Water Resistance Experiment

Is it easier to run in the water or on the shore? How does running in the water up to their waists compare with running in the water that is up to their ankles? Water is more resistant to movement than air.

The Science of Swimming

The more of the body is submerged in the water, the harder it is to move. ***That's why swimmers move as close to the surface as possible***. Moving through less resistant air allows for better speed of movement than moving through water.

Water resistance goes up as the surface area of a submerged body increases. That is the reason swimmers try to make their bodies as compact as possible as they move through the water.

Here are two investigations that you can try that demonstrate how water resistance slows larger objects moving through the water. A variety of shapes using playdough (experiment 1) and the shape of aluminium foil wrapped around stones (experiment 2) to make it fall faster or slower through the water.

The reason the playdough is falling to the bottom of the glass is the gravitational pull between playdough and the Earth. Besides working on water resistance and buoyancy, swimmers increase their speed by making their bodies as smooth as possible. They wear specially designed swimsuits, cover their hair with swim caps, and sometimes they even shave the hair on their bodies to be as streamlined as possible.

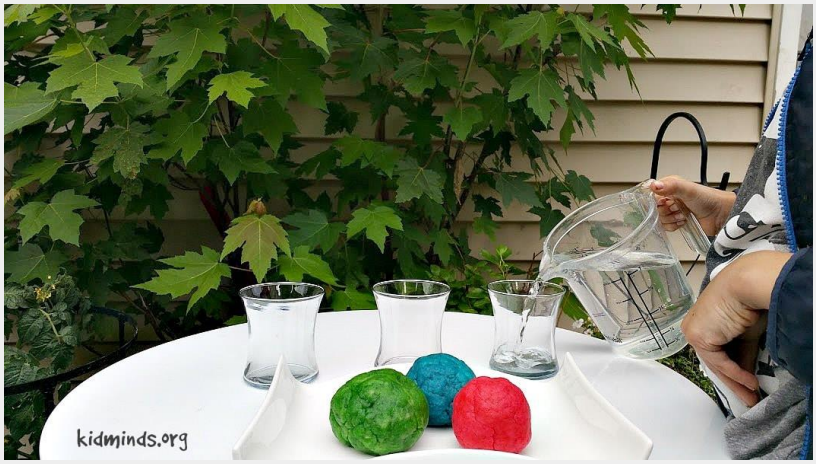
Water Resistance Experiment 1: Playdough

You need

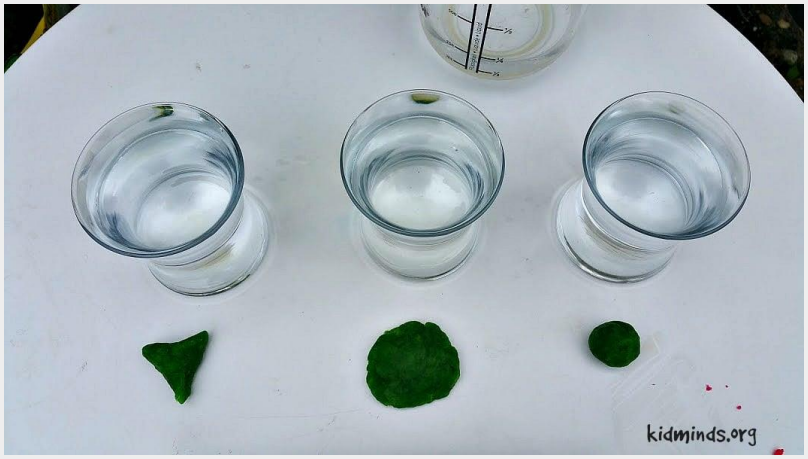
Glass cups/vases or jars
Playdough
Stopwatch

Instructions

Fill your clear containers with equal amounts of water.



Take three equal pieces of playdough. Shape one into a ball, one into a triangle and shape the other piece into a flat pancake.



What do you think will happen? Do you think all the pieces are going to sink? Which one do you think will sink faster?

Use the Observation Sheet at the bottom of the page to record your predictions.

Get the stopwatch ready (you could use the one on the phone) and drop each piece one by one recording the falling time.

Use the Observation sheet to record your findings.

Both, play dough shaped like a ball and play dough shaped like a triangle, dropped down like a rock, while the pancake took some time to float down in a fluid circular fashion.

Water Resistance Experiment 2: Aluminium Foil

This experiment is surprising and fascinating. You might predict that aluminium foil crumpled into a tight ball would sink and a flat piece of aluminium foil will float, but all pieces floated.

Add some small stones and experiment with stones in a foil in many different ways. First, add two small stones and crumpled aluminium foil tight around them. Put it in the water, it floats. But then…slowly it sunk.

Next hide two small stones in a flat, folded piece of aluminium. What happens? It shot down like a rock. *What?* Then experiment with folding the foil around stones in different ways to see, which fold made it sink faster or slower. Finally, make an aluminium boat and put a couple of stones in it, it floats.

You *need*

Glass cups/vases or jars
Aluminium foil
Stones
Stopwatch

Instructions

Fill the clear containers with an equal amount of water. Shape one piece of aluminium foil into a ball. Keep another piece flat.

Use the Observation Sheet to make your predictions.

Put them all in the water and observe what happens. Next fold stones inside the aluminium foil pieces in many different ways to see, which combination will allow for fastest sinking time and what shape will float.

Two forces are at play in this experiment. ***Gravity*** is pulling things down in the water, while ***buoyancy*** pushes upward against gravity. Different objects behave differently in the water depending on their ***density***. A crumpled ball of foil has more density because all of its weight concentrates in a small space. Our foil boat is spread out, less dense and therefore can float the objects that would normally sink on their own (i.e. stones). If you got interested in buoyancy try the Shark Experiment (add oil to make "shark" heavier, but it actually allows it to float better).

Name _____

Water Resistance Experiment with _____

Vocabulary

_____

What I Predict

The Longest Time to Sink

_____

The Fastest Time to Sink

_____

What I See

Draw Picture

Results

The Longest Time to Sink

_____

This shape sunk slowly because

_____

The Fastest Time to Sink

_____

This shape sunk fast because _____