WOW Program Lesson Plan

Floating Sharks

Program Duration:
15-20 minutes

Recommended Grade Levels:
Grades 3-5, but all ages could participate

Materials Needed:
- 2 clear water bottles

- Cooking oil

- Water

- Large container (to put the "sharks" in and test to see if they float)

- Sharpies

Learning Objectives
1. Students will be able to explain how buoyancy allows certain objects to float.
2. Students will be able to describe how different objects have different densities and how that affects other qualities of the object (e.g., buoyancy).

Preparation
- Discuss the concept of density and buoyancy and how they relate to an object's ability to float.
- Ask student to share examples of objects that float and objects that sink in the ocean.

Background
If you were to throw a rock into the ocean, what would happen? It would sink! Yet, why is it that much larger (and heavier) objects such as sharks are able to float? Why do they not also fall to the bottom of the ocean? This is because sharks are buoyant – in other words, sharks have the ability to float in water and other liquids! Sharks are designed to be buoyant so that they can swim freely. Sharks have livers filled with lots of oil. If you have ever tried mixing oil and water together, you'll know that it's nearly impossible – this is because they have different densities. Density measures how much space on object takes up in relation to its mass. In this experiment, we are going to investigate the densities of different liquids and how that affects the buoyancy of an object.

Activity
1. Fill a water bottle with some cooking oil. Fill the second water bottle with water. Make sure that both bottles contain equal amounts of liquid.
2. Draw a shark on the water bottles – get creative with this!
3. Fill the large container with enough water to allow the sharks to either float or sink.
4. Ask the student(s) if they think the sharks will float or sink and why. Then place the water-filled and oil-filled sharks in the container and see if they are buoyant or not.

Additional Questions
1. Why did the oil-filled shark float, while the water-filled shark sank? What is different between water and oil?
2. Since a rock would sink in water, how does its density compare to that of water or oil?
3. What other objects float in water? What about objects that sink?

Summary
Of the two different sharks, the oil-filled shark was observed to float while the water-filled one sank. This is because oil is less dense than water which allows it to float on top of water. The oil in sharks' livers acts similarly to floaties or tubes that kids might use when they first start learning to swim. The oil in their liver causes sharks to want to float instead of sink, since oil is less dense than water. That is why an animal as large as a shark can float, while a small rock will sink to the bottom of the ocean – it is much denser than the oil in the shark!

Extended Exploration

- Try this experiment with objects of different states of matter (e.g., why a helium-filled balloon will float, while an air-filled balloon doesn't).
- Test to see if the results of this experiment change with differently shaped/sized water bottles. Does density change with the amount of material you have?
- Check out this video for an explanation of buoyancy: https://www.youtube.com/watch?v=nMIXU97E-uQ