students with the resources, ideas, and individuals needed to help complete project tasks.

Handouts and Documentation

Keeping track of project documents and student work samples is an important yet often overlooked task. Below you'll find several suggestions to help you (and your students!) help manage the paper overload. By carefully archiving your project, you'll make it easier on yourself the next time around!

HANDOUTS

Use the checklist below to determine what types of project handouts may need to be generated.

☐ Overview documents explaining the project to students

☐ Project topic ballots, used by students to voice preferences on topics (if applicable)

☐ Timelines, checklists, benchmarks, due dates of key assignments

☐ Group roles descriptors

☐ Assignment descriptors for benchmark activities

☐ Communication materials for business or community partners

☐ Letters home explaining to parents how they can assist with and view project work

☐ Promotional materials inviting public members to final exhibition

☐ Student final reflection prompts

☐ Assessment tools (portfolios, journals, reports, tests, quizzes, etc.)

☐ Rubrics for student products

☐ "Brag Sheets" for students to describe their work and teammates' efforts in detail

DOCUMENTATION

Consider the documentation strategies below as a means to archive your efforts for future use.

☐ Incorporate documentation aspects into student assignments.

☐ Delegate documentation tasks to students involved in the project.

☐ Keep a daily personal project journal with ideas for future versions.

☐ Create visual artifacts of the project – photographs, videos, sketches, etc.

☐ Keep a hard copy of all project artifacts in a well-organized project binder.

☐ Keep an electronic folder or disk of all project documents.

☐ Have students create "sound bites" about the project – brief quotes that can be used in future promotional materials.

☐ Have audience members provide oral and/or written feedback to you and to students about the work they see and the learning that it demonstrates.

☐ Build a project website that includes process and product artifacts.

☐ Invite local media outlets to view project work and final exhibitions.

Meeting Special Needs
Accommodations and Modifications in PBL

The complexity and flexibility of the project-based approach provides an excellent environment in which students with special needs can thrive. Follow the suggestions below when designing your project to ensure that the needs of all students are addressed.

1. TRUST THE APPROACH

PBL works for special needs students for the same reasons that it works for most students – it's a sound pedagogical approach that engages learners, provides opportunities for meeting rigorous outcomes, and fundamentally changes the relationship between students, teachers, and the curriculum. Don't exclude special needs students from PBL experiences or shy away from using PBL with special needs students. For some of these kids, PBL is the gateway to academic success that they've been craving for so long!

2. CONNECT AND COMMUNICATE

While many schools feature a vast array of resources targeted at meeting the needs of special learners, few regular education teachers take advantage of these services. Tap into the expertise of the specialists in your building by opening the lines of communication.

► Meet with Special Education, ESL, and other resource staff members early in the year to develop ongoing communication strategies and to discuss the challenges and opportunities presented by your PBL approach. Be sure to share key project dates with resource staff members as soon as possible.

► Find out who the student's previous teachers were, and if possible, speak with them about the successes they had with the student.

► Build trust with the student by intentionally getting to know them at the beginning of the year.

► Make contact with parents *before* the first project starts.

3. IDENTIFY PROFICIENCIES AND NEEDS

It's likely that much of the work of identifying the strengths and weaknesses of individual students has already been done for you. If the student is already receiving special education or ESL services, read the student's IEP and talk with your school resource teachers and other teachers who work with the student. Of course, also supplement this information with your own observations and assessments. If the student is not yet receiving special services, talk with school counselors or administrators about the case.

As the year unfolds and the student participates in work in your class, make note of project aspects that are especially rewarding or challenging for the student, and make necessary adjustments as needed.

4. MAKE A PLAN

Work with the student, other staff members, and parents to create an individualized document that addresses issues such as quality of work, academic growth and product requirements. See the suggestions on the next page for needs-specific strategies.

Specific Needs and Interventions

STUDENT LEARNING NEED	SUGGESTED STRATEGIES AND INTERVENTIONS
Student has difficulty with ambiguity	Start with clearly defined short term expectations, increase amount of choice and responsibility
Student displays limited academic proficiency	Provide support through more accessible materials or study partners but expect growth and increasing (measurable) independence.
Student displays problems with personal responsibility	Provide frequent check points and require process logs, establish consequences for failure to complete work on time and gradually extend time between check points
Student says that they misunderstand instructions or instructions are unclear so work is of poor quality, incomplete, or late	Provide written documentation and graduated expectations Provide concise / precise / specific written instructions Provide initial examples, frequent checkpoints Provide Rubrics, Calendars, Completion guides Students read and initial to indicate their understanding of requirements, quality expectations, and due dates Instructor makes student contact/contract to assure understanding Provide options and flexible elements for enrichment or added points Instructor makes student contact/contract to assure understanding
Student does not work well in groups – problems with responsibility or compatibility	Provide documentation of expectations and growth Provide a leveled SCANS skills checklist to sequence skills and reward achievement Assign support elements to student as a solo assignment then integrate into group process Provide written review of expectation for growth and progress
Students whose primary language is not English.	Use ESL Support services Provide modification of reading & writing tasks to assure comprehension and build identified skills Provide a learning progress document – current and expected growth by project
Students who read/write/calculate significantly below grade level.	Provide modified tasks to assure comprehension and support to build identified skills Provide a progress document – current and expected growth by project
Students from circumstances that interfere with school achievement.	For attendance issues: Create personal contract for quality of work, academic growth and product requirements Connect student with appropriate school or community-based services
Students enter after instruction/project has begun.	Create personal contract for quality of work, academic growth and product requirements Be prepared to provide individual elements that function as project enrichment/support such as: Technology / presentation production Research / reference documentation – annotation, organization, extension Develop all or part of a " making of project" resource or production reference

Keys to Teaching Heterogeneous Groups

➲ Remember -- every child can learn. If you make professional decisions about who can learn and who cannot, the students will be able to sense this and you will affect their achievement in your class.

➲ Provide real challenges for all kids. This means that each learning activity has intrinsic meaning for students -- no busy work! It may be necessary to create additional or "honors" challenges for students who would like to go further in their learning.

➲ Don't ever teach to the middle -- everyone loses.

➲ Design instructional activities and assessments for students to construct knowledge rather than simply reproducing facts and ideas.

➲ Choose "enduring" facts, vocabulary, concepts, themes, and skills that will help students to become responsible and informed citizens as well as self-directed lifelong learners. Help students to see how their work in school in related to the world around them.

➲ Use open-ended questions to challenge students and guide their inquiry during a particular course or unit of study. Open-ended questions should allow for more than one "correct answer." Inquiry and exploration will foster thinking.

➲ In heterogeneous groups, the "how" becomes important. Breaking the lock step of all students doing the same activities to arrive at the same end is a key to success. Although you may have a common beginning and a common end, you may have to provide alternative roads for students to achieve the learning objectives.

➲ In planning the scope and sequence of your instruction and assessment, attempt to address as many of the "multiple intelligences" as possible -- thereby providing challenges for all students no matter what their strengths and weaknesses.

➲ Textbooks are designed for homogeneous groups. Don't depend on textbooks as a central focus for student learning. Use them as one of multiple resources from which students can access knowledge.

➲ Provide rich and varied resources. Give students opportunities to collect resources as part of the lesson/unit. Utilize a variety of resources such as guest speakers, videos, artifacts, and resources from town hall, historical societies, professionals, and local organizations.

➲ Give students as many opportunities as possible to make decisions and reflect on their learning.

➲ Be clear about goals and objectives of every lesson/unit. Don't keep secrets about what's going on. Post them. Share them. Tick them off together as they are learned.

➲ Provide rubrics, product descriptions, and exemplars as early as possible. These roadmaps will help students be successful.

➲ Ask that students submit multiple drafts before the final product is due so that you can give them feedback on how to improve their work.

– based on work of Susan Johnson; from Breaking Ranks II

Habits of Mind *in Brief*

1. Persisting.
Stick to it. See a task through to completion, and remain focused.

2. Managing impulsivity.
Take your time. Think before you act. Remain calm, thoughtful, and deliberate.

3. Listening with understanding and empathy.
Seek to understand others. Devote mental energy to another person's thoughts and ideas. Hold your own thoughts in abeyance so you can better perceive another person's point of view and emotions.

4. Thinking flexibly.
Look at a situation another way. Find a way to change perspectives, generate alternatives, and consider options.

5. Thinking about thinking (metacognition).
Know your knowing. Be aware of your own thoughts, strategies, feelings, and actions – and how they affect others.

6. Striving for accuracy.
Check it again. Nurture a desire for exactness, fidelity, and craftsmanship.

7. Questioning and posing problems.
How do you know? Develop a questioning attitude, consider what data are needed, and choose strategies to produce those data. Find problems to solve.

8. Applying past knowledge to new situations.
Use what you learn. Access prior knowledge, transferring that knowledge beyond the situation in which it was learned.

9. Thinking and communicating with clarity and precision.
Be clear. Strive for accurate communication in both written and oral form. Avoid overgeneralizations, distortions, and deletions.

10. Gathering data through all senses.
Use you natural pathways. Gather data through all the sensory paths: gustatory, olfactory, tactile, kinesthetic, auditory, and visual.

11. Creating, imagining, and innovating.
Try a different way. Generate novel ideas, and seek fluency in originality.

12. Responding with wonderment and awe.
Let yourself be intrigued by the world's phenomena and beauty. Fined what is awesome and mysterious in the world.

13. Taking responsible risks.
Venture out. Live on the edge of your competence.

14. Finding humor.
Laugh a little. Look for the whimsical, incongruous, and unexpected in life. Laugh at yourself when you can.

15. Thinking interdependently.
Work together. Truly work with and learn from others in reciprocal situations.

16. Remaining open to continuous learning.
Learn from experiences. Be proud – and humble enough – to admit that you don't know. Resist complacency.

Criteria and Rubric Ideas

Grant Wiggins and Jay McTighe remind us that criteria we use to assess performances needs to relate to what is central to the understanding, not just what is easy to score. In addition, we need to make certain that we identify separate traits of performance (e.g. a paper can be well-organized but not informative and vice versa) to ensure that the student receives specific and valid feedback. Finally, we need to consider the different types of criteria (e.g. the quality of the understanding vs. the quality of the performance in which it is revealed).

FOUR TYPES OF PERFORMANCE CRITERIA (with Sample Indicators)

