



Cabrillo Marine Aquarium

Lesson Plan

A Lesson on Camouflage – the octopus

Grade Level: K-1st

NGSS Standards: K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive. K-ESS3-1 Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

Materials Provided by CMA to enhance virtual learning:

Pictures of Octopus

Videos of Octopus swimming Pictures and/or illustrations of different marine habitats

Octopus Coloring Worksheet

Lesson Background – Adaptation for NGSS & Distance Learning

Distance Learning Adaptation: In these times of distance learning, this lesson can be modified in the following ways:

- Synchronous live discussion on a video conferencing platform (zoom, google meet, etc.) If your classroom is currently using class discussions, then this lesson can be introduced with the following conversation to introduce the concept.

Open discussion by asking:

- *What do people need to survive? What do you need to survive?* Note and reinforce when students suggest: shelter/home, food, water, oxygen.
 - Transition conversation to ask *What do animals need to survive? What does an octopus need to survive?* Students should be able to draw similarities: we all need shelter, food, water, and oxygen to survive.
 - Ask students *How would an octopus find shelter? Or food?* Students should then understand that animals need to hunt for their food. Ask students *What would make a good an octopus a good hunter?*
- A-synchronous / self-pace assignment. If your classroom is using an asynchronous model for instruction (such as take-home packets, or self-paced online modules) this lesson can be easily adapted. This lesson can be based on a pre-recorded video or a hard copy worksheet for students to conduct activity with family.
 - For prerecorded video, we would recommend the educator recording themselves to ask these questions, and guide students to the same conclusions
 - For take home packets, we would suggest synthesizing the lecture to a few key questions and facts for students to read along with family.
 - If your classroom is using EdPuzzle (online learning video tool) Educators can easily use the voiceover function over our provided content and include questions during the course of the video.



Both forms of instruction can utilize this background information from our previous lesson:

Animals in the wild have a difficult life. They have to hunt for their food, instead of buying it in a supermarket like we do! In turn, they are hunted by other animals. They need to have special strategies to help them sneak up on their prey and also to hide from their predators. One of the methods they use is camouflage. Camouflage means to disguise or hide and animals have many different ways to camouflage themselves. For example, decorator crabs attach anemones, coral and anything else they can find to their shells. Other animals use the color, shape or pattern on their bodies to blend into the background where they are not easily seen. Some insects, like the stick insects, look exactly like the leaves or branches they sit on. A zebra's stripes make it difficult for predators to pick out individual animals to chase. Other animals change their color: Arctic foxes are brown in the summer when they can hide among the trees, but white in the winter so that they are not easily seen against the snow. Probably one of the best animals at camouflaging is the octopus. Not only can the octopus change its color very quickly, but it also changes its texture and the patterns on its skin so that it matches the texture and patterns of the ocean floor. The octopus also hides itself in a cloud of black ink, which it releases if a predator gets too close. This gives it time to make its escape. As well as hiding the octopus from the predator, the ink also contains a chemical that can affect the predator's sense of smell.

Activity 1: Adaptations for Distance Learning

- *Prior to this lesson, send students the Octopus Coloring Worksheet for them to print out. If students do not have access to a printer, they can hand draw their octopus.*
- Show students pictures of different marine and ocean habitats, which can include our provided pictures as well as outside illustrations. Be sure to show pictures of the Rocky Shore, as this is a common habitat for the octopus.
- Have students pick one of the pictures you provided, and have them draw/paint/color in their octopus to camouflage in that environment.
- Have students share on a video conference call, or upload to your google classroom. Encourage students to share which octopuses they like – whether it be through discussion or “liking” or “commenting” on others.

Activity 2: All About the Octopus

This read aloud component can also be adapted for distance learning:

- Educator can read aloud on video conference platform. To enhance the learning experience educator could play videos of octopuses swimming in the water on their computer screen, display provided media, and share their screen to other students
- Enhance NGSS learning goals by asking students
 - *What does an octopus need to survive?*
 - *How do they get these things in the ocean or in their habitat?*
 - *What do people need to survive?*
 - *How do we get these things in our habitat?*
 - *What do we share with the octopus? What do we have in common?*

Octopuses are invertebrates, they have no bones in their bodies. This aspect allows them to go through very tight places and squeeze between rocks or live in spaces in which other animals cannot reach them. The only hard parts in octopuses are their beaks. They use their beaks to bit and also to release poisonous saliva that is used to subdue their prey. They also have a very good eyesight and can spot their prey and choose the best place to grab it.

