

Are your kids crazy about sharks? Then they would love this experiment!

In contrast to other fish, who have bladders filled with gas, sharks have a liver filled with low-density oil that is similar to vegetable oil. In this experiment, we use vegetable oil to explore the subject of buoyancy and make our "sharks" float.

First, we attach pennies to a toilet paper roll and place it in the water. It sinks. Then we fill a balloon with oil, place it inside the toilet paper roll, and put it back in the water. It floats. How is it possible that pennies sunk, but pennies + oil don't?



Shark Science



What you need

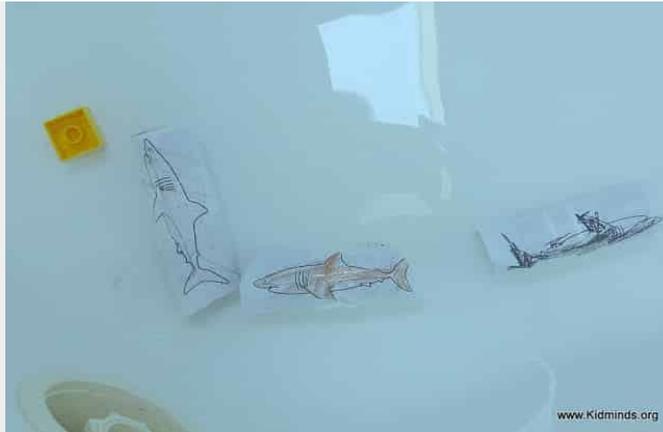
a toilet paper roll (you might need more)
1/3 cup vegetable oil
picture of a shark (or colouring page and crayons)
3 pennies
tape
balloon (12" at least)
a funnel
a bowl or a bathtub filled with water

What to do

- I printed out some shark colouring pages from coloringpedia.com (if you use the 3.5x5 setting you can print 4 sharks per page) and my kids coloured them. You can also use photos or draw your own shark.
- Use tape to attach your shark to a paper roll.
- Place three pennies along the bottom side of the shark and tape them in place. Distribute the pennies evenly.



- Now it's time to place the shark in the water, but before you do, *What do you think is going to happen? Is your shark going to sink or float?*



Yep! All our sharks are at the bottom of the tub.

Balloon time!

- Slowly fill the balloon with 1/3 cup of vegetable oil and tie it up (A word of warning: if you spill the oil, the balloon will get very slippery, which makes it hard to tie it).



- Insert the balloon inside the paper roll. It might take some good squeezing action to sneak it in. Try to centre it inside the roll.
- Place your noticeably heavier shark in the water the second time. But wait! *Is it going to sink or float? Why do you think that?*



Aha! Sharks float!!!

The science behind the experiment

If you hold a toy shark in the air and let it go, would it float in the air or drop to the ground? Of course, it drops because of the pull of gravity. Do you know that the same pull of gravity affects fish in the water?

But do fish drop to the bottom of the ocean because of that pull of gravity? No. They float. Fish developed a great adaptation to balance the pull of gravity with the upward push of buoyancy. **Buoyancy** is the upward force from the water to stay afloat.

Most fish have a bladder filled with gas. This is what keeps them balanced in the water. Sharks do not have such a bladder but they have developed different adaptations that help them achieve the same result. These adaptations are no bones, larger liver, and steering fins.

Sharks' Adaptations

Sharks do not have bones, but cartilage, which is about half the density of bones. However, the shark's body is still heavier and denser than water, so they use their fins to keep moving and propelling them forward at all times. Lastly, sharks liver is 25-30% of their body mass (only 5% for mammals). This liver is filled with low-density oil (similar to vegetable oil we used in the experiment) and it acts like a swim bladder of other fish by giving them neutral buoyancy.

Neutral buoyancy means that an object within a liquid is neither rising nor sinking, but maintaining the same depth. Unfortunately for sharks, their wonderful liver is used in a number of cosmetic products from lip balms to suntan lotions. Never buy these! Sharks are nice!