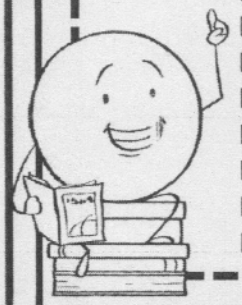
# HAIR as EVIDENCE

## TERMS TO KNOW

- Follicle: opening of skin through which hair grows
- Macroscopic: observable parts without microscope
- Microscopic: observable parts with microscope
- Cuticle: Outermost part of hair shaft
- Cortex: thickest part of hair layer
- Medulla: innermost layer of shaft
- Neutron Activation Analysis: technique used to determine evidence.
- Keratin: protein which lines original and outside surface of body
- Medullary index: used for species identification



**did you know?**

The average person loses approximately 40-125 hairs per day.

**Hair can be considered both class and individual evidence.**

**INDIVIDUAL EVIDENCE** ⟷ **CLASS EVIDENCE**

Attached

Without follicle

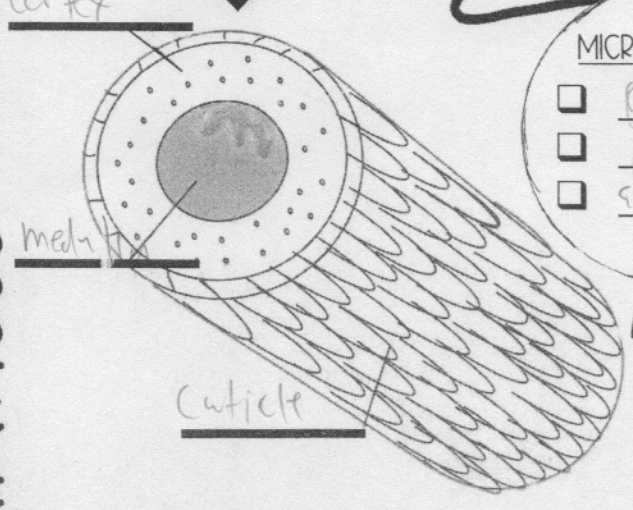
## PROPERTIES OF HAIR

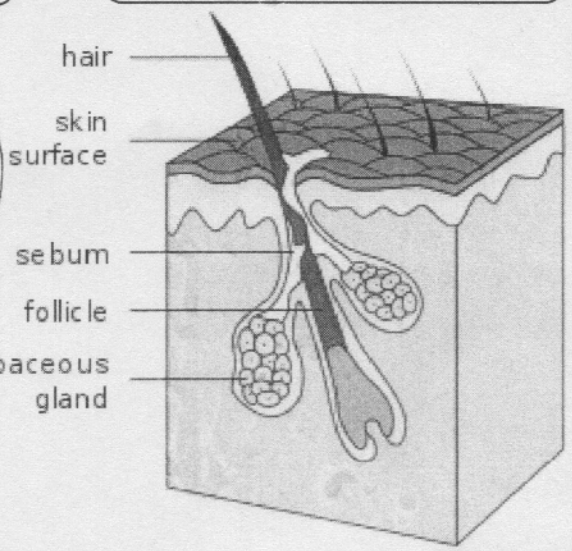
**MACROSCOPIC**

- length
- color
- curliness

**MICROSCOPIC**

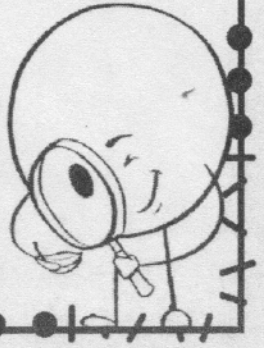
- pattern
- pigment
- scales




**FUNCTION OF HAIR**

- regulates temp.
- protects skin
- sensory organ



# FOLLICLE

papilla, root, blood capillaries.

# CUTICLE

outer layer that protects inner layer.

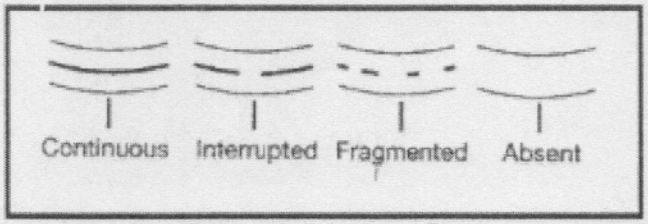
# CORTEX

middle, largest part that contains pigment.

