

Background: Last week, we learned that the balanced chemical equation was the nice little set of instructions that could be followed to turn reactants into products. Take a little of this and a little of that, add a little heat, and (boom) you have something that will make an insurance adjuster's day very interesting.

So let's look at that 'little bit'. Our ability to measure is usually limited to mass, with a scale or triple beam balance in some circumstances. That really just tells you how much stuff you have, but it doesn't tell you how many atoms or molecules you have. It turns out that there is a conversion from mass to amount, known as the mole.

In chemistry, the number of things is as important as the mass, since the two are directly related to one another. This happens in real life as well. A bag of chips is sold by the mass, but chips come in different sizes. As a result two different bags could have equal masses, but different numbers of chips in them.

Atoms and molecules have distinct individual masses that contribute to an overall mass. In this week, we will do some math to determine the relationship between a gram amount and a number of particles. Then all of those [funny 'mole' T-shirts](#) will make sense. You will also come to really love 6:02AM on October 23rd.

Objectives:

1. Determine the atomic mass of an atom.
2. Determine the molecular mass of a molecule.
3. Convert between moles and number of atoms/molecules.
4. Convert gram masses to molar masses.
5. Determine the percent composition of a compound.
6. Given the percent composition of a compound, determine the formula (empirical formulas).
7. Discern between empirical and molecular formulas.

Reading: Zumdahl Chapter 7