ANSWERS

Avogadro's Number is also called the MOLE!

ChemIstry: http://genest.weebly.com

Stop in for help every day at lunch and Tues, Weds, & Thurs after school!

Name_____

Period_____

1. What are a few of the conversion factors from today's class?
   (fill in from your classwork sheet or from the class web site after 5pm)

$\left(\frac{13 \text{ lights}}{1 \text{ meter}}\right)$ or $\left(\frac{1 \text{ meter}}{13 \text{ lights}}\right)$ or $\left(\frac{15 \text{ beans "A"}}{2.19 \text{ gram}}\right)$ or $\left(\frac{2.19 \text{ gram}}{15 \text{ beans "A"}}\right)$ or $\left(\frac{23 \text{ beans "B"}}{1.30 \text{ gram}}\right)$ or $\left(\frac{1.30 \text{ gram}}{23 \text{ beans "B"}}\right)$ or $\left(\frac{1.51\times10^{23} \text{ nitrogen molecules"}}{5.6 \text{ liter}}\right)$ $\left(\frac{500 \text{ sheets of stacked paper}}{2 \text{ inch}}\right)$

Problems with a ** will need to use the box above...

2. State Avogadro's Hypothesis:
   Same size gas volumes have same quantity of molecules (assuming same temperature & pressure)

3. Avogadro's Number was named in his honor after he died. He never saw this number. Write Avogadro's number: 6.02×10^{23}

4. If you had 4.66×10^{25} things, how many moles would you have?
   $4.66\times10^{25} \text{ things} \times \left(\frac{1 \text{ mole}}{6.02\times10^{23} \text{ things}}\right) = 77.4 \text{ moles}$

5. If you had 66 moles of things, how many things would you have?
   $66 \text{ moles} \times \left(\frac{6.02\times10^{23} \text{ things}}{1 \text{ mole}}\right) = 3.97\times10^{25} \approx 4.0\times10^{25} \text{ things}$

6. If you had 8.11×10^{25} atoms, how many moles of atoms would you have?
   $8.11\times10^{25} \text{ atoms} \times \left(\frac{1 \text{ mole}}{6.02\times10^{23} \text{ atoms}}\right) = 135 \text{ moles}$

7. If you had 90,000. liters of nitrogen molecules, how many molecules would you have?**
   $90\,000 \text{ L} \times \left(\frac{1.51\times10^{23} \text{ molecules}}{5.6 \text{ L}}\right) =$

8. If you had a stack of paper 44 inches tall **
   a. how many sheets would be in it?
   $44 \text{ inches paper} \times \left(\frac{500 \text{ sheets}}{2 \text{ inches}}\right) = 10000 \text{ sheets}$
   b. How many moles of sheets would that be?
   $10\,000 \text{ sheets} \times \left(\frac{1 \text{ Moles}}{6.02\times10^{23} \text{ sheets}}\right) = 2 \text{ moles}$

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9. If you had a string of holiday lights one kilometer long**
   a. how many lights would be in it?

$$1\text{ km} \times \left(\frac{1000\text{ meters}}{1\text{ km}}\right)\left(\frac{13\text{ lights}}{1\text{ meter}}\right) = 13000\text{ lights}$$

   b. How many moles of lights would that be?

$$13000\text{ lights} \times \left(\frac{1\text{ moles}}{6.02\times10^{23}\text{ lights}}\right) = 2.16\times10^{-20}\text{ moles of lights}$$

10. If you had a string of holiday lights that contained one mole of holiday lights, what would **
   a. be its length in meters?

$$1\text{ mole lights} \times \left(\frac{6.02\times10^{23}\text{ LIGHTS}}{1\text{ mole lights}}\right)\left(\frac{1\text{ meters}}{13\text{ lights}}\right) = 4.63\times10^{22}\text{ meters}$$

   b. In kilometers?

4.63×10^{22} m bounce decimal
4.63×10^{19} kilometers

   c. Look up the distance from the Earth to the Sun in kilometers (Internet!) (1.496×10^{11} meters)
   Sketch below the Earth, the Sun, and how long your string of lights would be.
   ten billion times farther than earth-sun distance!
   That's one hundred times farther than sun-galaxy center!

11. If you had a mole of beans "A", **
   a. how many beans would that be?

6.02×10^{23} beans is a mole.

   b. What would that many beans weigh?

$$6.02\times10^{23}\text{ beans} \times \left(\frac{2.19\text{ grams}}{15\text{ beans}}\right) = 8.79\times10^{22}\text{ grams}$$

   c. Look up the mass of the Earth. Sketch below the Earth, and a mole of beans based on your previous answer. 5.97×10^{27} grams

One hundred-thousandth of the Earth's mass.
So: