

**Mole Unit Ws #7 Molar Conversions**

Directions: Show all work! Always use units and box in your final answer.

- The molecular formula of aspartame, the artificial sweetener marketed as NutraSweet, is $C_{14}H_{18}N_2O_5$.
 - What is the molar mass of aspartame? **294 g/mol**
 - How many moles of aspartame are present in 1.00 mg of aspartame? **3.40×10^{-6} mol**
 - How many molecules of aspartame are present in 1.00 mg of aspartame? **2.05×10^{18} molecules**
 - How many hydrogen atoms are present in 1.00 mg of aspartame? **3.69×10^{19} H atoms**
- A sample of glucose, $C_6H_{12}O_6$, contains 2.03×10^{21} atoms of carbon. **180 g/mol**
 - How many atoms of hydrogen does the sample contain? **4.06×10^{21} H atoms**
 - How many molecules of glucose does the sample contain? **3.38×10^{20} glucose molecules**
 - How many moles of glucose does the sample contain? **5.62×10^{-4} mol glucose**
 - What is the mass of the sample in grams? **.101 g $C_6H_{12}O_6$ or 1.01×10^{-1} g $C_6H_{12}O_6$**
- Complete the mole conversion necessary to answer the following questions.
 - How many moles of chloride ions are in the sample Magnesium chloride has a mass of 0.0750 g?
 1.57×10^{-3} mol
 - What is the mass, in grams, of 3.50×10^{-3} mol of aluminum sulfate, $Al_2(SO_4)_3$?
1.20 g $Al_2(SO_4)_3$
 - What is the mass, in grams, of 1.75×10^{20} molecules of caffeine, $C_8H_{10}N_4O_2$?
 5.64×10^{-2} g $C_8H_{10}N_4O_2$
 - What is the molar mass of cholesterol if 0.00105 mol has a mass of 0.406 g?
387 g/mol
- Calculate the number of molecules in:
 - 0.0666 mol propane, C_3H_8 , propane, a hydrocarbon fuel. **4.01×10^{22} molecules propane**
 - a 50.0 mg tablet of acetaminophen, $C_8H_9O_2N$, an analgesic solid under the name of Tylenol. **4.55×10^{24} molecules acetaminophen**
 - a tablespoon of table sugar, $C_{12}H_{22}O_{11}$, having a mass of 10.5 g. **1.85×10^{22} molecules sugar**
- The allowable concentration level of vinyl chloride, C_2H_3Cl , released into the atmosphere from a chemical plant is 2.0×10^{-6} g/L.
 - How many moles of vinyl chloride in each liter does this represent? **3.2×10^{-8} mol/L**
 - How many molecules per liter? **1.93×10^{16} molecules / L**