

Practical DNA Training Program Outline

A two-week (9 business days) intensive laboratory-based training program designed to teach students the fundamentals of molecular techniques including DNA extraction, amplification (using PCR), sequencing and interpretation. The course includes training in the latest DNA technologies, including multiplex PCR, real time PCR and use of the 3100 automated sequencer and ABI 7000 real time PCR equipment. The laboratory sessions will have up to three students with one senior staff member.

- Laboratory 1:** Laboratory Techniques
- Laboratory 2:** Sample Collection and Preparation
- Laboratory 3:** Gel Electrophoresis
- Laboratory 4:** Extraction Procedures
- Laboratory 5:** Purification Procedures
- Laboratory 6:** Sex Determination PCR
- Laboratory 7:** PCR Preparation
- Laboratory 8:** Quantifiler-Real-time PCR
- Laboratory 9:** Gel Electrophoresis
- Laboratory 10:** PCR Product Purification
- Laboratory 11:** Sequencing Reaction
- Laboratory 12:** Sequence Purification
- Laboratory 13:** STR Multiplex
- Laboratory 14:** Sample Preparation
- Laboratory 15:** Group Project
- Laboratory 16:** Computer Lab

**A calculator is required for all labs.

The laboratory sessions are designed to follow the general process of the collection and preparation of a sample followed by the extraction and analysis of the DNA. The laboratories will cover the different types of samples that can be used for DNA analysis (buccal, hair, blood, bone) and the different preparation procedures required for each sample type. The participants will learn various DNA extraction methods applied to a variety of tissue types. Students practice on their own DNA samples using PCR (polymerase chain reaction), Multiplex PCR, Fluorescent labeled PCR, Sequencing, sequence specific PCR (standard) and combinations of these. Other techniques covered in the lab sessions include gel (Agarose and polyacrylamide) and capillary electrophoresis, column chromatography, centrifugation and pipetting. The participants will analyze the control region of their own mitochondrial DNA, and the sex chromosomes and STRs within their nuclear DNA. One laboratory session is also dedicated to the computational aspects of analyzing DNA wherein each participant has their own computer and works through databases, websites and programs that are applicable to their analysis or the interpretation of their results.