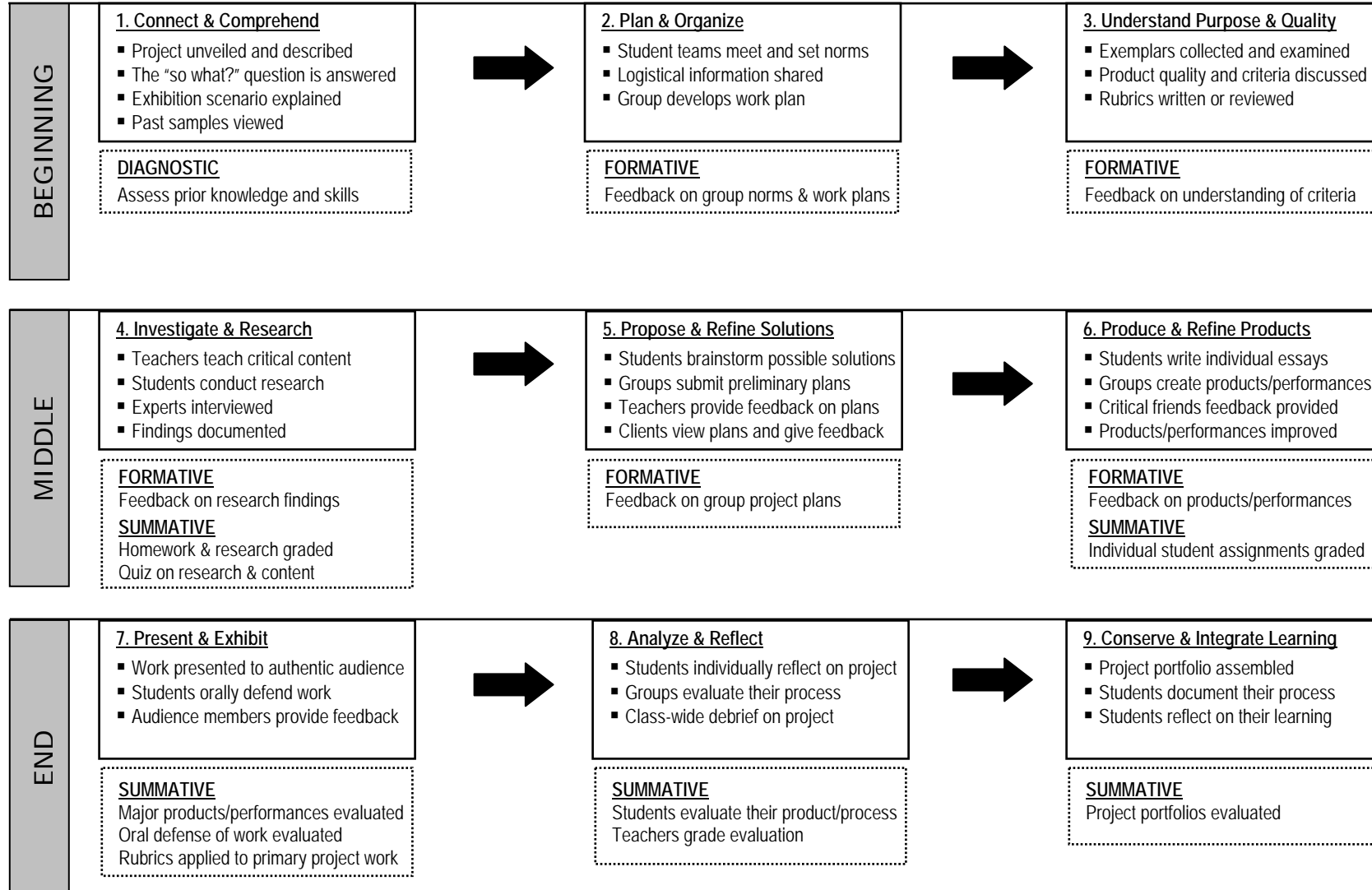| CONTENT	PROCESS	QUALITY	RESULT
Describes degree of knowledge of factual information or understanding of concepts, principles, and processes	Describes degree of proficiency/ skill. Refers to effectiveness of process or method used.	Describes degree of quality evident in products and performances.	Describes overall impact and extent to which goals, purposes, or results are achieved.
Accurate Appropriate Authentic Complete Correct Credible Explained Justified Important In-depth Insightful Logical Makes Connections Precise Relevant Sophisticated Supported Thorough Valid	Careful Clever Coherent Collaborative Concise Coordinated Effective Flawless Followed process Logical/reasoned Mechanically correct Methodical Meticulous Organized Planned Purposeful Rehearsed Sequential Skilled	Attractive Competent Creative Detailed Extensive Focused Graceful Masterful Organized Polished Proficient Precise Neat Novel Rigorous Skilled Stylish Smooth Unique Well-Crafted	Beneficial Conclusive Convincing Decisive Effective Engaging Entertaining Informative Inspiring Meets Standards Memorable Moving Persuasive Proven Responsive Satisfactory Satisfying Significant Useful Understood

Group Skills Scoring Rubric

Prerequisites: ☐ Group plan submitted ☐ Group process log checked ☐ Critical Friends protocol completed

	Group Communication	Time and Task Management	Positive Interdependence	*Mutual* Respect
Exemplary **4**	• Group meetings and discussions are frequent, focused, and useful • All members clearly share ideas and actively listen • All members are clear on group goals and tasks	• All tasks done in advance, allowing time for rehearsal and revision • Extensive evidence of advanced planning • Group is almost always on task • Distribution of work is very clear and effective	• All members trusted to carry out tasks • Individual strengths used creatively and effectively • Delegation of work is balanced and fair	• Different values, opinions and ideas are always respected • Group members very open to constructive criticism • Interactions are always positive and encouraging
Mastery **3**	• Group meetings frequent and focused • Group members share and listen to ideas • Members are generally clear on group goals and tasks	• All deadlines met • Advanced planning evident • On-task behavior is the norm • Distribution of work is clear and effective	• All members trusted to carry out tasks • Individual strengths featured • Delegation of work is fair	• Different values, opinions and ideas are respected • Group members open to constructive criticism • Interactions are generally positive and encouraging
Emerging **2**	• Group meeting focus inconsistent • Group interaction somewhat unbalanced • Some members are clear on group goals and tasks	• Some deadlines met; some are not • Some planning evident but plans not followed closely • Behavior is mostly on-task • Distribution of work somewhat unbalanced	• Most members trusted to carry out tasks • Individual strengths used • Delegation of work is mostly fair	• Different opinions and ideas are allowed • Group members listen to constructive criticism • Interactions are generally positive
Inadequate **1**	• Meetings are infrequent and unfocused • Group interaction is unbalanced and unhealthy, group does not speak or listen to each other well • Members unsure of goals and tasks	• Work is late or missing • Last-minute work style • Group often off task and unfocused • Distribution of work is unclear and ineffective	• Some members not trusted to complete tasks • Individual skills and talents left untapped • Delegation of work is unbalanced or unfair	• Opinions and ideas are not respected • Group members are closed to constructive criticism • Input is often not useful or personal or destructive
Scoring	____ x 2 = _____	____ x 2 = _____	____ x 1 = _____	____ x 1 = _____
			Grand total:	

The Nine Steps of Project Delivery (w/ Assessment)
(one approach to PBL process … fr. Swanson & Cosgrave)

Error!Error!

BEGINNING

1. Connect & Comprehend
- Project unveiled and described
- The "so what?" question is answered
- Exhibition scenario explained
- Past samples viewed

DIAGNOSTIC
Assess prior knowledge and skills

2. Plan & Organize
- Student teams meet and set norms
- Logistical information shared
- Group develops work plan

FORMATIVE
Feedback on group norms & work plans

3. Understand Purpose & Quality
- Exemplars collected and examined
- Product quality and criteria discussed
- Rubrics written or reviewed

FORMATIVE
Feedback on understanding of criteria

MIDDLE

4. Investigate & Research
- Teachers teach critical content
- Students conduct research
- Experts interviewed
- Findings documented

FORMATIVE
Feedback on research findings
SUMMATIVE
Homework & research graded
Quiz on research & content

5. Propose & Refine Solutions
- Students brainstorm possible solutions
- Groups submit preliminary plans
- Teachers provide feedback on plans
- Clients view plans and give feedback

FORMATIVE
Feedback on group project plans

6. Produce & Refine Products
- Students write individual essays
- Groups create products/performances
- Critical friends feedback provided
- Products/performances improved

FORMATIVE
Feedback on products/performances
SUMMATIVE
Individual student assignments graded

END

7. Present & Exhibit
- Work presented to authentic audience
- Students orally defend work
- Audience members provide feedback

SUMMATIVE
Major products/performances evaluated
Oral defense of work evaluated
Rubrics applied to primary project work

8. Analyze & Reflect
- Students individually reflect on project
- Groups evaluate their process
- Class-wide debrief on project

SUMMATIVE
Students evaluate their product/process
Teachers grade evaluation

9. Conserve & Integrate Learning
- Project portfolio assembled
- Students document their process
- Students reflect on their learning

SUMMATIVE
Project portfolios evaluated

PROJECT EXEMPLAR: *Excerpts* **from the GreenBizz Innovation Challenge, an interdisciplinary project at Digital Safari Multimedia Academy, Mount Diablo High School, Concord, CA**

(Note: 2008-2009 is the first year of the Digital Safari Academy GreenBizz Innovation Challenge Project; however, this project builds on an EBizz project which has been part of the Academy curriculum for over five years. You can learn more about Digital Safari Academy and the Academy projects at http://www.digitalsafari.org)

Introduction: Entrepreneurial endeavors are a vital part of our economic traditions. Entrepreneurs helped this country to become an industrialized nation and the economic leader that we are today. Entrepreneurialism has been and remains an important part of the American Dream.

However, our race to develop and acquire wealth has brought many unforeseen consequences, which we are now forced, to address. Global warming due to an over-reliance on fossil fuels is a global concern with more violent weather patterns emerging and sea levels on the rise. Our ground water is increasingly polluted and our fresh water resources in many areas of the world are drying up. Additionally, there exist large areas of the world where new technologies are essential to address widespread environmental degradation. New entrepreneurs and new ideas are needed to usher in a new way of doing business that respects our planet and its resources. The old way of doing business is not going to serve us in the long-term.

During this project you & your business team will develop a new product & prepare to bring it to market. However, the product you create must be socially responsible & either address the major environmental issues of our world directly or create a way to make necessary goods & services have a less negative impact on the environment. You can find examples of these industries (below).

Creating a positive product for the planet is only part of your problem. As a start up company seeking money & investors, you will need to write a compelling business plan showing the potential marketability & profitability of your product, create marketing materials that will bring it attention, & develop television commercials. Finally, you will participate in the 4th Annual Innovation Fair at the Concord Hilton, during which judges from the business community will award winners in several areas of competition including business plan presentation, television commercials, print marketing, & trade show presentation.

The project consists of five major components: 1) business plan, 2) marketing materials, 3) television commercials, 4) a professional presentation of your business plan & 5) participation in the DSA innovation fair. Each of these components will be evaluated for course credit by each of the teachers involved in the project. While you will receive credit for this project in each of your DSA classes, it is important to note that for economics and multimedia the project will comprise 50% of your semester grade.

Evaluation & Grading: DSA teachers will be responsible for evaluating & assigning grades for the Business Plan, Marketing Materials & Television Commercials. Our business partners who sit on our panel for the competition will be performing the evaluation of the Funding Presentations & Innovation Fair, as well as awarding "funds" (& hence the grades for these components). It is important to realize that, while technically grading the presentation an innovation fair only, judges will have access to all of your written & marketing materials, which may, in truth, color their ultimate evaluation of your company.

Rubrics used for evaluation of all parts of the project (both teacher evaluated sections and judge evaluated sections) will be posted to the Project Resources well in advance of the final evaluation. It is important that you consult the rubric & engage in a self-evaluation process throughout the project to ensure you are meeting expected standards & working towards the grade you want.

GreenBizz Rules for the Development of Products and Services

All products or services developed by student teams:
1. must have an environmental, health/ safety, or social benefit.
2. cannot include weapons of any kind.
3. may be marketed to consumers, businesses, or government.
4. must contain elements that are patentable to create barriers to entry for other companies.
5. must be one of the following: 1) new technology, 2) an original combination of existing technology, or 3) a new application of existing technology
6. should increase efficiency and decrease waste with respect to current methods

GreenBizz Project Industrial Sectors - Each product or service developed by your company needs to fall under one of the following industrial categories. In general terms, CleanTech categories lean towards capital goods while LOHAS is more focused on consumer products. Whatever the product or service you develop, a major goal is to achieve sustainability.

CleanTech - The concept of CleanTech embraces a diverse range of products, services, and processes across various industries designed to 1) Provide superior performance at lower costs 2) Greatly reduce or eliminate negative ecological impact, and 3) Improve the productive and responsible use of natural resources. For a more complete understanding check out this definition by Neal Dikeman, a venture capitalist.

CleanTech Industrial Sectors
   * Energy Generation - wind, solar, biofuels, etc.
   * Energy Storage - fuel cells, advanced batteries, hybrid tech, etc.
   * Energy Infrastructure - energy transmission and distribution
   * Energy Efficiency - lighting, building, glass, electric components, etc.
   * Transportation - vehicles, infrastructure, fuels
   * Water & Wastewater - water treatment and conservation, waste water treatment, etc.
   * Air & Environment - emissions control, cleanup, monitoring, etc.
   * Materials - nanotech, biomaterials, building materials, etc.
   * Manufacturing - advanced packaging, efficiency, smart production, etc.
   * Agriculture & Nutrition - natural pesticides and herbicides, aquaculture, etc.
   * Recycling & Waste Management

LOHAS stands for Lifestyles of Health and Sustainability & encompasses a broad range of consumer goods & services focused on health, environment, social justice, personal development & sustainable living.
Market Sectors: * Personal Health - natural/organic products, nutritional products, dietary supplements, etc.
* Green Building - sustainable flooring, renewable energy systems, wood alternatives, energy efficient appliances, etc. * Eco Tourism - eco-tourism and eco-adventure traveling * Natural Lifestyles - apparel, indoor/outdoor furnishings, organic cleaning supplies, efficient lighting, etc. * Alternative Transportation - Hybrid vehicles, biodiesel, mass transportation, etc.

