

The Case of the Bloody Shoeprint



Background:

At approximately 9:30 pm Friday August 19th, John Reginald returned from a local restaurant after having a late dinner with business associates. As he entered the front door of his house he noticed some glass on the floor. Stepping into his home office he noticed a windowpane was broken and had a smear resembling blood. Upon closer examination of his office he noticed the hard drive on his computer was missing. He also noticed a bloody print on the floor near his desk; it appeared to be a shoe print. He immediately called the police.

CSI arrived at his home, photographed the scene, and dusted for prints. Unfortunately no prints, other than Mr. Reginald's, were found on the desk, computer keyboard, or window.

Mr. Reginald is a computer engineer. He was recently hired by the president of a multibillion-dollar company to investigate internal fraud and money laundering. During his interview, Mr. Reginald mentioned to the police the 'thief' might be one of the company employees that broke into his home. Mr. Reginald informed the police that several of the employees had suspicious accounts. Although he did not finish his investigation, he gave the police the names of the employees that he was suspicious of.

Investigators interview several employees of the company and narrowed their search to 5 suspects. None of the suspects had an alibi for the night in question; Suspects 2,3 and 4 had wounds on the fingers of their right hand.

Evidence to be reviewed:

- photographs of shoe treads belonging to suspect's #1-#5
- carpet remnant with partial bloody shoeprint
- glass collected from the crime scene
- glass fragments collected from the shoes belonging to suspects #2, #3, and #4
- soil sample from the crime scene
- soil samples collected from the shoes belonging to suspects #1, #3, and #4

Your task:

You and your team are members of the Wake County Trace Evidence Branch. The blood collected from the crime scene has been sent to the serology lab located in Greensboro. It is imperative your observations are as detailed and factual as possible. Your analysis will be compared to the blood analysis done by the serology lab.

Suggestions for analysis:

Set up a table for observations for each set of evidence (shoeprints, glass, soil) you are analyzing; include a column for detailed sketches, one column for qualitative observations and a column for quantitative observations.

For glass analysis, set up a table for density data (include one column for mass, one column for volume, and one column for calculating the density) and a table for refractive index observations.

Summarize your results including: You must include conclusive, subjective statements when summarizing your findings.
Answer the related questions in complete sentences

Pre-Lab Questions:

1. Describe the techniques that a CSI would use to collect and package the following from the crime scene:
 - a. fingerprints that have been dusted
 - b. broken glass fragments
 - c. bloody shoeprint
 - d. sample of blood for DNA testing/blood typing
2. What is the purpose of having a reference sample in evidence analysis?
3. Why is it important to complete both multiple and different tests on the same piece of evidence?

Analyzing Evidence:

1. Make detailed observations of **each** suspect's shoes (#1-5). This should include **both** qualitative and quantitative measurements.
2. Make detailed observations and a sketch of the print left on the carpet. This should include **both** qualitative and quantitative measurements.
3. Make detailed observations of the glass removed from the tread of suspect #2, #3, and #4. This should include **both**

qualitative and quantitative measurements. You may use a magnifying lens or microscope to complete your observations.

4. Make detailed observations of the glass removed from Mr. Reginald's home. This should include **both** qualitative and quantitative measurements. You may use a magnifying lens to complete your observations.

5. Perform a density test on all of the glass fragments using the balance and graduated cylinder provided. Remember that density is ratio of mass to volume ($D=m/V$).

6. Determine the relative refractive index of all glass fragments using the provided liquids.

Liquid	Refractive Index
water	1.33
acetone	1.36
glycerin	1.47
benzene	1.50
silicone oil	1.52
sodium chloride	1.54

7. Make detailed observations of the soil removed from the tread of suspect #1, #3, and #4. This should include **both** qualitative and quantitative measurements. You may use a microscope to complete your observations.

8. Make detailed observations of the soil removed from Mr. Reginald's home. This should include **both** qualitative and quantitative measurements. You may use a microscope to complete your observations.

Post-Lab Questions:

1. What **additional** evidence related to this crime would be helpful in establishing a relationship between a suspect and the crime scene?
2. Based on your analysis of the evidence, who would you say is responsible for the theft? Give **FIVE** supporting statements that validate your conclusion.
3. State one observation for **each** suspect's shoe tread that ***individualizes*** their shoe impression.
4. What is the most difficult task when examining evidence and summarizing findings?