

## MONDAY MORNING

### Introduction to AP Chemistry

- AP Chemistry Syllabus and Redesign
  - Why the redesign?
  - What's new? What's out? Breadth and depth
    - What is assessed. MC and FRQ on the exam.
    - National Scoring Distribution – Interpretation
    - Practice Examination – use and abuse
- Laboratory expectations and resources
  - The AP Chemistry Lab Manual
  - Guided Inquiry – selecting appropriate laboratory exercises
- The AP Audit
  - Expectations
  - Resources and timeline

### Prior Knowledge and Fundamental Concepts

- Pre-AP Expectations
- AP Chemistry in the science sequence

### LAB – RedOx Titration

- College Board Lab Manual Investigation No. 08 or Similar

## MONDAY AFTERNOON

### The AP Chemistry Exam

- Format
- Resources for teachers, for students
- Retired exams, practice exam
- **Writing/adapting AP-like questions**

### Lab Resources and Inquiry

- Selecting a laboratory program
- Equipping the AP Chemistry lab

### AP Chemistry Pedagogy and Fundamental Concepts

- Representation of Substances
  - Formulae
  - States of Matter
  - Net Ionic Equations

### LAB – Gravimetric Analysis of an Alloy

- College Board Lab Manual Investigation No. 03 or Similar

### Practice Exam Deconstruction

Multiple Choice Questions (in groups)

## TUESDAY MORNING

### On-Line Resources for AP Chemistry – Teachers

- CollegeBoard.com
- AP Chemistry Community Pages

### AP Chemistry Pedagogy and Fundamental Concepts

- Chemical Reactivity
  - Acids and Bases
  - Oxidation/Reduction
  - Precipitation
- Stoichiometry
  - Why is a mole?
- Representation
  - Net Ionic Equations

### LAB – Synthesis and Characterization of Sulfuric Acid

- Synthesis and Percent Yield
- Acid/Base Titration

## TUESDAY AFTERNOON

### AP Chemistry Pedagogy and Fundamental Concepts

- States of Matter
  - Gases, Liquids, Solids
    - Maxwell-Boltzmann Distribution of Kinetic Energies
  - Properties
  - Models of substances and mixtures. Non-stoichiometric substances (doping)
- Intermolecular Forces
  - Representation
- Enthalpy and Entropy in Phase Transitions, Solubility
- Gases vs. Vapors
  - Behavior

### LAB – Synthesis and Characterization of a Gas

- Formula Mass of a Gas
- Gases and Vapors, an introduction to physic-chemical equilibrium

### Practice Exam Review/Scoring

Free Response Questions (in groups)

## WEDNESDAY MORNING

### On-Line Resources for AP Chemistry – Students

- OCW@MIT
- EdX, etc...

### AP Chemistry Pedagogy and Fundamental Concepts

- Models of Chemical Reactivity
  - Reaction Rates and Stoichiometry
  - Reaction Mechanisms
  - Differential Rate Law and Reactivity
- Integrated Rate Laws

### LAB – Factors that Affect Chemical Reactivity (AP Chem Lab Manual No. 10 *or alternative*)

- Clock Rxn Challenge
- Spreadsheet Modeling of Reaction Kinetics

### Exam Deconstruction

2016 AP Chemistry Exam Q1, Q4, Q5

## WEDNESDAY AFTERNOON

### AP Chemistry Pedagogy and Fundamental Concepts

- Chemical Equilibrium – Why?
  - Limiting Reactants and Equilibrium
  - Stoichiometry Review
- Thermodynamics of Equilibrium
  - G vs. Q
- Kinetics of Equilibrium System
  - $k_{\text{fwd}}$ ,  $k_{\text{rev}}$ , and  $K_{\text{eq}}$
- Behavior of Equilibrium Systems – LeChatelier's Principle
- Complex (and not-so-complex) ions...

### LAB – Demonstrating Equilibrium (AP Chem Lab Manual No. 13)

- Spreadsheet Modeling of Chemical Equilibrium

## THURSDAY MORNING

### AP Chemistry Pedagogy and Fundamental Concepts

- Equilibrium in Aqueous Solution
  - Solubility Equilibrium
  - Structure of Solutions
- Enthalpy and Entropy of Solubility
- Saturated Solutions and  $K_{sp}$

### LAB – Determination of $K_{sp}$ of Lead (II) Iodide

### Exam Deconstruction

2016 AP Chemistry Exam Q2, Q6  
Practice Scoring of Student Work

## THURSDAY AFTERNOON

### AP Chemistry Pedagogy and Fundamental Concepts

- Acids and Bases in Aqueous Solution
  - The Structure of Water
  - Acids and Bases, like Gaul, divided into three parts
  - pH and Acidity
- Acid/Base Titrations
  - Titration curves – concentration vs strength
- Buffers
  - Buffering Range
  - Buffering Capacity

### LAB – Solution Identification

### Course Syllabus/Audit Development

## FRIDAY MORNING

### **AP Chemistry Pedagogy and Fundamental Concepts**

- Behavior of Buffering Solutions
- Polyprotic Acids and Bases
- pH Calculations

**LAB** – Preparation of a Buffer (AP Chem Lab Manual No. 16)

### **Exam Deconstruction**

2016 AP Chemistry Exam Q3, Q7

### **Putting things together for AP**

- Building on the ideas and techniques presented throughout the week, we will conclude with reviewing the scope and depth of the AP curriculum. Participants will generate a syllabus appropriate to their course.