

2003 Biology Institute Daily Schedule

Descriptions of Lab Activities

July 7

AM- Find It Assess it Do it- Intro to lab procedures

Summary- In this session the participants will be schooled in the basic techniques that they will be using in the lab sessions to follow. The participants will learn to measure, prepare solutions, pour agarose gels, prepare bacterial transformation plates, and use a micro pipettor.

PM- During a brief afternoon session the participants will finish any of the lab stations they were unable to complete during the morning session

July 8

AM- DNA Isolation High Tech,

Summary the participants will learn to isolate clean high quality DNA from *Drosophila* specimens using a phenol/ chloroform extraction method followed by an ethanol precipitation.

PM DNA Isolation Lo Tech-

Summary- The techniques and principles which were learned in the morning session will be translated to a simpler method which can be used effectively in the classroom. The participants will be given salt, water, soap and alcohol and will design their own protocols to extract DNA from an assortment of groceries (Strawberries, corn, bananas, steak etc.)

July 9

AM PCR High Tech and Lo Tech

Summary- the participants will be introduced to the Polymerase Chain Reaction (PCR) a technique which scientists use to isolate a particular sequence from a prepared sample of whole genomic DNA. The High tech portion will utilize a thermalcycler, a computer controlled heating block. In the Lo Tech portion the participants will transfer their reaction manually between water baths which will be set at different temperatures and the results of this method will be compared to the results from the thermalcycler.

July 10

AM Manipulating PCR cloning I

Summary- In this session the participants will learn to make copies of the PCR products by ligating the fragments into a plasmid and then using the ligated plasmid to transform bacterial cells.

PM Direct sequencing I

Summary- In this session the participants will learn the Sanger dideoxy sequencing method. They will use their PCR products from the previous day as the template for the sequencing reaction.

July 11

AM Manipulating PCR, Cloning II and Direct Sequencing II

Summary- In this session the participants will learn to screen the bacterial colonies from the previous day using PCR. They will then use the PCR amplified clones as the template for a second round of sequencing. At this time the results of the previous days sequencing reactions will be assayed using the automated DNA sequencer. The participants will precipitate and prepare the sequencing reactions and will assist in loading the automated DNA sequencer.

July 12

AM Manipulating PCR Part III

Summary- The results of the previous days sequencing run will be evaluated and the second set of sequencing reactions will be assayed using the automated sequencer.

July 15

PM- Genomic Revolution PCR/sequencing class

Summary- In this session the participants will experience a program originally developed for High School participants at the Dolan DNA Learning Center. This inquiry based exercise show how DNA sequence data can be used to evaluate two conflicting hypotheses regarding the evolution of Modern Humans.

July 16

AM Collections

Summary- the participants will collect the specimens which they will use for their projects.

July 17

AM DNA Isolation

Summary- the samples collected the previous day will be identified and cataloged followed by DNA isolation.

July 18

AM PCR

Summary - the participants will use PCR to isolate the DNA fragments that they will use for their projects.

July 19

AM PCR assay

Summary-The results of the previous days PCR reactions will be evaluated.

July 21

AM Cloning, DNA sequencing

Summary- Sequencing of the previous day's PCR products

July 22

AM Cloning DNA sequencing Phase II

Sequencing reactions from the previous day will be loaded on the automated DNA sequencer. PCR reactions which failed the previous day will be attempted again.

July 23

AM Cloning DNA sequencing Phase III

Sequencing reactions from the previous day will be loaded on the automated DNA sequencer. PCR reactions which failed the previous day will be attempted again.

July 24

AM Data analysis

Summary- The participants will evaluate the results of the sequencing reactions, edit the sequences and begin the analysis of the data.

July 25

AM Data analysis

Summary- The participants will evaluate the results of the sequencing reactions, edit the sequences and begin the analysis of the data.

July 28

Summary- The participants will evaluate the results of the sequencing reactions, edit the sequences and begin the analysis of the data.