

GREAT TENTACLES! OCTOPUS STEAM

AGES

Children 6+ years

Tweens

PROGRAM DESCRIPTION

More than 150 species of octopuses exist in seas throughout the world. Famous for their bulbous bodies, bulging eyes, and eight arms with suckers, these “monsters of the sea” are invertebrates, solitary creatures, and highly intelligent with the ability to camouflage, move in and out of small nooks and crannies, and even the ability to expel ink. These group activities are designed to celebrate the unique cephalopod. You might also contact local marine biologists, aquariums, or other experts on octopuses and see if any can come present at your library. Suggested runtime: 60 minutes.



Image source: Shutterstock

MATERIALS AND PREPARATION

Optional: A projector, projector screen, and laptop if presenting examples of ocean environments and octopus camouflage.

TIP:

Due to copyright issues, you probably cannot screen *My Octopus Teacher* (Netflix) in your library, but you can recommend that tweens watch it at home before or after the program!

ADAPTATION:

For younger children, read *Inky's Amazing Escape* and make octopus slime together. You can also make a game out of matching an octopus to its environment, or create a “Where’s Waldo?” type game by asking for little ones to spot the camouflaged octopus.

ADAPTATION:

For teens, consider making no-sew octopus plushies! Tutorials available on Amy Glassenburg’s *While She Naps* blog, <https://bit.ly/3wJgO2d> or from Jennifer Maker, <https://bit.ly/2QYmqX3>

Activity #1: Octopus Locomotion

Materials: Balloon (1 per child), plastic straw (1 per racing station), small binder clip (1 per child), fishing line (various lengths for racing stations), crepe paper, construction paper, masking tape and regular tape, scissors, permanent markers

Optional: Octopus silhouettes on cardstock, air pump

An octopus can travel in two ways: When searching for prey, it will use its arms to slither over surfaces and feel for food; when it needs to move quickly, whether to attack prey or avoid danger, it will draw water into its muscular body cavity and then quickly force it out from a tube under its head. The force of the water squirting out pushes the octopus forward; this is called jet propulsion. In this activity, participants will design their own balloon octopus and demonstrate how they use jet propulsion to travel.

Instructions:

1. For each racing station, cut fishing line roughly the length of your activity room.
2. Thread the fishing line through the straw, then attach each end of the fishing line to the back of two chairs.
3. Make sure the chairs are pulled apart and the fishing line is stretched tightly.
4. Give each child a balloon and have them blow it up. (An air pump would also be useful to have.) Use a binder clip to keep the balloon nozzle closed so air cannot escape.
5. Optionally, let the children decorate octopus silhouettes on cardstock, which they can tape to their balloon when it's their turn.
6. To test the jet propulsion after the octopuses are complete, tape the threaded straw securely to the top of a completed balloon.
7. Carefully remove the binder clip and release the air.
8. The balloon will travel in the opposite direction from which the air escaped. Remind children that the balloons are using air for propulsion, whereas an octopus would use water.
9. Children can test how far their octopuses travel, make adjustments to their designs or the amount of air they use, and compete in races.

Activity #2: Octopus Camouflage

Materials: Air-dry clay in a variety of colors; items for creating texture, such as forks, combs, crinkled foil, and Legos; a variety of pictures of ocean environments and octopuses (printed or virtual)

Octopuses are masters of camouflage, seamlessly blending into their ocean surroundings or standing out in bright colors to startle their enemies. Octopuses are most unique because not only can they change their color to camouflage themselves, but they can also change their texture. In this activity, children create clay octopuses and see how well their camouflage blends into different habitats.

TIP:

Be sure to have a latex warning for parents (or buy latex-free balloons). Just being in the same room as latex can cause a reaction for those with an allergy.

TIP:

A less costly alternative to using air-dry clay is to have children color coffee filters instead.

Instructions:

1. Give each child a ball of air-dry clay and instruct them to sculpt an octopus with a unique texture, shape, size, and color to demonstrate their camouflage abilities.
2. You can give each child a printed picture of an ocean habitat they need to match, or provide pictures in a presentation for inspiration.
3. You can have a show and tell portion when they are finished creating their sculptures.
4. Think of the following while creating the octopuses:
 - **Shape:** Think of unique ways to mold your octopus. How could an octopus change its shape to look like something different when hiding?
 - **Texture:** Use a variety of items to give unique textures to your octopus. For example, if trying to blend in with a rock that looks very rough, how could octopus skin camouflage to look rough?
 - **Size:** Stretch the air-dry clay, or use small amounts depending upon whether or not you think the octopus would want to appear big or small in its environment.
 - **Color:** Use a variety of air-dry clay colors and blend them together to create the best camouflage. You could also use white clay and have children return to paint them at a later date or paint them at home.

