



Aquarium Webcam Resource Kit
Lesson *Amazing Adaptations*
3rd-5th Grade

Next Generation Science Standards:

- **3-LS2-1** Construct an argument that some animals form groups that help members survive.
- **3-LS3-2** Use evidence to support the explanation that traits can be influenced by the environment.
- **3-LS4-3** Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
- **3-LS4-4** Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change
- **4-LS1-1** Construct an argument that plants, and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- **5-ESS3-1.** Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.

Key Words:

- **Adaptation:** something an organism has on or inside its body, or a behavior, to help it survive in its habitat
- **Exoskeleton:** a rigid external covering for the body in some invertebrate animals, especially arthropods, providing both support and protection.
- **Hypothesis:** proposed explanation made based on limited evidence as a starting point for further investigation.
- **Photosynthesis:** the process by which green plants and some other organisms use sunlight to synthesize foods from carbon dioxide and water.
- **Predator:** the preying of one animal on others
- **Symbiotic:** interaction between two different organisms living in close physical association, typically to the advantage of both.
- **Zooxanthellae:** a yellowish-brown symbiotic alga present in large numbers found inside the tissues of many marine invertebrates, such as corals and giant clams.

Supplies:

- *Amazing Adaptations* Video
- *Amazing Adaptations* Worksheet
- Computer & projector to show videos and Tropical & Penguin Webcams
<http://www.aquariumofpacific.org/exhibits/webcams>
- Coral Conservation Worksheet
- NOAA Ocean Today Every Full Moon: *Coral Comeback?*
<https://oceantoday.noaa.gov/every-full-moon/full-moon-coralcomeback.html>
- *Sea Dragon* Video

Step 1: Play *Amazing Adaptations* Video

Step 2: *Sea Dragon* Video & Ocean Ranger Worksheet: *Amazing Adaptations* (Page 1)

- Watch the *Sea Dragon* video and fill out the Ocean Ranger Worksheet: *Amazing Adaptations* page 1
- Worksheet Directions
 - What do you notice? Record your sea dragon observations.
 - What are you curious about? List questions you have from these observations.
- Paired Discussion
 - What were some similarities or differences you noticed between sea horses and sea dragons?
 - *Encourage students to share “I notice _____”*
 - What questions do you have about sea dragons?
 - *“I wonder _____”*
 - Have students discuss a prediction/hypothesis to their question
 - *“I think _____ because _____”*
 - *Have students connect what they observed, learned, or already know to help them with a prediction*
 - Extension: thinking like a scientist, how would you investigate your question?

Step 3: *Penguin* Webcams & Ocean Ranger Worksheet: *Amazing Adaptations* (Page 2)

- Watch the *Penguin* exhibit webcams to fill out the Ocean Ranger Worksheet: *Amazing Adaptations* page 2.
- Worksheet Directions:
 - Make observations about penguins. List as many adaptations that you can see penguins using to survive in their habitat.
- Group Discussion
 - What adaptations do penguins have to avoid predators, find food, and move in and out of the water.
Some examples: feet, feathers, wings, black and white colors, beak.

- Compare the penguin and sea dragon adaptations you observed. How does each animals' adaptations help them in their habitat?
- How are their habitats different?
- What are examples of human adaptations?

Step 4: Observe Tropical Webcam

- Group Discussion
 - Based off your observations, what adaptations help these animals survive?
Bright colors help animals to camouflage with the colored corals, some swim in schools, large spots on tail known as false eye to confuse predators, patterns
 - How has their environment influenced these adaptations?
Brightly colored environment has influenced the fish to be brightly colored as compared to fish seen in other ocean habitats. For example, compare to fish found in the Blue Cavern Kelp Forest Webcam.
 - How can swimming in a school benefit a fish?
Swimming in a school helps the overall survival of the fish. Predators may catch the slow, old or sick fish in the group, but the main group has a better chance of survival versus being a solo fish.

Extension: Coral Conservation Activity

What happens when a habitat changes? Corals are the foundation for an entire habitat, supporting ocean life and people. They have some amazing adaptations in warm tropical waters but as water conditions change, it threatens both corals and the animals that rely on them.

This activity uses the video resources created by the [NOAA Ocean Today Every Full Moon](#) series, along with the *Coral Conservation Worksheet*. The total video times are about 30 minutes and content is geared for more advanced learners within this age band.

- Worksheet Directions
 - Have students watch each of the following video sections then pause to answer the worksheet questions.
 1. [Introduction: Coral Comeback](#) & [Rainforests of the Sea](#) Videos
 - Why are coral reefs important to wildlife and people?
Coral reefs provide food, shelter, and nurseries for ocean wildlife. People benefit from coral reefs because they support fisheries, create oxygen, and support tourism
 2. [Coral and the Algae](#) Video
 - What does the coral gain out a symbiotic relationship with the algae?
Like plants, algae and can make food from the process of photosynthesis. As part of the relationship with coral, algae will provide extra food for coral
 - How does a coral poly protect itself and the algae that lives with it?

Coral creates its own outside shell (exoskeleton) as it grows to protect itself. This protection is why the algae lives with the coral

3. [Coral Under Threat](#) Video
 - What are the main reasons coral is threatened?
Changing ocean temperature and chemistry due to climate change, overfishing, and pollution are some of the most pressing challenges for reefs.
 4. [What Can We Do](#) Video
 - What are scientists doing to protect corals?
Scientists are tracking changes in ocean temperatures and chemistry while monitoring the health of corals. With this information they are trying to reduce the impact of these stressors, while also studying corals that have traits that are more resilient for conservation breeding programs.
 - What are ways you can protect coral reefs?
Reducing our carbon footprint (bike riding, carpooling, solar, turn off lights when not using them, etc.), coral friendly sunscreen, sustainable seafood, educating yourself and others!
- Class Discussion
 - What did they find most interesting about coral conservation efforts?
 - What do you think are the advantages and challenges of the conservation work scientist are doing for coral?
 - Conservation Poster
 - Have each student create an educational poster about coral conservation to inspire others.