



Cabrillo Marine Aquarium Lesson Plan

Grade Level: Kindergarten and First Grade

Title: **Color in Science: A Lesson on Camouflage**

Objective: Students will be able to define camouflage and explain how it helps animals survive in their habitats. Students will experiment with colors and textures and learn that camouflage is an important adaptation that helps the octopus avoid getting caught by predators

California Science Standards: **K:** 2a, 2b, 2c, 4a-e **1st:** 2a, 2b, 2c, 4a, 4d, 4e

Time to Complete: 50 minutes

Vocabulary: Strategies, prey, predators, camouflage, blend, invertebrate, tentacles, suction cups, heart, gills, lifespan, solitary, mating, species, oxygen, plankton, carnivorous, jet propulsion, adapt, regenerate

Time to Complete: 50 minutes

Materials Provided by CMA Ocean Discovery Kits: *Worksheet: Octopus Coloring Sheet, Worksheet: Parts of an Octopus, Graphic: Parts of an Octopus Answer Key, Octopus Specimen, Posters, Books, and Habitat & Ocean DVD's*

Materials Provided by Teacher: Art materials for ocean scene (sand, rocks, shells, etc.), scissors, crayons, markers, paint, construction paper

Lesson Background:

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. So 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.

Lesson Outline:

Activity 1: Camouflage the Octopus

- Before this lesson, paint a large underwater ocean scene, about the size of a large classroom bulletin board.
- Add shells, sand & cut-outs of seaweed and rocks to make it look realistic.
- Give each student an *Octopus Coloring Sheet* and tell them to carefully color the octopus, so that it blends into the underwater ocean painting.
- Be sure to supply students w/ paints, rocks, crayons, sand & any other materials you have used in the ocean scene so that they can pick certain materials to decorate their octopus.
- When they have finished, have each student paste their octopus onto the ocean scene where they think it best blends in.
- As a class, vote which octopus is hidden the best.

Activity 2: All About the Octopus (read aloud to class)

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 bite and also to release poisonous saliva that is used to subdue their prey. They also have 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 short **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 even to feed herself. She will watch over the eggs and jet water over them to make sure that 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 the 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. Once they release the black ink they are able to swim away using the 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 the Octopus Quiz (*Test your students verbally*)

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 Extensions: Role play

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

References:

- LessonSnips
<http://www.lessonsnips.com>
- A Guide to the Side of the Sea
http://www.parks.ca.gov/page_id=25535/