

LS-HHMI Outreach Summer Curriculum Project Classroom Resource Information Form

Title	Exploring Biodiversity
Resource Type	Resources: Lesson Plan <input checked="" type="checkbox"/> Activity <input checked="" type="checkbox"/> Lab Activity <input type="checkbox"/> Homework Assignment <input type="checkbox"/> Correlations <input type="checkbox"/> Other <input checked="" type="checkbox"/> Powerpoint presentation
Description	This resource provides lesson plans, a powerpoint and activities that introduce biodiversity, explore methods for measuring biodiversity, and explores the positive and negative affects of human activities on global/local biodiversity.
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Objective	<p>To better understand what humanity knows about life on earth</p> <p>To understand the value of biodiversity to earth and ourselves</p> <p>To better understand the methods used by science to explore and measure biodiversity</p> <p>To understand how humanity has altered biodiversity</p>		
Key Concepts	<p>Biodiversity, richness, abundance, habitat fragmentation, invasive species, population, pollution, overexploitation, threatened and endangered species</p>		
Student Prep	<p>Freshman Biology</p>		
Materials	<p>Assorted Dried Beans, Coffee Cans, Cups, Calculators</p> <p>Handouts for Bean Biodiversity and Bird Biodiversity</p>		
Grade Level(s)	<p>10<sup>th</sup> - 12<sup>th</sup> Advanced Placement® Environmental Science</p>		
Teacher Prep Time	<p>1+ hour</p>	Class Time	<p>Around 1 hr for Bean Biodiversity, 1 hr for Bird Biodiversity 1 hour for research plus additional time to complete representing biodiversity activity</p>
National Standards	<p>12AS1.3 Use technology and mathematics to improve investigations and communications. A variety of technologies, such as hand tools, measuring instruments, and calculators, should be an integral component of scientific investigations. The use of computers for the collection, analysis, and display of data is also a part of this standard. Mathematics plays an essential role in all aspects of an inquiry. For example, measurement is used for posing questions, formulas are used for developing explanations, and charts and graphs are used for communicating results.</p> <p>12CLS4.4 Living organisms have the capacity to produce populations of infinite size, but environments and resources are finite. This fundamental tension has profound effects on the interactions between organisms.</p> <p>12CLS4.5 Human beings live within the world’s ecosystems. Increasingly, humans modify ecosystems as a result of population growth, technology, and consumption. Human destruction of habitats through direct harvesting, pollution, atmospheric changes, and other factors is threatening current global stability, and if not addressed, ecosystems will be irreversibly affected.</p> <p>12FSPSP3.1 Human populations use resources in the environment in order to maintain and improve their existence. Natural resources have been and will continue to be used to maintain human populations.</p> <p>12FSPSP3.2 The earth does not have infinite resources; increasing human consumption places severe stress on the natural processes that renew some resources, and it depletes those resources that cannot be renewed.</p> <p>12FSPSP3.3 Humans use many natural systems as resources. Natural systems have the capacity to reuse waste, but that capacity is limited. Natural systems can change to an extent that exceeds the limits of organisms to adapt naturally or humans to adapt technologically.</p> <p>12FSPSP4.1 Natural ecosystems provide an array of basic processes that affect humans. Those processes include maintenance of the quality of the atmosphere, generation of soils, control of the hydrologic cycle, disposal of wastes, and recycling of nutrients. Humans are changing many of these basic processes, and the changes may be detrimental to humans.</p> <p>12FSPSP4.2 Materials from human societies affect both physical and chemical cycles of the earth.</p> <p>12FSPSP4.3 Many factors influence environmental quality. Factors that students might investigate include population growth, resource use, population distribution, overconsumption, the capacity of technology to solve problems, poverty, the role of economic, political, and religious views, and different ways human s view the earth.</p>		

State Standards	<p>SIS3. Analyze and interpret results of scientific investigations.</p> <p>SIS4. Communicate and apply the results of scientific investigations.</p> <p>6.2 Analyze changes in population size and biodiversity (speciation and extinction) that result from the following: natural causes, changes in climate, human activity, and the introduction of invasive, non-native species.</p>
Sources	
References	<p>Carroll, David M. (1999) Swampwalker’s journal: a wetlands year, Mariner Books, New York</p> <p>Jones, T. and and Laughlin, T. (2009) Learning to measure biodiversity: two agent-based models that simulate sampling methods &amp; provide data for calculating diversity indices, The American Biology Teacher September 2009 vol 71 no 7</p> <p>Miller Jr. G. Tyler (2007) Living in the environment: principals, connections, and solutions 15<sup>th</sup> edition, Brooks/Cole California</p> <p>Raven, P., Berg, L., Hassenzahl, D. (2008) Environment 6/e, John Wiley &amp; sons, New Jersey</p> <p>Wilson, Edward O. (1992) The diversity of life, W. W. Norton &amp; Company, New York</p> <p>Wilson, Edward O. (1996) In search of nature, Island Press, Washington D.C.</p> <p>Wilson, Edward O. (2006) The creation: an appeal to save life on earth, W. W. Norton &amp; Company, New York</p>
Assessment	