

OpenStax	Learning Outcomes	
3.1	Explain the meaning of mole and its relationship to mass of an atom.	
3.1		Define mole using the isotope of carbon-12.
3.1		Recall the magnitude of a mole is equal to Avogadro's number.
3.1		Convert between the moles and atoms of an element.
3.1		Convert between grams and moles of an element.
3.1	Calculate formula and molar masses and relate to moles.	
3.1		Recognize that formula units are the simplest unit for an ionic compound.
3.1		Use atomic masses of elements in a compound to calculate the formula mass (amu) and molar mass (g/mol) of the compound.
3.1		Convert between moles and mass of a compound.
3.1		Convert between moles and the number of molecules or formula units of a compound.
3.2	Use percent by mass of a compound in calculations.	
3.2		Calculate the percent by mass of an element in a compound.
3.2		Use percent by mass as a conversion factor to calculate mass of an element in a given quantity of a compound.
3.2		Use subscripts in a chemical formula as a conversion factor between molecules or formula units and atoms or ions.
3.2		Analyze the percent by mass of a compound and determine the empirical formula.
3.2		Determine the molecular formula if given an empirical formula and its molar mass.
3.3	Describe solutions qualitatively and quantitatively.	
3.3		Define terms associated with aqueous solutions. (Solvent, solute, concentration, concentrated, dilute)
3.3		Define molarity.
3.3		Calculate molarity of a solution given moles or mass of solute and volume of solution.
3.3		Use molarity in calculations to find moles of solute, volume of solution, or mass of solute.
3.3	Use the dilution formula in calculations.	
3.3		State the dilution formula and identify all variables.
3.3		Use dilution formula to calculate unknown values when a solution is diluted.
3.3		Distinguish between dilute and concentrated solutions.