Name: ___Answer Key_____ Section: _____

Chem 1061 Quiz 1

1. Four cubes of equal mass are made of lead (density = 11.3 g/cm^3), silver (10.5 g/cm^3), iron (7.90 g/cm^3), and aluminum (2.70 g/cm^3). Which cube has the longest edge?

   Since density = mass/volume, and mass is consistent through all these samples, the product of density and volume for each of the cubes must be equal. To simplify, imagine there were two cubes of equal mass, one of high density and one of low density. Since d x V of the two cubes must be equal (m = d x V), then the cube with the smaller density must have a larger volume, and vice versa. Therefore, the cube with the lowest density, aluminum, will have the largest volume, and longest edges.

2. If the cube you mentioned above has a mass of 21.6 g, what are the dimensions of that cube, in cm? Show your work on the back.

   d = m / V and V = m / d. So, volume = (21.6 g) / (2.70 g/cm^3) = 8.00 cm^3. Volume of any solid box is length x width x height, and in a cube the three of these are equal, so volume = (length)^3. It follows that length = (volume)$^{1/3}$ or the cube root of volume. (8.00 cm^3)$^{1/3}$ = 2.00 cm. The dimensions of the cube are 2.00 cm x 2.00 cm x 2.00 cm.