

FRANKLIN-SIMPSON HIGH SCHOOL

Course Name: AP Chemistry

Unit Name: Solubility & General Equilibrium

Days: 14

AP Chemistry Objectives:

II. States of Matter (20%)

C. Solutions

1. Types of solutions and factors affecting solubility
2. Methods of expressing concentration (use of normalities is not tested)

III. Reactions (35–40%)

A. Reaction types

2. Precipitation reactions

B. Stoichiometry

1. Ionic and molecular species present in chemical systems: net ionic equations

C. Equilibrium

1. Concept of dynamic equilibrium, physical and chemical; Le Chatelier's principle; equilibrium constants
2. Quantitative treatment
 - a. Equilibrium constants for gaseous reactions: K_p , K_c
 - b. Equilibrium constants for reactions in solution
 - (2) Solubility product constants and their application to precipitation and the dissolution of slightly soluble compounds
 - (3) Common ion effect; buffers; hydrolysis

V. Laboratory (5–10%)

The differences between college chemistry and the usual secondary school chemistry course are especially evident in the laboratory work.

The AP Chemistry Exam includes some questions based on experiences and skills students acquire in the laboratory:

- making observations of chemical reactions and substances
- recording data
- calculating and interpreting results based on the quantitative data obtained
- communicating effectively the results of experimental work

Purpose of the Unit:

Students have already looked at basic solubility rules to determine if compounds are soluble or insoluble but in this unit we will discover that insoluble compounds actually have a small degree of solubility. Students will learn how to calculate solubility and look at how different factors (temperature, common ion, etc) effect the solubility of different compounds.

Prerequisites:

Students will need an understanding of:

- *LeChatlier's principle
- * Solubility rules

Daily Lesson Guide

Day	Lesson Content and Objectives	Focus Questions	Critical Thinking (High Yield / Literacy /LTF/etc.)	Engagement	Assessment and/or Accommodations
1-3	Equilibrium: General II.C.1, 2 III.A.2 III.B.1	* How are "insoluble" compounds soluble? * How can you calculate the concentrations of "insoluble" ions?	* Summarizing and note taking * I Do – We Do – You Do * Analysis/ Application * Learning with others	* ACT bell ringer * Take notes on modeled notes * Solve problems within notes solo and in small groups (formative)	* Evaluate student sample problems for understanding
4-6	Equilibrium: Kc, Kp, LeChatlier III.A.2 III.B.1 III.C.1 III.C.2.a III.C.2.b.2, 3	* How can Kc and Kp be determined? * What role does LeChatlier's principle play in solubility?	* Summarizing and note taking * I Do – We Do – You Do * Analysis/ Application * Learning with others	* ACT bell ringer * Take notes on modeled notes * Solve problems within notes solo and in small groups (formative)	* Evaluate student sample problems for understanding

7-8	Laboratory: AP Chemistry required lab 10, 17: Colorimetric or Spectrophotometric Analysis & Determination of K_{eq} II.C.1, 2 III.A.2 III.B.1 III.C.1 III.C.2.a III.C.2.b.2, 3 V.	* How can K_{eq} determined experimentally?	* Learning with Others * Generating and testing Hypotheses * Authenticity * Novelty and Variety * Analysis/ Applications/ Synthesis	* ACT bell ringer * Work in small lab groups to solve a lab problem * Use data collected to calculate K_{eq} (summative)	* Evaluate lab reports * Students can check themselves by verifying their results among other lab groups
9-12	AP General Solubility FRQs and MC questions II.C.1, 2 III.A.2 III.B.1 III.C.1 III.C.2.a III.C.2.b.2, 3	* How will I be tested over equilibrium on the AP Chemistry Exam? * How does everything I just learned fit together with what I already know?	* Learning with others * Choice * Clickers	* ACT bell ringer * Work independently, then in small groups, then as whole class to solve and grade FRQ's with AP rubrics * Use clickers and Turning Point to answers MC Questions from retired AP exams (summative)	* Evaluate student responses and provide immediate feedback on FRQ's and MC's with rubrics and keys

13-14	Unit Exam II.C.1, 2 III.A.2 III.B.1 III.C.1 III.C.2.a III.C.2.b.2, 3	* Can I use my knowledge to take an AP-like exam covering general and solution solubility?	* Evaluation * Analysis * Application * Synthesis * Authenticity	* ACT bell ringer * Solve retired AP Chemistry MC and FR Questions * Graded by AP standards and rubrics (summative)	* Evaluate exam
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