Project Requirement - The Business Plan
In summary, the business plan provides potential investors a summary of your product and the potential for your business to succeed in today's competitive business world. If the plan is properly developed and written, it provides more than mere numbers on paper. It serves as an effective communication tool to convey ideas, research findings and proposed plans to others. Secondly, it

forms the basis for managing the new venture. Lastly, it serves as a means by which to evaluate needed changes. Developing a Business Plan takes much time and effort, but the result can make the difference between success and failure. The Business Plan should show how all the pieces of the company fit together to create an organization capable of meeting its goals and objectives.

A properly developed and well-written business plan should answer questions such as:
    * Would the business be attractive to lending institutions?
    * Does the proposed business have a reasonable chance for success at the start?
    * Does the company give any long-run competitive advantages to the owners? To the investors?
    * Can the product be produced efficiently?
    * Can it be marketed effectively?
    * Can the product and marketing of the product be economically financed?
    * Can prospective owners express plans for the proposed business in writing in a clear, concise, and logical way so that it is easily understood and convincing to potential investors or lenders?

The Contents in Detail - Each company is responsible for preparing three complete, color and bound copies of your final business plan. Each of the 9 required components is described here. For those sections in which further explanation is necessary, you will find individual assignment sheets linked to each section and to the resource list to the right.

1. Cover Sheet - Designed to impress, the cover sheet must include your company name (followed   by "a digital safari greenbizz company"), company contact information, and be consistent with the visual identity you develop for your marketing campaign.

2. Executive Summary - Provide a clear but brief summary of the business plan. Though written last, the executive summary goes first. If an investor reads anything it will be this, therefore it is perhaps the most important piece of writing in the plan.

   * Start out with what your product is & why investors should be excited about it. Include the amount of funds requested and how they will be used * Summarize each section of your business plan.
   * Be logical, clear, interesting, & exciting in order to entice potential investors to continue reading.

3. Company Profile - The company essentials. Who are these people who want our money? Are they qualified? What are their goals?

   a. Mission Statement: Brief statement that sets the tone, defines the path, and provides the direction for the company. The statement should represent the company's goal, what the company stands for and their focus for the future.

   b. Company Description: Describes in general terms a clear & concise picture of what the company does, what it will offer, where it will operate, & how it will succeed. It should include company location, a history of the company, an organizational chart, & future goals of company.

   c. Personnel: Should highlight key personnel including CEO & management team. Should include name, job title & personal qualifications of each person. When discussing background, educational background & previous experience should be in fields related to your product idea.

   d. The Product - What are you making? How will prove to investors an opportunity exists?
   (1). Product Description: A brief description of what your product does.
   (2) List of Features & Functions: What is the value of your product to the customer? What will it do for them? How does it do it?
   (3) Specifications and Components: Size and weight?
   (4) Future Products: Variations based on clientele, if any.

e. Opportunity Assessment - (Assignment Sheet) * Present & Discuss specific evidence that supports your claim that there is a trend that demand for your product is growing. Use visuals to support your assertions whenever possible.

f. Competitive Analysis - (Assignment Sheet)
  (1). Identify major competitors and discuss their products
  (2) How will you compete? • What value do you offer over competitors? • What barriers can you create to fight competition?
  (3) Product Feature Matrix - a visual chart showing clearly how your product separates itself from your competition by key attributes such as features, price, size, portability, ease of use, etc.

g. Market Analysis - Provides an analysis of the market for your product and an evaluation of the potential for success within your market.
  (1). Customer Profiles: Define the customer that provides strategic focus for your business. Normally these will possess common characteristics & a relative high propensity to purchase a particular product or service. Thus, these clearly defined customers represent greatest potential for sales volume & frequency, & hence, the best target for advertising.   Characteristics that often define target market include: • Geographic • Demographic • Psychographic

  (2). Market Validation: Your research and information on your product demonstrating a business opportunity exists. Visually present the results of your market surveys and divide your market into workable segments such as: • Age • Income • Profession • Geography • Buying Pattern • Customer Needs

h. Marketing Plan - Outlines specific actions you intend to carry out to interest potential customers and clients in your product and/or service and persuade them to buy the produce and/or services offered. Components of the marketing plan are: a. Product: Product offered to consumer – also refers to any services or conveniences that are part of the offering. b. Price: Takes into account profit margins & probable pricing response of competitors. Includes a list price as well as discounts, financing, & other options such as leasing. c. Placement: What will be the means of getting the product to target customers.   d. Promotion: Decisions related to communicating & selling to potential customers. How will you best reach your target customer? • Television/Radio   • Print advertisements – Where will they go? • Other methods??

i. Financials - Financial information must include: (1). Operating Budget: Excel spreadsheets showing expenditures broken down into (a) Staffing, & (b) Operations for following • 4 quarters, beginning January, 2009 • 5 years, annually   (2). Cash-flow Projections: Detailed accounting of sales, production costs, & marketing expenses & net profit/loss for the first 4 quarters of operation. Again shown in an Excel spreadsheet. A narrative should follow that focuses on justification of your sales projections by referencing other sections of the plan such as competitive analysis & marketing analysis.   (3). Break Even Analyses: Graphical analyses from a perspective of (a) units sold, & (b) the point of time when total expenditures and income are equal. (4). Sources & Uses of Funds: Where is your money coming from? How are you prioritizing your expenses, i.e. what do you do if you don't get all of your funding needs met?

j. Marketing Materials: Preparing to market your product to your customers is an essential part of the GreenBizz project. Identifying your message & method & producing actual portions of your marketing plan will bring you closer to your product & put you in a better position to communicate your core values to your investors.

Advertising is not neutral. Its purpose is not simply to be looked at. Its purpose is to inspire action in the viewer. You want people who come in contact with your marketing message to reflect & act on it. Specifically, think about the following questions when developing your message & method: * What's in it for me? *And* * Will this product make me happier? healthier? richer? more attractive? solve my nagging problems? make my life better?

Additionally, there are other things to think about when developing your strategy: * Keep your message & design fresh. How will your ads stand out from hundreds or thousands of other messages your customers receive every day? Why will they stop to look at yours? * Ensure that quality of your product is evidently superior to competition in ways you need it to be. If your selling point is superior style then evidence of that is necessary. * Pay special attention that your message & method fits your target customer. Failure to do so is common with students whose egocentric & selfish tendencies cause them to design ads for themselves with no regard for the person you are trying to sell to.

Specific Materials Required - Details regarding each required object and directions for use are listed here. Specific activities centered on the creation of each item will take place in multimedia throughout the project.

1. Company Logo - Each company must have a logo that serves as a visual identifier for the company & brand. The logo should be used on all official company communications. Use of the logo in advertising is not required, but may be considered.

2. Business Cards & Letterhead - Each employee of the company must have business cards. Additionally, these cards must be carried any time business is being conducted for this product. It should be made available when meeting mentors & other adult business contacts.

3. Product Information Sheet - This sheet should contain a full color image and/or diagram of your product identifying key components and features. This item's purpose is to aid you in quickly and effectively communicating the nature and scope of your product to your investors.

4. Print Advertising - Design a series of 6 full color 8" X 10", 150pixel/inch print advertisements suitable for magazines or other print media. When developing ads for print or television, keep following advice in mind: • Establish a benefit. •Avoid cliché. • Limit yourself to one message per ad. • Originality, freshness, innovation (as long as it makes sense). • Tell consumer something they didn't know. • The visual & copy should not be repetitive.• Believability - no empty sales pitches. •Pay attention to visual hierarchy & other design principles.

5. Supplemental Materials - Superior companies will not shy away from work required to make their product stand above the crowd. Special credit consideration will be given to companies developing advertising campaigns that include print & television campaigns that go "above and beyond", &/or supplementary materials such as t-shirts, direct mail pieces, web banners and click-through ads, radio ads, or any other method at getting your message to your customer.

Television Commercial: Each company must produce two 30 second television commercials. These commercials should work together to sell your product to your target customers. Television commercials create a unique opportunity for you to establish desire in your customers and to communicate key elements differentiating your product from the competition.

Television commercials will compose a separate category of competition at the Innovation Fair, as well as contributing the best overall company category. If the quality of a commercial is deemed inadequate, the commercial will not be allowed into the public commercial competition.

Each commercial will require:
    * a shooting script approved by your GreenBizz instructors prior to production.
    * musical elements need to be original productions or from a royalty free library.
    * lighting & sound must be appropriate for public display (a projector & public address speakers).

Competition & Presentation: Your goal is simple. Get our panel of venture capitalists to give you the funds you need for start up. The panel has $5 million to invest, and will choose the companies they believe give them the greatest opportunity at a return on their investment. These decisions are based on a myriad of factors, some of which are unrelated to your product and reported bottom line. Many investors choose to invest in a person, not a product. Thus, a professional bearing, attire, rehearsal, personality, and a hook are a must.

You will have precisely 10 minutes to pitch your company to the investors. This will be followed by questions from the investors. It is vital that all members of your company are intimately familiar with your plan so that you can answer questions with confidence and authority. Since the time is so limited and such specific information must be communicated, we have prepared the following suggested outline for your presentation:

Slide Content:
1   Title Slide
2   Company Profile • Individuals and Qualifications • Mission Statement and Philosophy
3-4   Your Product • Your Inspiration • Target Problem & Needs Addressed • Features & Benefits
5   Business Opportunity • Market Trends • Opportunity for Investors

6-7   Marketing & Sales Strategies • Your Message • Target Customer • Marketing Channels
8-9   The Competition • Specific Competitors, the threat & how you will meet the threat.
          • Competition Graph
10-11   Operations • Manufacturing Agreements • Environmental Impact
12-14   Financials • Operations and Cash Flow Projections • Break Even Analysis • Funding Needs/Uses of
          Funds • Return on Investment
15   Summary

6. Innovation Fair: As a culmination to the business plan competition, each team will participate in the innovation fair. During the fair, all teams will compete simultaneously as groups of individual "investors" move through the crowd deciding how to invest money that they have. While these investors will represent smaller amounts of cash than the venture capitalists, they could serve to fill in the gaps left by a shortage of venture capitalist funding.

Each team will create a booth that they will use to present their company, product, and business plan to individual investors. Each investor who attends will have $50,000 to invest in one or more companies. Your goal will be to get as many investment dollars as you can under this format. Instead of presenting a single time in a structured format, this style of presentation will require you to work the crowd anticipating their questions and giving them the answers they need.

Your booth will need to include visuals of your product and key components of your business plan adapted to a tri-fold display. You may include 3 dimensional & 2 dimensional items in your display. Each display will be evaluated for its overall design, quality of included materials & the preparation of the company to present.

