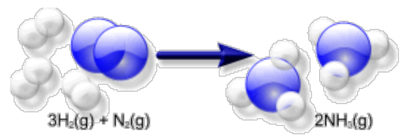
Follow along as you view the video, "Stoichiometry Calculations I: Mole-Mole Conversions" on edpzzle.com and fill in the blanks as you go. (Also available at http://youtu.be/LHDXJgqV1Nk)

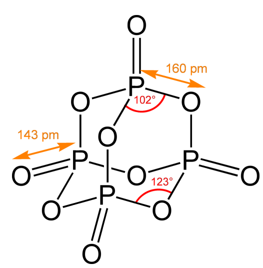
- Mole-Mole Calculations
  - Mole-Mole calculations are central calculations for ALL stoichiometry problems
  - Start in units of moles of one substance (given) from a chemical equation and end in units of moles of another substance (wanted) from the same chemical equation.
    - Substances can be any combination of reactants and products
  - Use the ratio of the moles of the wanted substance to moles of the given substance from the balanced chemical equation as a conversion factor.
  - How to use ratios to perform calculations
    - Identify given quantity (G) and wanted quantity (W)
    - Select mole ratio with ratio of coefficients of W and G from balanced equation
    - Multiply Given quantity by ratio to get wanted quantity
  - The Haber Reaction



    - For the reaction N_2 (g) + 3 H_2 (g) → 2 NH_3 (g), determine the number of moles of NH_3 produced by reacting 12 moles of H_2 with sufficient N_2. **W** **G**
      - We specify "sufficient N_2" to indicate that it can be ignored—we'll see more in limiting and excess reactants
    - Given (G) = 12 moles of H_2; Wanted (W) = moles NH_3
    - Ratio: $\frac{W}{G}$: $\frac{2 \text{ moles } NH_3}{3 \text{ moles } H_2}$ From Balanced Chemical Equation

$$\text{Moles } NH_3 = 12 \ \text{moles } H_2 \times \frac{2 \text{ moles } NH_3}{3 \ \text{moles } H_2} = \boxed{8 \text{ moles } NH_3}$$

      - Cancel mol H_2 in equation
      - Substance and units of answer match wanted
  - You Try It



    - For the reaction 4 P (s) + 5 O_2 (g) → P_4O_{10} (s), determine the number of moles of O_2 required to completely react with 6.35 moles of P.
    - G = 6.35 moles P; W = moles O_2
    - Ratio: $\frac{5 \text{ moles } O_2}{4 \text{ moles P}}$

$$\text{Moles } O_2 = 6.35 \ \text{moles P} \times \frac{5 \text{ moles } O_2}{4 \ \text{moles P}} = \boxed{7.94 \text{ moles } O_2}$$

  - Another Problem
    - The reaction between methane and sulfur produces carbon disulfide and dihydrogen sulfide:
      _4_ CH_4(g) + ___ S_8(s) → _4_ CS_2(*l*) + _2_ H_2S(g)
    - Balance the equation
    - How many moles of CS_2 are produced when 3.49 moles S_8 is used?

$$\text{mol } CS_2 = 3.49 \text{ mol } S_8 \times \frac{4 \text{ mol } CS_2}{1 \text{ mol } S_8} = \boxed{14.0 \text{ mol } CS_2}$$

    - How many moles of H_2S are produced?

$$\text{mol } H_2S = \frac{3.49 \text{ mol } S_8}{} \left| \frac{2 \text{ mol } H_2S}{1 \text{ mol } S_8} \right. = \boxed{6.98 \text{ mol } H_2S}$$