

CENTER FOR SCIENCE EDUCATION

at the East Bay Educational Collaborative

THE NEED

For students to achieve in science, they must engage in science.

Research conducted by the National Science Foundation, and many others, has demonstrated that an "engaging" science curriculum is an inquiry curriculum. To succeed, such an approach requires 5 elements:

1. Exemplary Curricula
2. Materials Support
3. Professional Development For Teachers and Administrators
4. District Administrative Support
5. Assessment

OUR GOAL

The goal of the *Center for Science Education* is to partner with districts to provide "world class," research-based, inquiry programs and practices for teachers. Our overriding goal is to help districts develop the structures necessary for improving instructional practice in order to maximize science achievement success for all students.

SOME STRATEGIES WE EMPLOY

Exemplary Curricula

We use science kits developed through rigorous experience from such publishers as FOSS and STC. When necessary, we have the capacity to develop gap-closing units, or specialized activities to meet a specific grade requirement.

Materials Support

We support the science kits through our Science Materials Resource Center. The Center's services include implementation planning; and, science kit auditing, replenishment and distribution.

Professional Development for Teachers and Administrators –

Our team of more than 15 science specialists and mentors, each with 30+ years of experience in education, provides professional development that is research-supported in inquiry, with embedded literacy and assessment strategies. Our team supports such inquiry science programs as FOSS, STC, and SEPUP. Team members bring a rich background of classroom teaching and experience to their work; along with a deep commitment to advancing teaching and learning in science classrooms.

District Administrative Support

Offer flexibility to individualize and assure teacher instructional support and improvement
Provide ongoing planning to support district vision and goals

Assessment

..... Scientist Notebooks and Formative Assessment



OUTCOMES

The Center for Science Education has brought and supports state-of-the art science education in over 40 school districts in Rhode Island, Massachusetts and Connecticut. The Center has aided the transition from either no science being taught (in some districts) or from science text based approaches. It has also assisted districts who seek to "fix" a broken kit-based system, or to complete a partial system.

IMPLEMENTATION EXAMPLE # 1 – *Scientist's Notebooks*

As documented by substantial research, students use of "Scientist's Notebooks" by beginning at kindergarten is an effective strategy to develop deep conceptual understanding of science concepts, fostering inquiry skills, and improving reading and writing. Using a common format for structure and vocabulary, students keep a notebook of investigations and findings -- much like real scientists. The scaffolding begins at kindergarten and increases in sophistication over the years through high school and beyond. Students' investigations proceed from "Claims and Evidence" through "Making Meaning Conferences" conducted by the teacher as a whole-class activity. The science center provides workshop as well as on-site training in developing and using scientist's notebooks using the *Half-Day Embedded Training Model* (see implementation example 2).

IMPLEMENTATION EXAMPLE # 2 – *Developing Formative Assessment Strategies*

Research has indicated the power of effective feedback in raising levels of student achievement. One very successful professional development approach we have developed is to work with teachers at their schools in an embedded experience over the course of several months. Typically, we send a team of primary and intermediate science specialists into a school to spend half a day with each sub-group of teachers. The principal arranges substitutes or coverage for half of the teachers providing students with specific, timely feedback.

TESTIMONIALS

- "The science program at the East Bay Educational Collaborative is a great example of collaboration and implementation of best practices based on research and data." Dr. Michael Klentschy
- "Of all the professional development I have participated in during the last 9 years, this PD has had the most significant impact on my teaching." Anne Pariseau, teacher
- "EBEC has been a source of the highest quality professional development in Science and Mathematics. With their help we are now steadily student performance and teaching abilities of our teachers. Their programs, initiatives, accountability, and their interest in meeting our needs are second to none." Catherine Oneppo, Principal

SERVICES INCLUDE

- Elementary Science: professional development and materials support for 's K-6 teachers and students
- Middle School Science: professional development and materials support for Middle School teachers and students using kit based science curricula
- High School Science: Physics First Reform – planning, professional development and support for re-sequencing the traditional high school curriculum
- Scientist Notebook training
- Formative Assessment training
- On-site professional development (16 specialists) – science, math, literacy professional development
- New kit development
- Kit modifications to meet state standards
- Mini-unit support to close gaps in Middle School kits
- Curriculum development: Common assessment tasks K-8
- Literacy through science training

The EBEC Science professional development team offers a complete menu in K-12 science that is carefully planned and coordinated with district and school instructional leaders with the overriding goal of improving instructional practice and result in student achievement improvement. Curriculum development and alignment with state and national standards can also be provided.

Research Base

Donovan, S., J. Bransford, and J. Pellegrino, eds. 1999. *How People Learn: Bridging Research and Practice*, Washington, DC: National Academy Press

Douglas, R., M. Klentschy, and K. Worth, eds., 2006 *Linking Science and Literacy in the K-8 Classroom*, Arlington, VA, National Science Teachers Association Press.

Harvey, S., A. Goudvis, 2000. *Strategies That Work: Teaching Comprehension to Enhance Understanding*, Portland, ME: Stenhouse.

Horizon Research, 2004. *Local Systemic Change 2004-2005 Core Curriculum Data Collection Manual*, Chapel Hill, NC: Horizon Research.

Klentschy, M., *Using Science Notebooks in the Elementary Classroom*, 2008, Washington, DC: National Science Teachers Association Press.

Klentschy, M., *Scaffolding Science Inquiry Through Lesson Design*, 2008, Portsmouth, NH: Heinemann.

Marzano, R., D. Pickering, and J. Pollock, 2001, *Classroom Instruction That Works, Research-based Strategies for Increasing Student Achievement*, Alexandria, VA, Association for Supervision of Curriculum Development.

National Academy of Sciences. 1997, *Science for All Children – A Guide to Improving Elementary Science Education in Your School District*, Washington, DC, National Science Resources Center, Smithsonian Institution.