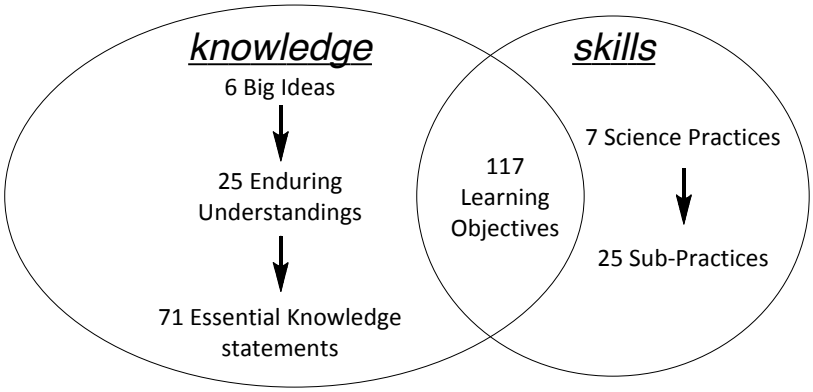
Content of the 2014 AP Chemistry Exam

The main goal of the new curricula in the AP sciences is to emphasize scientific inquiry and reasoning; this is accomplished by reducing the breadth of content students are expected to know, in lieu of achieving a deep, conceptual understanding of the course material.

The new AP Chemistry curriculum is framed around six **Big Ideas**:

1. **Atoms and Elements** - The chemical elements are fundamental building materials of matter, and all matter can be understood in terms of arrangements of atoms.
2. **Properties of Matter** - Chemical and physical properties of materials can be explained by the structure and the arrangement of atoms, ions, or molecules and the forces between them.
3. **Chemical Reactions** - Changes in matter involve rearrangement/reorganization of atoms, or a transfer of electrons.
4. **Kinetics** - Rates of chemical reactions are determined by details of the molecular collisions.
5. **Thermodynamic -** The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter.
6. **Equilibrium** - Any bond or intermolecular attraction that can be formed can be broken. These two processes are in a dynamic competition, sensitive to initial conditions and external perturbations.

The knowledge and skills students are expected to gain through AP Chemistry are outlined in the curriculum through Enduring Understandings, Essential Knowledge statements, Leaning Objectives and Science Practices.



The revision has both removed and added topics to the AP Chemistry syllabus:

Topics Removed as of 2013-14:
Assigning quantum numbers
Deriving the Henderson-Hasselbach equation
Knowledge of specific types of crystal structures
Knowledge of exceptions in electron configurations
Knowledge of exceptions to solubility rules
Writing nuclear reactions
Computations of solubility as a function of pH
Using standard enthalpies of formation to calculate the overall energy change in a reaction
Lewis Acid-Base Theory

Topics Newly Introduced as of 2013-14:
Photoelectron spectroscopy (PES) (**1.B.1.d**, **SP 1.5**)
Other types of spectroscopy (**LO 1.15**)
Mass Spectroscopy (**1.D.2**, **LO 1.14)**
Alloys (**2.D.2**, **LO 2.25**, **LO 2.26**)
Polymers (**2.D.4.b**, **5.D.3.b**)
Biochemical Systems (**throughout**)

A Note about Exclusion Statements:
"Exclusion Statements define the type and level of content that is excluded from the AP® Chemistry course and exam or *represents knowledge students should have acquired prior to participating in this course*." Each of the 23 exclusion statements has an accompanying rationale, which clarifies the reason for content being excluded.

Structure of the 2014 AP Chemistry Exam

Section I: Multiple Choice (50% of final score)

- 60 multiple choice questions in 90 minutes
- four answer options per question
- periodic table and equation sheet provided
- no calculators
- no penalty for incorrect or unanswered questions

BREAK

Section II: Free Response (50% of final score)

- 90 minutes to complete all 7 questions (uninterrupted)
- 3 multi-part questions (20-25 min/question)
- 4 single part questions (3-10 min/question)
- periodic table and equation sheet provided
- calculators are allowed (non-programmable, non-graphing)

Structure of the 2013 AP Chemistry Exam

Section I: Multiple Choice (50% of final score)

- 75 multiple choice questions in 90 minutes
- five answer options per question
- periodic table provided
- no calculators
- no penalty for incorrect or unanswered questions (since 2011)

BREAK

Section II: Free Response (50% of final score)

Part A

- 55 minutes for 3 calculation questions
- periodic table and equation sheet provided
- calculators are allowed (non-programmable, non-graphing)

Part B

- 40 minutes for 3 equation & essay questions
- periodic table and equation sheet provided
- no calculators

Types of Questions to Expect:

Multiple Choice (no calculator):

"Students should be encouraged to develop their skills in estimating answers and in recognizing answers that are physically unreasonable or unlikely."

- calculations performed via estimation (ie. answers differ by orders of magnitude)
- interpretation of models (spectral diagrams, molecular models, titration curves, etc.)
- interpretation and explanation of observation/data sets
- "Real World Application" including biological, polymer, and environmental systems
- factors the influence laboratory results

Free Response:

- Experimental design
- Analysis and interpretation of authentic laboratory data (including calculations)
- Articulating and then translation between representations, and defense of the models (symbolic/particulate/macroscopic representations, graphs, energy diagrams, spectra)
- Creating or analyzing atomic/molecular view to explain observation
- Quantitative problem-solving

A Note about Equations and Formulas List:

"The equations in the tables …. do not include all equations that might possibly be used. For example, they do not include many equations that can be derived by combining others in the tables. Nor do they include equations that are simply special cases of any that are in the tables."

Additionally, *Standard Reduction Potentials* have been removed from the Equations List and if required, data will be included in the pertinent question.