Project Calendar

Week One - September 8 – 12 In Class Project Introduction; Group idea brainstorming; Product Research and Development; Due: Group Ideas (Wed); Preliminary Product Sheet (Fri)

Week Two - September 15 – 19 Due: Survey Results

Week Three - September 22 – 26 Seed Money Requests - Preliminary Funding Due

Week Four - September 29 - October 3   DSA CHALLENGE DAYS - TUESDAY & THURSDAY
Due: Opportunity Assessment: Individual (Mon); Company (Fri)

Week Five - October 6 – 10 Due: Individual Competitive Analysis (Fri)

Week Six - October 13 – 17 *SENIOR CAMPING MON. – WED.* Due Product Information Sheet -Draft 1

Week Seven - October 20 – 24 Due: Competitive Analysis - Draft(Mon); Corporate Style Guide (Logo versions, Typography, Color Palette, Page Layout Sample) (Fri); Business Cards (Fri)

Week Eight - October 27 – 31 Due: Product Information Sheet - Draft 2 (Thu); Market Analysis - Draft (Fri)

Week Nine - November 3 – 7 Due: Marketing Plan - Draft 1(Fri);

Week Ten - November 10 – 14   NO CLASS MONDAY OR TUESDAY - VETERAN'S DAY
Due: Market Analysis Complete {Opportunity Assessment, Competitive Analysis, Market Anal} (Fri)

Week Eleven - November 17 – 21 Due: Company Profile - Draft 1 (Fri); Print Marketing Materials - Draft 1 (Fri); Television Commercial Shooting Script (Fri)

Week Twelve - December 1 – 5   Due: Life Cycle Analysis - Draft 1 (Fri); Company Profile - Draft 2 (Fri)

Week 13 - December 8 – 12   Due: Financial Analysis - Draft 1 (Fri); Executive Summary - Draft 1 (Fri);
Life Cycle Analysis -Draft 2 (Fri)

Week 14 - December 15 – 19 Due: Complete Business Plan Draft (Fri); Print Marketing Materials - Final Versions (Fri)

Week 15 - January 5 – 9 Due: Business Plan - Final Draft (3 Copies Bound and electronic version) (Fri); Presentation Files - Draft (Fri)

Week 16 - January 12 – 16 Due: Television Commercials (Mon); Presentation Files (Wed); Innovation Fair Materials (Wed); Thursday, January 15, 4th Annual Innovation Fair, Concord Hilton, 6 p.m.

Green Bizz Opportunity Assessment: One way in which to assess whether your product is going to be successful is to identify trends that show that "need" for your product is going to grow in the future. The more possible growth you can show potential investors, the more likely you are to be funded.

A trend is changes that are happening over a period of time. To support the existence of a trend you will need to locate statistics & evidence to support that trend. These trends & evidence will support conclusions that a business opportunity exists.

   * Product – Alternative Energy Vehicle
      o Premise: The need for hybrid cars is going to increase in the next 20 years.
      o Evidence: Recent disasters have made it clear that our oil supply is not reliable & sustainable.
      o Trend: Experts report that we are rapidly depleting the world's supply of oil.
      o Conclusion: Good Opportunity
   * Product – Video Game System Using a VCR
      o Premise: The need for products requiring the use of the VCR is growing.
      o Evidence: DVDs are taking the place of VHS tapes.
      o Trend: Sales of DVD products are increasing every year while sales of VHS products are dropping.
      o Conclusion: Not an opportunity

Your must do some research into the "need" for your product. Identify any local, national or international trends that are going to support the proposition that your product is going to be successful. Support your trends with data and evidence and discuss how the data or evidence supports your conclusion of a trend.

Task: This is a combination individual assignment as well as a group assignment.
Individual: Each person must turn in at least 2 articles, reports or documents that support a trend that is affecting the "need" for your product. Summarize each article & how information shows a trend. Directly connect the article to your product. You must turn in the article with the summary.

Group: Each group must turn in a 1-page narrative that address any trends that are affecting the "need" for your product. Again directly connect the trends to your product. Cite any sources within the body of your narrative that support your trends.

Green Bizz Competitive Analysis Now that you have determined that there is an opportunity for your product to successfully enter the market, you now need to identify and evaluate your competition. After identifying and analyzing the competition, you must then discuss how your product will differentiate itself from others. In short, what is your product's competitive advantage? Why would consumers buy your product instead of your competitor's product?

When identifying your competition, think about what goods and services compete for the same consumer dollars. Some competitors might produce very similar products. For example, Nike and Reebok are clear competitors in the athletic shoe market. Some competitors are different in nature, but still compete for the same consumer dollars. For example, Disneyland and the state park system are competitors because both compete for vacation dollars and vacation time.

Once you find your competition you must then discuss how your product differs from your competition. For example, Nike's shoes may provide more arch support than Reebok's shoes. One may be generally cheaper than the other. In the Disneyland/State Parks example, Disneyland may be more expensive but offers Disney characters & the Disney atmosphere. State parks are cheaper & allow children to discover beauty of nature.

This is a combination individual assignment as well as a group assignment:

Group Brainstorming: Your group will meet in class and brainstorm about the types of competition that may exist for your project, and who the competitors may be. Each group should identify enough competitors so each person can research 2 different competitors.

Individual - Each person must identify 2 competitors. * Provide the name of the competitor and describe their product(s) that compete with yours. * Explain in what ways their product is competitive with yours (i.e. fills similar need or want, or provides a substitute). * Explain how your product will differentiate itself. Why will consumers spend their money on your product instead of theirs?

Group - Each group must turn in an analysis of the competition and a comparative matrix of the features, functions, and value propositions. * Provide the names of the main competitors and explain their products. * Explain how each product represents competition. * Explain how your product will differentiate itself from the competition. * Provide a comparative matrix with a discussion of the differentiators.

The GreenBizz Challenge: California Content Standards Addressed – Economics, English, & Information Technology

Economics, 12.1 Students understand common economic terms, concepts & economic reasoning. 1. Examine causal relationship between scarcity & need for choices. 2. Explain opportunity cost & marginal benefit & marginal cost 3. Identify difference between monetary & nonmonetary incentives & how changes in incentives cause changes in behavior. 4. Evaluate role of private property as incentive in conserving & improving scarce resources, including renewable & nonrenewable resources. 5. Analyze role of a market economy in establishing & preserving political & personal liberty.

12.2 Students analyze elements of America's market economy in a global setting. 1. Understand relationship of concept of incentives to law of supply & relationship of concept of incentives & substitutes to law of demand. 2. Discuss effects of changes in supply &/or demand on relative scarcity, price, & quantity of particular products. 3. Explain roles of property rights, competition, & profit in a market economy. 4. Explain how prices reflect relative scarcity of goods & services & perform allocative function in a market economy. 5. Understand process by which competition among buyers & sellers determines a market price. 6. Describe effect of price controls on buyers & sellers. 7. Analyze how domestic & international competition in a market economy affects goods & services produced & quality, quantity, & price of those products. 8. Explain role of profit as incentive to entrepreneurs in a market economy. 9. Discuss economic principles that guide location of agricultural production & industry & spatial distribution of transportation & retail facilities.

12.4 Students analyze elements of U.S. labor market in a global setting. 1. Understand operations of labor market, including circumstances surrounding establishment of principal American labor unions, procedures that unions use to gain benefits for their members, effects of unionization, minimum wage, & unemployment insurance. 2. Describe current economy & labor market, including types of goods & services produced, types of skills workers need, effects of rapid technological change, & impact of international competition. 3. Discuss wage differences among jobs & professions, using laws of demand & supply & concept of productivity. 4. Explain effects of international mobility of capital & labor on U.S. economy. 12.6 Students analyze issues of international trade & explain how U.S. economy affects, & is affected by, economic forces beyond U.S.'s borders. 1. Identify gains in consumption & production efficiency from trade, with emphasis on main products & changing geographic patterns of 20th-century trade among countries in Western Hemisphere 2. Understand changing role of international political borders & territorial sovereignty in a global economy.

English Language Arts, Grade 12: 2. Reading Comprehension (Focus On Informational Materials): Students read & understand grade-level-appropriate material. They analyze organization patterns, arguments, & positions advanced.   Comprehension & Analysis of Grade-Level-Appropriate Text: * 2.1. verify & clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents 2. Writing Applications (Genres &Their Characteristics) * 2.3. write job applications & resumés: * provide clear & purposeful information & address intended audience appropriately * use varied levels, patterns, &

types of language to achieve intended effects & aid comprehension * modify tone to fit purpose & audience * follow conventional style for type of document (e.g., resumé, memorandum) & use page formats, fonts, & spacing that contribute to the document's readability & impact of document * 2.4. deliver multimedia presentations: *combine text, images, & sound & drawing information from many sources (e.g., television broadcasts, videos, films, newspapers, magazines, CD ROMs, the Internet, electronic media-generated images) * select an appropriate medium for each element of presentation; *use selected media skillfully, editing appropriately & monitoring for quality * test audience's response & revise presentation accordingly 2. Speaking Applications (Genres & Their Characteristics) * 2.2. deliver multimedia presentations that *combine text, images, & sound by incorporating information from a wide range of media, including film, newspapers, magazines, CD-ROMs, online information, television, videos, & electronic media-generated images; * select an appropriate medium for each element of the presentation; * use selected media skillfully, editing appropriately & monitoring for quality; * test audience's response & revise presentation accordingly.

Information Technology Career Pathway Standards B. Media Support and Service Career Pathway: B1.0 Students understand effective use of tools for media production, development, & project management. * B1.1 Know basic functions of media design software, such as keyframe animation, 2-D design, & 3-D design. * B1.2 Use appropriate software to design & produce professional-quality images, documents, & presentations. * B1.3 Analyze purpose of media to determine the appropriate file format & level of compression. * B1.4 Analyze media & develop strategies that target specific needs & desires of the audience. * B1.6 Know basic design elements necessary to produce effective print, video, audio, & Web-based media. * B1.7 Use technical skills (e.g. pagination, printing, folding, cutting, & binding) to produce publishable materials.

GreenBizz Project Resources - (This list is intended to be a growing one. If you find

a great resource you believe others would benefit from, please let us know so we an include it here.)

   * The Story of Stuff - www.storyofstuff.com/ - This 20 minute short provides the rationalization for the GreenBizz Innovation Challenge. It's worth viewing again when developing your product's lifecycle analysis, or simply when you need inspiration.

   * Flex Your Power - www.fypower.org/ - California's statewide energy efficiency and marketing campaign web site has many valuable resources on power use by different sectors of our economy and what current best practices towards savings are.

   * Cleantech News - www.altenergystocks.com/alt/content/general/ - Run by AltEnergyStocks.com, CleanTech news aggregates news from around the web into a single place.

   * Clean Break - www.cleanbreak.ca/- A blog run by an energy reporter for the Toronto Star, Clean Break examines "trends, happenings, and innovations in the Clean Technology Market"

   * How Stuff Works - www.howstuffworks.com - Need to know how hydrogen fuel cells work? How about nuclear power? Or, nanotechnology? If you have questions about how any of the technology you're interested in working with actually works, this is a good place to start.

   * Wikipedia - www.wikipedia.com - What can't you find at Wikipedia? Pay special attention to where the entries you look at link to. It's here you will often find the gold you are looking for.

