

FIBER ANALYSIS TEAM

BACKGROUND:

The first task a forensic scientist faces when presented with a questioned fiber is to identify the class to which that fiber belongs. The oldest method for determining a fiber's class, and one that is still in use today, is the burning test. In this test, a small specimen of a questioned fiber is burned in order to observe the presence or absence of smoke, emitted odors, and the characteristics of the charred end of the fiber. This will help your team discern between different classes of fiber. Common fiber classes include:

- **Animal fibers:** burn readily with the ammonia-like odor of burning hair.
 - *Wool, mohair, animal hair, or silk.*
- **Plant fibers:** burn readily with an odor similar to burning paper.
 - *Cotton, linen, hemp* found in rope or other organic textiles.
- **Artificial/Synthetic fibers:** melts, producing a burning plastic odor.
 - *Nylon, polyester, acrylic, rayon* found commonly in clothing, suits.
- **Mineral fibers:** do not burn or produce any odors.
 - *Asbestos*, essentially rock in fiber form.

PART I: GATHERING EVIDENCE

Your team will carefully and thoroughly search your assigned area for fibers left at the crime scene. Pay attention to common objects where fibers could snag or fall, so keep your eyes on the floor so as not to overlook evidence. Continue gathering evidence until your team has anywhere from **3 – 4 different** types of fibers. For the lab portion of the investigation, you will burn-test these fibers and compare them to known specimens. Make notes in your EVIDENCE LOG and observe all protocol:

- ✓ Wear gloves, lab coats, and shoe covers before entering the crime scene.
- ✓ When locating evidence, **carefully** remove the specimen and place it in an evidence bag (if possible).
- ✓ After locating evidence, note all details in your EVIDENCE LOG.
- ✓ Check the bottoms of your shoe covers for evidence that you may have accidentally stepped on or missed.

PART II: TEST FIBER SPECIMENS BY BURNING

Fill out the FIBER BURN CHARACTERISTICS chart while completing this lab.

1. Wearing gloves and handling all fibers with tweezers, place each fiber collected in individual plastic bags and label them as Fibers A, B, C, and D.
2. Igniting your burner or flame source first (ask for help if you need it).
3. Beginning with one known fiber specimens at a time, (Acrylic, Cotton, Nylon, Polyester, Rayon, and Wool), cut a small piece from the samples and hold it between the ends of the tweezers.
4. Touch the free end of the fiber just close enough to the flame for it to ignite.
5. Once the sample begins to burn, pull it back to observe the burn characteristics. Note any **odors** caused by the burning, as well as the characteristics listed in the chart below (use a **Y** for *yes* or **N** for *no*).
6. Repeat steps 3 – 5 for all known fiber specimens and for the unknown specimens your team collected. When finished, answer the questions on the following page.

FIBER BURN CHARACTERISTICS

Fiber	Melts?	Curls?	Burns?	Extinguishes?
<i>Acrylic</i>				
<i>Cotton</i>				
<i>Nylon</i>				
<i>Polyester</i>				
<i>Rayon</i>				
<i>Wool</i>				
FIBER A				
FIBER B				
FIBER C				
FIBER D				

REVIEW QUESTIONS

a. Based on your tests, classify the unknown fibers:

- i. FIBER A _____
- ii. FIBER B _____
- iii. FIBER C _____
- iv. FIBER D _____

b. Which unknown fibers were difficult to identify? Why?

c. Name a few items, garments, or textiles in which your unknown fibers could be found:

- i. FIBER A _____
- ii. FIBER B _____
- iii. FIBER C _____
- iv. FIBER D _____

d. Do you think this test is accurate enough to be admissible in a courtroom situation? Why/Why not?

PART III: REVIEW THE POLICE REPORTS

Over the next few pages, your team will need to review the official police report of the crime as well as witness interviews. Some witness accounts will contradict others so it's your job to determine, based on your understanding of the evidence your team collected, who could be an innocent bystander and who could be a suspect.

DO NOT CONVERSE WITH OTHER ANALYSIS TEAMS AT THIS TIME!

You must form your own conclusions as a team first. If it helps, use the following analysis techniques:

- ✓ Note the WHO, WHAT, WHERE, and WHEN of the witness accounts.
- ✓ What are the relationships between witnesses?
- ✓ Create a timeline of where witnesses were at the time of the crime.

Use this space for notes and brainstorming...

PART IV: CONSULT YOUR PEERS

As a team, consult with **one** other analysis team that you feel may enhance your investigation (e.g. Hair and Fiber Analysis). Ask and answer the following questions:

Analysis team being consulted? _____

What physical evidence did this team gather? _____

What techniques did this team use to analyze their evidence?

What conclusions did this team arrive at? Why?

After consulting with the other analysis team, how does this change your original conclusions? Why?

PART V: CONCLUDING ANALYSIS

As soon as everyone has had a chance to converse with other investigative teams, we will all gather together and draw our final conclusions.