

Lab Report

Date:



Title: Archimedes' Principle of Buoyancy

Aim:
We want to determine the density and weight of an object in the air, in water and in salt water.

Material:
Metal cylinder, Newton Meter or spring scale, graduated cylinder, salt, scales

Procedure:

1. First measure the mass of the metal cylinder.
2. Second weigh the object with the Newton Meter and record the result.
3. Then submerge it in water and weigh it again.
4. Determine the volume of the displaced water.
3. Finally repeat steps 1. & 2. in salt water.

Results: (Be careful: express the result properly!)

Mass = Volume =
 Weight in the air = Density =

	water	Salt water
Weight in (N)		
Buoyant Force = $W_{air} - W_{liquid}$		

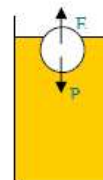
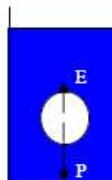
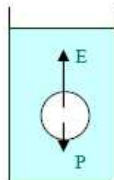


Conclusions:
 This experiment has shown that when we submerge an object in water,

 - An object weighs *more/less* in water than in the air.
 - Because salt water is *more/less* dense than pure water, it weighs *more/less* in salt water.
 - The density of the iron is: $d_{iron} = 7,89 \text{ g/mL}$. Is the object made of iron?

Questions:

1. Why is it easier to float in the sea than in a river or swimming pool?
2. Put the words in order: *is equal to* / *the liquid displaced* / *The buoyant force* / *the weight of*
3. Decide which one **floats, sinks or has neutral buoyancy**



Decide which object has **less / more / equal** density than the fluid's density.



1. What nationality was Archimedes?
2. Allegedly how old was Archimedes when he died? 55 65 75
3. Archimedes invented a method for determining the _____ of an object with an irregular shape.
4. What was the name of the King who asked Archimedes to calculate the density of his crown?
5. What happened to the water in Archimedes bath?
6. Is water incompressible? True / False
7. When Archimedes put the crown into the water it displaced an amount of water _____ to its own _____.
8. What is the formula for calculating the density of the crown?
9. What was Archimedes wearing when he ran in the street to exclaim his new invention?
10. What did Archimedes shout, which translates into English as 'I have found it!'?

The most widely known anecdote about Archimedes tells of how he invented a method for determining the volume of an object with an irregular shape. According to Vitruvius, a new crown in the shape of a laurel wreath had been made for King Hiero II, and Archimedes was asked to determine whether it was of solid gold, or whether silver had been added by a dishonest goldsmith. Archimedes had to solve the problem without damaging the crown, so he could not melt it down into a regularly shaped body in order to calculate its density. While taking a bath, he noticed that the level of the water in the tub rose as he got in, and realized that this effect could be used to determine the volume of the crown. For practical purposes water is incompressible, so the submerged crown would displace an amount of water equal to its own volume. By dividing the weight of the crown by the volume of water displaced, the density of the crown could be obtained. This density would be lower than that of gold if cheaper and less dense metals had been added. Archimedes then took to the streets naked, so excited by his discovery that he had forgotten to dress, crying "Eureka!" (Greek: "εὕρηκα!", meaning "I have found it!")

Etape finale

Placez la paille
derrière le centre de
la feuille et retenez
le tout grâce à la
punaise.

