DENSITY RIDDLE:

You have a rubber balloon with a string attached to it, and a weight attached to the other end of the string. You put just the right amount of air into the balloon such that if you submerge the balloon and weight under water to a depth of 30 feet, the balloon will not rise or sink because its buoyancy force is exactly balanced by gravity. You then pull the balloon and weight down another 30 feet.

If you let the balloon go at this depth, will it rise or sink? Assume that the water temperature is the same at both depths.

Answer: *The balloon will sink. At a depth of 60 feet, the water pressure is greater than it is at 30 feet (by about 15 PSI). Because of this, the balloon will shrink, causing the balloon/weight system to increase in density. The total volume is smaller while the total mass stays the same. Since the system is now more dense than it was at 30 feet, it will sink. Also important is the fact that since water is pretty much incompressible, the water density at both depths will be about the same.*