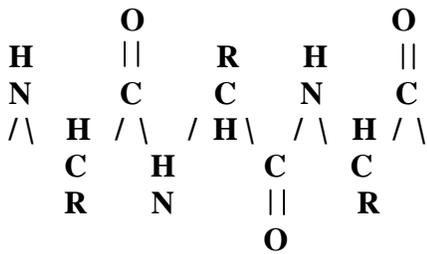
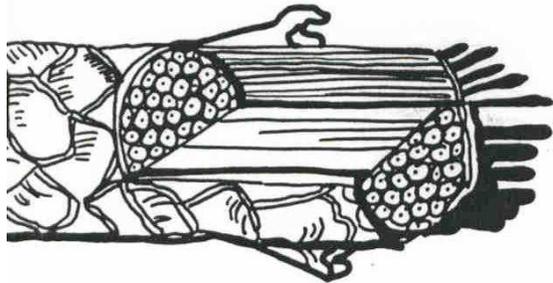


CHARACTERISTICS OF WOOL

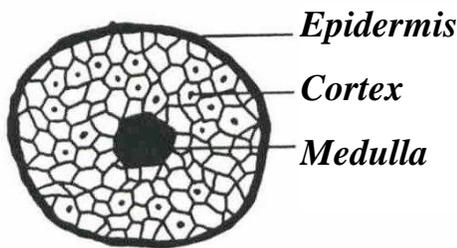


Chemical Structure: Wool is a natural protein fiber that grows from the follicles of the sheep's skin. It is like human hair in that it is composed of keratin-type protein. Chemically these proteins contain five elements: carbon, hydrogen, oxygen, nitrogen and sulfur. These five elements are combined 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 woolen 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 is a natural protein fiber the chemical bonds will break down over a period of time when wool is exposed to the elements of nature. Wool clothing and other products will last a long time but if they ever end up in the landfill they will break down and become part of the soil. Discarded wool has very little impact on the natural environment and because of this wool is environmentally friendly.

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: Disappearing Act (Adult should help with this activity)

- Fill a clear glass jar $\frac{3}{4}$ full of full strength bleach.
- Place a moderated amount of wool into the bleach.
- Place a secure lid onto the jar and discover the difference in time when using agitation and/or lack of air in the process of breaking the chemical bonds of the wool. Watch or come back later to see that the wool has disappeared.

Questions:

1. Did it take longer for the wool to disappear without a lid on the jar? _____
2. Do you think agitation helped to break the chemical bonds? _____
3. Why is it important to use products that break down in nature? _____
4. Wool can be called _____ freindly because it has very little impact on the natural environment when it is discarded.

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.