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Curriculum Units by Fellows of the Yale-New Haven Teachers Institute
2015 Volume IV: Big Molecules, Big Problems

Molecular Structures and Chemical Forces in Textiles

Guide for Curriculum Unit 15.04.01
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The world of textiles is endless in its applications, not only in its timeless use in clothing and household fabrics but in today's ever-expanding synthetic textiles, from fire-retardant space suits to bullet-resistant Kevlar used in armor. This unit explores the chemistry behind the unique properties of different textiles by looking at the structure of each textile's most prominent molecule, identifying the type of bonds and intermolecular forces present in and between the fibers. The unit provides a foundation in columbic attraction, intermolecular forces, and hydrophilic and hydrophobic interactions before moving on to exploring both natural and synthetic textiles. The types of textiles included in unit are cotton, wool, silk, nylon, polyester, and spandex. The unit culminates in a molecular modeling project in which students have an opportunity to choose a textile to research and model using their own materials, showcasing their ability to connect structure and function to their peers.

(Recommended for Chemistry, grade 11)

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