

5. If you want to repeat the experiment, remove your hand and sponge from the water. Holding the sponge above the large plastic container, squeeze to remove as much water as possible. Then dunk your hand and sponge back into the water.

Results

When you dunked the sponge into the water, you should have seen bubbles coming out from the sponge. If you examine the sponge, you will see that it is full of holes. These holes allow space for air inside the sponge, but when you placed the sponge in the large plastic container, it began to absorb water. The water took over the spaces that had been filled with air, and the displaced air left the sponge as bubbles. If you repeated the experiment, you squeezed the sponge to remove water, which allowed air to re-enter the spaces inside of the sponge.

Discussion

If you watch river otters swim, you may see streams of bubbles following behind them. These bubbles are caused by air being pushed out of the otter's fur.

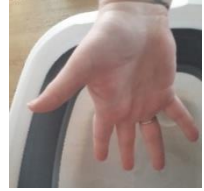


Otters have two layers of fur. There is a short, dense undercoat that prevents water from penetrating to the skin, and longer guard hairs. A layer of air is trapped in the spaces between these hairs and provides a layer of insulation to help keep the otter warm. When the otter dives into the water, the air is displaced and produces the stream of bubbles you see.

Experiment 2 - Otter Feet

Methods

1. For this experiment, you will need the large plastic container filled with several inches of water and a plastic bag.
2. Start by spreading the fingers of one hand far apart. Keeping your fingers in this position, place your hand into the water with your fingers facing the bottom. Now slowly move your hand forward and backwards through the water. You can write your observations or draw your experience in the space below.



3. Now, place your hand into the plastic bag and spread your fingers far apart, like you did before. If you face your fingers toward the ground and the bag falls off your hand, use your second hand to hold it in place. Place your bagged hand into the water with your fingers facing the bottom, and slowly move your hand forward and backwards. How does this feel different from before? You can write your observations or draw your experience in the space below.

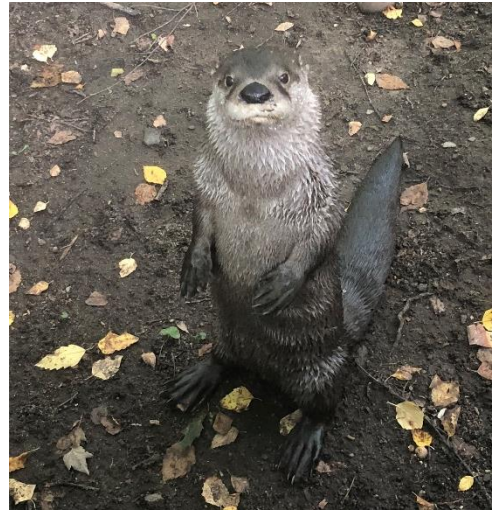


Results

It was pretty easy to move your bare hand through the water, but it took more force to do so when your hand was in the bag. The bag created a larger surface area because it filled in the gaps between your fingers. Without the bag, the water could pass through your fingers, but with the bag, you were pushing more water with your hand.

Discussion

River otters are well adapted to swimming and have webbed feet. This webbing creates a larger surface area, like having the bag on your hand, which allows the otter to push more water and propel itself further when swimming.



Next Gen and New York State Science Learning Standards

- Grades K-2
 - **K-PS2-1:** Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
 - **K-PS2-2:** Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.
 - **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.
 - **K-2ETS1-2:** Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- Grades 3-5
 - **3-PS2-2:** Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.***Note: This applies only to the boat experiment**
 - **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.
 - **4-LS1-1:** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.