Name: _____ Date: _____ Class: _____

Buoyancy Worksheet Answers

1) A medical ship has a mass of 100,000 kg. What volume of fresh water (ρ=1025 kg/m3) will the ship *displace*?

100,000 [kg] / 1,025 [kg/m^3] = **97.56 m^3**

2) How much mass can a 1,000,000 L balloon lift if the inside temperature of the balloon is 80 ºC and the outside air temperature is 20 ºC?

First, move the terms containing V to the same side by subtracting VρInside Fluid from both sides:

$M < V \rho_{\text{Outside Fluid}} - V \rho_{\text{Inside Fluid}}$

Next, plug in the numbers:

M < (1,000,000 L) (1.204 g/L - 1.000 g/L)
M < **204 kg**

3) How many 10 L helium balloons would it take to lift a man in an armchair (75 kg) if the density of air is 1.2 g/L and the density of helium is 0.1786 g/L. Assume each balloon has a mass of 3 g. (Hint: First calculate how much extra mass a helium balloon can carry)

Just like the example in the lesson, one balloon can lift 10.2 g. If each balloon has a mass of 3 g, then each balloon can carry 7.2 g.

75 kg / 7.2 g = **10,417 Balloons.**