

Name _____

Date _____

PICKING UP THE PIECES

A Lab on Fiber Analysis

Objective

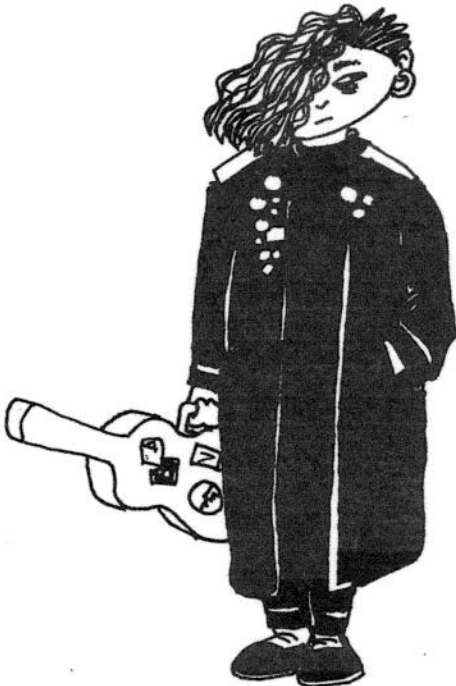
You will collect fiber evidence, then analyze it to identify its source.

Background Information

On Saturday morning, a woman's body is found in a stairwell of a downtown apartment building. The woman, who was a resident of the building, had been robbed and badly beaten. Crime scene investigators recover seven different types of fibers from the victim's body. Six of these fibers match fabrics in the victim's home. The seventh fiber, a red one, does not match anything belonging to the victim. Neighbors tell the investigating team that the victim hated red, and probably did not own anything that color.

When questioned by police, the woman's next door neighbors reveal that they saw a tall, young man in a red jacket enter the victim's apartment on Saturday night. The night watchman had reports that no one had walked into the building wearing a red jacket on the night of the murder. Therefore, the police assume that the murderer lives in the apartment building.

Police begin questioning all of the tall, younger men in the apartment building who own a red coat. They also check the labels in the coats to find out what kind of fibers make up the coat materials. These men are now considered to be suspects.



George, whose red coat is made of wool



Dave, the owner of an expensive silk red coat

Materials

- Compound-light microscope
- Slide
- Cover slip
- Forceps
- White paper
- Candle
- Match
- Paper pattern of victim
- Red fibers
- Samples of wool, rayon, silk, polyester, and cotton

Procedure

1. Collect a red fiber from the "victim" by carefully lifting the fiber with a pair of forceps. Do not touch the fiber with your hands. Place the fiber on a piece of white paper, then fold the paper in half twice.
2. Carry the fiber to your lab station. Prepare a wet-mount slide of the fiber by placing it on the slide, adding a drop of water, and covering the fiber and water with a cover slip.
3. Examine the fiber under low, medium, and high magnification of your microscope. Sketch what you see. Note any pits or striations on the fiber.

Low-magnification sketch of crime-scene fiber:

Medium-magnification sketch of crime-scene fiber:

High-magnification sketch of crime-scene fiber:

2. From the burning tests, which type of fiber is most similar to the unknown fiber taken from the victim? Describe the characteristics they have in common.

3. Why might an investigator want to identify unknown fibers from a crime scene?

4. Which suspect do you believe committed the crime?

4. Compare this fiber to known samples of wool, rayon, silk, polyester, and cotton. Sketch each of these samples at the magnification that gives you the best view and record these sketches here.

Known Fiber	Low	Medium	High
Wool			
Rayon			
Silk			
Polyester			
Cotton			

5. Light your candle and compare the burning characteristics of the unknown fiber to the known samples. Record your observations on the Data Table.
- Holding the fiber in forceps, bring it close to, *but not touching*, a flame. Describe the fiber's behavior as it approaches a flame: does it begin to melt, ignite, curl?
 - Holding the fiber in forceps, touch the fiber to a flame. Does it ignite quickly or slowly? Does it sputter, drip, or melt?
 - Remove the fiber from the flame and describe how it behaves. Does it self extinguish, continue to burn, or continue to glow?
 - Note any odor associated with the fiber in the flame. Does it smell like vinegar or hair?
 - What kind of residue is left after the fiber is removed from the flame? Does the fiber leave a white, fluffy ash, a hard bead, or a melted blob?

DATA TABLE
Behavior of fibers in flame.

	<i>Approaching flame</i>	<i>In flame</i>	<i>Removed from flame</i>	<i>Odor</i>	<i>Residue</i>
Fiber from victim					
Wool					
Rayon					
Silk					
Polyester					
Cotton					

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Postlab Questions

1. From your observations of the fibers under the microscope, which type of fiber is most like the unknown fiber taken from the victim? Describe the similarities of these two fibers.