Activity #3: Octopus Slime

Materials:

- 5 oz. clear glue
- ½ cup warm water
- 2–4 drops food coloring
- ½ tsp. baking soda
- 1–2 Tbsp. contact lens solution
- Mixing bowl
- Spoon
- A variety of small containers to test slime texture and shape, such as toilet paper tubes, ice cube containers, condiment cups, etc.

Octopuses have soft bodies, with the exception of their beaks, so they can fit into incredibly small spaces. In 2016, Inky, an octopus at New Zealand's National Aquarium, escaped his tank through a small opening, crawled across the floor, and then slid through a drainpipe that led directly to the sea. Inky was roughly the size of a soccer ball and the drainpipe was only a few inches wide. After making the slime, mimic Inky's escape and have children test what shapes and containers it can fill easily.

Instructions:

- Combine the glue and water.
- Add food coloring of your choice and mix well.
- Add the baking soda and stir.
- Now add the contact lens solution in a slow, steady stream. It is important to go carefully here. The chemicals in the contact lens solution activate the recipe, so make sure you don't go too fast or add too much.
- Stir it well, at first with a spoon, and then knead it with your hands. It will be sticky at first, but the longer you knead it the smoother it will become.

Activity #4: Suction Strength

Materials: A variety of suction cups (including those with hooks); a variety of materials to test, such as paper clips, keys, rubber bands, cups, plastic bags, and paper plates.

Octopuses have roughly 280 suckers located on their arms. They use them to grasp onto objects in their environment, such as rocks when they're moving or hiding, or onto food in order to guide it into their mouths to eat. Some of the large suckers near the octopus' beak can hold around 35 pounds of weight and crack open clams or other prey. When a suction cup latches onto an object, the pressure from the air or water outside is stronger than the pressure inside the suction cup. It pushes on the suction cup and creates the force we call suction, causing it to stick to whatever object it's attached to.

Instructions:

1. Stick a variety of suction cups to different surfaces and objects.
2. Test out different strategies for making the suction cups stick, such as adding water to the suction cup versus leaving it dry. What items do the suction cups stick to? Why do you think so?
3. Hang a variety of items from suction cup hooks of different sizes on the wall. Which suction cup hooks can hold the greatest amount of weight? The smallest amount of weight? Why might some be weaker than others?
4. You can also play Pin the Sucker on the Octopus on a window or whiteboard (see Resources for an octopus silhouette)

UNIQUE SPACE AND/OR PERSONNEL NEEDS

Add extra staff or volunteers for large groups. Octopus locomotion is a great one to run outdoors.

TIP:

You can also make suction cup seascape prints by dipping the cups in green or blue paint, and pressing them onto paper.

RESOURCES

Web

“Cephalopod Locomotion Lab” from *New England Aquarium*:
<https://bit.ly/3cjg9fN>

Jet propulsion from *NASA*: <https://go.nasa.gov/3yGztxf>

Information about octopus camouflage from *Science Friday*:
<https://bit.ly/3vnueAx>

“How Do Octopuses Change Color?” from *Ocean Conservancy*:
<https://bit.ly/3yIKkH3>

Inky the Octopus from *National Geographic*: <https://on.natgeo.com/3frwRvs>

Coffee filter camouflage from *The Library as Incubator Project*:
<https://bit.ly/3yLchOz>

Slime recipe from *Natural Beach Living*: <https://bit.ly/2RRAiCH>

Suction cup strength tests from *Kids Soup*: <https://bit.ly/3fL5vQ2>

Suction cup printing from *Kids Soup*: <https://bit.ly/3bVRk9S>

“Eight Great Reasons To Be A Sucker For Octopuses: from *Oregon Coast Aquarium*: <https://bit.ly/3frv4GZ>

Books

Non-fiction

Obsessive About Octopuses (2020) by Owen Davey (children’s)

Inky’s Amazing Escape (2018) by Sy Montgomery and Amy Schimler-Safford (children’s)

The Octopus Scientists (2015) by Sy Montgomery and Keith Ellenbogen (children’s)

The Soul of an Octopus (2016) by Sy Montgomery (adult)

Fiction

Octopus Escapes Again (2016) by Laurie Ellen Angus (children’s)

Fourteen Animals (That Are Definitely Not an Octopus) (2018) by Gabe Pyle (children’s)

If I had an Octopus (2021) by Gabby Dawnay and Alex Barrow (children’s)

The Benefits of Being an Octopus (2018) by Ann Braden (children’s)

Printables

Octopus Silhouette

Octopus Coloring Sheet



