 

**HIGH SCHOOL**

**Biotechnology**

**Supplemental: Medical/Pharmaceutical Biotechnology Resource List**

**University of Utah** provides Teacher Lesson Plans; "Print and Go" Index with activities, labs, teacher guides and more. Relavent Topics: Gene Therapy, Genetic Disorders, Using Family History to Improve Health, Intro to Genetics for grades 5-7, Pharmacogenomics & Stem Cells. <http://gslc.genetics.utah.edu/teachers/>

* **Genetic Learning Center** gives access the University of Utah's Genetic Science Learning Center - including the Genomics of Health Series after creating a log-in profile at no cost. <http://learn.genetics.utah.edu/>

**University of Washington** These programs provide interdisciplinary, hands-on science curricula, teacher training, equipment, and support. <http://chroma.gs.washington.edu/outreach/>

* **High School Human Genome Project** The High School Human Genome Program allows high school students to sequence DNA in their classrooms and to contribute their data to the Human Genome Project. The program was developed jointly by scientists from the University of Washington's Department of Molecular Biotechnology and high school teachers from the Puget Sound region. <http://hshgp.genome.washington.edu/>
* **Huntington's Disease Ethics Module** Ethics Module, part of the High School HGP with the focus on Presymptomatic Testing for HD. "Klein Family Case Scenario" and decision making model. <http://hshgp.genome.washington.edu/teacher_resources/EthicsModuleJuly1998.pdf>

**Duke University** Accessible Genetics Research Ethics Education (AGREE) is a series of web-based educational modules on ethics and genomics research that are available free of charge. <http://agree.mc.duke.edu/>

**University of Kansas’** Medical Center Genetics Education Center provides list of resources for educators interested in human genetics and the human genome project. Topics include: Curricula, Human Genome Teacher Network, Teacher Training options, and resource lists. <http://www.kumc.edu/gec/>

**University of Pennsylvania** provides free access to its “High School Bioethics Project” after a log-in profile is created. <http://www.bioethics.upenn.edu:16080/highschool/>

**University of Virginia** provides nine modules, including one on Public Health Genetics: Screening Programs and Individual Testing/Counseling. This curriculum is a resource to enhance and encourage thoughtful, well informed, and critical discussions of ethical issues in public health. <http://www.asph.org/UserFiles/Module8.pdf>

**University of Texas – Pan America** provides a biotechnology and medical laboratory science curriculum with activities that include: Protein quantification with spectrophotometer, ELISA screen for HIV antibodies, sickle cell anemia & electrophoresis, DNA fingerprinting, electrophoresis and evolution, bacterial transformation, personal DNA isolation, PCR; all available through free downloads. <http://www.panam.edu/dept/biotech/modules.html>

**Oklahoma City Community College’s** Biotechnology and Bioinformatics Discovery site aims to infuse biotechnology into the high school setting through teacher activities, trainings and summer science academies. <http://www.occc.edu/BBDiscovery/>

**Seattle Pacific University's College of Arts and Sciences** offers their Program in Biotechnology for K-12 teachers, including the summer course "Biotechnology Applications for Secondary Teachers"; resources in science education and bioethics; classroom assistance with application of biotechnology/genetics-related topics using SPU Biotechnology Program students and faculty. <http://www.spu.edu/depts/dcs/summer/science/intro.html>

**The Human Genome Project’s Educational Resources** provides information for teaches and students complete with webcasts, images, videos, presentations and related career information. <http://www.ornl.gov/sci/techresources/Human_Genome/education/education.shtml>

**Biological Sciences Curriculum Study (BSCS)** has several High School curriculums related to biotechnology and genetics, including:

* **Mapping and Sequencing the Human Genome: Science, Ethics, and Public Policy.** This curriculum supplement describes the history, organization, and funding of the HGP and is designed for approximately one week of classroom instruction. <http://www.bscs.org/page.asp?pageid=0|31|53|308|86&id=0|mapping_and_sequencing_the_human_genome:_science,_ethics,_and_public_policy>
* **The Human Genome Project: Biology, Computers, and Privacy.** This stand-alone instructional module addresses the general issue of information technology as it relates to the Human Genome Project.<http://www.bscs.org/page.asp?pageid=0|31|53|308|85&id=0|the_human_genome_project:_biology,_computers,_and_privacy>
* **The Puzzle of Inheritance: Genetics and the Methods of Science.** This curriculum provides teachers with an update on important information about nontraditional inheritance and the nature of science and includes five related classroom activities.<http://www.bscs.org/page.asp?pageid=0|31|53|308|90&id=0|the_puzzle_of_inheritance:_genetics_and_the_methods_of_science>
* **Genes, Environment, and Human Behavior.** This curriculum supplement explores how scientists investigate the genetics of human behavior. The curriculum, BSCS's fourth module related to the Human Genome Project, includes background information on the methods and assumptions of behavioral genetics and five student activities. <http://www.bscs.org/page.asp?pageid=0|31|53|308|82&id=0|genes,_environment,_and_human_behavior>
* **Bioinformatics and the Human Genome Project**. This stand-alone instructional module addresses how and why computers are essential for analyzing the data produced by the Human Genome Project. The module provides teachers with background information about development and applications of bioinformatics. Five inquiry-based classroom lessons create a scenario where students play the roles of employees of a fictitious biotechnology company. <http://www.bscs.org/page.asp?pageid=0|31|53|308|77&id=0|bioinformatics_and_the_human_genome_project>

