# Survivor on a Raft

A 62 kg survivor is on a floating raft with a surface area of 4 square meters. 2.4 cm of the raft's 9 cm thickness is underwater. (Take seawater of density 1025 kg/m$^3$.)

a) Draw a free body diagram of the raft.

b) Sum the forces acting on the raft.

c) Find the buoyancy of the raft. (Possible questions)

d) Find the weight of the raft.

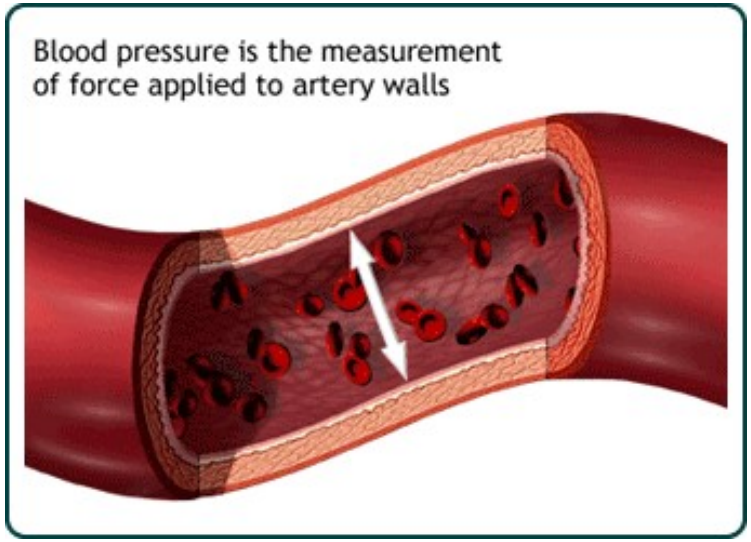
e) Find the density of the raft.

f) Find the maximum buoyancy the raft can experience.

g) Find the max weight the raft can support.

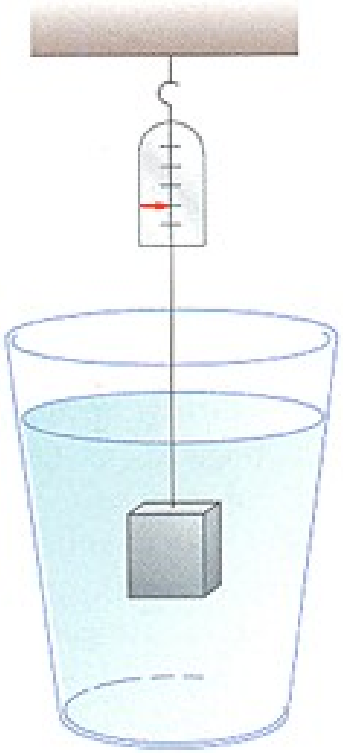
The blood in your body is a liquid. If your body did not regulate this pressure (which is does to some extent), where would your blood pressure be highest?

Consider lying down.

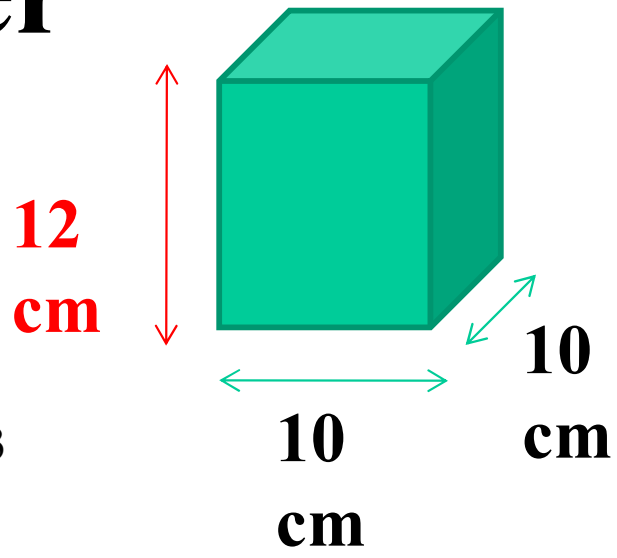



If you suddenly stand up, your body takes a moment to regulate your blood pressure and that's why you can feel dizzy. If the pressure at your heart is 13.3 kPa, what is the instantaneous pressure 18 inches above your heart just after standing. Blood density is 1060 $kg/m^3$

(b) At your feet (say 4 feet below)?



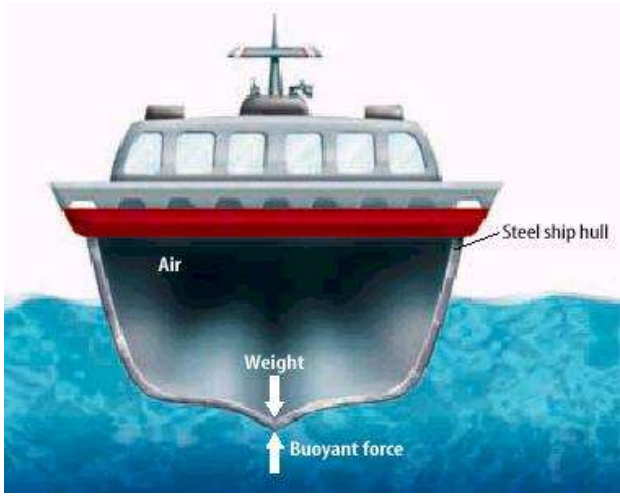
# Block in Water




Water density = 1000 kg/m$^3$

A 10 kg block (with dimensions as shown) is suspended from a scale and immersed in water. The top of the block is 5.0 cm below the surface of the water. (a) What are the forces exerted by the water on top and bottom of the block? (b) What is the reading of the spring scale? (c) Show that the buoyant force equals the difference between the forces at the top and bottom of the block.

# Floating Object




The average human has a density of 945 kg/m$^3$ after inhaling and 1020 kg/m$^3$ after exhaling. Without making any swimming movements, what percentage of the human body would be above the surface in the Dead Sea (a lake with a water density of about 1230 kg/m$^3$) after inhaling and after exhaling?

$$\frac{\rho_{fluid}}{\rho_{object}} = \frac{V_{object}}{V_{fluid}}$$