The Exploratorium is a museum of science, art, and human perception in San Francisco. Interactive exhibits at the museum explore the complexity of the natural world by challenging the visitor to engage in discovery. Each summer, enthusiastic science and mathematics teachers convene at the Exploratorium for the Summer Institute, an exciting learning experience. For four weeks, middle and high school teachers participate in a rich mix of learning experiences designed to help them infuse their teaching with hands-on activities, inquiry, and strong science content. Our teachers explore phenomena on the museum floor, then investigate the exhibits' concepts through hands-on classroom activities. Our teachers also share their expertise, discussing strategies that work well in their classes.

The Summer Institute begins with the study of perception, which provides an excellent meeting ground for teachers whose backgrounds and content expertise vary. Since few instructors teach perception, studying it as a group gives all participants experience as learners, and demonstrates the power of inquiry-based science instruction in building new knowledge. The Institute then offers various science and math topics, depending on the focus of the class. Content covered in the sessions supports both state and national science and mathematics standards. We design and publish our own hands-on activities for classroom use, and provide materials to all workshop participants. These activities use easy-to-acquire, inexpensive, and reusable materials. We strive to show teachers how science can be taught on a shoestring budget.

Throughout the Summer Institute, staff scientists and educators provide guidance and mentoring. Teachers are given individual work time to explore their own interests by conducting research in the Exploratorium’s Multimedia Library, or by building projects in our Machine Shop. Machine Shop
instructors, who are schoolteachers themselves, assist teachers in designing projects and learning how to use power tools. Later, participants practice teaching techniques by presenting their projects and research results to colleagues.

Following the Summer Institute, our alumni are invited to attend Saturday sessions during the academic year. These sessions focus on single topics that are always explored through hands-on investigation and group activities. Alumni can also return for special two-week advanced institutes offered during subsequent summers. Many alumni have been active participants in our workshops for over ten years. In this way, our program is unique: We provide teachers with opportunities for both giving and receiving support throughout their professional lives.

**Summer Institute Schedule**
The Summer Institute is a four-week intensive program for middle and high school science and mathematics teachers. Workshops are offered throughout the summer from mid-June through mid-July. Classes meet Monday through Friday. Teachers can select morning sessions (8:30 a.m. to 2:00 p.m.) or afternoon sessions (12:00 noon to 5:30 p.m.). Teachers can also select workshops that focus on life sciences, physical sciences, or mathematics at either the middle or high school level. After completing the Summer Institute, teachers are paid a stipend of $1100 and become Teacher Institute alumni.

Applications for the Summer Institute are sent in mid-February to individuals and selected schools. Interested teachers can e-mail annar@exploratorium.edu or call (415) 561-0313 to get on the application mailing list. The deadline for applications is April 15. Participants are notified of their acceptance status during the first week of May.

**Teacher in Residence (TIR)**
The Exploratorium Teacher Institute invites alumni of our program to take a sabbatical from their classroom teaching to work with the Institute as a Teacher in Residence (TIR). During their residencies, TIRs can participate in exhibit building, teach in our professional development workshops, and visit local schools to model lessons for teachers. TIRs also offer assistance to school districts throughout the San Francisco Bay Area by organizing and leading district professional development days and providing in-class coaching.

**Exploratorium Teaching Resources**

**Teacher Institute Publications**

The Teacher Institute staff has produced several science and mathematics publications that are excellent classroom resources. The Exploratorium Science Snackbook Series provides “recipes” for creating small, inexpensive versions of the Exploratorium’s most popular exhibits. The latest book in this series, Square Wheels and Other Easy-to-Build, Hands-On
Science Activities, contains thirty-one of these projects. Other books include Math and Science Across Cultures, with creative experiments featuring games, art, music, and everyday activities from around the world. Human Body Explorations: Hands-on Investigations of What Makes Us Tick, contains twenty-eight activities enabling learners to discover how their bodies function on microscopic and macroscopic levels. Math Explorer provides a variety of engaging, hands-on activities for middle school students, and the Science Explorer series presents enriching projects for parents and children, ages 6–10, to do at home. Traces of Time: The Beauty of Changes in Nature and The Color of Nature both contain stunning color photographs and lively text that encourage readers to observe and discuss nature in a completely different way. All of these publications are available at the Exploratorium Store or online at www.exploratorium.edu/store.

Exploratorium Learning Studio
The Exploratorium Learning Studio offers further support for teaching science and mathematics by maintaining an extensive collection of books, journals, and videos. Alumni of the Teacher Institute can borrow materials at any time. Browse the Learning Studio catalog online at www.exploratorium.edu/ls. Other educators may borrow materials by purchasing an “Educator Membership” from the Exploratorium at www.exploratorium.edu/membership.

Web Sites
The Teacher Institute’s Web site at www.exploratorium.edu/ti contains information about our program as well as classroom-tested activities we have developed. Alumni of the Teacher Institute can engage in online conversation on the Teacher Institute listserv, Pinhole. Teachers provide resource information, present questions students have asked, discuss science in current events, and suggest activities. Access to Pinhole is given to all Teacher Institute participants.

