Worksheet fluids solutions

**1.** Circle all of the words below which represent a substance scientifically classified as a fluid.

a)water b)gas c)lemonade d)a rock e)air f)a single solid object g)a liquid h) sand

**2.** Lower case **ρ** and capital **P** both represent quantities pertaining to fluids, what are these quantities?

ρ represents density, P represents pressure

**3.** Name two units that can be used to measure pressure. What one is used in the metric system?

atm (atmospheres), psi (pounds per square inch) and Pa (pascals) are all acceptable ways to measure pressure, and thus acceptable solutions amongst others.

The pascal is used in the metric system.

**4.** Circle the quantities that are equal to the buoyancy force according to Archimedes's principle.

pressure Bernoulli weight of displaced fluid weight of the object density of the fluid density of the object

**5.** Circle the quantities that are NOT intrinsic.

mass acceleration pressure force density speed

**6.** A large 23kg, 0.0307 m3 box is 75% submerged, meaning that 75% of the object is under water. The density of water is 1,000 kg/m3 . Provide a numerical result for the following quantities:

**a.** The volume of the box.

$$V\_{box}=0.0307m^{3}$$

**b.** The density of the box.

$$ρ=\frac{m\_{box}}{V\_{box}}=\frac{23kg}{0.0307m^{3}}=749.9\frac{kg}{m^{3}}$$

**c.** The weight of the box.

$$F\_{g,box }=m\_{box}g=\left(23kg\right)\left(9.8\frac{m}{s^{2}}\right)=225.4N$$

**d.** The volume of the displaced water.

$$V\_{water}=.75V\_{box}=\left(.75\right)\left(0.0307m^{3}\right)=0.023m^{3}$$

**e.** The mass of the displaced water.

$$ρ\_{water}=\frac{m\_{water}}{V\_{water}}\rightarrow m\_{water}=ρ\_{water}V\_{water}$$

$$m\_{water}=\left(1,000\frac{kg}{m^{3}}\right)\left(0.023m^{3}\right)=23kg$$

**f.** The weight of the displaced water.

$$F\_{g,water }=m\_{water}g=\left(23kg\right)\left(9.8\frac{m}{s^{2}}\right)=225.4N$$

**g.** Since buoyancy is just another word for the buoyant force.

$$F\_{B}=F\_{g,water }=225.4N$$