Name _____ Date _____ Class _____

Enrich

Water in the Atmosphere

A hygrometer is a device that measures relative humidity. Read the passage below. Then answer the questions that follow in the spaces provided.

Hair Hygrometers

A hygrometer that uses a human hair was invented in 1783. In a hair hygrometer, a long strand of human hair is kept under tension by a weight or a spring. The hair also has a pointer attached to one end. When humidity increases, the hair becomes longer, and the pointer moves, indicating the relative humidity on a numbered scale. When humidity decreases, the hair becomes shorter, and the pointer moves again.

Hair is made up of keratin, a long, coil-shaped protein. Weak bonds called hydrogen bonds hold the turns of the coil in position. Imagine a spring whose coils are tied together by small strings. As long as the strings are in place, the coil can't be stretched. But if you cut some of the strings, you can stretch the coil.

Hydrogen bonds are sensitive to water. When humidity is high, some of the hydrogen bonds in keratin break, allowing the hair to stretch. From a dry day to a humid day, the length of a hair can increase by as much as 3 percent.

1. Wool yarn can be substituted for the human hair in a hygrometer. Why would this work?

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2. Why does the hair shorten when humidity decreases?

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3. The hygrometer must be calibrated before it is used. How might this be done?

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