The Exploratorium maintains an extensive collection of online educational science and mathematics resources at www.exploratorium.edu. You'll find articles on science content, descriptions of hands-on activities developed by the Exploratorium, live Webcasts from science laboratories around the world, online exhibits, and links to other exemplary science education Web sites. The Web site’s digital library allows you to search through archives of thousands of Exploratorium Web pages. Log on to www.exploratorium.edu/educate and find further “Tools for Teachers,” including links to the Teacher Institute and the Learning Studio, and information about programs for students.

Webcasts and The Iron Science Teacher
The Exploratorium periodically creates live Webcasts, including the very popular Iron Science Teacher, a take-off of the Japanese TV series Iron Chef. Iron Science teacher participants

Two teachers discover the path of blood flow through the chambers and vessels of a sheep heart.

During an Iron Science Teacher Webcast, a young audience member assists a teacher, who is participating in the Summer Institute.
build science activities based on a secret ingredient, using simple materials, and present these activities to both a live audience and a virtual audience over the Internet. See the archives at www.exploratorium.edu/ironscionticateacher.

Field Trips
A field trip to the Exploratorium can be an integral part of a science curriculum and a valuable addition to classroom work in many subjects. Field trips are by reservation only, 10 a.m. to 4 p.m. Plan your field trip early; spring slots fill up fast. For reservations, call (415) 561-0317.

Exploratorium Store
The Exploratorium Store stocks a wide range of science and activity books, posters, and educational toys. Visit the Store in person or online at www.exploratorium.edu/store.

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The Exploratorium Teacher Institute is generously funded by the National Science Foundation, The Noyce Foundation, the Carnegie Corporation of New York, The Walter and Elise Haas Fund, The Arthur Vining Davis Foundations, Wells Fargo, and Bank of America.
The Exploratorium Teacher Institute (TI) has been offering workshops in content and pedagogy to middle and high school science teachers since 1984. Our mission is to help these teachers infuse their classes with hands-on activities, scientific inquiry, and strong content. Teachers who participate in the four-week introductory Summer Institute return to the Exploratorium as Teacher Institute alumni for ongoing professional development throughout their careers. The Teacher Institute is now a professional home to well over 2,000 alumni—many have been active participants for over ten years.

In 1998, the Teacher Institute noticed a sharp increase in the number of beginning science teachers applying to our Summer Institute. We also found that many of our most experienced alumni were retiring from classroom teaching, yet were eager to help other teachers and continue their association with the Exploratorium.

We took the opportunity presented by the "changing of the guard" to create a two-year program for novice science teachers (TI Beginning Teacher Program) and another two-year program designed to train and support a group of experienced TI alumni who would serve as their mentors (TI Leadership Program). The programs make up the Exploratorium Teacher Induction Program. The primary goal of the program is to support, retain, and develop the next generation of science teachers, while also inducting them into the larger community of exemplary teachers who make the Exploratorium Teacher Institute their professional home.

### Beginning Teacher Program

Beginning science teachers at the middle and high school level are a diverse group with varying needs. Some are recent graduates of teacher-education programs, while others are still working on their credentials. Some have strong science backgrounds, whereas others have a more limited understanding of content. Because beginning science teachers differ so greatly in background and need, the TI Beginning Teacher Program offers participants a wide variety of content workshops, support-group meetings, teaching seminars, and in-class coaching sessions from which to choose. With the guidance of Exploratorium staff and experienced science teachers (who are also active participants in Teacher Institute programs) serving as their mentors, beginning teachers tailor the program to meet their unique needs.

Each fall, about thirty beginning science instructors who teach in the San Francisco Bay Area start the two-year support program. Novices are required to attend four science-content workshops, a minimum of four teaching seminars, and a minimum of four support-group meetings each year. New teachers also receive classroom visits by experienced science teachers.
The Exploratorium Teacher Induction Program also trains and supports experienced science teachers who then serve as mentors and in-class coaches for our beginning teachers. Each year, fifteen alumni of the Teacher Institute are selected to begin a two-year commitment as mentors.

Training begins with a four-week summer Leadership Institute where the Exploratorium staff prepares these alumni for their new roles. During the school year, the Exploratorium staff continues to work closely with the mentors on an individual basis, helping experienced teachers sharpen their mentoring and coaching skills. The most successful mentors are then asked to join the Leadership Training Institute the following summer, where they share their insights and expertise with a new group of exemplary teachers about to start their two-year service to the beginning science teachers in the Teacher Induction Program.

For More Information
If you know a beginning middle or high school science teacher in the Bay Area who needs support, or if you would like more information about our Teacher Induction Program, please see our Web site at www.exploratorium.edu/ti. You may also contact Linda Shore, Director of the Teacher Institute (lindas@exploratorium.edu) or Anna Rochester, Program Manager of the Teacher Institute (annar@exploratorium.edu) or by phone at (415) 561-0313.

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