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Bouyancy Calculation:

1 Formula for Buoyant Mass m(b)

m(b) = m(object) x (1- (p(fluid)/ p(object)))

m(object)= true mass of the object  
p(object)= average density of the object  
p(fluid)= average density of the surrounding fluid

If the fluid density is greater than the average density of the object, the object floats. If less, the object sinks.

2 Formula for Buoyant Force:

F(buoyant) = -pVg

p = density of the fluid  
V = volume of the object being submerged  
g = standard gravity on Earth (~ 9.81 N/kg)

3 Archimedes Principle: "When a solid body is partially or completely immersed in water,

the apparent loss in weight will be equal to the weight of the displaced liquid."

Formula for Density of immersed object relative to the density of the fluid object is immersed in:

Relative Density = Weight / (Weight - Apparent Immersed Weight)

WHO IS THIS ARCHIMEDES GUY?

[](http://en.wikipedia.org/wiki/File:Domenico-Fetti_Archimedes_1620.jpg)

**Archimedes of Syracuse**; *c.* 287 BC – *c.* 212 BC) was a [Greek mathematician](http://en.wikipedia.org/wiki/Greek_mathematics), [physicist](http://en.wikipedia.org/wiki/Physicist), [engineer](http://en.wikipedia.org/wiki/Engineer), [inventor](http://en.wikipedia.org/wiki/Inventor), and [astronomer](http://en.wikipedia.org/wiki/Astronomer). Although few details of his life are known, he is regarded as one of the leading [scientists](http://en.wikipedia.org/wiki/Scientist) in [classical antiquity](http://en.wikipedia.org/wiki/Classical_antiquity). Among his advances in [physics](http://en.wikipedia.org/wiki/Physics) are the foundations of [hydrostatics](http://en.wikipedia.org/wiki/Fluid_statics), [statics](http://en.wikipedia.org/wiki/Statics) and an explanation of the principle of the [lever](http://en.wikipedia.org/wiki/Lever).

He proved that an object plunged into liquid becomes lighter by an amount equal to the weight of liquid it displaces; popular tradition has it that Archimedes made the discovery when he stepped into the bathtub, then celebrated by running through the streets shouting "Eureka!" ("I have found it!"). This principle, which is equivalent to what is now called Archimedes' principle is that a body immersed in a fluid is buoyed up by a force equal to the weight of fluid displaced by the body.   
  
The details of Archimedes' defense of Syracuse are less generally known. Apparently, he devised a number of improved catapults and crossbows that pushed back ordinary waves of attackers. When the Romans brought [seagoing](http://www.answers.com/topic/seagoing) siege vehicles, Archimedes used levers to drop huge boulders on the attackers, sinking the ships. Another story is that he focused the Sun's rays with mirrors on the ships to set them [afire](http://www.answers.com/topic/afire), but this is unlikely.  
  
Archimedes is generally considered to be the greatest [mathematician](http://en.wikipedia.org/wiki/Mathematician) of antiquity and one of the greatest of all time.

Archimedes died during the [Siege of Syracuse](http://en.wikipedia.org/wiki/Siege_of_Syracuse_(214%E2%80%93212_BC)) when he was killed by a [Roman](http://en.wikipedia.org/wiki/Roman_Republic) soldier despite orders that he should not be harmed.