**Mixing Gases**

**As mentioned before: determining if a reaction is spontaneous or not depends on temperature, pressure and composition.**

**Example: Synthesis of ammonia:**

**N2 (g) + 3H2 (g) 2NH3 (g)**

**(catalyst present)**

**We can predict the direction of the spontaneous reaction from the relative values of the equilibrium constant (Kp)and the Reaction Quotient (Qc).**

**Since Kp = 4.4 x 105 at 300K and Qp = 1 for partial pressures of 1 atm, the reaction will proceed in the forward direction because Qp is less than Kp.**

**Under these conditions, the reverse reaction is nonspontaneous.**

**At 700 K, however, Kp = 8.8 x 10-5 and the revers reaction is spontaneous because Qp (1) is greater than Kp.**

**\*\*Remember Kp values change with temperature.**