

# General Biology I (101-NYA)

## Community Ecology Concepts & Learning Outcomes

Topic	Concept	Learning Outcomes																					
<b>Ecological community</b>	1. An ecological community is a group of species that coexist and interact within a defined area.	1. Define ecological community and give examples																					
<b>Overview</b>	2. Species in a community interact. Fate of a particular population may be tightly linked to other species that share its habitat. 3. Effects of interactions among species on the fitness of the individuals involved could be: <ol style="list-style-type: none"> <li>Positive (+) interaction between 2 species: provides a fitness benefit to members of one species</li> <li>Negative (–) interaction between 2 species: hurts members of one species</li> <li>Neutral (0) interaction between 2 species: no effect on the members of either species</li> </ol>	2. List and define the 3 main effects of interactions among species on the fitness of individuals																					
<b>TABLE 55.2</b> <b>Types of Ecological Interactions</b> <table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2" rowspan="2"></th> <th colspan="3">EFFECT ON ORGANISM 2</th> </tr> <tr> <th>HARM</th> <th>BENEFIT</th> <th>NO EFFECT</th> </tr> </thead> <tbody> <tr> <th rowspan="3">EFFECT OF ORGANISM 1</th> <th>HARM</th> <td>Competition (-/-)</td> <td>Predation or parasitism (-/+)</td> <td>Amensalism (-/0)</td> </tr> <tr> <th>BENEFIT</th> <td>Predation or parasitism (+/-)</td> <td>Mutualism (+/+)</td> <td>Commensalism (+/0)</td> </tr> <tr> <th>NO EFFECT</th> <td>Amensalism (0/-)</td> <td>Commensalism (0/+)</td> <td>—</td> </tr> </tbody> </table>					EFFECT ON ORGANISM 2			HARM	BENEFIT	NO EFFECT	EFFECT OF ORGANISM 1	HARM	Competition (-/-)	Predation or parasitism (-/+)	Amensalism (-/0)	BENEFIT	Predation or parasitism (+/-)	Mutualism (+/+)	Commensalism (+/0)	NO EFFECT	Amensalism (0/-)	Commensalism (0/+)	—
		EFFECT ON ORGANISM 2																					
		HARM	BENEFIT	NO EFFECT																			
EFFECT OF ORGANISM 1	HARM	Competition (-/-)	Predation or parasitism (-/+)	Amensalism (-/0)																			
	BENEFIT	Predation or parasitism (+/-)	Mutualism (+/+)	Commensalism (+/0)																			
	NO EFFECT	Amensalism (0/-)	Commensalism (0/+)	—																			
<b>Types of species interactions</b>	3. Species interactions fall into several categories: <ol style="list-style-type: none"> <li>Mutualism: both participants benefit from an interaction (+/+ interaction). Examples: association between plants and mycorrhizae; between plants and nitrogen-fixing bacteria.</li> </ol>																						

	<ul style="list-style-type: none"> <li>b. Commensalism: one species benefits but the other is unaffected (+/0 interaction). Example: cattle egrets forage for insects near large mammals, and the movements of the large animal flush out insects, which the birds eat. The mammal does not gain or lose anything from this interaction.</li> <li>c. Amensalism: one participant is harmed but the other is unaffected (0/- interaction). Example: branches falling from trees damage smaller plants beneath them.</li> <li>d. Predator-prey or parasite-host interaction: one organism may benefit itself while harming another organism (+/- interactions). Examples: fox hunting and preying on rabbits; wasp parasitoids on moth larvae.</li> <li>e. Competition: occurs when 2 organisms use the same resources and those resources are insufficient for their combined needs (-/- interaction). When 2 species compete for identical resources, one will be more successful and will eventually eliminate the other (competitive exclusion principle). Examples: consumptive competition (food consumption competition), territorial competition, exposure to light competition.</li> </ul>	
<b>Coevolution</b>	<ul style="list-style-type: none"> <li>4. Coevolution (also known as reciprocal adaptation) refers to the evolution of an adaptation in one species leading to the evolution of an adaptation in a species with which it interacts.</li> <li>5. A series of reciprocal adaptation may lead to a coevolutionary arms race (eg, back-and-forth evolution of defense and offense between predator or parasite and prey).</li> </ul>	
<b>How do preys defend themselves?</b>	<ul style="list-style-type: none"> <li>6. Adaptations against predation in preys include: <ul style="list-style-type: none"> <li>a. Behavioral: eg, schooling in fish</li> <li>b. Cryptic coloration (blending with the environment; becoming invisible to the predator; avoidance of detection)</li> <li>c. Aposematic coloration/signals: warning/conspicuous coloration, sounds, odors, etc.; advertising danger to the predator or unpalatability</li> <li>d. Mimicry: close resemblance of one species for another. There are 2 types of mimicry: Müllerian mimicry (resemblance of 2 harmful prey species to each other) and Batesian mimicry (resemblance of a harmless prey species to a dangerous prey species)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>2. Describe 4 ways prey evolved to defend themselves against predators</li> </ul>