Interdisciplinary Curriculum Exemplar:
Overview of BRIDGE BUILDER - an interdisciplinary Engineering Unit from ConnectEd California

Bridge Builder
CONTENTS

Subunit 1 Overview		Form and Function (& Curriculum Materials
Lesson 1.1	Principles of Engineering	**Introduction to Bridges** Students are introduced to the unit and the culminating project. Students begin the unit with an introduction to the four major types of bridges, how they differ structurally, and their comparative advantages and disadvantages. *(Curriculum Materials: Lesson Plan, PowerPoint: Intro to Bridges; Lab: Mini-Models; Worksheet: Bridge Classification & Scavenger Hunt)*
Lesson 1.2	English Language Arts	**Great Bridges** Students read and discuss excerpts from David McCullough's novel, <u>The Great Bridge: The Epic Story of the Building of the Brooklyn Bridge</u>. Each student selects and researches the history of famous bridge. Students synthesize their research into a historical narrative about their selected bridge. *(Curriculum Materials: Lesson Plan, Reading: The Great Bridge, Handout: Historical Narratives)*
Lesson 1.3	U.S. History	**Growth in the Gilded Age** Students examine historical maps of New York City to identify the patterns of New York City's rapid urbanization in the 19th Century and use those patterns to justify the need for bridges at specific locations. *(Curriculum Materials Lesson Plan; Maps: New York City 1642-1916;Reading: Bridging the East River; Reading: The Big Bridge Scheme)*
Lesson 1.4	English Language Arts	**Site Selection** Students break into groups to read and analyze the site selection reports from a number of different bridges. Through interpretation of these technical reports, students will identify key factors that affect the selection of a site for bridge construction. *(Curriculum Materials: Report: Columbia River Crossing Study; Handout: Interpreting the Table of Contents)*
Lesson 1.5	Biology or Earth Science	**Environmental Mitigation** Students learn about various environmental factors that must be considered when beginning a major bridge construction, both in where the bridge is placed and what impact the bridge will have on the surrounding environment. Students also study the process by which environmental mitigation is planned to offset the impact of the construction. *(Curriculum Materials: Lesson Plan, Demonstration: Wetland Sponge, Reading:*

Wetland Compensatory Mitigation)

Subunit 2 Overview		**Structural Support**
Lesson 2.1	Physics or Mathematics	Science of Bridge Structure Students are introduced to the physics and math associated with calculating the forces on a truss bridge. This lesson covers content previously taught in Principles of Engineering lesson 5.1, but it can be covered by either the physics or math teacher. *(Curriculum Materials: Lesson Plan, PowerPoint: Truss Bridge, Lab: Reaction Forces; Worksheet: West Point Bridge Design)*
Lesson 2.2	Algebra	Estimating Live Loads Students estimate and graph the number of cars and busses that would fill a bridge span given the average lengths of each type of vehicle. They express the relationship between the number of different vehicles and the live load on the bridge as a graph and an equation. The class then finds the range of live load that the bridge would be expected to withstand. *(Curriculum Materials: Lesson Plan, Lab: How Many Vehicles?, Worksheet: Estimating Live Loads)*
Lesson 2.3	Chemistry	Rusty Truss Students investigate the corrosion of metals in a lab in order to identify various factors that contribute to the corrosion process.. Students conclude by researching and reporting on how actual bridges are protected and maintained from corrosion. *(Curriculum Materials: Lesson Plan, Lab: Corrosion Chemistry, Reading: Steel Bridge Corrosion)*
Lesson 2.4	English Language Arts	Bridge Disaster News Report Students watch footage of the Tacoma Narrows Bridge collapse and read newspaper accounts of the event. Students will then research a different bridge collapse and write their own news accounts of the disaster and the subsequent investigation. *(Curriculum Materials: Lesson Plan, Video: Tacoma Narrows Bridge, Handout: Reporting the News)*
Subunit 3 Overview		**Build Your Bridge**
Lesson 3.1	U.S. History	Building the Brooklyn Bridge Students investigate how the political machine of the era influenced building projects like the Brooklyn Bridge. Students also analyze the dilemmas facing American workers seeking to improve working conditions in the 19th century by researching and role-playing the caisson workers strike during the construction of the Brooklyn Bridge. *(Curriculum Materials: Lesson Plan, Handout: 19th Century Commercials: Reading: Bridge Innovations; Handout: Bridge Strike Role play)*
Lesson 3.2	Principles of Engineering	Bridge Blueprints Students are provided with the design constraints for the culminating project. Students design their bridges using 3D modeling software, and use the software to conduct stress analysis on their design. Students revise and retest their designs before building in-class building begins. *(Curriculum Materials: Lesson plan, Handout: Truss Designs, Handout: Bridge*

Project Design Brief)

Lesson 3.3	Principles of Engineering	Opening Day

Students build their bridge designs out of balsa wood and test them for strength against their classmates.
(Curriculum Materials: Lesson Plan)

National Standards Alignment

English Language Arts	Mathematics	Social Studies	Science	Engineering
NCTE Standard 1 Standard 3 Standard 4 Standard 5 Standard 6 Standard 7 Standard 8 Standard 11 Standard 12	*NCTM Algebra* Understand patterns, relations, and functions Represent and analyze mathematical situations and structures using algebraic symbols *NCTM Geometry* Use visualization, spatial reasoning, and geometric modeling to solve problems	*NCHS World History* Era 8, Standard 2 Era 8, Standard 4 Era 9, Standard 1 Era 9, Standard 2 Era 9, Standard 3 *NCHS U.S. History* Era 8, Standard 3 Era 9, Standard 2 Era 10, Standard 1	*NRC Physical Science 9-12* Objects change their motion only when a net force is applied. Laws of motion are used to calculate precisely the effects of forces on the motion of objects. The magnitude of the change in motion can be calculated using the relationship $F = ma$, which is independent of the nature of the force. Whenever one object exerts force on another, a force equal in magnitude and opposite in direction is exerted on the first object.	*ITEA* Standard 1 Standard 2 Standard 3 Standard 4 Standard 8 Standard 9 Standard 10 Standard 11 Standard 18 Standard 20

Description/Excerpts from an INTEGRATED CURRICULUM/ INTERDISCIPLINARY PROJECT from Build San Francisco: The Rincon Towers: A 12-Week Interdisciplinary PBL Unit for Social Science and Architectural Design

Sources: What Kids Can Do *and* Build San Francisco - Will Fowler & David Rosenbaum, The Architectural Foundation of San Francisco

Preface: This unit was completed by students at the Build San Francisco Institute in Spring of 2005. It grew out of a proposal written by the students to the What Kids Can Do Foundation in Fall of 2004. Although the project was student authored & followed student direction throughout, the standards- based curriculum that supported the project was developed by a classroom teacher & the director
of the Build SF program. As a model of student & faculty cooperation on learning design, it is a remarkable achievement. While this particular project is a "one time event" the project-based structure & lesson design of the modular approach taken by the teacher in structuring the student project is a replicable model.

Program Structure: The Build San Francisco Institute is a collaboration between the Architectural Foundation of San Francisco and San Francisco Unified School District. Students attend their regular high school and take core subjects in the mornings, then bus to BSFI for afternoon elective classes in Architectural Design and Urban Sociology. These classes are taught in an interdisciplinary project based approach, working with each student as an individual.

All students create semester long goals, and instruction is designed to meet these individual goals. In addition all students are assigned a professional mentor, and meet two afternoons each week in the mentor's firm. This combination of real world experience and individualized instruction creates a school day structure quite different from the normal high school environment. The project based approach taken by the BSFI staff is highly effective in meeting the requirements of this structure.

Six Weeks Skills Building Modular Program: A video project is a time consuming process. Work created by professionals will take crews of several dozen workers months or years to complete. A dozen high school students who have little or no experience with video techniques, and in some cases, limited academic skills, will require a training period before attempting such a project. BSFI spends the first six weeks of the semester on skills development and background research before formally launching the project.

Student Proposal: In November 2004, the students of Build San Francisco Institute authored the following proposal for the What Kids Can Do Foundation of Providence Rhode Island. The proposal was accepted and funding was granted for the purchase of video equipment for the school. This outline led to the Rincon Towers Project design in the second semester of the 2004-2005 school year:

Grant Application - BUILD San Francisco
School: Beginning in the Fall of 2004, Architectural Foundation of San Francisco opened the Build San Francisco Institute, enabling San Francisco Unified School District students to join an experimental learning program in architecture and urban design. Offering classes and mentorships in the afternoon hours of the school day, the Build San Francisco Institute introduces students to

the real world of urban planning design, offers them a unique opportunity to become involved in the development of San Francisco. In past years the participants of Build SF have worked with firms on the San Francisco

Museum of Modern Art, the New San Francisco Main Library, the Magnet School of the Art, the Mission Bay Masterplan, and SBC Park. 10th -12th graders are eligible for this opportunity. This school consists of various types of ethnicities such as Filipino, African American, White, Hispanic and other races. The Institute has enrolled 15 students, under the supervision of 2 teachers. We are located at 654 Mission St in the South Of Market (SOMA).

2. PROBLEM AND HOPED-FOR IMPACT: The problem we chose to address is the effect of allowing market forces alone to dictate supply of residential housing in SF South of Market (SOMA), recent development deals that the city has proved. It is important because low-income families will be moved to make room for high-end real estate. We hope (to) bring this project to city's planning commission & redevelopment agency decisions. We hope to benefit San Francisco's diverse communities.

3. RESEARCH QUESTIONS & INITIAL THEORIES: Our research has shown that a medium home priced home in San Francisco is around $650,000 & is rising. According to the S.F. Chronicle only 11 to 14 percent of people currently living in San Francisco can afford to buy a home. At the same time the city is building high-end condominiums starting from $750,00-$1.5 million. To build these condominiums the city is demolishing low-income housing further increasing the homeless population.

Theory: • Is the city planning commission demolishing low-income neighborhoods to build high-end property. • Because the city is raising the standard of living, Government Subsidies cannot sustain the average family. • Could mid to high-rise buildings be built to house low to middle income families and still be financially feasible?

4.REASEARCH METHODS & ANALYSIS: Some methods we plan to implement include working with non-profit organizations, study past and present surveys, interpret local statistics, contact city agencies, research the internet, speak with local planners and developers, and use videotape to record the neighborhood's condition as well as its progress. We will also interview experts and residents directly affected by the SOMA renovation. David Habert, a redevelopment planner, says "We're trying to create a neighborhood were people want to live", but what is happening is that they want to create

a neighborhood where rich people want to live.

5. FINAL PRODUCTS, ACTION, & PUBLIC ATTENTION: Our team intends to create a multimedia report, including digital video, power point, & an extensive written analysis. We will present our findings to the City Planning Commission & the Redevelopment Agency. We expect to lobby support from the Department of Health & Human Services, architecture/development firms, & public support.

6. EVALUATION: We hope to impact development of SOMA, by building more affordable housing & less single occupancy rooms (SRO's), hope to learn process (by which) city is developed, apply math & design knowledge, that we have & will learn from SF Build Institute, to real world & influence public opinion.

7.OBSTACLES: Getting people to follow up on our information and accept our proposal as a valid fact. We feel that or project will be intensive. Time will be a major factor because results will not happen over a short period. Money is an obstacle, because we need equipment. Patience is needed to get lobbyists. But truthfully this will be a difficult task to accomplish. We have a lot of good ideas for SOMA, but the reality is or plan will take several years, even generations to accomplish.

The Rincon Towers Project Background: San Francisco is a unique city, geographically as well as culturally. The peninsular location & geology upon which the city rests creates a series of challenges for urban developers. Hampered by lack of space & seismic constraints, the city has a difficult time growing. Population of San Francisco has remained remarkably stable over the last fifty years & in recent years has even declined slightly. This series of constraints combined with desirability of the city culturally has created one of the most expensive housing markets in the nation & an accompanying shortage of affordable units for working class families. In an effort to address these problems, the City Planning Commission is in the process of approving a new approach to housing design in the South of Market region of the city – high rise condominium towers on an area known as Rincon Hill. As a requirement for approval, developers must commit to a percentage of affordable units to be constructed with each new tower. These affordable units, however, need not be located in the area of the construction, but can be developed "off site", elsewhere in the city. Students will investigate this plan & the process through which it is being approved through deep background research, interviews with the principal participants, & a video survey of the area. This research will be distilled into a ten to fifteen minute video, directed, scripted & edited by students. Faculty members will assist students in developing their ideas, writing & editing, & training in video techniques.

Final Project on South of Market Housing *Organizing the Project*: As is usually the case with a quality PBL activity, the project tended to grow out of the students' vision, rather than a teacher 's lesson design. In this model, the teacher is a coach, not an instructor. Although he oversees production of the final product and guides students to an understanding of the issues, he does not dictate a set of answers. In fact, as students soon discovered , in an urban development problem as complex as the Rincon Towers Project, there is no one "right answer" at least not in the usual school understanding of correctness. As a sidebar, it is interesting to note that in this regard the instructors were students as well. In a project as complex as this, no one has a definitive "right answer." At the same time, it is even more important in PBL to establish a structure for the project. These structures are much more closely aligned to those of a design or production studio than that of the usual high school classroom. This alignment meets the goals of BSFI in that it introduces students directly to professional methodology found in urban planning and design. As the project evolved, each section of the video became a module, with its own set of research requirements, artistic challenges, writing and analysis issues and final synthesis of information. Within each modules, the instructors embedded a set of standards based challenges which the students needed to meet in order to achieve their goals.

