Problem discussed in the videos:

A buoy in the ocean is connected by a massless rope to an underwater weight. The buoy has mass 1500kg and dimensions 1m×1m×3m. The underwater weight has dimensions 2m×1m×.5m. Use 1000kg/m^3 for the density of the water.
(a) Draw free body diagrams for the buoy and underwater weight.
(b) What is the magnitude and direction of the buoyant force on the weight?
(c) How large can the mass of the weight be if the system does not sink?
(d) Now suppose that the underwater weight has a mass of 2000kg. What is the tension in the rope?
(e) If the underwater weight has a mass of 2000kg, what volume of the buoy will be submerged?