**How does an octopus change its body to blend in with its environment?**

In this lesson, students will learn about camouflage by watching a video of an octopus blend into its surroundings. They will learn about four different characteristics to **describe** camouflage—texture, shape, color, and size—and will observe and explain how an octopus changes these characteristics in order to camouflage itself. Finally, students will create and discuss their own uniquely shaped, textured, colored, and sized “octopus” using modeling clay.

**Target Grades: 3-5**

**Content Areas**: Marine Biology, Language Arts

**Activity Type:** Art and descriptive writing activity

**Time required:** 60 minutes + 15 minutes extra for optional extension activities.

**Standards:** NGSS: 2-LS4-1, NGSS: 3-LS4-2 CCSS.ELA-Literacy.W.2.8

**Students Will Be Able To:**

Use observations of a live octopus to model different ways that octopuses can camouflage themselves by changing their body’s texture, shape, size, and color. Students will also use their observations to explain how octopus camouflage can help the animals blend into different habitats.

**Materials:**

* Projector or interactive whiteboard and computer
* Internet access or “Where’s the Octopus” video pre-downloaded onto computer
* Modeling clay or dough (search online for inexpensive recipes you can make at home)
* Graphic organizer for describing octopus characteristics
* Optional: Octopus coloring activity printout

**Activities and Sequence:**

1. **Introduce the concept of camouflage** *(PowerPoint Presentation – 10 mins)*
 Organisms use camouflage to look like their surroundings in order to hide. Show students different images of organisms blending in with their environment. Engage students with the following questions:
* *How would you dress in order to camouflage yourself in a movie theater? On a soccer field?*
* *Why would an organism want to hide? Who or what could it be hiding from?*
* *What does an animal’s camouflage tell you about its habitat? Could you guess where an animal lives based only on its camouflage?*
1. **Watch the raw footage of an octopus coming out of camouflage** (*Video 1min 15s*)
Watch the raw video footage of the octopus changing shape *without the voiceover*.
Encourage students to describe how the octopus changed with the following questions:
* *What happened to the shape of the octopus? How was it shaped at first? How was it shaped at the end?*
* *What happened to the color of the octopus? Why was it green and brown at first?*
* *What happened to the size of the octopus? Was its size larger at the beginning or end of the video? Why might it want to look large?*
* *How did the texture of the octopus change?*
* *Why would an octopus want to hide? How could camouflage help it survive?*
1. **Act out the four basic camouflage tactics** (*15 minutes)*
Ask students to recall and observe how the octopus in the video changed its shape, size, texture, and color in order to blend in, and how the animal changed those characteristics when it was startled. Have students demonstrate their understanding of each tactic with the following prompts:

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| **Tactic** | **Definition** | **Example** | **Student Prompt to act-it-out** |
| Shape | The outline or area of an object | An apple has a round shape. | *How can you change your shape? How can you change the shape of your hand to look like different things?* |
| Texture | The way something feels (or how you think it feels based on how it looks) | The texture of the sweater is soft. The texture of the desk is smooth. | *Point to something that has a smooth texture. Point to something that has a rough texture. How would you figure out the texture of some paper (or the carpet, rug, or clouds)?* |
| Size | How big or small something is; how much space it takes up | A balloon starts out small, but when you add air to it, it gets much bigger in size. | *If you wanted to look like you were growing in size, what would you do? How could you make yourself look smaller in size? What would you do to make a balloon swell? How would you make a balloon shrink?* |
| Color | The pigmentation of something; the way something appears based on how it reflects light  | The color of most salad is green; apples can be green, red, or even yellow in color. | *Find someone with \_\_\_\_\_\_\_\_\_ color shirt on and stand next to them. Find someone with \_\_\_\_\_\_\_ color pants and stand next to them.*  |

1. **Watch the complete “Where’s the Octopus”** **video** *(Video length: 4 min 36 seconds)*
This video involves an interview with marine biologist Dr. Roger Hanlon as he describes what is so unique about octopus (and squid) camouflage. *A transcript of this video has been provided along with a list of vocabulary and informational text prompts.*

Engage your students with the following questions:
* *What did the octopus do to look bigger?*
* *Octopuses don’t have bones or hard outer shells for protection. Why would this lack of protection make it so important for them to hide?*
* *Does the octopus hold still when it is trying to blend in, or does it move? Do you think that octopuses blend in better when they hold still or when they move?*
* *What is so unique about octopus skin? Do you think our skin looks like that under a microscope? Why or why not?*
1. **Octopus sculpting activity** *(20 minutes + 10 for cleanup)*
This activity can be done as a station, group, or table activity, or students can work independently. Give each student a small ball of modeling clay or dough. Instruct students to sculpt an octopus with a unique texture, shape, size, and color using the following techniques:
* Texture:Students can give their octopus a unique texture with texturing tools like plastic forks, plastic combs, or crinkled up foil.
* Shape: Students can use tools/hands to mold the octopus into unique shapes.
* Size: Students can modify size by stretching out their dough, or by using more/less of the dough.
* Color: Depending on the availability or type of dough being used, students can blend colors, or the finished octopuses can be baked and painted later.
1. **Assessment: Write a Description of the Octopus**
 Students can describe the texture, shape, size, and color patterns of the octopuses that they created in their scientific notebook, or on the graphic organizer worksheet provided. Modify the length or complexity of sentence-starters to accommodate varying student skill levels. Encourage advanced students to describe how each camouflage tactic helps their octopus blend into its environment.

*Dough-free paper octopus modification:* Print out this octopus coloring worksheet. Have students modify the texture, color, shape, and size of their octopus picture by folding, crumpling, cutting, and coloring it. Students can also create a paper octopus from scratch using colorful construction paper and similar techniques.

*Game Wrap-up:* Play “I spy” with the sculpted (or paper) octopuses. Have students sit in a circle and place their octopus on a paper plate with their name on it in the middle of the circle. Use adjectives to describe one of the octopuses (“I spy with my little eye an octopus that has a bumpy texture!”) Next, invite students to ask questions about other traits (e.g., “Is it big or small?”) until they guess who made the octopus in question. Students can take turns being the spy after a few rounds of practice.