Unit 03: Biology

Content Area: **Science**
Course(s): **Forensics**
Time Period: **Semester 1**
Length: **4 weeks**
Status: **Published**

Standards

LS4.A	Evidence of Common Ancestry and Diversity
	Obtaining, Evaluating, and Communicating Information
	Patterns
	Constructing Explanations and Designing Solutions
	Cause and Effect
	Engaging in Argument from Evidence
	Systems and System Models

Enduring Understandings

1. Presumptive and confirmatory tests for blood and bodily fluids are both useful in their own ways.

2. The development of DNA technology has changed the field of forensic science forever.

3. DNA evidence is highly important to a forensic investigation and therefore needs to be handled properly.

4. The principles of DNA can be applied as a means to identifying one person with a reasonable certainty.

Essential Questions

1. What are the benefits of presumptive testing if it can't be brought into court?
2. How has DNA profiling contributed to the development of the field of forensic science?
3. What DNA technologies have been developed that can be used to isolate and identify evidence?
4. What is the significance or value of DNA evidence to forensic investigation?

Knowledge and Skills

Knowledge:

1. Students will know and be able to describe the forensic tests used to characterize a stain as blood.

2. Students will know how to identify and describe the various strategies used to find "invisible" evidence such as color change and luminescence.
3. Students will know how to differentiate between presumptive tests and tests of confirmation.
4. Students will know the laboratory tests necessary to characterize seminal stains.
5. Students will know how to explain how suspect blood and semen stains are to be properly preserved for laboratory examination.
6. Students will know how to describe the chemical reactions between blood and the Kastle Mayer test and Luminol reagents.
7. Students will know the composition of blood.
8. Students will know the function of blood cells.
9. Students will know how to screen for the presence of human blood.
10. Students will know which biological samples contain which types of DNA.
11. Students will know the procedures for extracting and processing DNA through the process of polymerase chain reaction and gel electrophoresis.
12. Students will know how DNA technology has evolved over the past thirty years and understand how this evolution connects to the work of the Innocence Project.
13. Students will know the difference between mitochondrial DNA and nuclear DNA.
14. Students will know how to identify the parts of a nucleotide and explain how nucleotides are linked to form DNA and explain the concept of base pairing as it relates to the double-helix structure of DNA.
15. Students will know the newest DNA typing techniques, like short tandem repeats (STRs) and polymerase chain reaction (PCR), are applied to forensic DNA typing and how CODIS is used to compare DNA samples.
16. Students will know the necessary procedures for proper preservation of biological evidence for laboratory DNA analysis.

Skills:

1. Determine whether or not a sample is a bodily fluid using presumptive testing methods.
2. Construct an explanation of DNA's significance to the field of Forensics and evaluate its use in solving crimes.
3. Analyze simulated DNA samples using gel electrophoresis and describe if any samples match.
4. Read DNA profiles and compare them to suspect DNA profiles.
5. Identify matches and non matches using CODIS reports.

Assessments

https://docs.google.com/document/d/1wR7bQF-8AQoRrt0g4C3hKja0yjwDjC9_BiAmONWbTcI/edit