



APS Science Curriculum Unit Planner

Grade Level/ Subject Grade 7 Life Science	
Stage 1: Desired Results	
Enduring Understanding	
Organisms can survive only in environments where their needs can be met, but the changes that one organism makes to adapt or survive impacts other organisms and the environment.	
Correlations	
Unifying Understanding	Our world is comprised of a multitude of interrelated systems. Patterns and cycles exist in nature.
VA SOL	5, 7, 8, 9, 10, 12
NSES (grade level)	
AAAS Atlas	The Living Environment: Flow of Matter and Energy Flow of Matter in Ecosystems (p. 77) “All organisms, including the human species, are part of and depend on two main interconnected global food webs. One includes microscopic ocean plants, the animals that feed on them, and finally the animals that feed on those animals. The other web includes land plants, the animals that feed on them and so forth.” “For any particular environment, some kinds of plants and animals survive well...and some cannot survive at all.” (p. 83) “Changes in environmental conditions can affect the survival of individual organisms and entire species...” (p. 83)
Essential Questions	
<ul style="list-style-type: none"> • How do living things affect their physical environment? • How are organisms interdependent on each other and factors in the environment? • How do populations change with the environment and other populations? • How do organisms respond to changes? 	
Knowledge and Skills	
Students should know:	
<ul style="list-style-type: none"> • An organism’s niche represents an interactive, dynamic process that maintains a relatively stable condition in an ecosystem. • Biotic and abiotic factors. • The needs of biotic factors, including how they use abiotic factors. • How biotic factors are organized (population, community, ecosystems, etc). • How to determine population size and what changes a population. • Interactions between populations. • How energy flows through populations • Differences in environments and biomes • Eutrophication and succession 	
Students should be able to:	
<ul style="list-style-type: none"> • Give examples of how biotic factors affect the abiotic environment. 	

<ul style="list-style-type: none"> • Differentiate between a niche and a habitat. • Compare and contrast biotic from abiotic factors. • Explain how biotic are dependent on abiotic factors. • Count population sizes by the most appropriate method for a particular population. • Organize organisms into populations, communities, etc. • Explain changes in populations according to biotic and abiotic factors. • Compare and contrast the types of relationships between organisms. • Observe populations in the surrounding area. • Create diagrams of food chains or webs, and energy pyramids showing the transition of energy through populations. • Diagram the nature cycles and explain the influence of biotic factors • Compare and contrast the biomes • Explain how specific adaptations affect an organism’s survival • Evaluate the effect of humans on the environment and the other organisms within it 	
Stage 2: Assessment Evidence	
Prior Knowledge and Skills	
<ul style="list-style-type: none"> • Familiarity with the water cycle • Basic knowledge of the effect of fertilizers on plant growth • General idea of the process of biological decomposition, decay, “rotting” 	
Formative Assessment	Summative Assessment
<ul style="list-style-type: none"> • Lab activities • Quizzes • Group project(s) 	<ul style="list-style-type: none"> • Testing to corroborate the knowledge and skills listed above • Creative thinking activities, in which students design solutions to ecological problems (e.g., the ever-increasing production of carbon waste)
Stage 3: Learning Plan	
References to Adopted Materials	
<ul style="list-style-type: none"> • PH Science Explorer: <i>Life Science</i> - CYCLES OF MATTER (pp. 746-751); Adapting to the Environment (p. 723) • Prentice Hall “Life Science”- Chapter 21 (pg.704-735) and Chapter 22 • FOSS Populations and Ecosystems 	
Suggested Investigations	
<ul style="list-style-type: none"> • APS Problem-Based Laboratory: Paper Decomposition • Observational walk through a wooded or shrubby area to record evidence of organisms and their niches. • Populations Density lab • Food Chain/Web or Energy Flow charts • Acid Rain PBL 	
Outdoor Education Applications	
<ul style="list-style-type: none"> • As indicated below under “Field Trips”, any natural environment will provide opportunity to observe niches. The Outdoor Lab provides an abundance of such opportunities. 	
Resources	
Web Sites	

<ul style="list-style-type: none"> • http://www.purchon.com/ecology/niche.htm • http://essp.csumb.edu/esse/climate/climatebiogeo.html (for teacher reference) • http://www.windows.ucar.edu/tour/link=/earth/Life/biogeochem.html
Videos
<ul style="list-style-type: none"> • The Ecosphere: Where All Life Exists (9-12) (24:32)
Online clips
<ul style="list-style-type: none"> • The Cycle Series: The Carbon Cycle (6-8) (11:07), Discovery Streaming • The Cycle Series: The Oxygen Story (6-8)(15:02), Discovery Streaming • The Nitrogen Cycle (9-12) (2:27), Discovery Streaming
Field Trips
<ul style="list-style-type: none"> • Any local undeveloped area can provide evidence of one or more niches. Even a grassy area can be instructive, especially if considered in the context of succession.
Other
<ul style="list-style-type: none"> • Natural cycles can naturally lead to a discussion of recycling of (renewable) materials by humans and long- and short-term consequences of our failure to do so.