

GENOMICS (GNIC)

Week One	TOPICS	ACTIVITIES	STUDY HALL
Day 1:	Review What is a Gene?	<p>Morning:</p> <ul style="list-style-type: none"> -Lab Safety Video -Getting to Know You -Community Standards -Laptop Distribution -Review of Lab Safety <p>Afternoon</p> <ul style="list-style-type: none"> -What is a Gene? (group research/discussion) - Pre-assessment 	<p><u>Ch2: Discovering Genomics, Proteomics and Bioinformatics</u> (2nd Edition)</p> <p>Answer questions 1, 3, 4, 5, 12, 13</p>
Day 2:	What is Genomics?	<p>Morning:</p> <ul style="list-style-type: none"> - FIELD TRIP: DR. FEINBERG'S LAB <p>Afternoon:</p> <ul style="list-style-type: none"> - DNA Sequencing (lecture) - Edvotek kit 339 - Edvotek kit 340 	<ul style="list-style-type: none"> - Quiz on DNA Sequencing focusing on the differences between the Sanger Method and the Automated Method. - Completion of Edvotek kit 340
Day 3:	The Human Genome Project	<p>Morning:</p> <ul style="list-style-type: none"> -Primary literature readings from Feb 2001 <i>Science & Nature</i> publications <p>Afternoon:</p> <ul style="list-style-type: none"> - BSCS Bioinformatics Lesson 1 - BSCS Bioinformatics Lesson 2 	<ul style="list-style-type: none"> - BSCS Bioinformatics Lesson 3
Day 4:	Comparative Genomics (Part I)	<p>Morning:</p> <ul style="list-style-type: none"> - Genomic Libraries (lecture) - Blotting (Southern, Northern, Western) (lecture) - RFLPs (lecture) - ESTs (lecture) - Genomic Analysis (shotgun vs. contigs) (lecture) - Primary literature readings and presentations by groups from Lawrence 2005, Modi and Crews 2005, Bennetzen 2005, Dujon 2005, Hall and Carlton 2005, Catillo-Davis 2005 <p>Afternoon:</p> <ul style="list-style-type: none"> - Phylogenic Trees Activity - Review of Basic Lab Techniques Lab - Introduction to Disease Project 	<p><i>Discovering Genomics, Proteomics and Bioinformatics</i> (2nd Edition) pp. 178-198 #1, 2, 5, 25, 26, 27, 29, 30, 31.</p>
Day 5:	Comparative Genomics (Part2)	<ul style="list-style-type: none"> -Weekly Quiz -Environmental Case Study 	<p><u>Ch 4: Genomic Variations</u> (Campbell & Heyer)</p>

Week Two	TOPICS	ACTIVITIES	STUDY HALL
Day 6:	Special Chromosomes: Mitochondrial DNA	<p>Morning:</p> <ul style="list-style-type: none"> - Endosymbiont theory and mitochondrial DNA (lecture) - Mitochondrial Control Region Polymorphisms & Molecular clocks (lecture) - Review procedure for mitochondrial DNA lab - Cheek swab and DNA extraction - PCR of DNA <p>Afternoon:</p> <ul style="list-style-type: none"> - Review of electrophoresis procedure - Load and run electrophoresis - Primary literature reading of Medini et al., 2005 - Discussion of paper - Stain gels 	<ul style="list-style-type: none"> - 16S and 18S rRNA (lecture) - Work on disease project.
Day 7:		<p>FIELD TRIP TO NIH Intramural Sequencing Center (NISC)</p> <p>DEPART: 9:30 AM RETURN: 3:00 PM</p>	<ul style="list-style-type: none"> - Isolated colony from environmental lab & inoculate LB broth - Disease project
Day 8:	Bacterial Genomics	<p>Morning:</p> <ul style="list-style-type: none"> - Review procedure for purification of bacterial DNA and PCR amplification <p>Afternoon:</p> <ul style="list-style-type: none"> - Purify genomic DNA 	<ul style="list-style-type: none"> - PCR amplification of 16S rRNA gene - Disease project
Day 9:	Complex Traits	<p>Morning:</p> <ul style="list-style-type: none"> - Purification of PCR product - Electrophoresis of PCR product <p>Afternoon:</p> <ul style="list-style-type: none"> - Cut out DNA bands - Case study: "What's wrong with my child?" chapter 11 <i>Discovering Genomics, Proteomics and Bioinformatics</i> (2nd Edition) 	<ul style="list-style-type: none"> - Review for quiz - Disease project
Day 10:	Complex Traits HapMap	<p>Morning:</p> <ul style="list-style-type: none"> - Gel extraction using a microcentrifuge - Weekly quiz <p>Afternoon:</p> <ul style="list-style-type: none"> - Quantify amount of DNA for sequencing - HapMap tutorial 	<ul style="list-style-type: none"> - Disease project

Week Three	TOPIC	ACTIVITIES	STUDY HALL
Day 11:	Microarray Technology Genomics & Proteomics: Expansionist Biology	Morning: - Review of weekly quiz - Microarray technology (lecture) - Gene-chip microarray activity #2: structure and function Afternoon: - Gene-chip microarray activity #3: build a model of a microarray	- Disease project
Day 12:	Epigenetics	Morning: - In Search of the Cancer Gene lab Afternoon: - Epigenetics (lecture) - Primary literature reading Bjornsson et al., 2004 and Feinberg and Tycko 2004 - Discussion of papers	- Look at results of In Search of the Cancer Gene - Complete lab write up
Day 13:	Proteomics	Morning: - Determination of Amino Acid Sequence of a Peptide lab Afternoon: - Proteomics (lecture)	- Review of DNA sequences from Bacterial Identification lab - BLAST and ClustralW of DNA sequences
Day 14:	Presentations	Morning: - Disease presentations Afternoon: - Disease presentations	- Movie
Day 15:	Farewells	Parent Conferences	