



Grade: 10

Subject: Biology

Unit: Ecosystems

Time: 18 days

Instructional Goals: TLW understand the interconnectedness of the members and processes in an ecosystem.

TLW demonstrate an understanding of populations and the factors that limit them.

TLW make use of mathematical models of scientific data in furthering their understanding of ecosystems.

ESLO Standard	Objective, (E, D, M) E=Emerging, D= Developing, M=Mastery	Duration	Teaching Method	Resources/Text	Assessment	Additional Notes/ Biblical Integration
2 3 4 6 7	TLW explain how plants and animals cycle carbon and nitrogen within an ecosystem. (E) TLW explain how matter cycles and energy flows in ecosystem (E)	3 days	Demo – compare and contrast healthy and non-healthy ecosystems (w/ respect to energy flow, ie: marine ecosystems after oil spill) Reflective Writing – SW compare differences between marine ecosystem before and after oil spill Learning Center – SW read provided information and fill in webs showing the carbon, nitrogen, and matter cycles and the flow of energy in an ecosystem Presentation _SW condense all their webs and cycle charts from the Learning Center activity into one poster and present to the class	http://www.marietta.edu/~biol/102/ecosystem.html	P/P unit test Writing piece Poster Presentation	This unit will need to be tied in with expedition Ruben works with ReefCheck and will be the best resource for this (Ask Tim)
1 7 8 9-12 SYSC	TLW evaluate the conditions necessary for rapid population growth (e.g., given adequate living and nonliving resources and no disease or predators, populations of an organism increase at rapid rates). Given ecosystem data, calculate the population density of an organism (E) TLW know that in complex systems, entirely new and unpredictable properties may emerge. Consequently, modeling a complex system in sufficient detail to make reliable predictions may not be possible.	3	R. and R – discuss lobster food webs, habitats, and reproductive cycles. Brainstorm – SW discuss what conditions affect lobster populations Modeling: Predation and resource availability modeling lab Discussion -class discussion of the limitations of the predation model.	Lola Lobster Reading Books (blue spiral-bound) *Lab resource sheets “Biology” Lab resource binder, p. ecology 1.5-1.8 (McDougal-Littell),	Lab Report	B.I. Story of tower of Babel after Noah’s flood in Genesis



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2 4 6 7 8	TLW explain factors, including matter and energy, in the environment that limit the growth of plant and animal populations in natural ecosystems (E)	2	<p>Game – SW create board game with lobster theme which simulates consequences of actual possible events in an ecosystem</p> <p>Drawing – SW show relationships between lobsters and other animals in food chain</p> <p>Discussion – how many eggs do lobsters release? How many survive? Why?</p>	<p>“Gene Scene” activities at http://dmr.state.il.us/education/diversitybasics/Section1.pdf</p> <p>Lola Lobster Reading Books (blue spiral-bound)</p>	<p>Teacher Observation of game results</p> <p>P/P unit test</p>	
1 2 3 6 7	<p>TLW draw a systems diagram to illustrate and explain why introduced (nonnative) species often do poorly and have a tendency to die out, as well as why they sometimes do very well and force out native species. (E)</p> <p>TLW understand that systems can be changing or in equilibrium. (E)</p> <p>TLW explain the consequences for failure to provide appropriate citations. (D)</p> <p>TLW provide appropriate citations for all ideas, findings, and information used in any and all written reports. (D)</p>	2	<p>Reading and Response: SW read about the lion fish as an introduced species and create an educational poster teaching people the dangers of introducing a species to a new area.</p> <p>Lecture – ethics in research</p> <p>Learning Center – learn about instances of scientific misconduct</p> <p>Reading and Response–“Scientific misconduct” article and reading guide</p> <p>Lecture – detailed information about what makes a website or resource reliable.</p> <p>Research – SW compare and contrast reliable and non-reliable websites.</p>	<p>http://www.sciencedaily.com/releases/2008/07/080717164319.htm</p> <p>http://www.nytimes.com/2009/11/21/science/earth/21climate.html?_r=1</p> <p>article and reading guide</p>	<p>P/P unit test</p> <p>Student posters</p> <p>Reading guide</p> <p>Student use of citation and reliable sources in various lab reports</p>	<p>B.I. We are all wanting to “make a name” for ourselves (Gen. 9) but God wants us to make His name great. When we claim the work of others for ourselves, we do so in order to make our name great. . .</p>
9-11 LS2C						
9-11 LS2D						
9-12 SYSD						
9-12 INQH						



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1 2 3 4 5 6 7	<p>TLW compare the biodiversity of organisms in different types of ecosystems (e.g., rain forest, grassland, desert) noting the interdependencies and interrelationships among the organisms in these different ecosystems. (E)</p> <p>TLW know that systems thinking can be especially useful in analyzing complex situations. To be useful, a system needs to be specified as clearly as possible. (E)</p>	3 days	<p>Field Trip – SW visit the upper Salto de Jimenoa and find examples organisms that depend on one another</p> <p>Ref. Writing – SW discuss how biodiversity is a major theme in molecular biology, macrobiology, our social lives, and our spiritual lives.</p> <p>Lab: Biodiversity</p> <p>Modeling activity: Modeling Biodiversity #1</p> <p>Modeling activity: Modeling Biodiversity #2</p> <p>Discussion-Compare the health of a system created as the Biblical account relates and as Darwin’s “tree of life” recounts it.</p>	<p>*Lab resource sheets</p> <p>“Biology” Lab resource binder, p. ecology 81 (McDougal-Littell)</p> <p>*http://www.accessexcelle.com/AE/ATG/data/released/0534-KathyParis/index.php</p>	Lab sheets from modeling activity	<p>B.I.- It would have been very difficult for organisms to evolve slowly over time if it is true that biodiversity is a key component to a system’s health.</p>
1 3 5 6 7 8	<p>TLW explain how scientific concepts and findings relate to a resource issue currently under discussion in the Dominican Republic. (E)</p> <p>TLW explain how the concept of sustainable development may be applied to a current resource issue in the Dominican Republic. (E)</p>	3 days	<p>Game – Tragedy of the commons fishing game</p> <p>Hands-On – SW Create lobster habitats (expedition project)</p> <p>Reflection – SW discuss how lobster habitats create sustainable lobster populations</p> <p>Peer Sharing – SW share how humans effect lobster habitats in an informative essay.</p>	<p>Patrick is best resource for rules of this game</p> <p>Daniel will have plans for the habitats. Also check with the Peace Corp volunteers involved in the project.</p>	Part of product from expedition	
1 2 6 7	<p>TLW formulate one or more hypotheses based on a model or theory of a causal relationship. (D)</p> <p>TLW demonstrate creativity and critical thinking to formulate and evaluate the hypotheses. (E)</p>	1 day	<p>Peer sharing-students will generate hypotheses for their lobster expedition based on other models of similar relationships elsewhere</p>		List of hypothesis	



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2 3 6 7	TLLW participate in a scientific discussion about one's own investigations and those performed by others. (E) TLLW respond to questions and criticisms, and if appropriate, revise explanations based on these discussions. (E)	1	Peer Critique -students will discuss the solutions proposed to issues surrounding lobsters and overfishing. Discussion -students will discuss and defend their work on lobster habitats to parents at 'expedition night'	Expedition work	Critique and teacher observations	