

# Lab: Symbiosis

MAKEUP VERSION

## Prelab:

1. Define Symbiosis.

**Activity:** Using the cards on page 3, match the appropriate organisms into the rows below. Each card is used only once and each symbiosis type has only four sets of organisms.

## Data:

<b>MUTUALISM</b>	Species One	Species Two	Description of Relationship
Example One			
Example Two			
Example Three			
Example Four			

<b>COMMENSALISM</b>	Species One	Species Two	Description of Relationship
Example One			
Example Two			
Example Three			
Example Four			

<b>PARASITISM</b>	Species One	Species Two	Description of Relationship
Example One			
Example Two			
Example Three			
Example Four			

continued on back

***Analysis Questions:***

2. Define mutualism.
  
3. Give an example of mutualism among terrestrial species.
  
4. Define commensalism.
  
5. Give an example of commensalism among terrestrial species.
  
6. Define parasitism.
  
7. Give an example of parasitism among terrestrial species.
  
8. Do you think symbiotic relationships are more common in aquatic or terrestrial environments? Why?
  
9. Describe a basic difference between symbiotic relationships in shallow water versus deep water.
  
10. If you could have a symbiont of your own, what would it be? Describe your relationship with that species.

<p><b>Staghorn Coral</b> Staghorn Coral, <i>Acropora cervicornis</i>, is a branching, stony hermatypic coral that forms reefs. It is very common in the Atlantic Ocean and Caribbean Sea. As with all hermatypic coral, it uses symbiotic algae to obtain energy.</p>	<p><b>Sacoglossa Sea Slug</b> This Sacoglossan Sea Slug, <i>Oxynoe olivacea</i>, demonstrates kleptoplasty, which is a symbiotic event during which algae is eaten and the plastids are stored near the skin for photosynthesis.</p>
<p><b>Barnacle</b> <i>Coronula diadema</i> is a barnacle that burrows into the skin and blubber of whales. They do not harm the whales, but do benefit from having a habitat where nutrients are available.</p>	<p><b>Decorator Crab</b> The Decorator Crab, <i>Moreiradromia antillensis</i>, attaches other organisms to its shell for camouflage. These organisms can include seaweed, kelp, sponges and anemones.</p>
<p><b>Pinhead Pearlfish</b> The Pinhead Pearlfish, <i>Encheliophis Boraborensis</i>, is an uncommon species of pearlfish. These fish are known for their relationship with sea cucumbers. The pearlfish lives within the anus of the sea cucumber, doing no long-term harm.</p>	<p><b>Orange Clownfish</b> The Orange Clownfish, <i>Amphiprion percula</i>, is a small marine fish that inhabits lagoons and seaward reefs. They are well-known for their relationship with anemones, where they find protection from predators and competitors.</p>
<p><b>Common Remora</b> The Common Remora, <i>Remora remora</i>, has a modified dorsal fin that acts like a suction cup. This allows them to attach to other fish for a free ride, allowing them to feed on scraps.</p>	<p><b>Magnificent Sea Anemone</b> The Magnificent Sea Anemone, <i>Heteractis magnifica</i>, is found in the Indo-Pacific and is common to coral reefs. It is frequently found with various species of anemone fish, which bring them food and supply nutrients to the anemone.</p>
<p><b>Giant Oceanic Manta Ray</b> <i>Manta birostris</i>, the Giant Oceanic Manta Ray, is the largest species of ray. The largest of these species can reach over 5,000 pounds. They, like other rays and sharks, can serve as hosts for commensalistic fish that feed on their scraps.</p>	<p><b>Pineapple Sea Cucumber</b> <i>Thelenota ananas</i>, the Pineapple Sea Cucumber, is the frequent home of fish that back into its anus. The sea cucumber is capable of regeneration, so no long-term harm comes to it. The fish, however, is able to escape and hide from predators.</p>
<p><b>Hawaiian Bobtail Squid</b> <i>Euprymna scolopes</i>, the Bobtail Squid, incorporates special bacteria into two special light organs. This allows the squid to countershade and communicate with others.</p>	<p><b>Bioluminescent Bacteria</b> <i>Vibrio fischeri</i>, a bioluminescent bacteria, can be found inside other creatures that use it to produce light. It benefits from this relationship by having a suitable habitat.</p>

<p><b>Gill Fluke</b> The Gill Fluke, <i>Zeuxapta seriolae</i>, is a flatworm that lives on the gills of fish and feeds on blood. Infections can cause emaciation, lethargy and mortality.</p>	<p><b>Yellowtail Amberjack</b> The Yellowtail Amberjack, <i>Seriola lalandi</i>, is a mainly pelagic fish that forms large schools. They can be susceptible to gill parasites.</p>
<p><b>Zooxanthellae</b> Zooxanthellae are single-cell plants that live in the tissues of animals. There are many species of zooxanthellae, all within the genus <i>Symbiodinium</i>. They are most commonly associated with reef-forming corals.</p>	<p><b>Killer Alga</b> Killer Alga, <i>Caulerpa taxifolia</i>, is an invasive species. This alga, like others, are used in a wide variety of symbiotic relationships. One particularly curious one involves chloroplasts being sequestered to allow the consuming organism to perform photosynthesis.</p>
<p><b>Humpback Whale</b> The Humpback Whale, <i>Megaptera novaeangliae</i>, is a baleen whale found throughout most of the world's oceans. As with most whales, they are susceptible to ectoparasites and commensalistic hitchhikers.</p>	<p><b>Sponges</b> Sponges (phylum Porifera) are sessile animals whose shape is adapted for maximum water flow, allowing them to filter feed. They will grow on a wide range of surfaces, including rock, coral, man-made structures, and even the shells of other animals.</p>
<p><b>Common Remora</b> The Common Remora, <i>Remora remora</i>, has a modified dorsal fin that acts like a suction cup. This allows them to attach to other fish for a free ride, allowing them to feed on scraps.</p>	<p><b>Barramundi</b> The Barramundi, <i>Lates calcarifer</i>, is found in coastal waters, estuaries and lagoons, and is a popular game fish. They can be susceptible to skin parasites.</p>
<p><b>Bioluminescent Bacteria</b> <i>Vibrio fischeri</i>, a bioluminescent bacteria, can be found inside other creatures that use it to produce light. It benefits from this relationship by having a suitable habitat.</p>	<p><b>Skin Fluke</b> The Skin Fluke, <i>Benedenia seriolae</i>, is a flatworm that lives on the surface of a fish and feeds on skin cells. They have a circular organ that acts like a suction cup to attach to the fish. Heavy infections cause irritability, anorexia and mortality.</p>
<p><b>Sea Lice</b> Sea Lice, <i>Caligus bonito</i>, are copepods that live on the skin of fish and feed on the epidermal tissue and blood of fish. They are often found on anadromous fish, although they cannot survive in freshwater.</p>	<p><b>Bluestreak Cleaner Wrasse</b> The Bluestreak Cleaner Wrasse, <i>Labroides dimidiatus</i>, inhabits areas of the coral reef with large fish populations. It feeds on crustacean ectoparasites and mucus of other fish.</p>