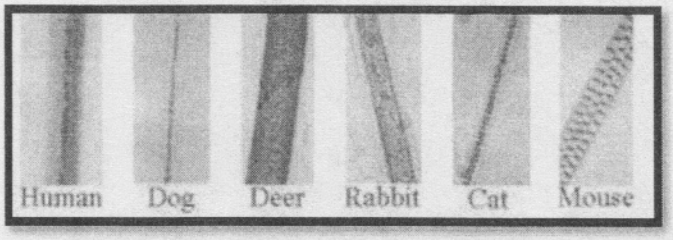
# MEDULLA

hard to get center with 4 different classifications

# MEDULLA PATTERNS

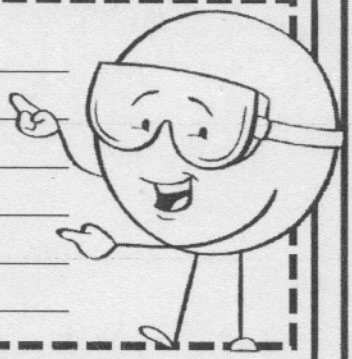



# HAIR DIFFERENCES




## BODY HAIRS

- ☐ human – continuous
- ☐ dog – continuous
- ☐ Deer – continuous
- ☐ Rabbit – continuous
- ☐ cat – continuous
- ☐ mouse – continuous

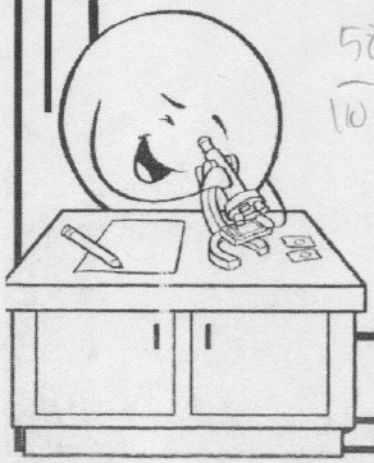


| | HUMAN HAIR | ANIMAL HAIR |
|---|---|---|
| PIGMENT | even | concentrated in center |
| MEDULLA | less than $\frac{1}{3}$ | greater than $\frac{1}{2}$ |
| SCALE STRUCTURE | long and thick | short and coarse |

## MEDULLARY INDEX

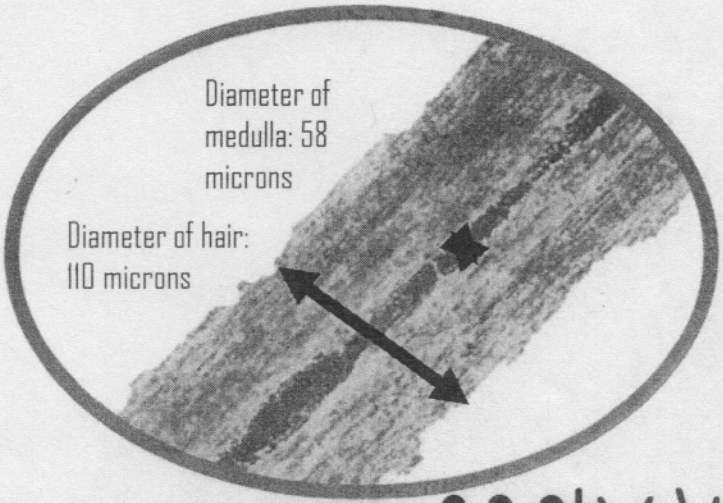
formula

$$\frac{58}{110} = .52$$



## PRACTICE

What is the medullary index of the hair below?