Twelve week Structure: Students will organize, research, develop and present a final group project centered in a major design or development issue for San Francisco. This student led demonstration of
knowledge will utilize all of the skills and concepts taught in the Architectural Design and Urban Sociology Modules. Using a similar modular approach, the project is divided into twelve separate modules. Each module will be studied by the entire class. However, separate teams of students will be given the responsibility for converting the research into the final video edit.

Project Modules **Module One: Introduction to San Francisco**
California Content Standards Addressed: *Social Science*: • Students show connections, causal & otherwise between particular historical events & larger social, economic, & political trends & developments. • Students recognize complexity of historical causes & effects, including limitations on determining cause & effect. • Students interpret past events & issues within context in which an

event unfolded rather than solely in terms of present-day norms & values. • Students understand meaning, implication, & impact of historical events & recognize that events could have taken other directions. • Students analyze human modifications of landscapes & examine resulting environmental policy issues. • Students compare present with past, evaluating consequences of past events & decisions & determining lessons that were learned. • Students analyze how change happens at different rates at different times; understand that some aspects can change while others remain the same; & understand that change is complicated and affects not only technology & politics but also values & beliefs. _Fine Arts_: • Understanding historical contributions & cultural dimensions of visual arts.

Challenges: This module introduces students to their city and its unique personality. In order to understand impact of a major redevelopment plan such as the Rincon Towers Project, the students first must take a good look at what is here now, and why its character is so special.
• _Students collaboratively create a list of features of the city that make it unique & define its character & define a "San Francisco aesthetic" • Students videotape examples of the unique San Francisco urban landscape_
• _Students research the history of the city and the elements that have shaped its character_
• _Using their research, students write a one minute script for video production "The Rincon Towers."_

Module Two: Introduction to Urban Development
California Content Standards Addressed: _Social Science_: • Students compare the present with the past, evaluating the consequences of past events and decisions and determining the lessons that were learned. • Students analyze how change happens at different rates at different times understand that some aspects can change while others remain the same; and understand that change is complicated and affects not only technology and politics but also values and beliefs. • Students use a variety of maps and documents to interpret human movement, including major patterns of domestic and international migration, changing environmental preferences and settlement patterns, the frictions that develop between population groups, and the diffusion of ideas, technological innovations, and goods. • Students relate current events to the physical and human characteristics of places and regions • Students distinguish valid arguments from fallacious arguments in historical interpretations. • Students identify bias and prejudice. • Students construct and test hypotheses; collect, evaluate, and employ information from multiple primary and secondary sources; and apply it in oral and written presentations • Students show the connections, causal and otherwise, between particular historical events and larger social, economic, and political trends and developments of historical events and recognize that events could have taken other directions. • Students analyze human modifications of landscapes & examine resulting environmental policy issues. • Students conduct cost-benefit analyses and apply basic economic indicators to analyze the aggregate economic behavior of the U.S. economy.

Fine Arts: • Students analyze role & development of the visual arts in past & present cultures throughout the world, noting human diversity as it relates to the visual arts & artists. • Identify & describe role & influence of new technologies on contemporary works of art. • Identify and describe trends in the visual arts and discuss how the issues of time place, & cultural influence are reflected in selected works of art. • Discuss the purposes of art in selected contemporary cultures.

Challenges: In this module students learn the process of large scale urban development, including such past re-development projects South of Market as Moscone Center & Yerba Buena Center. Students learn interplay of political, cultural & economic forces that lead to, or prevent large scale urban development. Students become acquainted with such concepts as capital, finance, risk, venture capitalism, interest rates & role of entrepreneur in creating urban change.

• Students use primary sources to investigate plans for new development in South of Market area • Students analyze political, economic & cultural aspects of development in San Francisco• Students interview experts in SOMA development • Students create a video sequence analyzing development in the SOMA area

Module Three: Introduction to Rincon Hill Development
California Content Standards Addressed: <u>*Social*</u> <u>*Science*</u>: • Students relate current events to physical & human characteristics of places & regions • Students distinguish valid arguments from fallacious arguments in historical interpretations. • Students identify bias & prejudice. • Students construct & test hypotheses; collect, evaluate, & employ information from multiple primary & secondary sources; & apply it in oral & written presentations • Students show connections, causal & otherwise, between particular historical events & larger social, economic, & political trends & developments of historical events & recognize that events could have taken other directions. • Students analyze human modifica-tions of landscapes & examine resulting environmental policy issues. • Students conduct cost-benefit analyses & apply basic economic indicators to analyze aggregate economic behavior of U.S. economy.

<u>*Fine Arts*</u>: • Processing, analyzing & responding to sensory information through language & skills unique to visual arts. • Creating, performing & participating in visual arts. • Students analyze role & development of visual arts in past & present cultures throughout world, noting human diversity as it relates to visual arts & artists. • Identify & describe role & influence of new technologies on contemporary works of art.

<u>*Challenges*</u>: In this module, students begin to "zoom in" on Rincon Hill Neighborhood & proposed development of Rincon Towers. In order to appreciate changes promised for area, students must grasp history of Rincon Hill, changes of demographics that have occurred over time, & significance of the proposed change as a departure traditional "San Francisco" aesthetic. Students must understand economics of development & current trends in the San Francisco Real Estate Market. Students will begin to understand such concepts as "on-site and off-site affordable housing ratios.
• Students conduct primary research on the proposed development of Rincon Towers.• Students attend Planning Commission meetings to hear conflicting opinions on passing of proposed development• Students conduct expert interviews to learn in detail how proposed development will provide a percentage of off-site affordable housing • Students will create a video sequence analyzing proposed building of Rincon Towers

Module Four: Overview of SF and RH History
California Content Standards Addressed: <u>*Social*</u> <u>*Science*</u>: • Students show connections, causal & otherwise between particular historical events & larger social, economic, & political trends & developments. • Students recognize complexity of historical causes & effects, including limitations on determining cause & effect.• Students interpret past events & issues within context in which an event unfolded rather than solely in terms of present-day norms & values. • Students understand meaning, implication, & impact of historical events & recognize that events could have taken other directions. • Students analyze human modifications of landscapes & examine resulting environmental policy issues. • Students compare present with past, evaluating consequences of past events & decisions & determining lessons that were learned. <u>*Fine Arts*</u>: • Students analyze role & development of visual arts in past & present cultures throughout world, noting human diversity as it relates to visual arts & artists. • Identify & describe role & influence of new technologies on contemporary works of art.

<u>*Challenges*</u>: In this module students develop an appreciation for the long & important history of Rincon Hill Neighborhood and the various roles it has played in San Francisco. Students learn that neighbor-hoods are not static, but dynamic and go through life cycles & alterations to suit the

needs of each particular era. Economic factors will be studied as well as social & cultural keys to change. Defining the traditional San Francisco aesthetic will be an important aspect of this module.
• *Students use primary & secondary sources to research history of Rincon Hill Neighborhood.* • *Students collect images documenting changes over time & styles of architecture in Rincon Hill Neighborhood*
• *Students discuss evolution of neighborhoods & factors that contribute to their advance or decline*
• *Students create a script for a video sequence on the history of Rincon Hill*

Module Five: Introduction to San Francisco and Rincon Hill Geology

California Content Standards Addressed: *Social Science*: • Students use a variety of maps & documents to interpret human movement, including major patterns of domestic & international migration, changing environmental preferences & settlement patterns, frictions that develop between population groups, & diffusion of ideas, technological innovations, & goods. • Students relate current events to physical & human characteristics of places & regions • Students distinguish valid arguments
from fallacious arguments in historical interpretations.

Challenges: San Francisco, like many cities, is defined by its peculiar geological base. Once a city of sand dunes, with little room for expansion and limited bedrock for building, the city has grown in spite of these limitations. Students will study the role the environment plays in creating new structures in the city.
• *Students study geology of San Francisco & learn which seismic elements restrict building styles & heights in the city.* • *Students interview experts on application of physics & seismic principles to modern construction methods* • *Students understand how physical environment plays a role in determining different styles of architecture* • *Students create a video script explaining why the geology of Rincon Hill is especially suited for high rise development, while other sites are more appropriate for low cost housing.*

Module Six: The Aesthetics of the High Rise Building

California Content Standards Addressed: *Social Science*: • Students analyze human modifications of landscapes & examine resulting environmental policy issues. *Fine Arts*: • Aesthetic Valuing: Responding to, analyzing, & judging works in visual arts. • Connections, Relationships, Applications: Connecting & applying to what is learned in visual arts to other art forms, subject areas & careers.

Challenges: While skyscrapers were the triumph of 20th century architecture, they are not always viewed with awe in the 21st
. In this module, students will examine aesthetic considerations of high rise buildings & join the debate on their usefulness. Students will study classic examples of high rise architecture & determine a set of values that they can apply to proposed models of Rincon Towers.
• *Students learn the history of the skyscraper* • *Students study drawings, models, and photographs of famous high rise structures* • *Students create 3D computer images of high rise structures* • *Students interview a leading high rise architect to learn principles of high rise design* • *Students analyze appeal of high rise condominiums to top end markets* • *Students discuss transformation of San Francisco skyline that will result from Rincon Towers.* • *Students debate artistic & cultural values of high rise structures in Bay Area*
• *Students create a video script about addition of new high rise buildings in San Francisco*

Module Seven: Affordability Issues

California Content Standards Addressed: *Social Science*: • Students analyze how change happens at different rates at different times; understand that some aspects can change while others remain the same; & understand that change is complicated & affects not only technology & politics but also values & beliefs. • Students distinguish valid arguments from fallacious arguments in historical interpretations. *Fine Arts*: • Students create a two-or three-dimensional work of art that addresses a social issue. • Students present a universal concept in a multi media work of art that

demonstrates knowledge of technology skills.

Challenges: Limited by its size of 49 square miles, & its geological constraints, San Francisco is still a place where people want to live. This combination of factors pushes housing costs to some of the highest in the nation. While the upper middle class finds opportunities for their price range, working class families find themselves increasingly pushed out of the market, or into less desirable neighborhoods. Students, looking to their future, have doubts that they will ever be able to live in the city of their birth as young adults. The question of affordability, & more importantly affordable by whom, is one which every student takes very seriously.

• Students study classic models of urban social organization • Students calculate rates of housing expenditures for San Francisco & compare to national averages • Students calculate necessary income levels for family of four to live in San Francisco • Students discuss role of finance in determining final design criteria• Students discuss race, culture & neighborhood demographics in terms of urban development
• Students conduct primary & secondary research on impact of the Rincon Towers Project on new affordable housing units in San Francisco • Students create a video script about impact of Rincon Towers on affordable housing in the city

Module Eight: Introduction to City Planning
California Content Standards Addressed: Social Science: • Students analyze how change happens at different rates at different times; understand that some aspects can change while others remain the same; & understand that change is complicated and affects not only technology & politics but also values and beliefs.• Students construct & test hypotheses; collect, evaluate, and employ information from multiple primary & secondary sources; & apply it in oral & written presentations.
Fine Arts: • Identify contemporary styles and discuss the diverse social, economic, & political developments reflected in the works of art examined.

Challenges: Students are surprised to learn that the city doesn't just happen – that skilled professionals work diligently to plan for the future. The process through which a project such as the Rincon Towers gain s approval is an excellent example of modern democratic government procedure. Students begin to appreciate the complexity of the decisio0n making through which a city evolves.

• Students will research historical maps and city plans • Student will learn various classical models for city organization • Students will read selections from Global City Blues by Daniel Solomon & Life and Death of Great American Cities by Jane Jacobs • Students will attend SF Planning Commission Meetings • Students will center the Rincon Towers Project in the overall San Francisco General Plan • Students will create a video module on the Rincon Towers as a planned civic development

Module Nine: The Economics of Urban Development
California Content Standards Addressed: Social Science: • Students conduct cost-benefit analyses and apply basic economic indicators to analyze the aggregate economic behavior of the U.S. economy.
Fine Arts:• Describe relationship involving art maker (artist), making (process), artwork (product), & the viewer. • Identify intentions of artists creating contemporary works of art & explore implications of those intentions.• Analyze & articulate how society influences the interpretation & message of a work of art.

