

LESSONS & RESOURCES ON APPLIED EVOLUTION

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So far, there are only a few lessons on applied topics that have been developed. “**When Milk Makes You Sick**” (www.indiana.edu/~ensiweb/lessons/tp.milk3.html) is a lesson that applies evolution to medicine: what is the evolutionary explanation of lactose intolerance. The students learn about lactose intolerance, and more specifically about how the ability to absorb lactose evolved in humans that kept dairy animals (the ancestral conditions is lactose intolerance). The students examine pedigrees to understand the genetics of lactose intolerance, as well as geographic variation in lactose intolerance to understand the selective pressures for the ability to absorb lactose. This lesson is also available from Science Kit. The lesson as presented on the web is a bit confusing; the explanations are more user-friendly in the Science Kit packet.

The PBS’ *Evolution* television series has an episode devoted to applied evolution: “**The Evolutionary Arms Race**.” Also check out the PBS video “**Learning and Teaching Evolution**,” a companion to the series (available at www.pbs.org/wgbh/evolution/educators/teachstuds/svideos.html), which contains short, seven-minute segments for use in the classroom. Segment six (“**Why Does Evolution Matter Now?**”) summarizes the part of “The Evolutionary Arms Race” that deals with antibiotic resistance. In association with the show, PBS has an extensive website (www.pbs.org/wgbh/evolution/) and a teacher’s guide (WGBH 2001). Both of these resources have a unit, also titled “**Why Does Evolution Matter Now?**” The unit in the teacher’s guide has several lessons on evolution topics in the news (even though they may not be obviously about evolution), while the unit on the website (www.pbs.org/wgbh/evolution/educators/lessons/lesson6/teach.html) has lessons on antibiotic resistance and other relevant topics.

OTHER RESOURCES ON APPLIED EVOLUTION

There are several other resources you can use to develop your own lessons on applied topics. The first place to start would be Steve Palumbi’s new book, called **The Evolution Explosion: How Humans Cause Rapid Evolutionary Change** (Palumbi 2001). In this book,

written for the educated general public, he details several examples of how understanding evolution is important to today's society, including antibiotic resistance, the evolution of HIV, pesticide resistance, the evolution of exploited fish populations, and the evolution of various human diseases. Another resource is **Why We Get Sick: the New Science of Darwinian Medicine** (Nesse and Williams 1994), also written for the educated general public. In this book, Nesse, a doctor of psychiatry, and Williams, an evolutionary biologist, team up to examine many different medical conditions from an evolutionary perspective. The topics covered include genetic diseases, legacies of evolution, diseases of civilization, cancer, allergies and more.

For more technical reviews of some of these topics, look into **Evolution of Infectious Disease** (Ewald 1994), **Darwin's Spectre: Evolutionary Biology in the Modern World** (Rose 1998), **Evolutionary Medicine** (Trevathan et al. 1999), and **Evolution in Health and Disease** (Stearns 1999).

Literature Cited:

- Ewald, P.W. 1994. *Evolution of Infectious Disease*. Oxford University Press, Oxford.
- Nesse, R.M. & G.C. Williams. 1994. *Why We Get Sick: The New Science of Darwinian Medicine*. Vintage Books, New York.
- Palumbi, S.R. 2001. *The Evolution Explosion: How Humans Cause Rapid Evolutionary Change*. W.W. Norton & Company, New York.
- Rose, M.R. 1998. *Darwin's Spectre: Evolutionary Biology in the Modern World*. Princeton University Press, New Jersey.
- Stearns, S.C. (ed.) 1999. *Evolution in Health and Disease*. Oxford University Press, New York.
- Trevathan, W.R., E.O. Smith, & J.J. Mckenna (eds.) 1999. *Evolutionary Medicine*. Oxford University Press, New York.
- WGBH. 2001. *Evolution: Teacher's Guide*. WGBH, Boston.