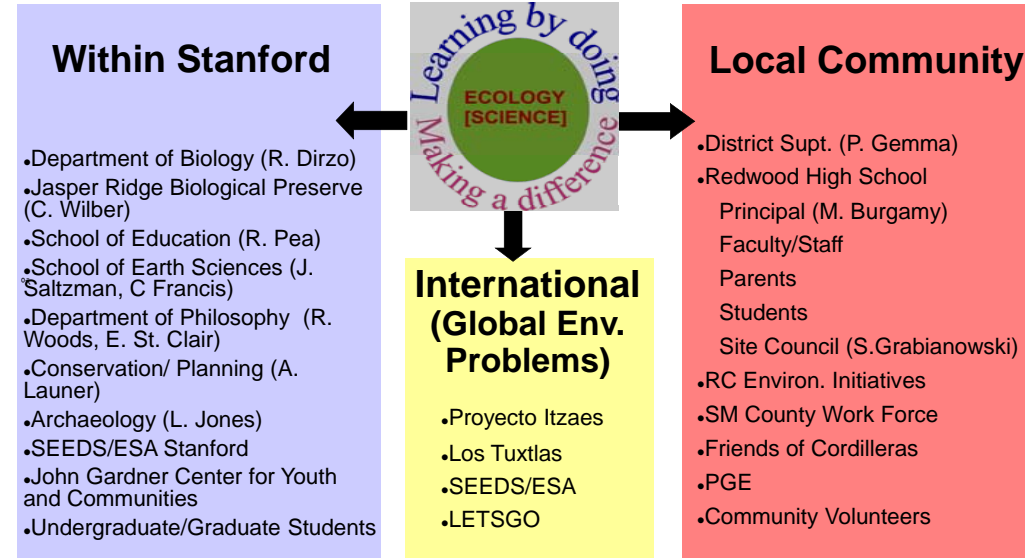


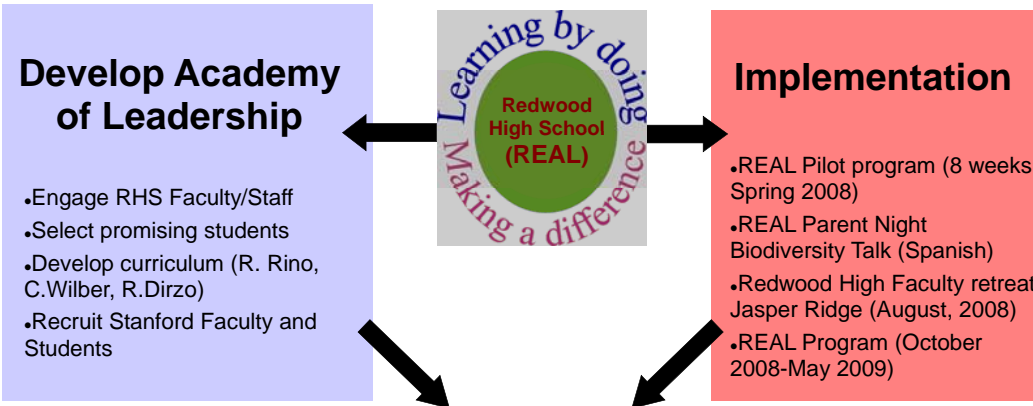
Introduction, Background

- Science education is essential for the prosperity of society
- Assessments of science education in the US show poor student performance and a chronic ethnic disparity among students pursuing higher education
- Simultaneously, environmental problems are increasing locally and globally
- Pedagogical improvements are needed to make science education (ecology) an attractive, rewarding, and fulfilling option for K-12 students and teachers
- Higher education institutions can play an important role in training the new generation of ecologists and science educators in ecology. *Ecology: Learning By Doing* addresses these concerns
- The Redwood Environmental Academy of Leadership (REAL) program is an effort of Stanford University (faculty/staff/students) to connect with teachers and students of Redwood High School (RHS) in project-based learning
- Main goals: Provide RHS students and teachers with sustainable resources to teach and learn ecology; engage them in active, hands-on projects that create the desire to learn; to produce a program that is replicable/transferable; give students confidence to know they can do well in science
- Our ultimate aspirations: Engage RHS students/teachers/families in appreciating the fascination, complexity, and societal value of ecology; to increase Stanford involvement in local outreach and K-12 education and to link students across borders via technology to enrich their knowledge of global problems and our global responsibility to address them

Concept, participants



Methodological approach

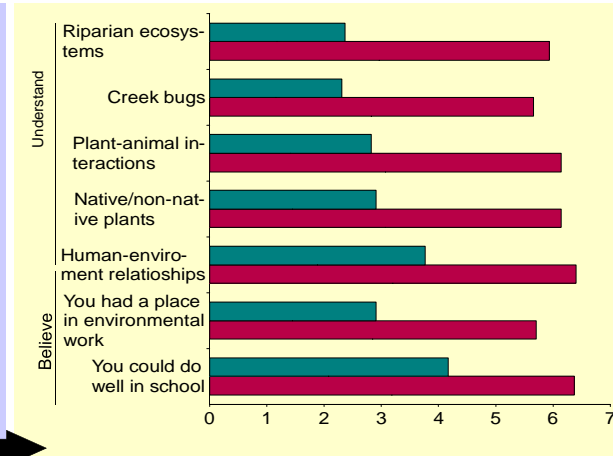


Representative examples of curriculum sessions (Hands-on activities)

- | | | |
|--|---|--|
| <ul style="list-style-type: none"> • Watershed-to-creek • Riparian ecosystems • Vegetation analysis • Plant-animal interactions • Environmental justice | ➔ | <ul style="list-style-type: none"> • A sharing circle • Conceptual introduction • Field activity execution • Math, language, analysis • Student journal |
|--|---|--|

Results, outcomes

- Survey results show increased student understanding of ecological concepts and interest in nature and the environment in general
- Students confidence increased in school in and in their ability to envision themselves as scientists
- Students indicate a stronger understanding of the skills involved in doing science (data collection, analysis, and interpretation, species identification, measurements)
- This plot illustrates the understanding or believing of the students about several topics before (blue) and after (red) the REAL program



Future Directions 2009/2010

- Expand REAL to full-time program as a comprehensive academy open to students from throughout the San Francisco Bay Area [*Replicability*]
 - Strengthen network of local participants [*Sustainability*]
 - Expand field trip/field work opportunities to increase student understanding of ecological work.
- Going Global! LETS GO and REAL collaboration will link students from REAL with students in Sweden and Mexico [*Global Networking*].