

Inquiry by Teachers

By Doris Ash, Cappy Greene and Marilyn Austin

This introduction to the work of six teachers was contributed by staff members of the Exploratorium's Institute for Inquiry. —EDITOR

The Exploratorium is a renowned museum of science, art, and human perception located in San Francisco. Physicist Frank Oppenheimer founded the museum in San Francisco in 1969 as a place to introduce people to science by encouraging self-discovery through a process of asking questions that lead to further understanding. That process is the basis for the Exploratorium's philosophy of science education.

For more than 25 years, the museum has been experimenting with inquiry-based science learning in partnership with teachers and schools in the San Francisco area and across the country. As part of the museum's Center for Teaching and Learning, the Institute for Inquiry provides elementary educators with programs for exploring, examining, and discussing the nature of inquiry. One facet of this program is the Teacher Learning Group, comprised of teachers from San Francisco and nearby Marin County, all graduates of the Institute for Inquiry.

The Teacher Learning Group

This group of teachers has used classroom-based research to infuse inquiry into student learning and into their own teaching practice. The Learning Group has had an emphasis on reflective practice, collaboration and discussion and practitioner-based work using the classroom as the laboratory.

Over the past six years we have seen tremendous growth in the professional skills of a changing group of teachers. As they undertake inquiries into their

own practice, they consciously identify the subtle steps that allow inquiry to grow for their students. Often they begin by working with the process skills of science, observing, questioning, predicting, interpreting, communicating, etc. Teachers model the skills students need to allow process understanding to grow: they model questioning, use planning templates, introduce reflective thinking, and emphasize de-briefing and group-sharing skills.

Self-reflection

While these teachers are guiding inquiry in their own classrooms, they are simultaneously doing an inquiry into their own classroom practices. Their inquiry shares the same process skills that they model for their students. They are inquiring into student learning, using student work as the data.

To do this formative assessment, there must be a mechanism for gathering, interpreting, and making decisions about student progress and for matching the pedagogical techniques that will move students forward. But these next steps also inform the teacher's own practice. This intertwining of actions of both student and teacher is the basis for self-reflective practice and professional development.

The Learning Group provides opportunities for collaboration within a safe and supportive environment where there is constructive feedback on classroom research and practice. Our Learning

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Group consists of teachers across many grade levels and areas of interest. They have found that children of all ages can be successful at inquiry. They know that inquiry can be practiced outdoors and indoors and in a wide variety of content areas. We find this diversity to be enriching to us all.

Featured in this issue of *Connect* are six case studies of science inquiry in the elementary classroom written by participants of the Teacher Learning Group. Each article explores some critical aspect of inquiry:

JOANNA VILLAVICENCIO looks at the classroom environment and kindergarten inquiry into light and color;

JANE BRESNICK explores the facilitation of inquiry into force and motion in the first grade;

WENDY CHEONG examines the role of questioning in a sound unit in second grade;

BETTY MOTT discusses the role of observation in a third-grade creek study;

BETH KRAFT looks at inquiry and project-based learning in a year-long inquiry in the fifth grade;

JULIA MARRERO explores how inquiry leads to content while exploring a sixth-grade unit on the water cycle.

As we have observed these teachers work to change their practices to be more effective, and then share their experiences with their peers, we realize that this is professional development that comes directly from them and from their classroom experiences. The teachers have honed their skills so that their classrooms have become demonstration classrooms. We have brought participants from other seminars to observe them. These members of the Teacher Learning Group have become mentors in their schools and in their districts, have led workshops for incoming teachers and have presented their work at several professional conferences. You will find examples of their exceptional work throughout the pages of this issue of *Connect*.

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