

LS-HHMI Outreach Curriculum Project Information			
Title	Ericabrowneteacherguide2010, ericabrownestudentassignment2010,		
Resource Type	Lesson Plan <input checked="" type="checkbox"/> Classroom Activity <input checked="" type="checkbox"/> Laboratory Activity <input checked="" type="checkbox"/> Homework Assignment <input checked="" type="checkbox"/> Bioinformatics <input type="checkbox"/> Other <input type="checkbox"/> <Specify> (Modifiable! Could be used as homework, classwork and field work or done completely in class)		
Description	Activity for students to compare the diversity and number of species on earth today compared to the number of species that have ever inhabited the earth. (Optional activity includes the option for ecological field study and the use of field guides.)		
Author(s)	Erica Browne		
Author Institution(s)	Daniel Hand High School		
Objective	To have students conceptualize and put into their own words the vast diversity of living things. To create a mathematically supported model or analogy to explain the number of known and unknown species on the planet, both today and in the past. (If teachers add in the outdoor education piece students will also be examining the diversity of life in their own backyard.)		
Key Concepts	Biodiversity! Students will be focused on understanding how many species are alive today, how many are identified and how many have existed in the past.		
Student Prep	Lesson can be incorporated into many different parts of high school biology curriculum. Can be an introductory or a culminating activity. Can be related to the topics of: classification, evolution, and/or ecology. As designed here students should be familiar with basic classification (what is an example of a plant? Animal? What is a species?) Basic math skills, making ratios and comparisons (Optional: collection and identification of organisms in the field)		
Materials	Paper, pen, calculator, internet or library access Optional Field work: hand lens, binoculars, field guides, various nets (skim, sweep, butterfly, fishing), and plastic bags and bucket		
Grade and Level(s)	9, 10 th grade biology (general and college prep level)		
Teacher Prep Time	20 minutes	Class Time	Between 2- 4 class periods depending on optional activities
National Standards	Life Science: Content Standard C: Biological Evolution		
State Standards	Massachusetts: 5. Evolution and Biodiversity Central Concepts: Evolution is the result of genetic changes that occur in constantly changing environments. Over many generations, changes in the genetic make-up of populations may affect biodiversity through speciation and extinction. SIS1. Make observations, raise questions, and formulate hypotheses. <ul style="list-style-type: none"> • Observe the world from a scientific perspective. • Pose questions and form hypotheses based on personal observations, scientific articles, experiments, and knowledge. • Read, interpret, and examine the credibility and validity of scientific claims in different sources of information, such as scientific articles, advertisements, or media stories. SIS3. Analyze and interpret results of scientific investigations. <ul style="list-style-type: none"> • Present relationships between and among variables in appropriate forms. <ul style="list-style-type: none"> ○ Represent data and relationships between and among variables in charts and graphs. • Use mathematical operations to analyze and interpret data results. 		

	<ul style="list-style-type: none"> • Assess the reliability of data and identify reasons for inconsistent results, such as sources of error or uncontrolled conditions. • Use results of an experiment to develop a conclusion to an investigation that addresses the initial questions and supports or refutes the stated hypothesis. • State questions raised by an experiment that may require further investigation. <p>Connecticut: SCIENTIFIC NUMERACY</p> <ul style="list-style-type: none"> ◆ Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas. <p>Grade10: Standard V: Genetics, Evolution and Biodiversity</p> <p>10.5 - Evolution and biodiversity are the result of genetic changes that occur over time in constantly changing environments.</p>
Sources	<p>-Article "Greatest Mysteries: How Many Species Exist on Earth?" http://www.livescience.com/strangenews/070803_gm_numberspecies.html</p> <p>-Chapter 1 of The Future of Life by E.O. Wilson Pg 10-21 Examples of biodiversity levels in various groups) (ISBN: 978-0679768111)</p> <p>-Time Magazine Article "Vanishing Before Our Eyes" Wilson, Edward O. "Vanishing Before Our Eyes." TIME.com. Time Magazine, 26 Apr. 2000. Web. 19 July 2010. <http://www.time.com/time/printout/0,8816,996747,00.html#>.</p> <p>-http://www.hawaii.edu/gk-12/opihi/assessment/fgfp.pdf (Optional making a field guide resource; keywords: Hawaii. intertidal field guide, lesson plan)</p> <p>-PBS Evolution Series: Video 3: Extinction http://www.youtube.com/watch?v=GIRMvaeVEaA&playnext_from=TL&videos=dVJeusJBIQ</p>
References	<p><Cite any other sources that you referred to (unpublished faculty talks, etc.).></p>
Assessment	<p>This lesson plan can be assessed in multiple ways. The field work, ability to read and answer questions, and mathematical procedures used to create the model are all part of the overall assessment.</p>