

**Unit # - 2 – Evolution (6 weeks)**

<b>Standards Addressed</b>	<b>Student Learning Objectives for this Unit</b>	<b>Content Skills and Knowledge</b>	<b>Learning Activities and Instructional Strategies</b>
<p>NSES Standards: Properties &amp; Changes of Properties in Matter Transfer of Energy</p> <p>PA STEE Standards: 3.2.7.A (sci. k) 3.2.7.B (app k) 3.3.7.D (nat sel) 3.3.10.D (evolu) 3.4.7.A (str mat) 3.4.7.B (e sources and transfers) 3.4.7.B (e ht trn) 3.1.7.B (models) 3.7.7.B (instr)</p> <p>1.2 read crit 1.4 writing 1.8 presentation</p> <p>2.2 comp/estimation 2.3 measurement/est 2.5 prob solving 2.6 data analysis</p>	<p>Standard: Biological Evolution &amp; Changing Atmosphere Fundamental concepts and principles that underlie this standard include:</p> <ul style="list-style-type: none"> <li>▪ The sun, the earth, and the rest of the solar system formed from a nebular cloud of dust and gas 4.6 billion years ago. <u>The early earth was very different from the planet we live on today.</u></li> <li>▪ Geologic time can be estimated by observing rock sequences and using fossils to correlate the sequences at various locations. Current methods include using the known decay rates of radioactive isotopes present in rocks to measure the time since the rock was formed.</li> <li>▪ Interactions among the solid earth, the oceans, the atmosphere, and organisms have resulted in the ongoing evolution of the earth system.</li> <li>▪ Evidence for one-celled forms of life--the bacteria--extends back more than 3.5 billion years. <u>The evolution of life caused dramatic changes in the composition of the earth's atmosphere, which did not originally contain oxygen.</u></li> <li>▪ Species evolve over time. Evolution is the consequence of the interactions of (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, and (4) the ensuing selection by the environment of those offspring better able to survive and leave offspring.</li> <li>▪ The great diversity of organisms is the result of more than 3.5 billion years of evolution that has filled every available niche with life forms.</li> <li>▪ Natural selection and its evolutionary consequences provide a scientific explanation for the fossil record of ancient life forms, as well as for the striking molecular similarities observed among the diverse species of living organisms.</li> <li>▪ The millions of different species of plants, animals, and microorganisms that live on earth today are related by descent from common ancestors.</li> </ul>	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>▪ Relative placement of: Cenozoic, Mesozoic, Paleozoic and Precambrian eras.</li> <li>▪ Cambrian explosion</li> <li>▪ Relative Dating (rock strata)</li> <li>▪ Absolute Dating (radioactive dating)</li> <li>▪ Fossils and fossil formation</li> <li>▪ Embryological similarities</li> <li>▪ Body Structure (homologous structures)</li> <li>▪ Chemical compound similarities</li> <li>▪ Influence on Darwin               <ul style="list-style-type: none"> <li>○ Geology: Lyell</li> <li>○ Farmers: artificial selection</li> <li>○ Population: Malthus</li> </ul> </li> <li>▪ Natural Selection</li> <li>▪ Peppered Moth example</li> <li>▪ Mass extinctions</li> <li>▪ Dinosaur theories</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>▪ Compare and Contrast the evidence for evolution from a variety of sources.</li> <li>▪ Analyze data from various sources.</li> </ul>	<p><b>Labs or Demonstrations:</b> Population Growth versus Food Supply Adaptation Behooves You Evolution's Explosion Humans and Apes: A Question of Origins</p> <p><b>Readings:</b> Change Over Time How Does Evolution Happen? Natural Selection in Action</p> <p><b>Worksheets:</b> Taking the Earth's Pulse The Evolution of Living Things</p> <p><b>Technology Links</b> This "learning tool" is called <a href="#">Understanding Evolution</a>. It is a wonderful, one-stop destination for educators of any level, the <a href="#">University of California Museum of Paleontology</a> has compiled an inexhaustible resource for teaching evolution in the classroom.</p> <p>The name of this "learning tool" is called <a href="#">Evolution Lab</a>. Students get to see evolution in action and get to really ask some interesting "what if" questions in this clever and conceptually clear simulation.</p> <p><a href="http://www.learningscience.org/lsc3cevo lution.htm">http://www.learningscience.org/lsc3cevo lution.htm</a></p>