

Name _____

Hair Analysis Lab

Background information:

Hair is a very common form of evidence in many cases of homicide, as well as in crimes of sexual assault. It also enters into many cases of burglary. Some of the points that may be proven by the use of hair as physical evidence are as follows:

1. It can link a suspect to the scene of the crime.
2. It can indicate the entrance or exit route of the criminal
3. It can show contact with the victim
4. It can serve to identify clothes or shoes, abandoned or denied, by the suspect.
5. It can indicate the contact of the victim in a (hit and run) accident with the car of the suspect.

Hair from any part of the body exhibits a range of characteristics, such as color, length, and diameter. Even hair from different parts of the same area, the crown, sides, and rear of the head, for example, will differ somewhat. It is, therefore, necessary for the forensic examiner to keep this mind when collecting reference hairs and to obtain an adequate supply to compare with the suspect's hair. Usually, the collection of several dozen hairs from relevant parts of the body will suffice.

Purpose:

To observe, analyze and compare the hair morphology of humans and other animals.

To determine the origin of unknown hairs found at crime scenes

Part 1: Observation of Human Hair Types

Materials:

Compound microscope Slides and cover slips forceps Glycerin

Procedure:

1. Obtain a strand of your own hair. Make sure that the root is intact.
2. Place the hair on a clean microscope slide.
3. Place a drop or two of glycerin on the hair to hold it in place. Put cover slip over hair.
4. Observe the hair at 100X.
5. Locate the root end of the hair. Sketch and label it in the data chart.
6. Scan along the length of the hair shaft. Note any foreign particles clinging to the hair. Determine what type of medulla is present. Record your observations.
7. Increase the magnification and note the color, diameter, pigment distribution in the hair. Record your observations.
8. Examine the tip of the hair. Add the cuticle, medulla, pigment granules and tip to the sketch of your hair. Make sure you label each structure.
9. Compare your hair with the other prepared slides provided by your teacher.
10. Make sketches of each. Label source and record your observations.

Part 2: Hit and Run Crime Scene

Joe and Mike are in an automobile involved in a one- car accident. Some property damage is sustained, and the car is badly damaged. This accident takes place in the evening and there are no witnesses present. The two men are only slightly bruised, neither sustaining any serious injury. Both persons do, however, suffer a bump on their head, with some lacerations of the skin and resultant bleeding. One person's head came in contact with the windshield of the car, as evidenced by the windshield being cracked, a small amount of blood, and a few strands of hair stuck to the glass at the place of impact. This was on the passenger side of the automobile. Both persons are suspected of having been under the influence of alcohol, and each maintains that the other was driving the car at the time of the accident. The officers at the scene, in attempting to determine the identity of the driver, collect blood and hairs from the impact point on the windshield. They have obtained hair samples from the head of each of the two people involved and have transferred all materials to the forensic laboratory. Your job is to determine who was driving and who the passenger was on this fateful night.

Procedure:

1. Obtain a strand of hair from the Scene.
2. Make a wet mount of the hair using glycerin. Observe the hair. Sketch and Record your observations in the data chart.
3. Repeat the procedure to observe Joe and Mike's reference hairs. Sketch and record observations in the data chart.
4. Determine whose hair is found at the scene.

Part 3: Observations of Animal Hair

Animal hairs are often encountered in forensic case work. Shed hairs from domestic pets such as cats, dogs, ferrets, and hamsters are often seen on clothing items or in dust specimens. Hair from grooming pets finds its way into the dust of a given environment. Animal hair originating from articles of clothing and other textile materials made of animal hair such as wool or fur, can become air borne and can thus be incorporated into the dust of a given location. Animal hairs used in the manufacture of wearing apparel, office and household draperies, textiles, and carpets are easily transferred between people, places and things. The investigative information provided by animal hair evidence is often used to help associate people, reconstruct events, and solve crimes.

Materials:

Prepared animals slides Microscope

Procedure:

1. Obtain a prepared slide of an animal hair.
2. Observe under 100X. and 400X
3. Note the cuticle pattern, the medullary configuration and cortical configurations. Use your notes and other reference materials to determine types. Record your observations.
4. Sketch and label structures in data chart.
5. Repeat for 6 different animals.

Part 4: Scale Patterns on Hair

Scale patterns are of little value in human hair comparisons but can aid in distinguishing animal hairs. The pattern of cuticle scale is useful in determining the species origin of hair. In human hair, the scales overlap smoothly, whereas in other mammalian species they protrude in a rough, serrated form. It is difficult to examine the cuticle patterns directly, so what is most often done is to prepare a cast of the scales. In this part, we will make casts and examine the scale patterns of human and animal hairs.

Materials

Strand of human hair 3 animal hairs (dog, cat, rabbit or rat)
2 Microscope slides per hair tissue and alcohol Clear Nail polish

Procedure

1. Clean the strand of hair you intend to use by pulling it through a folded tissue moistens with alcohol to remove grease and oil from hair source.
2. Examine it briefly under the microscope to determine if the cleaning has been effective.
3. Smear a glass slide with a thin layer of nail polish.
4. Before the clear polish dries, which takes place very quickly, place a strand of hair on the surface of the polish.
5. Before the polish dries completely, BUT after the surface becomes partially solidified, lift the strand of hair off the slide. You should now have an imprint of the hair in the polish.
6. Observe the slide under low power making sure you do not get any polish on the objective lenses.
7. Observe the scale pattern of the human hair. What type of scale pattern does it have? (Hint: Use your resources) Look for impressions of individual scales and note the following features.
 - a. Do the scales completely surround the hair shaft?
 - b. What is the general shape of the scale
 - c. Record your observations.
8. Repeat with 3 other animal hairs. Sketch the patterns and name scale patterns.

Name _____

Hair Analysis Lab - Data Sheet
PLEASE MAKE ALL DRAWINGS IN PENCIL!!

Part 1: Observation of Human Hair Types

Your hair – Sketch and label all structures

Observations

Human- Three Colors:

Human Hair- Dyed (If slide not available make one from a student who chemically treats their hair)

Part 2: Hit and Run Crime Scene

Crime Scene	Joe	Mike

Part 2: Hit and Run Crime Scene cont.....

Who was driving?

Who was the passenger?

How do you know? List the comparison points.

Part 3: Observations of Animal Hair

Animal Name	Animal Name	Animal Name
Sketch	Sketch	Sketch
Observations	Observations	Observations

Part 3: Observations of Animal Hair (continued)

Animal Name	Animal Name	Animal Name
Sketch	Sketch	Sketch
Observations	Observations	Observations

Part 4: Scale Patterns on Hair

Describe scale pattern of the human hair:

Animal Name	Animal Name	Animal Name
Sketch of Scale Pattern	Sketch of Scale Pattern	Sketch of Scale Pattern
Name of Scale Pattern	Name of Scale Pattern	Name of Scale Pattern
Observations	Observations	Observations

Conclusion Questions:

- 1. If you found that several hair samples from a crime scene contained follicles, what would that indicate?**
- 2. Describe the difference in appearance among human hairs taken from various parts of the body.**
- 3. Describe the appropriate process for collecting hair samples as physical evidence at a crime scene.**
- 4. What are the features of hair that make it a useful type of physical evidence?**
- 5. What are the differences between typical human hair and typical animal hair?**
- 6. What information can and can't be ascertained from a hair sample?**