Group No: ___ Case #: 4-1 Date: _____ Period: ____

Names of members:_____, _____, _____, _____

Burn Analysis of Fiber

Background information: Fiber evidence can be found at crime scenes in a number of different ways. In personal contact between the clothing of a suspect and a victim, cross-transfers may occur. In a break-in, fibers can become fixed to window screens, or broken glass. In an auto accident, fibers, threads, or even pieces of clothing may adhere to parts of a vehicle.

Fiber analysis does not follow any set procedure. Microscopic examination of both longitudinal and cross sectional samples is generally used. Additional tests such as burning can determine the identity of a fiber.

Natural fibers tend to look like hair and will often have rough external surfaces. Plant fibers, such as cotton, may be more ribbon shaped and may contain twists at irregular patterns. Synthetic fibers (man made) tend to be smooth and uniform, and some may have long extrusion lines on the outer layer.

Scenario: A robbery occurred within a well-to-do neighborhood. The thief grabbed an expensive satiny cotton cream-colored pillowcase to carry out the jewelry that he stole from the jewelry box in the bedroom. Knowing that the items would be listed as stolen goods, the thief immediately took the jewels to a pawnshop to exchange the jewels for money. He carelessly tossed the pillowcase onto the backseat of his car.

Feeling elated at having gotten so much money for the stolen goods, the thief and some of his friends celebrated at the local bar. Having had too much alcohol, the thief was driving erratically. The police stopped the man to give him a ticket for DWI and noticed the cream-colored pillowcase in the back of his car. The dispatcher at the police headquarters had sent out a message for all patrol officers describing the robber that had occurred that night. No one saw the robber. The only description given was that the robber used a cream- colored soft cotton pillowcase.

Was this the pillowcase taken from the home where the robbery occurred? Was it cotton? Was the color the same?

Procedure:

A. Microscope Analysis

i. fiber

1. Pick fibers from Suspect's pillowcase with a piece of clear tape.
2. Place fiber on microscope slide.
3. Observe under microscope. Take a picture of the fiber at 100x and write the description in the data section. What type of fiber do you think this is? Natural or synthetic?
4. Pick fibers from CS pillowcase. Repeat step 3.
5. Compare with suspect's pillowcase fiber.

ii. Weave pattern

1. Place the suspect's pillowcase (fabric) directly on the microscope slide.
2. Observe under microscope. Take a picture at 40x and write the description of the weave pattern.
3. Repeat with CS pillowcase.

B. Burning Tests for Fibers

Put away microscopes before lighting your Bunsen burners!

1. Light a Bunsen burner.
2. Hold a fiber; bring it close, but not in direct contact, to the flame. Does the fiber melt, ignite, or curl? Record observations.
3. Touch the fiber to the edge of the flame. Does the fiber ignite quickly or slowly? Does it sputter, melt, or drip? Record observations.
4. Remove the fiber form the flame. Does it continue to burn? Does it glow and smolder? Does it self-extinguish? Record your observations.

C. Clean Up

You must wipe down the table so next class can use the laboratory table.

Data:

a. Microscopic drawing

CS Pillow Fiber	Suspect Pillow Fiber
Fiber (100x)	Fiber (100x)
Weave pattern (40x)	Weave pattern (40x)
Description:	Description:

b. Burn analysis

	CS Pillowcase	Suspect's pillowcase
Flame Test (does sample curl as it burns?)		

Burn Test (burns or melts? burns slowly or quickly?)		
When Removed from Flame (goes out or continues to glow?)		
Odor while Burning (tar, burning hair or paper, acrid)		
Color and Texture of Residue (beads, ash, crusty, fluffy, round)		
Determine the fiber type		

Conclusion: Was the pillow car found in suspect's car similar to the one at CS? Or is there enough evidence to establish a definite connection to a suspect? If not, what more is needed?

Key to use to determine the type of fiber

When fiber is removed from flame,

1a. It ceases to burn.....Go to 2

1b. Fiber continues to burn .....Go to 3

2a. Fibers have the odor of burning hair/strong odor .....Go to 4

2b. Fibers do not smell like hair.....polyester

3a. Fibers produce a small amount of light ash residue.....rayon

3b. Fibers produce a gray, fluffy ash .....cotton

4a. A hard black bead results from burning .....wool

4b. A brittle, black residue result..... silk