Challenges: How does a 600 million dollar deal come together? Who has the power to command the expenditure of such huge sums? For students, this is a great mystery, one that is not explained by television programs about Donald Trump. By meeting real estate developers, financiers, & architects of the Rincon Towers, students begin to learn that the process of high finance is something that can be studied & learned, & that real people – not tabloid stars – are behind the creation of large

urban developments. By studying basic economics, and the mathematics of real estate, students begin to
appreciate the risks of this high stakes game.

• *Students will understand basic workings of capitalism, including supply & demand, role of entrepreneur, loans & interest, capital investment & rates of return*• *Students will calculate the rate of return on a 600 million dollar investment* • *Students will understand the role of economics in determining aesthetic considerations.*

Module Ten: The Human Face of Urban Growth

California Content Standards Addressed: *Social Science*: • Students recognize complexity of historical causes & effects, including limitations on determining cause & effect. • Students analyze how change happens at different rates at different times; understand that some aspects can change while others remain the same; & understand that change is complicated & affects not only technology
& politics but also values & beliefs. • Students show connections, causal & otherwise, between particular historical events & larger social, economic, & political trends & developments.

Fine Arts: • Investigate & discuss universal concepts expressed in works of art from diverse cultures.

Challenges: When one neighborhood undergoes the transformation foreseen for the Rincon Hill neighborhood, the current population is affected. Students, however, need to understand the process in its entirety, and not develop limited knee-jerk reactions to the problem. In this module, students begin to evaluate the human factors in urban development, and the choices the city must make to satisfy all of the various stakeholders. It becomes clear to the students that there are choices, and that there may be a variety of "right" answers. Choosing the correct "right" answer is the problem.

• *Students will identify demographic groups & subgroups in San Francisco by income, ethnicity, age & job classifications*• *Students will identify neighborhood values & trends based upon demographics* • *Students will research root causes of homelessness* • *Students will understand cultural values in determining design aesthetics*• *Students will interview housing pro growth and anti growth advocates* • *Students will understand terms such as "pied a terre", absentee landlord, & foreign capital investment* • *Students will create a video report on human considerations in development in San Francisco*

Module Eleven: San Francisco as an Urban Center

California Content Standards Addressed: *Social Science*: • Students relate current events to physical & human characteristics of places & regions. *Fine Arts*: • Construct a rationale for the validity of a specific work of art —artwork that falls outside their own conceptions of art.

Challenges: Many students are familiar with social difficulties through their exposure through the media. Other students are all too familiar with social problems in their daily life. In this module students begin to understand the real impact of 21st century urban social issues, and the extent to which they are present in San Francisco.

• *Students will study local graffiti and its role in social communication*• *Students will study crime rates and the breakdown of crime by neighborhoods* • *Students will discuss root causes of poverty and the need to provide social services* • *Students will learn the interplay between government and citizens* • *Students will understand the workings of complex urban infrastructure systems* • *Students will create a video report on urban issues in the Rincon Towers neighborhood.*

Module Twelve: Final Analysis of Research and Conclusions

California Content Standards Addressed: *Social Science*: • Students construct and test hypotheses; collect, evaluate, and employ information from multiple primary and secondary sources; and apply it in oral and written presentations. *Fine Arts*: • Students create a two-or three-dimensional work of

art that addresses a social issue.• Develop written criteria for the selection of a body of work from their portfolios that represents significant achievements.

Challenges: What did we learn? What does it all mean? In this module, students review their research & draw general sets of conclusions about major issues raised in their study of the Rincon Towers.

• Students will discuss & analyze complexity of Rincon Towers project & form opinions based upon evidence as to its feasibility • Students will present their conclusions as a part of a presentation to a panel of experts

STUDENT VIDEO CELEBRATES SAN FRANCISCO HISTORY: CHALLENGES HIGH-RISE DEVELOPMENT PLAN

SAN FRANCISCO, CA—The Build San Francisco Institute looks like a busy architecture firm: in a light-filled, airy space, blueprints are spread over a conference table; a small group is researching city demographics at a station of computers; and someone is on the phone asking questions of a seismic engineer. But these twelve engaged workers are not architects-they're sophomores, juniors, and seniors in high school.

In the Spring of 2005, students converged in a project-based learning classroom to create a high-quality documentary video about one of the most pressing and underreported real estate development issues in the Bay Area today: the Rincon Hill Plan. The project provides a replicable model of achievement: it merges multidisciplinary, real-world research with rigorous learning, and influences public opinion in the process.

The Rincon Hill Re-Development Plan would transform two square miles of warehouses South of Market Street into a luxury high-rise condominium area. It would also invest city resources in the courting the biotech industry's wealthiest workers, and dramatically alter the skyline of the city by the Bay. The "Rincon Towers" video documents BSFI's students' investigation of the plan, driven by a complex question: Should market forces alone dictate the supply of residential housing in SF south of Market Street? In a city where only fifteen percent of the citizens can afford home ownership, this is a powerful question, and one with no simple answer.

Students began by researching history, geology, demographics, economics, & aesthetics of San Francisco. They toured the city with video cameras to determine which features made it unique. They read selections from Life and Death of Great American Cities by Jane Jacobs, and Global City Blues by Daniel Solomon; attended SF Planning Commission meetings; interviewed politicians and developers, and grew to appreciate the complexity of decision-making through which a city evolves.

As they met with city leaders & studied angles of the problem, BSFI students were astonished to realize that they knew more about issues of affordable housing, public policy, & urban development than many adults they encountered. By documenting each stage of their learning & condensing it into a one-of-a-kind 45-minute video, they hope to raise public awareness about the issue-& increase public's participation in the development process.

The Learning Process One of the most extraordinary aspects of this high-achieving program is that it draws students who, for the m ost part, are struggling academically. Students at the Build San Francisco Institute came from probation programs and continuation schools, as well as arts and charter high schools around the city. They take busses and trains downtown at lunchtime to join their counterparts in the BFSI office.

Part of the program's success can be attributed to the self-selecting nature of the project. Student Yury Kogan, 16, explains, "Everybody was like—oh, yeah, I want to do that! And everybody who wanted to do it just got in a group. Everybody had the same goal." Another factor contributing

to the success is a mentorship program, which immerses students into the professional work environment. Two afternoons a week, BSFI students work with a mentor in a professional setting which matches their interests, from engineering and construction firms to a neighborhood history center. The other three afternoons were dedicated to research and documentation as a team.

Program Director Will Fowler says, "A project like this is all about organization. It's not the kind of organization from the old days in teaching, where you had the five-step lesson plan. You have to know who's working on what; you have to be, in essence, the manager of a media company. It's more the job of a producer than a director."

Fowler and instructor Dave Rosenbaum built the program to operate in modules, each one of which could serve as an end-point. The beginning weeks were spent on skill-building and background research, before the work of the project formally began. "On the first day of class," teacher Dave Rosenbaum says, "many did not know how to use a ruler. We had almost no supplies; we had Legos, and construction paper. So we started with Legos: 'See how far a distance you can span with Legos.' We created a bridge. That launched us into spatial relations, engineering, and group work."

The first three weeks were focused on academic skill-building. Rosenbaum taught cursive penmanship, so that students could write quickly and take notes. To prepare for the visiting speakers, students practiced how to appear attentive, use good listening skills, and ask informed questions. For research, they focused on outlining, reading a passage and summarizing, and using complex sentence structures to convey ideas. In math, they created basic word problems based on real-life economics, such as how to read a budget, or calculate the rate of return on an investment.

For the second three weeks, students focused on background research about development and gentrification in the city of San Francisco. Working in teams, they created PowerPoint presentations in lieu of papers or tests. They acquired new vocabulary phrases: eminent domain, entrepreneurship, DINK (Double Income, No Kids), fault line, capital investment, rate of return, absentee landlord. They traveled throughout the city of San Francisco, tracing its history from geologic time to today.

By the seventh week, they began to host the roster of expert speakers who would become their living textbook. From the CEO of the property company behind the Rincon Towers project, to a prominent land-use lawyer who opposed the project, students encountered the dueling minds behind the public ideas. By interviewing nine of the most influential people in city politics around their central conference table, students got a real-life immersion into the policy process—and injected their voices into the dialogue.

The students filmed these teaching sessions with developers, city planners, & political leaders, and those teaching sessions form the backbone of their video. Many let down their public personas and became unusually candid in the classroom. Students introduce the viewers to the multiple faces and facets of the Rincon Hill Plan with careful editing, and allow viewers to draw their own conclusions.

The film is shot & edited in a straightforward manner. Between clips of San Francisco landscapes & monuments, students narrate their subjects. They introduce clips of expert speakers & summarize speakers' position & point of view. Their scripts are condensed, stimulating, & well memorized.

Not leaping to judgment   In the tradition of investigative reporting, the team did not make prior judgments about the issue. Instead, they entered the complex vortex of city politics & economics, and tried to proceed without pre-conceived ideas. Brandon Kissinger, 18, says, "Just like San Francisco's diversity, that movie is really diverse: we all come from different points of views and different places."

Although issues of poverty and homelessness are not covered directly by the camera's eye, an awareness of their import sometimes surface in the expressions of the student narrators. In one particularly moving moment, Henry Boteo, in a clipped Mexican accent, says, "There's no room in this city for me." He shoots a burning gaze at the camera before walking off screen. The screen is empty for a split second, & the viewer registers his absence. The subtlety with which the issues of gentrification & development are treated-in what is often a strident, polarized debate--make this documentary stand out.

Indeed, one of the hallmarks of its genuine inquiry is that the students did not come to a consensus opinion about the project. Some, like Rachel Johnson-Leiva, feel that Rincon Hill should be preserved & revitalized as an historic area. Osmundo Arguello is in favor of discarding the project entirely, & investing money in San Francisco's poorer neighborhoods. Others, like Brandon Kissinger, see an economic benefit to housing the wealthy, and feel excited by the plan. The atmosphere of healthy disagreement is a tribute to the level of intellectual respect among the students.

"I don't want to sugar-coat this," says Dave Rosenbaum, speaking about the group work. "It's incredibly intimate and it has all the conflict and difficulty of family relationships, when you work intensively in small groups." Student Osmundo Arguello agrees, but he adds, "Something good comes out of work like this. You feel proud of what you did, what you have accomplished. All you've got to do is put your mind into it, do what you have to do, get on task, get to work. Don't let time run."

"Rincon Towers" will screen this summer at the S.F. City Planning Commission, student film festivals, & grassroots organizations. Students who researched, wrote, filmed, edited, & starred in the video hope that their work will benefit San Francisco's diverse communities, encourage participation in the civic process, and ensure a fairer economic future for residents of the city they call home.

They're not ending there, however. The Build San Francisco experience has awakened passions in its students, several of whom plan to pursue college studies in architecture, interior design, construction management, and history. As David Gastaneta, 16, says, "I'm going to design something in this city: that's what I'm going to strive for. I'm going to leave my own opinion, and my own impact on San Francisco."

Go to http://www.whatkidscando.org/archives/studentresearch/2005buildsanfran.html And click to: Watch the Rincon Towers Project Video. (series of video clips)
Download the Rincon Towers project-based learning unit (1.2 mb PDF)
View a photo gallery of Build San Francisco students at work.
Read student reflections on the Rincon Towers project.
Read an interview with Program Director Will Fowler.

MAKING A GUIDE TO THEIR BAY: San Diego Students Explore Deeper Perspectives

SAN DIEGO, CA—Holding a meter-square contraption made of white PVC pipes, a few students crouch over a patch of tide-washed sand, counting the limpets & barnacles they find within the transect. Up the shore, classmates are using a laser leveling device & a pole to measure off the tide's height at regular intervals. Others poke around the water's edge, turning over rocks or following the path of a shorebird. A few solitary students sit at a distance with notebooks, writing or drawing in response to the urban seascape before them.

Like the explorers who sailed into this bay 300 years ago, 56 students at High Tech High in San Diego have discovered a new world in their urban neighborhood, where land meets sea—and where schoolwork actually matters.

