Unit 3: Impression Analysis

Content Area: **Science**
Course(s):
Time Period: **Marking Period 3**
Length: **3 weeks**
Status: **Published**

Brief Summary of Unit

The focus of this unit is an introduction to the viability of soil as a form of forensic evidence. Proper collection and analysis techniques for soil analysis are introduced and practiced as students recognize the multifaceted applications of soil analysis as a prevalent type of evidence. Students will practice conducting a thorough analysis of soil samples ranging from chemical, physical, and biological characteristics. Through analysis connections will be made to the influences of environmental factors such as climate change on soil formation and characteristics. Students will also consider the types of information that can be obtained from a soil sample, modeling how it could be used during an investigation.

Revised: July 2023

Essential Questions/Enduring Understandings

Essential Questions

- What is the forensic significance of class and individual characteristics to the comparison of footwear, tire, and tool mark impressions?
- How can similar shoes, tools, and tires be distinguished to individualize one particular sample?
- What impact do minute imperfections have on objects that can leave impressions?

Enduring Understandings

- Students are able to perform thorough analyses on sample impression evidence in order to determine the presence of a positive match via the location, type, and number of individualizing characteristics.
- Students are adept at creating and comparing sample impressions, analyzing the minute imperfections that distinguish similar impressions from each other.

Objectives

- Students will know how to differentiate between class and individualized characteristics in shoe impressions, tire impressions, and tool mark impressions.
- Students will be skilled at individualizing sample impressions by identifying individualizing markings on impressions.
- Students will know the best methods for determining if two impressions originated from the same source.
- Students will know the impact of surface type on the quality and likelihood of an impression.

- Students will know how the presence of an impression can be used to link a vehicle, tool, suspect, etc. to a crime scene.
- Students will know how minute imperfections can impact resulting impressions.
- Students will know the best methods for the preservation of footwear evidence when collecting evidence.
- Students will know the significance of comparison techniques in discerning the origin between sample impressions.
- Students will be skilled at conducting an analysis between known and unknown samples to determine their origin.
- Students will know the relevance and application of impression evidence to solving a crime.

Learning Plan

- Preview essential questions and connect to learning throughout the unit.
- Establish prior knowledge and understanding prior to the start of the unit.
- Introduction to the material via direct instruction with the use of Google Slides presentations and infographics.
- Participate in demonstrations and activities that build upon information delivered via direct instruction.
- Have students conduct an analysis of current shoes they are wearing with a partner to introduce the topic and get students interested.
- Identify the differences in wear patterns in different people's shoes and discuss factors that may contribute to the wear of a person's shoe (or tire or tool).
- Complete the individualization activity between sample shoe impressions, using the type, location, and frequency of individualizing marks to demonstrate a common source.
- Locate and consider case studies where impression analysis and evidence is utilized.
- Participate in laboratory activities to create impressions using different mediums, analyze them, and locate individualizing markings.
    - Shoe Analysis Lab
    - Tire Analysis Lab
    - Toy Car Impression Analysis Lab
    - Tool Mark Analysis Lab
- Watch an episode of Forensic Files that demonstrates how impression evidence and analysis is used to investigate and solve a crime.
- Develop a complex understanding of how impression evidence and analysis can be used to resolve an

investigation.

Assessment

Formative

- Do Now Questions
- Exit Ticket Questions
- Whole class discussion participation
- Small group discussion participation
- Individual student questions/responses
- Independent tasks
- Lab experiments
- Quizzes

Summative

- Unit project-->Interactive case study creation
- Lab activities throughout the unit
    - Shoe Impression Lab
    - Tire Impression Lab
    - Toolmark Impression Lab
    - Teeth Impression Lab (if time permits)

Benchmark

- Final Exam

Alternative Assessments

- Open note test
- Project on impressions-->Create your own case study

Materials

- Forensic Science, An Introduction by Roy Saferstein textbook
- Impression Analysis Google Slides
- Assorted episodes of Forensic Files & CSI Season 1
- Lab materials