**Resources for Teaching and Learning about Evolution**

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**Recommended General and Introductory Resources**

**Understanding Evolution** (<http://evolution.berkeley.edu/>) provides an introduction, teaching materials and resource library. One useful resource for planning your teaching is a compilation of misconceptions about evolution and responses to these misconceptions (<http://evolution.berkeley.edu/evolibrary/misconceptions_faq.php>). (Another useful compilation of misconceptions and responses is available at <http://www.talkorigins.org/faqs/faq-misconceptions.html>.)

**Evolution** (<http://www.pbs.org/wgbh/evolution>) provides information about many important aspects of evolution and a variety of resources for teachers and students. For example, informative videos are available (<http://www.pbs.org/cgi-registry/2wgbh/evolution/library/search.cgi>) and the "All in the Family" activity (http://www.pbs.org/wgbh/evolution/change/family/) is a very useful activity to help students understand the importance of homology and similarities in development for establishing phylogenetic relationships.

**Evolution by Natural Selection** (<http://serendipstudio.org/sci_edu/waldron/#evolution>) is a classroom simulation activity that helps students understand how natural selection works and counteracts some common misconceptions. Principles of natural selection are demonstrated by a simulation that involves different color pom-poms on different color and texture habitats and student feeders equipped with different types of feeding implements. Students analyze results to see how different traits contribute to fitness in different habitats. Additional examples and questions help students to understand the process of natural selection, including three necessary conditions for natural selection to take place.

**The Making of the Fittest** (<http://www.hhmi.org/biointeractive/shortfilms/>) has several short films (including Natural Selection and Adaptation, The Birth and Death of Genes, Natural Selection in Humans) with accompanying classroom activities.

**Concept cartoons** for stimulating discussions about common misconceptions related to evolution are available at <http://www.biologylessons.sdsu.edu/cartoons/concepts.html>

**Understanding and Analyzing the Evidence**

**Teaching about Evolution and the Nature of Science** (<http://www.nap.edu/openbook.php?record_id=5787>) is a helpful resource for learning about the types of evidence that support our understanding of evolution, with relevant teaching activities.

**Cells within cells: An extraordinary claim with extraordinary evidence** (<http://undsci.berkeley.edu/article/endosymbiosis_01>) provides an informative review and analysis of research on the hypothesis that mitochondria and plastids are evolutionarily descended from endosymbiotic bacteria. This reading can be used with the discussion activity shown on the next page.

**Cells within cells: An extraordinary claim with extraordinary evidence**

Read at least page 1, the bottom half of page 5 through page 9, and page 12 in the PDF of "Cells within cells: An extraordinary claim with extraordinary evidence" (<http://undsci.berkeley.edu/article/endosymbiosis_01>).

Questions

1. Summarize the evidence that supports the hypothesis that endosymbiosis was the process responsible for the evolutionary origin of mitochondria and plastids (e.g. chloroplasts).

2. Why did it take such a long time for the hypothesis of endosymbiosis to gain widespread acceptance?

3. How does this research illustrate the following general principles?

* Two important sources of scientific progress are technological advances that provide new ways of investigating research questions and conceptual advances that provide new ways of understanding and asking questions about natural phenomena.
* Scientists may oppose new hypotheses for reasons that are not entirely rational, particularly reluctance to change or replace a hypothesis that their previous research has supported.
* For many scientific hypotheses, we are not sure if they are true or false. Instead, scientists have a little, some, or considerable uncertainty about the validity of many hypotheses.

4. Use this information to make this diagram of the scientific method more accurate and realistic.



(Figure from <http://static.ddmcdn.com/gif/scientific-method-17.jpg>)

1. These Teacher Notes are available with clickable links at <http://serendipstudio.org/exchange/bioactivities>/evolrec [↑](#footnote-ref-1)