Inspiring Greatness
ISD
INDEPENDENCE SCHOOL DISTRICT

High School Science Virtual Learning

Forensic Science
Soil Analysis

May 7, 2020

High School Forensic Science
Lesson: May 7, 2020

Objective/Learning Target:
Students will be able to understand how crime scene investigators use soil samples as evidence.

1. Is all soil the same? What kinds of things could be different about soil samples taken from different locations in the world?

2. Where would we most likely see soil samples being taken from in a crime investigation?

1. Soil could be different colors. It can have different types of rocks or sand in it. It could have different microorganisms and insects living it it.

2. From the bottom of shoes, from clothing, from tools used for digging

Lesson Activity:

Directions: Watch the lecture provided in the link. Take notes as you go. When you are done, watch the video again, answering the following questions as you go.

Link(s): Soil Analysis Lecture

Practice

You will use the information from the activity on slide 5 to answer the following questions.

Practice Questions

1. What is soil made of?
2. What living things are found in soil?
3. What characteristics of soil are analyzed?
4. What items is soil found on in crime situations?
5. What types of crimes commonly have soil as evidence?

Practice Questions Answer Key

1. What is soil made of? Inorganic material like rocks and organic material like decomposed plants.
2. What living things are found in soil? Fungi, bacteria, plants
3. What characteristics of soil are analyzed? Color, mineral content, weight, density, bacterial DNA,
4. What items is soil commonly found on in crime situations? Clothing, tools, shoes, wheel wells of vehicles, tires,
5. What types of crimes commonly have soil as evidence? Hit and run, rape, murder and assault.

More Practice

Read the materials linked below to see an example of forensic soil analysis in action. Answer the questions on the next slide covering the case.

Case Overview

Detailed Description of Procedure

More Practice Questions

1. Where did this case occur?
2. Who were the victims in this case?
3. What clues did scientists get from just the soil samples alone?
4. What did the x-ray diffraction data tell the scientists?
5. Based on the soil samples, where did the investigators look for the bodies?
6. What was the biggest benefit of using the soil analysis in this case?

More Practice Questions Answer Key

1. Where did this case occur? South Australia
2. Who were the victims in this case? 2 victims, a mother and her child
3. What clues did scientists get from just the soil samples alone?
   a. Smeared edges on the shovel indicated wet soil
   b. Angular edges of the quartz rock indicated it was not soil from the surface of the earth or moving water
   c. Yellow and pink material indicated iron and clay
   d. Absence of plant material indicated it came from deeper soil
   e. Small white fragments were kaolinite-rich, meaning it probably came from quarry rock.
4. Based on the soil samples, where did the investigators look for the bodies? Dr Fitzpatrick believed that the soil came from an industrial gravel quarry, probably in the Adelaide Hills.
5. What did the x-ray diffraction data tell the scientists? The soil from the suspect and shovel were identical matches to the soil from the quarry region.
6. What was the biggest benefit of using the soil analysis in this case? Using the soil analysis helped investigators find the crime scene (and the bodies). This lead to a quick arrest and confession, saving the prosecution time and money to investigate other crimes.

Additional Learning

Using color to analyze soil

Case study using soil analysis