41.2: Introduction

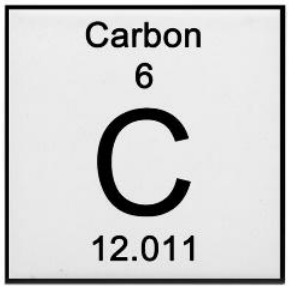
There is a relationship between moles, grams, and the number of molecules that is similar to the relationship between dozens, grams, and the number of pieces. One mole of any substance has the same number of particles (6×10^{23}), just as one dozen of any item has the same number of pieces (12).

Table 41.2.1: Moles and Molecules

Substance	Molecules
1 mole H_2O	6×10^{23}
1 mole CO	6×10^{23}
1 mole H	6×10^{23}
1 mole O_3	6×10^{23}
Item	Pieces
1 dozen Cookies	12
1 dozen Roses	12
1 dozen Eggs	12
1 dozen Paperclips	12

The mole is central to stoichiometry like the meter is central to the metric system. If the number of moles are known, then the amount of grams and the number of particles may be calculated. The atomic mass on the periodic table indicates the amount of grams that one mole of a particular type of atom would contain. Avogadro's number is the number of atoms or molecules that 1 mole of *any* substance would contain.

Table 41.2.1: Example

	$N_A = \frac{6 \times 10^{23} \text{ particles}}{1 \text{ mole}}$
1 mole of Carbon has 12.011 grams	1 mole of Carbon has 6×10^{23} atoms

Contributors and Attributions

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