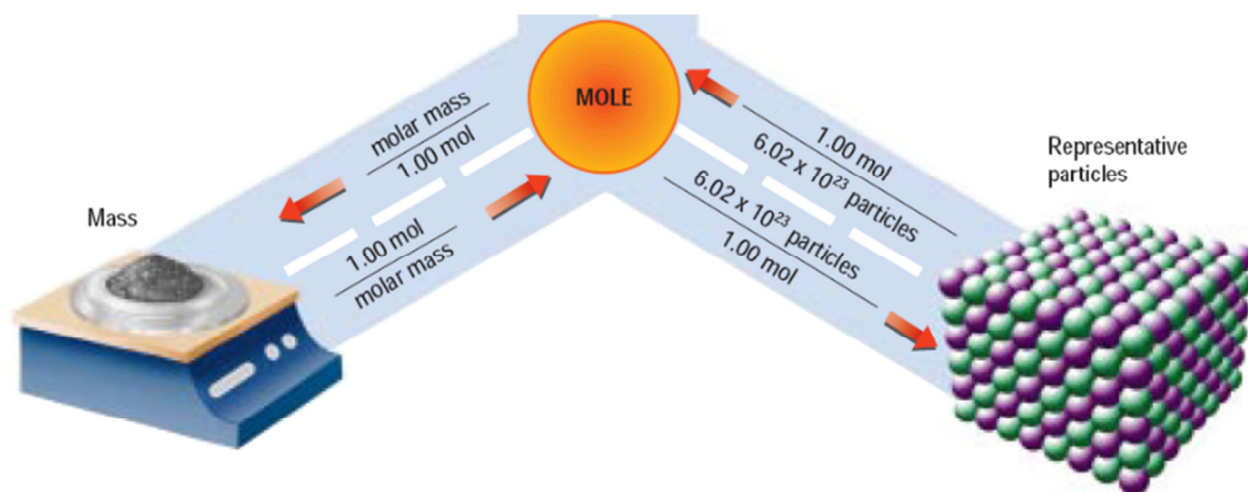


Last class, we learned that a mole is an exact amount. We also learned that the periodic table gave us the molar mass, or the mass of one mole of a substance. All of the problems that we solved were 1-step problems, either starting or ending on moles. We now progress towards 2-step mole problems. You might have the mass and be asked how many atoms, ions, or other particles are present or you may be asked how many grams of a substance are present if there are a certain number of atoms. These 2-step conversions can be set up all at once, but you **MUST** go through the mole to convert from mass to number of representative particles. (A representative particle can be an atom, isotope, ion, molecule or compound.)



The Road map below will help to set up problems:



Example # 1: If a sample of lead contains 425.3 grams, how many lead atoms are present in the sample?

Example # 2: A scientist separates 1.62×10^{24} atoms of sulfur from a mixture. How many grams of sulfur does the scientist have?

Work the following molar conversions. Show all your work set up with units for full credit. Remember Sig Figs.

1. How many atoms of barium are present in a 52.5 gram sample?

- An empty aluminum can has a mass of 14.08 grams. How many aluminum atoms does it take to make an aluminum can?
- How many grams of tin are present in a sample containing 4.36×10^{24} atoms of tin?
- How many atoms of vanadium are present in 51.00 grams of vanadium?
- A gold ring has a mass of 5.25 grams. How many atoms of gold are present in the ring?
- A silver ring has a mass of 5.25 grams also. How many atoms of silver are present in the ring? Before you calculate, do you expect 5.35 grams of silver or gold to have more atoms?
- A mercury thermometer breaks and spills 3.4×10^{24} Hg atoms all over the floor. How many grams of mercury are on the floor?
- 250.0 grams of silicon are on a scale. How many silicon atoms are present in the sample?
- What is the mass of 7.91×10^{26} atoms of lead?
- If you had 2.1077×10^{24} atoms of an unknown element and you were told that there were 276.36 grams of that element, which element would you predict you had?