

Symbiotic Relationships
and
Microorganism Interactions

TEKS

12 The student knows that interdependence and interactions occur within an environmental system. The student is expected to:

12(A) interpret relationships, including predation, parasitism, commensalism, mutualism, and competition among organisms

11(C) summarize the role of microorganisms in both maintaining and disrupting the health of both organisms and ecosystems

Vocabulary

- Symbiotic
- Competition
- Mutualism
- Parasitism
- Commensalism
- Predation

Prerequisite Questions

- What is a relationship?
- How can organisms interact ecologically?

Essential Question #1

- How can scientists categorize the different types of organism interactions in ecological systems?

Symbiotic

- A **symbiosis** happens when different organisms live and interact together forming an interdependent relationship.
 - These relationships can be any type from beneficial (helpful) to detrimental (harmful)



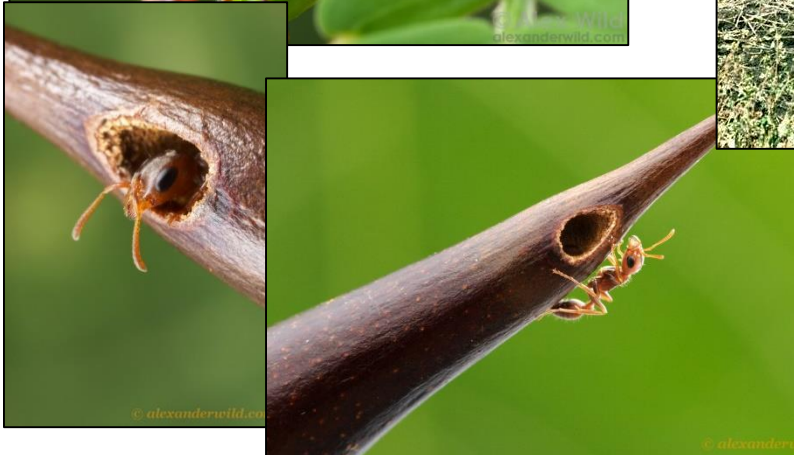
Competition

- **Competition** happens when organisms fight for the same resources.
 - Resource examples: food, water, space, sexual partners, etc.



Mutualism

- Mutualism is a symbiotic relationship in which both organisms benefit. (+/+)



Parasitism

- Parasitism is a symbiotic relationship where one organism benefits and the other is harmed. (+/-)



Commensalism

- Commensalism is a symbiotic relationship where one organism benefits and the other organism is neither helped nor harmed. (+/0)



Predation

- Predation happens when one organism feeds off of another organism.



Microorganism Interactions in Ecosystem

- Microorganisms (ex: bacteria, fungus, protists, etc.) can have many different symbiotic relationships.
- Many bacteria and fungi are harmful to organisms and cause sickness (ex: salmonella, staph, strep, ring worm, White nose syndrome, etc.)
- Some are beneficial and exist in a mutualistic relationship. (ex: our gut bacteria, bacteria in yogurt and fungal mycorrhizae)

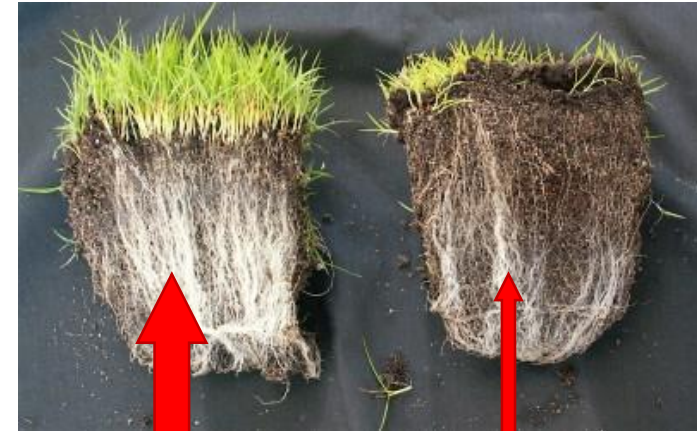
White Nose Syndrome in bats

- The fungus that grows on the nose of bats cause the bats to act irregularly, ending in their deaths.
 - The fungus steals the bats energy while they hibernate. (parasitic)
 - About 5.7 million bats have died to date.
- This is an example of how microorganisms can affect an ecosystem, by removing bats from the food web.



Mycorrhizae of fungi near plant roots

- Fungi are external digesters.
- They secrete digestive enzymes that break down the food source they are growing on, then they absorb the digested nutrients.
- Some fungi mycorrhizae (underground fungal cells) grow into and around plant roots, which allows the plants to take up some of the externally digested materials into their roots.
- The plants drop dead leave and plant matter that the fungi eat. (mutualism)



Lots of fungal
mycorrhizae

Little fungal
mycorrhizae