

## Pre-Laboratory Questions:

- 1) If humans are the same species, why are certain regions of our DNA variable (i.e. different sequence of DNA bases) from person to person?
  - a. What factors might give rise to variation within the total gene pool of a human population?
  - b. Describe the factors that might give rise to variation in DNA sequence between offspring and parents.
- 2) Imagine that you are a forensic investigator. Name at least three different types of evidence that might be collected at a crime scene from which you could extract DNA.
  - a. What are some hurdles that may be associated with collecting sufficient DNA evidence from samples obtained at a crime scene (*Hint*: think about the origin of the evidence, the amount, etc.)?

## **During Laboratory Questions:**

- 1) Chelex is an important tool for this DNA extraction.
  - a. What is the purpose of the Chelex resin? How does charge play a role in its function?
  - b. Once our concentrated cell solution is added to the Chelex, the entire mixture is placed in the thermal cycler for a ten-minute boil cycle. What is the purpose of boiling the mixture and why should we not carry out this step before the boiling step?
- 2) Specifically describe the target of our PCR reaction. What region of the genome will we be amplifying and on what chromosome is it found?



## **Post-Laboratory Questions:**

- 1) Why is it important to PCR amplify the target region of DNA in this experiment as opposed to just analyzing this region from the purified genomic DNA?
- 2) Before we examine our genotype using gel electrophoresis, let's take a moment to think about the outcome of our PCR. Answer the following questions:
  - a. Is it possible for the PCR to synthesize multiple amplicons (i.e., amplified fragments) of different size in this experiment? If so, what is contributing to the difference in fragment size? (Be specific with regard to how different sizes might have been obtained).
  - b. Assume that my genotype at D1S80 is (18, 23). Explain what this means in terms of the number of repeats. How many amplicons of different size would you expect to observe if you were to run the PCR product on a gel?