# EXPLORING HAIR

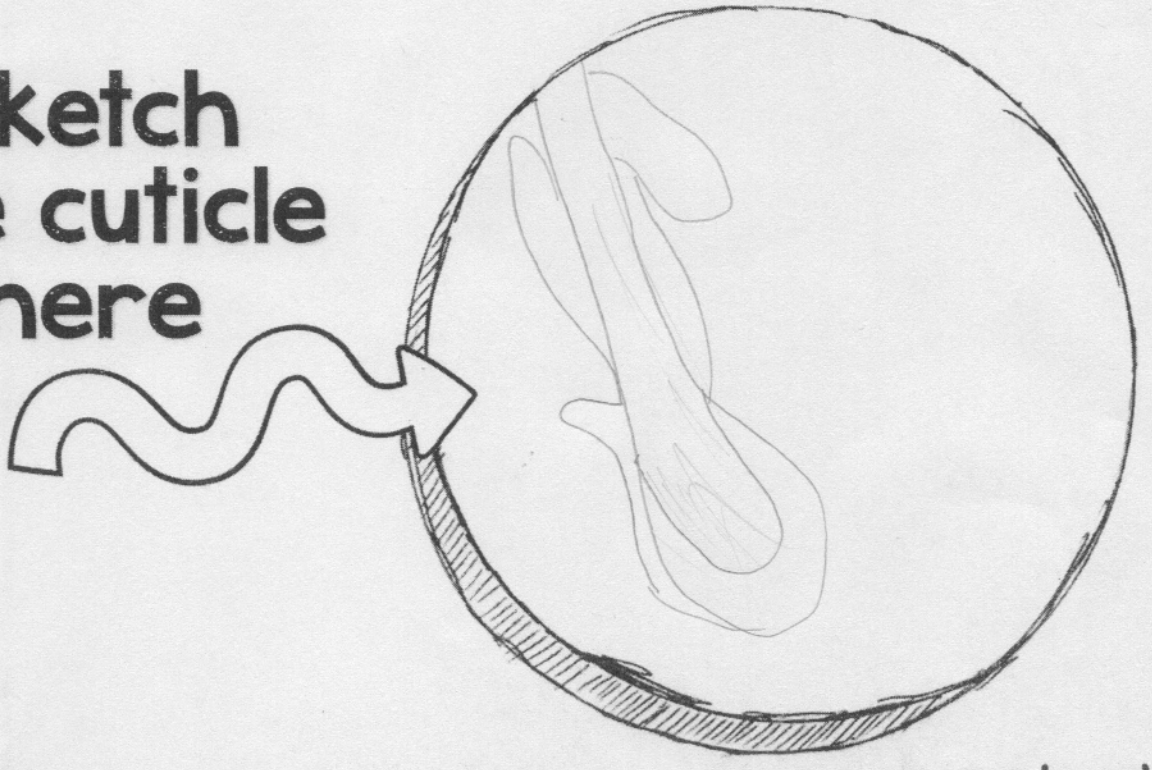
Materials:

- Microscope
- Microscope slide
- Isopropyl alcohol
- Cotton balls
- Clear nail polish
- Human and/or non-human hair samples

Procedure:

1. Thoroughly clean the hair you intend to cast by pulling it through a cotton ball moistened with alcohol.
2. Apply a very think layer of clear nail polish to a microscope slide in a long stripe.
3. Immediately lay the hair sample across the nail polish.
4. Allow the polish to dry and lift the hair out of the polish by the root end.
5. An imprint of the hair should be visible on the surface of the polish.
6. Place the slide on the microscope stage and begin viewing under the lowest magnification.
7. Increase the magnification until you get the clearest view of the cuticle.
8. Sketch your observations in the space provided.

**sketch the cuticle here**



## Analysis Questions

1. Who is known as the pioneer of Forensic science?
Dr. Edmond Locard

2. What famous political leader's death led to an investigation that used hair samples to test for toxins? Napoleon Bonaparte

3. What was Napoleon Bonaparte best known for (as it pertains to his political rule)?
Conquering much of Europe

4. When did Napoleon die?
1821 May 5

5. What was believed to be the manner of death directly after Napoleon died? Carcinoma

6. How many samples of Napoleon's hair was tested for toxins? 5

7. What is neutron activation analysis?
determine elements in materials

8. What were the findings from the NAA that was performed on Napoleon's hair?
He was poisoned

9. How is NAA used in forensics?
testing hair samples

10. What implications did the findings of arsenic have on the theories that surrounded Napoleon's manner of death?
He was murdered instead of disease.