Octopus comes from a Greek word which means eight-legged or eight-footed and the reason for this is that its foot is divided into eight tentacles. These tentacles are like long flexible arms. On each tentacle, there are two rows of suckers or suction cups, which allow the octopus to hold on tight to anything it catches. These suction cups also allow the octopus to identify and taste what it is touching. Octopuses are shaped like a bag or their heads look similar to bulbs. Octopuses have three hearts. Two hearts pump blood to the gills and one pumps blood through the body. The color of their blood is bluish-green. Octopuses are known for their intelligence and their problem-solving skills. They are considered the most intelligent invertebrate and some scientists consider them even more intelligent than dogs.

Octopuses have a shore lifespan of up to only five years. They are solitary animals. The male usually dies after a few months of mating with the female. The female will stay and watch over her eggs without ever leaving them from one to two months depending on the species. She will not move ever to feed herself. She will watch over the eggs and jet water over them to make sure they get enough oxygen and are clean. The mother dies soon after the eggs hatch. The newly hatched octopuses spend their first weeks as ocean plankton, at the surface of the water. Then they gain weight and drop to the bottom.

There are approximately 300 species of octopus in the world. The largest octopus species is the giant Pacific octopus, which weighs anywhere from 30-100 pounds and has an arm span of about 14 feet. Octopuses can be found in every ocean in the world at different depths. Their bodies are usually smaller in warmer waters and larger in cold waters. They live in small, tight places in crevices between rocks or corals. They are carnivorous and eat fish, clams, lobsters, and crabs.

The predators of the octopus are moray eels, sharks, and marine mammals. Octopuses can crawl and swim. They can also use jet propulsion to provide themselves with greater speed to get away from their predators. Octopuses have two amazing aspects in their physical make-up to defend themselves against predators. First octopuses have the ability to change the color of their skin and its texture, so that they camouflage themselves. This means that they change colors to adapt to the environment around them so that predators do not see them. Second, if they are spotted, they are able to squirt and release black ink to confuse their predators who cannot see where they went or be able to smell them. One they release the black ink they are able to swim away using jet propulsion. If an octopus is caught, it can detach one of its arms to get away. The arms of an octopus can grow back again and regenerate.

Activity 3: All About Octopus Quiz

This activity would be best modified as a video conference activity, or as an activity for parents to do alongside students.

1. Octopuses are:

- a. Mollusks
- b. Cephalopods
- c. Invertebrates
- d. All of the above

2. The number of hearts an octopus has is:

- a. One
- b. Two
- c. Three
- d. Four

3. The number of tentacles an octopus has is:

- a. One
- b. Four
- c. Eight
- d. Ten

4. and 5. Name two unique features about the self defense mechanism of the octopus (how it defends itself from predators or being seen by predators).

Octopuses are able to change the color and texture of their skin to camouflage themselves in order to blend in with their environment.

Octopuses can squirt and release black ink to confuse predators who cannot see where they went or be able to smell them

True or False:

T 6. The tentacles of octopuses regenerate or grow if they are cut off.

F 7. The tentacles of the octopus are a smooth surface that has nothing on them.

F 8. Octopuses are herbivores, meaning they only eat plants and vegetation.

F 9. Octopus can live up to 20 years.

T 10. The newly hatched octopus eggs spend their first weeks at the surface of the water as plankton.

Lesson Extension: Role Play

This activity could also easily be done with video conferencing. Educators can also record themselves doing these role playing exercises, and post for students to follow along. Students could upload or share their interpretations to google classroom or other school websites. This would be a great way to have family participation.

Procedure: Have students act out these sea scenarios.

(Teacher can describe scenario.)

- Waves crashing on a rock
- An octopus hiding
- A hermit crab moving into a new shell
- A sea anemone capturing a fish
- An octopus feeding on mollusks
- An octopus escaping from a predator
- A jelly floating with the current
- A crab walking sideways, defending itself with its claws

