

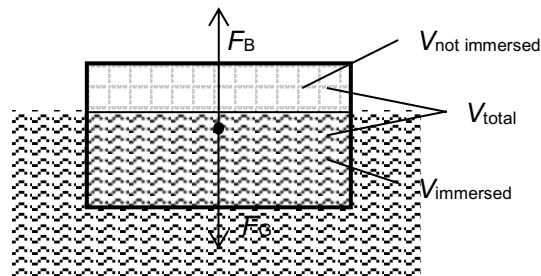
What makes an object sink or float?

An object submerged in water is subject to two forces:

- The gravitational force (pointing down)
- The buoyant force (pointing up)

Depending on how those two forces compare, the object will sink, hover at constant altitude, or rise until it floats.

When an object floats, only the immersed part of the object's volume causes a buoyant force. Therefore it is immersed as deep as needed to produce a buoyant force which is equal to the gravitational force.



A floating object displaces a weight of fluid equal to its own weight.

Comparing the density of the fluid to the density of the submerged object the following rules apply:

- An object more dense than the fluid in which it is immersed will sink
- An object less dense than the fluid in which it is immersed will rise up and float
- An object that has a density equal to that of the fluid in which it is immersed will neither sink nor float

The reason for this is that for a fully submerged object we have:

$$F_B = \rho_{\text{liquid}} \cdot V_{\text{object}} \cdot g$$

$$F_G = m \cdot g = \rho_{\text{object}} \cdot V_{\text{object}} \cdot g$$

That is, if ρ_{liquid} is larger than ρ_{object} , F_B is larger than F_G , and the object will rise up.