



How to Sweat ... and Not Stay Wet

By Neal M. Abrams

We sweat. We get caught in a rainstorm. We spill our water during lunch. There are many times we get wet, stay wet, and feel uncomfortable for a long time afterward. If this ever happens to you, the kind of fabric in the clothes you're wearing can make a big difference!

Suppose you want to wear something completely waterproof. It would keep water *off* you, but it will keep water *in*, too. You see, water is always evaporating off our skin. Wearing a truly waterproof fabric would make you feel sweaty and gross. Read about the relationship each of the three fabrics listed in this article has with water. What you'll learn will help you decide what to wear if you plan to run a lot during recess, or if the forecast calls for rain ... or if you decide to play catch with water balloons.

Cotton

Cotton is soft, feels comfortable, and stretches. These properties make cotton a top pick for towels, jeans, and shirts. Cotton holds onto water because it is very **hydrophilic** ("water-loving"). It can pull a little bit of sweat from your body (a process called "**wicking**") to keep you feeling dry and comfortable. However, cotton doesn't dry very quickly. If you got caught in a rainstorm, you would not feel good at all. Imagine wearing wet jeans! There are times when the water-absorbing property of cotton is not so great. Cotton can be woven, like in jeans, or knit like in T-shirts. Knit fabrics tend to stretch better than those that are woven.

Wool

Wool is both water repellant and very absorbent. How can this be? It has to do with the unique structure of the wool fiber. It has an inner core that is hydrophilic and attracts water, like cotton. However, the inner core is covered with overlapping

scales. These scales have a waxy coating, called lanolin, which is **hydrophobic** ("water-fearing"). Due to this amazing structure, wool can absorb up to 20% of its weight in water before it starts to feel damp! Wool does something else amazing. As the fibers absorb moisture, a little bit of heat is released. The wool holds the water, preventing evaporation (which is a cooling process). These two processes keep people feeling warm, even when a little wet. Another reason wool keeps people warm is that it contains many tiny air pockets. This structure provides a layer of insulation, holding a person's own body heat on the inside while keeping the cold air outside. These properties explain why many hats, scarves, sweaters, coats, and even socks are made of wool.

Quick-dry Athletic Wear

Athletic wear is made of polyester or nylon combined with a little Spandex (a synthetic fiber known for its stretchiness). Polyester and nylon dry quickly because their molecular structures are much less hydrophilic than cotton. They also tend to be wrinkle-, shrink-, and stain-resistant. Adding Spandex fibers allows the fabric to stretch as the wearer moves. This is because the polymers in Spandex coil and uncoil like a spring, giving it a unique stretchy property. The special weave and blend of fabrics cause liquid water to bead up, yet water vapor can easily move through the spaces between the yarns. Quick-dry athletic wear is a great solution for people who exercise outside. These fabrics will get wet eventually, but the water will evaporate more quickly than it does from cotton or wool. As the water evaporates, it takes a little heat from its surroundings, meaning a person wearing the shirt or shorts will feel a little cooler. Feeling cooler could be especially welcome in hot weather.

Thanks to nature and chemistry, we have fabulous fabrics that help us feel dry and comfortable, even soon after getting wet.

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