

(ELSI) of the Human Genome Project. Teachers network with peers and professionals, and acquire new sources of information during four phases: 1) the first one-week summer workshop to update teachers on human genetics concepts and new sources for classroom curricula including online resources; 2) classroom use of new materials and information; 3) the second one-week summer workshop where teachers return to exchange successful teaching ideas and plan peer teaching sessions and mentor networking; 4) dissemination of genetic information through in-services and workshops for colleagues; and collaboration with genetic professional participating in our Mentor Network.

The applications of Human Genome Project technology are emphasized. Individuals who have contact and experience with patients, including clinical geneticists, genetic counselors, attorneys, laboratories geneticists and families, take part in didactic sessions with teachers. Throughout the workshop, family panels provide an opportunity for participants to compare their textbook-based knowledge of genetic conditions with the personal experiences of families who discuss their condition, including: diagnosis, treatment, genetic risk, decisions, insurance, employment, family planning, and confidentiality.

Because of this project, teachers feel more prepared and confident teaching about human genetics, the Human Genome Project, and ELSI topics. The teachers are effective in disseminating knowledge of genetics to their students who show a significant increase in human genome knowledge compared to students whose teachers have not participated in this project.

Teacher dissemination activities extend the project beyond participation at summer workshops. To date, 55 workshop participants have completed all four project phases by organizing more than 200 local, regional, and national teacher education programs to disseminate knowledge and resources. More than 1500 colleagues and the general public have participated in teacher workshops, and over 56,000 students have been reached through project participants and their peers.

The project participants organize interdisciplinary peer teaching sessions including bioethical decision making sessions combining debate and biology classes; sessions for social studies teachers; human genetics and multi-cultural collaborations; cooperative learning activities; and curricular development sessions. Students were involved in sessions on ethics, politics, economics and law. Teachers organize bioethics curriculum writing sessions, laboratory activities using electrophoresis as well as other biotechnology, and sessions on genetic databases.

A World Wide Web home page for Genetics Education assists teachers in remaining current on genetic information and helps them find answers to student inquiries. The

home page has links to numerous genome sites, sources of information on genetic conditions, networking opportunities with other genetics education programs, teaching resources, lesson plan ideas, and the Mentor Network of genetic professionals and a network of family support groups willing to work with teachers and their students.

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Human Genome Education Program

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The Human Genome Education Program (HGEP) operates within the Stanford Human Genome Center. It is a collaborative effort among HGEP staff, Genome Center scientists, collaborating staff from other education programs, experienced high school teachers, and an Advisory Panel in the fields of science, education, social science, assessment, and ethics.

The Human Genome Project will have a profound impact on society with its applications in testing for and improving treatment of genetic disease and the many uses of DNA profiling. The goal of HGEP is to help prepare high school students and community members to be able to make educated decisions on the personal, ethical, social and policy questions raised by the application of genome information and technology in their lives.

The primary objectives for HGEP are to (1) develop a human genome curriculum for high school science and (2) education outreach to schools and community groups in the San Francisco Bay Area. To achieve Objective 1, the HGEP is working to develop, field test, and prepare for national dissemination a two laboratory-based curriculum units for high school students. Unit 1, "Dealing With Genetic Disorders," explores the variety of treatment options potentially available for a genetic disorder, including gene therapy. Unit 2, "DNA Snapshots, Peeking at Your DNA," explores human relatedness through examining the student's own DNA polymorphisms using PCR.

Each unit is centered around a societal or ethical problem raised by these important applications of genome information and technology. Students use modeling exercises and inquiry laboratory experiments to learn about the science behind a given application. Students then combine the science they have learned with other relevant information to choose a solution to the societal/ethical problem posed in the unit. As a culminating activity, the students work in groups to present and defend their solution.