$\qquad$
Homework \#1

1. Draw a nanoscale representation of an element. Include a brief explanation of your picture.


## Explanation:

2. Draw a nanoscale representation of a compound. Include a brief explanation of your picture.


## Explanation:

3. Draw a nanoscale representation of a mixture of a compound and an element. Include a brief explanation of your picture.


## Explanation:

$\qquad$
Homework \#1
4. If you had 2340 Japanese yen and you needed to exchange it for Euros, how many Euros would you expect? The current exchange rate is that 109.4 Japanese yen are equivalent to 0.8089 Euros. (Show all of your work using the factor-label method.)
5. According to global warming climatologists, worldwide ocean levels are rising about 1.4 millimeters each year. At this rate, how many years will it take to raise the ocean levels 30 feet? (Salisbury Maryland sits about 30 feet above sea level today.)
$\qquad$
Homework \#1
6. The mousepad for a computer is about 0.25 inches thick. Pretend you could place one atom on top of another to form a stack of atoms, one touching the next (see figure below). If you put one atom at the bottom of your mousepad and then put the next one on top of it and then another on top of it and so on, until you reached the top of the mousepad, how many atoms would you have? You may assume that a typical atom is a sphere with a diameter of 150 picometers.

7. An oxygen molecule, $\mathrm{O}_{2}$, at room temperature travels with an average speed of $440 \mathrm{~m} / \mathrm{s}$.
a. Convert the molecule's speed to miles per hour using the factor-label method.
b. How many times faster or slower is this than your average speed while driving?
$\qquad$
Homework \#1
8. This problem will require some measurement and estimation. Be sure to describe in detail how you made any measurements, including the equipment and method you used, and any estimates (method and justification).
a. Estimated Distance from the 101 lab room to your lecture instructor's office: $\qquad$ (number) $\qquad$ (units)
b. Description of how you estimated the distance from the 101 lab room (HS 352) to your lecture instructor's office:
c. Measured Time it took you to walk from the 101 lab room to your lecture instructor's office: $\qquad$ (number) $\qquad$ (units)
d. Description of how the time was measured for you to go from the 101 lab room (HS 352) to your lecture instructor's office:
e. Use your data to determine your average speed of travel from the 101 lab room (HS 352) to your lecture instructor's office.
$\qquad$
Homework \#1
9. Convert your speed that you calculated in problem 8 (using the factor-label method) to
a. $\mathrm{mi} / \mathrm{sec}$
b. $\quad m / s e c$ (Note: $m$ stands for meters, mi stands for miles.)
10. Convert your speed from problem 9 (using the factor-label method) to a. $\mathrm{mi} / \mathrm{min}$
b. $\mathrm{mi} / \mathrm{hr}$
c. $\mathrm{km} / \mathrm{hr}$

