Material	Density (kg/m^3)
wood	600
water	1000
aluminum	2700
steel	7800
lead	11300
gold	19300

Several solid blocks made of different materials (wood, aluminum, steel, lead and gold) are placed in a tub of water. The densities of these materials are given above. All of the blocks have the same volume. The blocks are released and allowed to reach some equilibrium position (that is, some may sink and some may float). Which of the following statements are true?

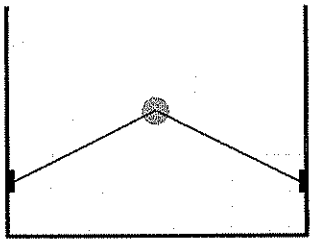
Choices: **True**, **False**.

A. The wood block experiences the greatest buoyant force
B. The lead block experiences a greater buoyant force than the aluminum block same
C. The wood block has the smallest mass
D. The wood block experiences a greater buoyant force than the aluminum block All is immersed, no
E. The lead block displaces more water than the steel block same for both

Tries 0/99

Answer for Part: 0	• False • False • True • False • False

A spherical bead of volume 68 cm^3 and density 460 kg/m^3 is held underwater by a long string (length 46 cm) attached to the sides of a 37 cm wide container. What is the tension in the string?



Tries 0/99

Answer for Part: 0	• 0.303 [0.287686768937091 0.317969586719943] Sig 0 - 15 • Unit: N

6) buoyant force, fbd

know, V_b, ρ_b, $\rho_w = 68\times10^{-6}\,m^3$, $460\,kg/m^3$, $1000\,kg/m^3$; $\ell = 0.46\,m$, $W = 0.37\,m$

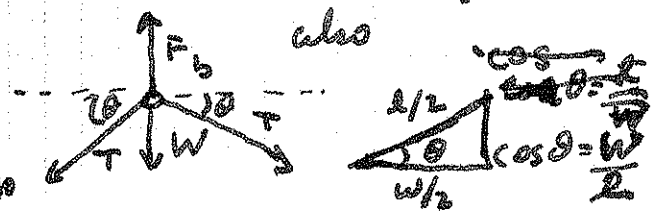
unknown: T

estimate. $F_b \sim 2W$, $F_{mg} = W$

$W = 68\times10^{-6}\times 460\times 9.8 \sim 34\times10^{-2}$

$T \gtrsim W = 0.34\,N$

0) FBd → 4 forces, W, F_b, $2\times T$



$\Sigma F = 0 = F_b - W - 2T\sin\theta$

$F_b = \rho_w V g$; $W = \rho_b V g$

A) $2T\sin\theta = \rho_w V_b g - \rho_b V_b g$

$T = \dfrac{\rho_w - \rho_b}{2\sin\theta} V_b g$

$\sin\theta = \sqrt{1-\cos^2\theta} = \sqrt{1 - W^2/\ell^2}$

$T = \dfrac{\rho_w - \rho_b}{2\sqrt{1-\frac{W^2}{\ell^2}}} V_b g$

$T = \dfrac{1000\,kg/m^3 - 460\,kg/m^3}{2\sqrt{1-\frac{0.37\,m^2}{0.46\,m^2}}} 68\times10^{-6}\,m^3 \times 9.8\,m/s^2$

$T = 0.303\,N$

L) units & estimate check out so answer is reasonable

I picked $T > 0.34$ but had not considered $2T > 0.34$

Must include the weight