

Unit	Stream Ecology
Lesson	I.1 Introducing Ecology
Essential question	How do organisms interact with biotic and abiotic factors in their habitat?
Objective	Students will be able to apply ecology vocabulary to a stream ecosystem.
Key words	Organism, species, hybrid, population, community, ecosystem, biotic, abiotic, habitat, niche, competitive exclusion
Related Standards	
NGSS standard	HS-LS4-4
AP Env Sci topic	I.1
IB Biology topic	A3.1, B4.2, C4.1
IB ESS topic	2.1
Suggested sequence of learning activities	<ol style="list-style-type: none"> 1. Starter quiz/prior knowledge check 2. Direct instruction (if traditional) or classroom discussion (if flipped). Slides here. 3. Analysis questions (completed by individual or group) 4. Peer check of analysis questions. Answers by request. 5. Individual exit ticket/comprehension check
Assessment	Exit ticket/comprehension check
Possible modifications	<ul style="list-style-type: none"> ● Give a keyword list (with or without definitions already included) to students before or during class ● Be intentional about student groupings (eg. heterogeneous skill levels)
Resources required	Copies (or digital distribution) of analysis question sheet to students
Starter questions	<ol style="list-style-type: none"> 1. What are three animals that might live in a stream? 2. What does a fish need to live in a stream?

<p>Concepts covered in lesson</p>	<p>Ecology is the study of organisms, or living things, and their environments. A species is a group of organisms with similar characteristics that can potentially interbreed and produce fertile offspring. For example, the brook trout is a species of trout and the green darner is a species of dragonfly. Note that this definition of species is not always clear. For example, two species of trout, rainbow trout and cutthroat trout, can interbreed to produce a hybrid offspring called cutt-bow which is also fertile. A population is a group of organisms of the same species living in the same area at the same time. A community is a group of populations of different species that live in the same area. An ecosystem is a community of living things (biotic factors) interacting with the non-living components (abiotic factors) of a specific area. Habitat is the word that means the physical location where an organism lives. For example, a lake trout's habitat might be a specific range of depth in a lake. Niche is a more specific word that can be described as the functional role of a species in an ecosystem. This would include both the physical habitat where a species lives in addition to its relationships and interactions with its community. For example, a crayfish's niche may be as a scavenger that feeds on dead organic material in the mud of a stream. The competitive exclusion principle states that when two species attempt to occupy the same niche, one species does better, causing the other species to reduce in number or change its niche.</p>
<p>Slide presentation</p>	<p>Link here</p>
<p>Activity</p>	<p>Analysis questions (link here) completed individually or in groups then checked by peers or teacher. Answers by request.</p>
<p>Exit ticket questions</p>	<ol style="list-style-type: none"> 1. Which biological term is larger, a population or a community? 2. Is the pH of stream water a biotic or abiotic factor? 3. How is a species' niche different from its habitat? <p><u>Answers:</u></p> <ol style="list-style-type: none"> 1. <i>Community (defined as a group of populations living together)</i> 2. <i>Abiotic (pH is a non-living factor)</i> 3. <i>Niche includes the functional role of an species, habitat is only the physical location where a species lives</i>

Extension questions/activities/resources	<p>Good video with more detail about niche and competitive exclusion here. Crash Course video with additional detail here.</p> <p>HHMI Biointeractive video and resources on Rosemary and Peter Grant's work with finch beaks in the Galapagos here.</p>
--	--