For three months in spring 2005, an eleventh-grade High Tech High teaching team centered its math, science, and humanities coursework on an ambitious investigative project. In expeditions to sites around the nearby bay, students carried on the tradition of the explorer's log, rendering close observations—scientific, cartographic, etymological, even poetic and political—for others who might follow.

Now those students have brought their work to the public, as a striking and useful field guide called *Perspectives of the San Diego Bay*. The 240-page book, which they designed and produced themselves with support from a small WKCD Student Research for Action grant, already has found an eager audience in local and national environmental groups.

Writing with a purpose For its authors, that means more than any A on their report cards. "Every kid has that question, 'Where am I going to use this in the real world?'" says Evan Morikawa, one of the guide's chief student editors. "Well, you can't get much more attached to the real world than this. My friends are like, 'I'm studying for finals right now,' and I'm like, 'Well, I'm going to make and publish and print and sell a book!'"

Beautifully illustrated and designed, filled with color photographs, maps, and charts, the field guide teems with life, energy, and detailed information. It stands on its own as a naturalist's guide, identifying, analyzing, and quantifying the life forms found in the bay's inter-tidal zones and harbors. A student-written history of mapmaking by early explorers segues into a state-of-the-art overview of present-day biogeography, with students using sophisticated GIS mapmaking technology to represent their data. And in the tradition of the adventurer's log, students offer philosophical perspectives on the worlds they observe, in reflections, poems, and commentary pieces.

Not least, these young authors have an explicit public purpose: to awaken San Diego to the potential destruction of its Bay, as the balance grows ever more precarious between their city's natural life, industry, and commerce. "Most San Diegans have been down to the Bay," said Josefina To, a High Tech High eleventh grader who helped write the grant proposal for the project. "But we know very little about its biodiversity or its habitats."

Strong Models Across Disciplines The guide's professional contents and appearance derive in part, says High Tech High biology teacher Jay Vavra, from their teachers' decision to begin with students examining strong models from across the disciplines.

For a pilot project last year, Tom Fehrenbacher's humanities class read The Log from the Sea of Cortez, a 1940 travel log written by John Steinbeck and his friend Ed Ricketts, director of Pacific Biological Laboratories. "It mirrored our project, in creating an eclectic field guide," said Vavra, "not just about the creatures but more about how we can interact with organisms and also see ourselves in them." This year students pored over Jared Diamond's Collapse, applying its benchmarks for the decline of societies to the current situation of the San Diego Bay.

In biology class, students read and critiqued some twenty other guides for naturalists, "pulling out what they thought was interesting and appropriate for a field guide," Vavra said. Several calculus students in Rod Buenviaje's math class last year used Fourier analysis to schedule school-day research trips so they coincided with the necessary low-low tides. And using a National Science Foundation grant to two local colleges, professors taught the student researchers how to use Geographic Information System technology.

The investigation itself was unglamorous, even grueling. But students made the smallest task their own, coloring their scientific entries with vivid or irreverent observations. The great blue heron's call is low and heavy, like "an old rusty car door opening," they write. Snowy egrets "also feed on crustaceans, frogs, and if you're at Sea World, churros." Some raptors "even steal the nests and habitats of other birds because they do not feel like creating ones for themselves." Advice on a family tour to the Boat Channel reads, "Integrate sunbathing activities on the broken slabs of sharp concrete walls with the identification of different vermin that live along and among those slabs."

Whether writing about sponges or pelicans, sea lions or the homeless human population that frequents the Bay, the student authors also cast a thoughtful eye on interdependence and sustainability in San Diego's turbid mix of the military, industry, tourism, and nature. One section describes the effects of boat paints on marine life; one takes note of how Coronado Island's socioeconomic elite isolates itself from the city's pressing problems.

Even the students' poetry evokes interconnectedness; from the Boat Channel, Khoa Tran writes: "I cast my feet and hands into the sea / Let my head lie by the dry sand / Wither away wither away / I have barely made a scratch / 'will I be remembered?' echoes in the far distant / From where my reality came..." In the existential sense, this young poet may have a point. But from the evidence High Tech High students have put forward in Perspectives of the San Diego Bay, they need not worry that anyone will forget them soon.

Go to http://www.whatkidscando.org/specialcollections/student_research_action/makingaguide/index.html and Click to:
Download a PDF (2.7 MB) of excerpts from Perspectives of the San Diego Bay: A Field Guide.
Download a PowerPoint (1.4 MB) detailing the team's research methods and data collected.
Read a WKCD interview with teacher Jay Vavra.
Read student reflections on the project.
Connect to Perspectives of the San Diego Bay at Next Generation Press.

Six A's Tool: "Tweaking" a Project or Assignment

This design template leads you through key questions you'll want to address in building a new project. You may want to have a copy of your course content standards handy as you work your way through the template.

	CRITERIA	SELF-ASSESSMENT	IDEAS FOR REVISION
AUTHEN-TICITY	Project emanates from a problem or question that has meaning to the student Problem or question is one that might actually be tackled by an adult at work or in the community Students create or produce something that has personal and/or social value beyond the school setting	1 2 3 4	
ACADEMIC RIGOR	Students acquire and apply knowledge central to one or more discipline or content area Students use methods of inquiry central to one or more discipline (e.g., to think like a scientist) Students develop higher order thinking skills and habits of mind (e.g., searching for evidence, taking different perspectives)	1 2 3 4	
APPLIED LEARNING	• Students solve a semi-structured problem (e.g., designing a product, improving a system, or organizing an event) that is grounded in a context of life and work beyond the school walls • Students acquire and use competencies expected in high performance work organizations (e.g., teamwork, problem solving) • Work requires students to develop organizational and self-management skills	1 2 3 4	

	CRITERIA	SELF-ASSESSMENT	IDEAS FOR REVISION
ACTIVE EXPLOR-ATION	• Students spend significant amounts of time doing field-based work • Students engage in real investigations using a variety of methods, media, and sources • Students communicate what they learn through presentations	1 2 3 4	
ADULT RELATION-SHIPS	• Students meet and observe adults with relevant expertise and experience • Students work closely with at least one adult • Adults collaborate on the design and assessment of student work	1 2 3 4	
ASSESS-MENT	• Students reflect regularly on their learning, using clear project criteria that they have helped to set • Adults from outside the classroom help students develop a sense of the real world standards for this type of work • There are opportunities for regular assessment of student work through a range of methods, including exhibitions and portfolios	1 2 3 4	

To Do … **Create a 6 A's Project Design Poster**

Purpose   This "6 A's' Project Design Poster activity is intended to showcase the work your team has done thus far on your project design. Please feel free to add any additional information you feel is important to help your colleagues understand your project design and your thinking.

Procedures   Each Academy team will create an Academy Project Poster that includes a brief description/ overview of your project, including theme/topic &/or essential/driving question; activities; outcomes (including any significant student products/services); ways in which project will address the 6 A's; etc. Also, include duration of your project; breadth (three/four classes/disciplines, blending academic-technical, interdisciplinary, etc.) of your project; how you will assure rigor and relevance; any uses of technology; etc. You might also describe how you plan to scaffold the project for student success. What elements of your project design support success for every student and help to ensure high quality student work?   What sort of exhibition of student and/or culminating work do you plan? How will you involve students in reflecting on what they have learned as a result of doing this project?

By 1 p.m. all of the Project Design Posters will be posted on our Gallery Walls & featured in a Gallery Walk during which all participants will use post-it comments to give and receive feedback.

As part of your poster content, be sure to describe how the project addresses each of the 6 A's:

ACADEMIC RIGOR ❑ What is the central question addressed by the project? ❑ What knowledge areas and central concepts will it address? ❑ What learning standards will the project address? ❑ What habits of mind and/or SCANS skills will students develop?
AUTHENTICITY ❑ Where in the "real world" might an adult tackle the problem or question addressed by the project? ❑ How do you know the problem or question has meaning for your students? ❑ Who might be appropriate audiences for the students' work?
APPLIED LEARNING ❑ What will the students do to apply the knowledge they are learning to a complex problem? ❑ Which of the competencies expected in high-performance work organizations does the project provide opportunities for students to develop? (e.g., working in teams, using technology appropriately, communicating ideas; collecting, organizing, and analyzing information) ❑ Which self-management skills does the project require students to use? (e.g., developing a work plan, prioritizing aspects of work, meeting deadlines, identifying & allocating resources)
ACTIVE EXPLORATION ❑ What field-based (outside the classroom) activities does the project require students to conduct? (e.g., interviewing expert(s) or participating in a worksite exploration) ❑ Which methods and sources of information are students expected to use in their investigations? (e.g., interviewing and observing, gathering and reviewing information, collecting data, model-building, using on-line search engines/web sites)
ADULT CONNECTIONS ❑ Do students have access to at least one outside adult with expertise and experience relevant to their project who can ask questions, provide feedback, and offer advice? ❑ Does the project offer students the opportunity to observe and work alongside adults during at least one visit to a worksite with relevance to the project? ❑ Does at least one adult from outside the classroom help students? ❑ Develop a sense of the real-world standards for this type of work?
ASSESSMENT PRACTICES ❑ What are the criteria for measuring desired student outcomes (disciplinary knowledge, habits of mind, and skills/applied learning goals)? ❑ How are students involved in reviewing or helping to establish the Project criteria? ❑ Which methods of structured self-assessment are students expected to use? (e.g.., learning journals/learning logs, peer conferences, teacher or mentor/consultant conferences, rubrics, periodic review of progress) ❑ How students receive timely feedback on their "project in progress" from teachers, mentors/consultants, peers? ❑ Do students prepare a culminating exhibition or presentation at the completion of the project that demonstrates their ability to apply the knowledge they have gained?

If there is time, DO a second poster. DESIGN A PROJECT STORYBOARD THAT YOU CAN USE WHEN YOU INTRODUCE THE PROJECT TO YOUR STUDENTS (or introduce the project to parents and/or partners). Use your creativity & colored markers to design a storyboard or 'map' of the project that will help students understand key elements of the project and the project 'flow.'

Purpose Design a visual representation of your project using pictures, words, and diagrams. Receive written feedback on your project from colleagues who view your storyboard.

Format As a team, create a project "storyboard" on a large piece of chart paper. Use colored markers and try to make it visually stimulating! Possible visual formats include:

- ❑ Timeline
- ❑ Flow chart
- ❑ Game board
- ❑ Diagram
- ❑ Map

Things to Include   Remember that your team will receive feedback on your project from your storyboard, so make it detailed enough for people to understand the key components of your project design! You may want to include items such as:

- ❑ The "big idea" of the project
- ❑ Essential questions that focus the project
- ❑ Courses that are integrated for the project
- ❑ Basic logistics (project length, structure of student teaming, etc.)
- ❑ Exhibition details
- ❑ Sketches of student products
- ❑ Benchmarks along the way that break the project up into smaller chunks
- ❑ Assessment strategies
- ❑ Scaffolding & support strategies
- ❑ Resources needed for the project
- ❑ How the project will meet each of the Six A's:
    - o Academic Rigor
    - o Authenticity
    - o Adult Connections
    - o Active Exploration
    - o Applied Learning
    - o Assessment Practices
- ❑ Key questions that remain for which your team would like feedback

WORKSHOP REFLECTION: THE 5 MINUTE PAPER

What were the most useful or meaningful things you learned during this session?
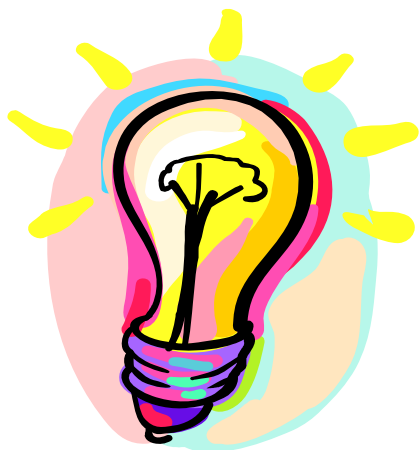
What questions remain uppermost in your mind as we end this session?

Action Planning: What will be your next step/s?