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Curriculum Units by Fellows of the National Initiative

2008 Volume VII: Urban Environmental Quality and Human Health: Conceiving a Sustainable Future

Life Cycle Analysis of an ordinary plastic water bottle

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The ninth grade integrated science curriculum spends an entire quarter of the year exploring polymers, including plastics. This unit will be used to teach most of the topics in the second quarter.

The unit will begin with an introduction, which is designed to show the students generally where we are going with the unit. The family history section will come next as a way to introduce students to the concept that humans have existed for thousands of years without plastic water bottles. The conceptions phase of this unit is about the bottle design. The design of an object has a large impact on how easily the object may be reused or recycled at the end of its life, so this phase is really the beginning of the life cycle, as it largely determines the eventual fate of the bottle. The section on the birth of the bottle discusses how the chemicals that make up a bottle came to be and come together. Adolescence in a bottle is the time when the character of the bottle is formed, in this case the physical processes that are used to transform the amorphous PET into the bottle itself. Adulthood, and the working life of the bottle, follows, after which, seniority ensues. The discussion about seniority will focus on how bottles can be reused and if they really should be reused. Finally, death, and the possibility of recycling if you like are discussed, which brings back the idea of the importance of design which was discussed at the very beginning of the unit.

(Developed for Integrated Science, grade 9; recommended for General Science, grades 6-10, and Chemistry, grades 9-12)

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