

**SC151 - CHAPTER 6 LEARNING OBJECTIVES**

To satisfy the minimum requirements for this course, you should master the following learning objectives.

Describe the properties of chemical equilibrium and be able to

- write the equilibrium expression ( $K$ , or  $K_p$  for gaseous reactions) for a balanced chemical equation.
- define the concept of activity, how it relates to the “true” equilibrium constant, and how activity contributes to  $K$  being unitless.
- classify any equilibrium as heterogeneous or homogeneous.
- given a chemical reaction and its equilibrium constant, determine the new equilibrium constant when the reaction has been reversed or multiplied by a constant numerically.
- evaluate  $K$  and  $K_p$  from knowledge of the equilibrium concentrations (or pressures) of reactants or products, or from the initial concentration and the equilibrium concentration of at least one substance.
- interpret the magnitude of  $K$  and  $K_p$  and what this tells you about the extent of reaction and the composition of the equilibrium mixture.
  - use  $K_p$  and  $K$  to calculate equilibrium concentrations (i.e., apply *ICE* tables).

Describe the concept of reaction quotient,  $Q$ , explain the difference between  $Q$  and  $K$ , and by comparison with the value of the equilibrium constant,  $K$ ,

- determine whether a reaction is at equilibrium.
- predict in which direction a reaction will shift to reach equilibrium.

Explain how the relative equilibrium quantities of reactants and products are shifted by changes in temperature, pressure, volume, or the concentrations of substances in the equilibrium reaction (Le Châtelier’s Principle).