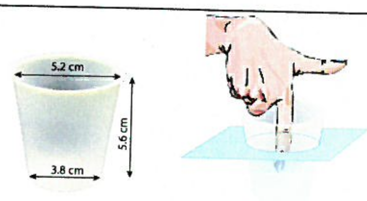
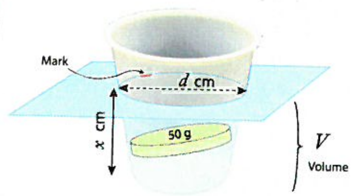
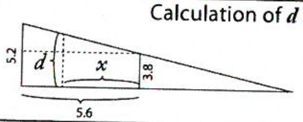
PhysicsLab-008	Buoyancy	Class I	Date 10/24	Name Shubei Morita

Hypothesis	An object completely immersed in a fluid experiences an upward buoyant force equal to the weight of fluid displaced by the object. (Archimedes' Principle)

TOHEI

Experiment-A - A weight in a cup

1	Experience the buoyant force		
2	Measurement of the buoyant force A weight in a plastic cup on water		Measurement of x x = 3.6 cm
	 Calculation of d	$d = x \times \frac{5.2 - 3.8}{5.6} + 3.8$	d = 4.05
	Calculation of V *(V: The volume of water that the abject displaces)*	$V = \frac{1}{2} \times (Upper\ Area + Lower\ Area) \times x$ $\frac{1}{2} \times \left((\frac{4.05}{2})^2 \pi + (\frac{3.8}{2})^2 \pi \times 3.6$	V = 43.6 cm^3
	Buoyant force	$f = \rho_{water} V g$ $1000 \times 43.6 \times 10^{-6} \times 9.8$	f = 0.43 N
3	Gravity on the weight (and the cup)	$W = mg$ 0.05267 kg × 9.8	W = 0.52 N

OK

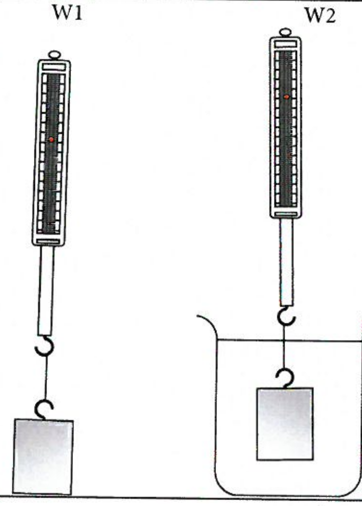
Discussion

I calculated Buoyant force and Gravity on the weight. These two result should be equal. But there is error that there two are not equal. I think the first mesurement is little different from actual number.

Very good

PhysicsLab-008	Buoyancy	Class 1	Date 10/24	Name Shuhei Morita

Experiment-B - Weight

1	Measurement (Zero adjustment of a spring scale)		Measurement W1 = 0.6 N W2 = 0.4 N Buoyant force $f = W1 - W2 =$ 0.2
2	Calculation	$x \times 9.8 = 0.6$ Mass of the weight (m)	0.061 kg
		Volume of the weight (V)	0.000020408 m³ → 2.04 m³ × 10.5
		Density of the weight (ρ)	2989 kg/m³ → ≒ 3000 kg/m³

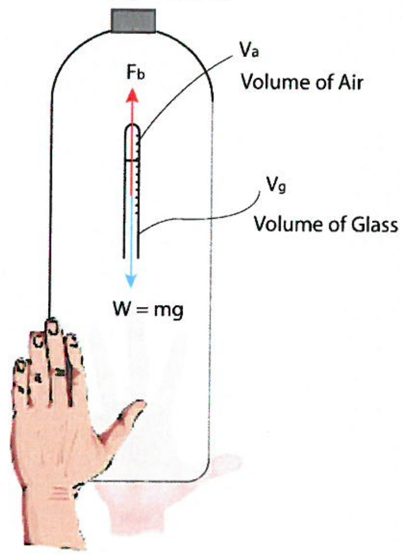
OK

Discussion

when I put the weight into water, Buoyant force occurred. It works upper direction for weight. So power which works down direction increased.

PhysicsLab-008	Buoyancy	Class I	Date 10/24	Name Shuhei Morita

Experiment-C - Cartesian Diver

1	Set up and measurement	$F_b = (V_g + V_a)\rho_w g$ 	Measurement The <u>volume of air</u> inside the test tube (Va) when it is in the intermediate position of the bottle.
2	Data	Mass of the test tube (m) = 14.77g Density of glass (ρ glass) = 2500 kg/m³ Volume of the test tube(Vg)= 0.00000591 = 5.91 × 10^{-6} m³	1.477 × 10^{-2} kg 5.91 × 10^{-6} m³
3	Calculation	Buoyant Force — 8.0 × 10^{-6} m Fb = (Vg+Va) $\rho_w g$ — 5.91 × 10^{-6} m³ = 0.136	0.136 N (0.14N)
		Gravity = mg = 0.1447	0.1467 N (0.14N)

OK

Discussion and opinions

When I push the battle inside, glass goes down because volume of air decreases and also Buoyant force decreases.
I was very excited this experiment because look like little wierd.

When I stopped the glass, Buoyant force and Gravity should be the same.