



Curriculum Units by Fellows of the Yale-New Haven Teachers Institute  
2006 Volume V: Engineering in Modern Medicine

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## **Hold Off on the Headphones**

Guide for Curriculum Unit 06.05.04  
by Matthew Cacopardo

This unit deals with sound waves and their influence on our society and physiology. Its goal is to have students develop a scientific understanding of the properties of sound waves and how these properties when abused can lead to negative physiological changes in our ability to hear sounds. It is an interdisciplinary approach which utilizes the sciences, mathematics and the humanities. It begins by introducing the concept of a longitudinal sound wave. It briefly compares these waves to transverse waves but then delves deeper into the properties of sound waves. It describes how the human ear is able to pick up sound and carry the information back to the central nervous system. It examines the delicate structures of the inner ear's auditory cells, the destructive capabilities of abusing the properties of sound waves, and how this abuse can be detrimental to the survival of these cells and the quality of hearing ability. Students will read various articles on the effects of headphone use on the hearing of younger adults. Students will write a persuasive essay for or against extended iPod use. With this knowledge students will create an ad campaign for modern biomedical technology for improving hearing after damage is done.

(Recommended for Integrated Science, Conceptual Physics, and Biology, grades 9-10.)

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