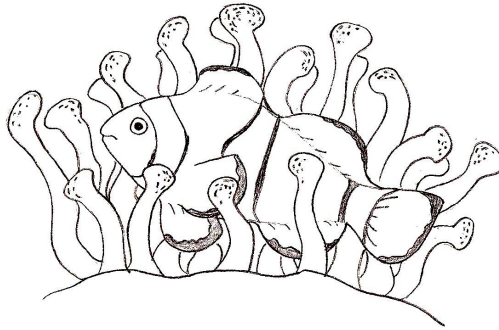




Symbiosis



(mutualism, parasitism, commensalism)

Five Fast Facts:

1. Symbiosis describes any *relationship* between two species that is helpful or harmful to one or both of the organisms.
2. Symbiotic relationships occur in all marine ecosystems (from the deep sea to coral reefs), and between both vertebrates and invertebrates.
3. *Parasitism* is a form of symbiosis where one species benefits when the other is harmed. External parasites, such as copepods, cling to the outside of many different marine fish, absorbing the others' nutrients through the scales and skin.
4. Porcelain crabs/anemone fish fiercely guard their sea anemone shelter. This relationship is known as *mutualism* since both animals benefit: the crab/fish is given protection from the anemone, and the anemone receives food scraps and protection from the crab/fish.
5. *Commensalism* is a symbiosis where one species benefits with no effect on the other animal at all. For example, remoras get a ride and an easy meal when they tag along with larger marine fish and mammals, who remain unaffected by their "hitchhikers."

Food for Thought:

1. Why do marine organisms develop symbiotic relationships?
2. What are some drawbacks of symbiosis?



Activities to do with your kids:

- **Celebrity Couples** - students create a magazine cover that features three celebrity couples (real or fictional characters). Each couple must be identified as one of the forms of symbiosis, with a brief description that explains how and why they fit the form.
- **RAFT** (depending on symbiosis type, one example for parasitism: **R**ole-marine fish, **A**udience-parasite, **F**ormat-letter of protest, **T**opic-leave me alone)

Celebrity Symbiosis

Directions: *Based on your knowledge of symbiosis, you will create the cover of a magazine featuring three celebrity couples (one for each type of symbiosis). Your cover must be illustrated with full color, and include descriptions of how and why each couple demonstrates their specific type of symbiosis. Use this sheet to draft your ideas, remembering to be creative and have fun!*

Although one example has been given, you must still come up with YOUR OWN couple for mutualism!

Mutualism

Example: Barack and Michelle Obama demonstrate a mutual symbiotic relationship, because they both benefit from the others' strengths. Barack's high-profile position as President offered Michelle opportunities to enact social reform and public outreach; Michelle in turns helps Barack raise their two daughters and also advocates on his behalf in the media and during campaigns.



Mutualism

Commensalism

Parasitism