

Essential Elements of Project-Based Learning

The following is based on work performed by John Larmer, John Mergendoller, and Suzie Boss of the Buck Institute for Education (authors of *Setting the Standard for Project Based Learning*), and describes the essential elements of project-based learning and how they are reflected in *California Coastal Voices*.

Student Learning Goals

Project-based learning is one of the instructional strategies highlighted in the *California Science Framework* as “congruent with the principles” of three-dimensional learning—the notion that learning should weave together skills and practices, crosscutting concepts, and content knowledge acquisition. Each *California Coastal Voices* Project supports this type of learning. Equal emphasis is placed on acquiring specific knowledge and on thinking and working like a scientist or engineer. Knowledge is most effectively retained through habitual application; skills are honed through practice towards measurable mastery.

“When teachers integrate all three dimensions of the CA NGSS, their classrooms look different...Both the *NRC Framework* and the CA NGSS highlight a vision for student learning centered on the development of practices and knowledge that will transfer beyond the classroom and beyond formal K–12 schooling. In particular, the aim is to prepare all students graduating from high school to be critical consumers of information and capable problem-solvers and to engage in public discussion using evidence-based argumentation across a broad range of topics.”

2016 California Science Framework

Essential Project Design Elements in California Coastal Voices

Entry Event and Challenging Question: Each Project begins with an entry event that inspires, excites, and engages the students (often a guest speaker but sometimes a video or video conference), and a Challenging Question that students respond to, modify, or discard in favor of co-authoring a related question. The question prompts the use of science and engineering practices to learn significant content and requires thinking across traditional content boundaries guided by the crosscutting concepts.

Sustained Inquiry: The Projects are designed to last three to six weeks and may in some circumstances lend themselves to longer time periods. Supporting sustained inquiry is a primary task for teachers as students are asked to go beyond internet searching to interviewing professionals, finding primary source documents, and performing field work. Each student team must explore the needs and perspectives of a variety of stakeholders and constituents. Content learning is supported by placing knowledge into action in the *Student-Driven Projects* by restoring natural environments, proposing solutions to government agencies, conducting field activities with community members, or helping peers explore coastal career opportunities.

Authenticity: Using real world issues as context for learning increases student interest and motivation (NRC and Larmer, 2016) and so are emphasized in all the *California Coastal Voices* projects. Service to the community is part of the *Student-Driven Projects*.

Student Voice and Choice: Meeting the challenges facing the world today and in the future requires leaders and problem-solvers who will take initiative. Schools can help create these citizens by letting kids explore what matters to them and teaching them how to tackle real-world problems. In *California Coastal Voices*, various levels of student voice and choice are designed into each Project. In the *Teacher-Guided Projects*, student voice and choice ensures student activation. In the *Student-Driven Projects*, students are given more latitude, up to full co-authoring of goals, methods, and presentation options if circumstances allow.

In all of the Projects, teachers have the flexibility to alter the amount of student choice. In the final analysis, teachers will consider student readiness, school culture, students' comfort with student-led projects, and other constraints before deciding on the degree of voice and choice. One key exception relates to organizing project teams; for effective groups, classroom teachers should control this process.

Reflection: If experience is the teacher, structured reflection is the pathway to performance. Science notebooks, self-assessments, and peer reviews are built into each Project. These reflection tools offer students structure as they make their way through the messy business of questioning, exploring, explaining, and extending into action. Teachers should share their own reflective thinking during conferences, casual conversations, and progress checks to demonstrate this important Habit of Mind for students.

Critique and Revision: Frequent feedback from teachers (formative assessment) is a key influencer of quality learning environments. Research by John Hattie of the Melbourne Educational Research Institute supports self-assessment, peer review, professional mentoring from working adults, and teacher evaluation routines. As Dr. Hattie states in *Visible Learning for Teachers: Maximizing Impact on Learning*, "The student's role is not to simply do tasks decided by teachers, but to actively manage and understand their learning gains. This includes evaluating their own progress, being more responsible for their own learning, and being involved with peers in learning together."

In *California Coastal Voices*, significant content knowledge is monitored over the entire course of a Project and is assessed via individual drafting, revising, and editing of written products. This gives teachers many opportunities to adjust instruction. Rubrics are used to evaluate critical thinking, communication, collaboration, creativity and willingness to innovate.

Public Product: This is the culminating activity of many of the Projects in *California Coastal Voices*. Making the learning product public creates a positive pressure towards accuracy and clarity of expression. Knowing that the work can make a difference in the community is also part of the motivation equation.