**National Human Genome Research Institute (NHGRI)** provides educational materials about genetics and genomics for students, teachers and the general public. <http://www.genome.gov/Education/>

**National Institute of Health (NIH) Office of Science Education** offers multiple educational resources including topics sorted by topic (ie bioethics, genetics, technology), grade level, or resource format (ie lesson plans, online resources) Access Excellence website provides a series of learning modules on multiple science and health topics, including biotech and genetics. <http://science-education.nih.gov/students>

* **Human Genetic Variation** is one of the High School curriculum supplement series provided. <http://science.education.nih.gov/supplements/nih1/Genetic/default.htm>

**DNA Interactive (DNAi)** has a Teacher Guide that provides fifteen lesson plans, resources, and guides to use their interactive website complete with a table listing standards correlation and materials provided. <http://www.dnai.org/teacherguide/guide.html>

**Genetics Education Partnership (GEP)** is a learning community of kindergarten through 12th grade teachers, scientists, and genetics professionals from throughout Washington state who are committed to genetics teaching. <http://genetics-education-partnership.mbt.washington.edu/>

**National Health Museum’s** Access Excellence website provides a series of learning modules on multiple science and health topics, including biotech and genetics. <http://www.accessexcellence.org/>

**The Biotechnology Institute** has an Education Resources section which provides links to resources, activities, events and professional development opportunities. <http://www.biotechinstitute.org/resources/index.html>

* **Shoestring Biotechnology** [**: Budget-Oriented High Quality Biotechnology Laboratories for Two-Year College and High School**](http://portal.nabt.org/PortalTools/Shopper/ProductDetail.cfm?ProdCompanyPassed=NBT&ProdCdPassed=NBT-13)is a laboratory manual available to order for $40.00 from the National Association of Biology Teachers website and is the basis for the teacher professional development that the Biotechnology Institute conducts around the nation. <http://www.biotechinstitute.org/resources/shoestring_biotech.html>

**Dolan DNA Learning Center** with the Cold Springs Harbor Laboratory, hosts an interactive informational website called, *“Your Genes, Your Health”* and is linked to a companion site called *“DNA From The Beginning”* which can be used to review information interactively. <http://www.ygyh.org/hd/whatisit.htm> (HD specific link) <http://www.dnaftb.org/dnaftb/>

**Modern Biology for High School Classrooms’** website has a “Snapshots of Science and Medicine” section that was recently focused on DNA Chips and related labs, background information and more. <http://science.education.nih.gov/newsnapshots/TOC_Chips/toc_chips.html>

**Foundation for Blood Research (FBR)** provides an interactive module, *“Chances’ Choice”* for teaching human genetics to high school biology students and is designed to demonstrate the practical applications of human genetics research. It includes clinical information about a variety of common genetic disorders; description of the technology used to test for these disorders; and the social, legal, economic, and ethical issues that affected families typically face. Free except for shipping and handling. <http://www.fbr.org//publications/cc/chances-choices.html>

**The Berkley Lab’s** Education Site on Genome Science Education Outreach provides an interactive module, *“Chances’ Choice”* for teaching human genetics to high school biology students and is designed to demonstrate the practical applications of human genetics research. It includes clinical information about a variety of common genetic disorders; description of the technology used to test for these disorders; and the social, legal, economic, and ethical issues that affected families typically face. Free except for shipping and handling. <http://www.fbr.org//publications/cc/chances-choices.html>

**San Francisco Unified School District** has made it a goal to have all high school biology teachers include a biotechnology experience for all their classes. Adobe files list activities, lab and more information on this initiative. <http://www.sfusd.k12.ca.us/programs/sf_base/program.htm#skills>

**PBS** produced a three part series that was aired in 2003 examining issues of genetic science - Who Gets to Know: Genetics & Privacy; Making Better Babies: Genetics & Reproduction; Genetics on Trial - Genetics, Behavior & the Law and has accompanying classroom materials to conduct a lesson examining these concepts. <http://www.pbs.org/inthebalance/archives/ourgenes/index.html> <http://www.pbs.org/inthebalance/archives/ourgenes/lesson_index.html>

**Environmental Health Science Education,** part of the National Institute of Environmental Health Sciences, provides a list of curricular materials, many of which are standards based, to help teachers expose students to environmental health concepts. <http://www.niehs.nih.gov/science-education/teachers/curricular.htm>