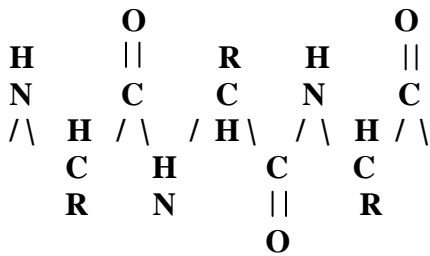
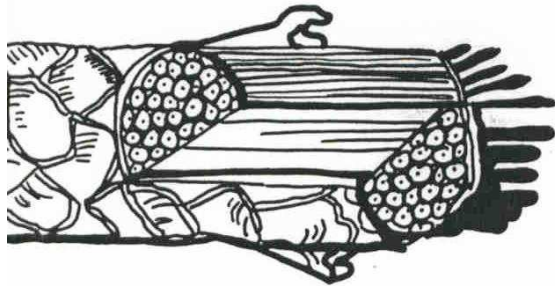


# CHARACTERISTICS OF WOOL

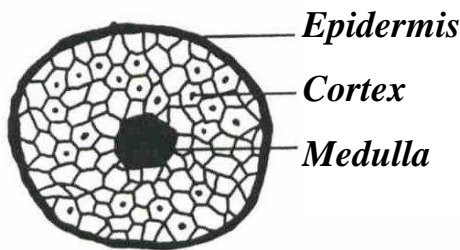


Chemical Structure: Wool is a natural protein fiber that grows from the follicles of the sheep's skin. It is like human hair in that it is composed of keratin-type protein. Chemically these proteins contain five elements: carbon, hydrogen, oxygen, nitrogen and sulfur. These five elements are combined into 19 amino acids linked together in ladder-like polypeptide chains.



Physical Structure: A cross-section of the wool fiber under magnification shows three distinct parts of wool's physical structure:

- Epidermis or cuticle – the outer layer composed of scales – absorbs water
- Cortex – the main part of the fiber composes 90% of the fiber mass
- Medulla – the center honeycomb-like core contains air spaces



The elasticity of the wool fiber is from the natural crimp, or degree of waviness of the fiber. Two kinds of cortical cells on different sides of the fiber arranged unevenly along its length cause the fiber to be elastic and bend or turn, giving wool a natural three-dimensional crimp. Because the wool fiber is naturally elastic and resilient (bounces back), it gives all woollen fabrics many unique properties such as rapid wrinkle recovery, durability, bulk, lofty hand (it “feels” good), warmth, and resistance to abrasion.

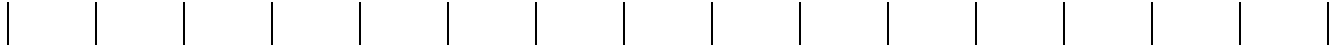
Wool is a hygroscopic fiber, which means that it takes up moisture in vapor form. Wool can easily absorb up to 30% of its weight in moisture without feeling damp or clammy. Wool garments can protect the body in both cold and warm conditions because it absorbs moisture and keeps a layer of air next to the skin.

Because wool contains moisture in each fiber, it resists flame without chemical treatment. Wool is self-extinguishing. This means that instead of burning freely when touched by flame, wool chars and stops burning when it is removed from the source of fire. It will not support combustion; this is why wool blankets are recommended for use in extinguishing small fires.

# PUTTING WOOL TO THE TEST

## Test #1: Elasticity

- Place wool fiber on lines. Mark where it ends.
- Stretch the fibers. Mark where they end.



Questions:

1. Elasticity is the result of the natural \_\_\_\_\_ of the fiber.
2. Wool fiber is naturally elastic and \_\_\_\_\_.

## Test #2: Water absorbency

- Place two Tablespoons of water on a plate.
- Wipe up the water with the wool.

Questions:

1. Did the wool absorb the water? \_\_\_\_\_
2. If you squeeze the wool, will water come out? \_\_\_\_\_
3. The water is absorbed into the \_\_\_\_\_, or outer layer of the fiber.

## Test #3: Fire qualities

- Remove a small section of wool.
- Have an adult light a match and burn one end of the wool. Remove the match from the wool and extinguish the match.

Questions:

1. Did the wool continue to burn when the match was removed? \_\_\_\_\_
2. Wool resists flame because there is \_\_\_\_\_ in each fiber.
3. Wool is self-\_\_\_\_\_ because it stops burning when removed from the source of the fire.

# WHAT DOES A WOOL FIBER LOOK LIKE?

Directions:

1. Look at a wool fiber under a microscope or strong magnifying glass.
2. Draw a wool fiber in the space below and label the three parts of the fiber:  
Epidermis, Cortex, and Medulla
3. Tape a wool fiber next to your drawing when you are finished.