Calculations with Atoms

Directions: The usual stuff. Use the factor-units method and give answers to the proper number of significant figures. Your textbooks have tables of atomic properties.

1. What is the average mass of exactly a million sulfur atoms in (a) amu and (b) grams?

2. Suppose that a piece of DNA has a mass of 12,000,000 amu. What is the DNA’s mass in grams?

3. If a small car weighs 2,130 pounds, what is the car's mass in amu?

4. If we redefine the atomic mass scale to make a nitrogen atom's mass exactly 1 Eckerd atomic mass unit (Eamu) then what is the average mass of a fluorine atom on this scale?

5. What is water's density (1.0 g / cm³) in units of amu / nL?

6. Which is larger, the number of stars in the Andromeda galaxy (about 300 billion) or the average number of atoms making up 1.00 ng of boron? Justify your answer.

7. Consider a spherical human cell that is about 20.0 µm in diameter. If the cell is about 11% hydrogen, and has a mass dominated by water, then what is the mass of hydrogen in the cell, in amu?