

Syllabus Development Guide: AP Chemistry

To the AP teacher: Please take full advantage of this guide. It is designed to support you as you develop your syllabus for the AP Course Audit. The guide contains the following sections and information:

Curricular Requirements	The curricular requirements are the core elements of the course. Your syllabus must provide clear evidence that each requirement is fully addressed in your course.	Important Considerations	Aligned with the Evaluation Guidelines, these statements provide advice on the type of evidence your syllabus should include.
Scoring Components	Some curricular requirements consist of complex, multi-part statements. These particular requirements are broken down into their component parts and restated as “scoring components”. Reviewers will look for evidence that each scoring component is included in your course.	Reference	As appropriate, references to specific sections of the official AP Course Description or other pertinent publications are included here.
Key Terms	To ensure the clarity of certain terms or expressions that may have multiple meanings, each of these terms is clearly defined.	Samples of Evidence	For each scoring component, three separate samples of evidence are provided. These statements provide either verbatim samples from actual authorized syllabi or clear descriptions of what acceptable evidence should look like.
Evaluation Guidelines	These are the exact guidelines used by reviewers as they evaluate the evidence in your syllabus. Use these to interpret any requirement you may find ambiguous.		

Curricular Requirements	Scoring Components, Key Terms, Evaluation Guidelines, Important Considerations, References and Samples of Evidence			
<p>Curricular Requirement 1: The course provides instruction in each of the following five content areas outlined in the Course Description:</p> <ul style="list-style-type: none"> • Structure of Matter (Atomic theory and atomic structure, Chemical bonding) • States of Matter (Gases, Liquids and solids, Solutions) • Reactions (Reaction types, Stoichiometry, Equilibrium, Kinetics, Thermodynamics) • Descriptive Chemistry (Relationships in the periodic table) • Laboratory (Physical manipulations; Processes and procedures; Observations and data manipulation; Communication, group collaboration, and the laboratory report) 	Scoring Component 1*: The course provides instruction in Structure of Matter: atomic theory and structure.			
	*Note Each Curricular Requirement may be subdivided into two or more distinct Scoring Components.			
	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference
	All terminology in the Scoring Component is clear. No clarification is needed.	Scoring Component is clear and explicit. No Evaluation Guideline is needed.	<p>The syllabus should demonstrate evidence of instruction in the structure of the atom as well as introduce the quantum concept of the electronic structure of the atom.</p> <p>Sufficient evidence can be demonstrated through instruction in electron configuration and atomic properties.</p>	For more information see page 5 of the AP Chemistry Course Description.
	Samples of Evidence			
Sample 1	Sample 2	Sample 3		
The syllabus cites the text title and chapter of an AP Example Textbook.	The syllabus includes atomic theory and structure as part of a review from first year.	Under the atomic theory section, the syllabus includes a description of atomic orbitals.		

Curricular Requirement 1 (continued): The course provides instruction in each of the following five content areas outlined in the Course Description: <ul style="list-style-type: none"> • Structure of Matter (Atomic theory and atomic structure, Chemical bonding) • States of Matter (Gases, Liquids and solids, Solutions) • Reactions (Reaction types, Stoichiometry, Equilibrium, Kinetics, Thermodynamics) • Descriptive Chemistry (Relationships in the periodic table) • Laboratory (Physical manipulations; Processes and procedures; Observations and data manipulation; Communication, group collaboration, and the laboratory report) 	Scoring Component 2: The course provides instruction in Structure of Matter: chemical bonding.			
	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference
	All terminology in the Scoring Component is clear. No clarification is needed.	Scoring Component is clear and explicit. No Evaluation Guideline is needed.	<p>Evidence of the topic of chemical bonding should include ionic and covalent bonding. Polar covalent bonds may be introduced while discussing states of matter.</p> <p>Evidence of molecular orbitals is not required to meet this scoring component.</p>	For more information see page 5 of the AP Chemistry Course Description.
	Samples of Evidence			
Sample 1	Sample 2	Sample 3		
The syllabus cites the text title and chapter of an AP Example Textbook.	In the unit of chemical bonding, the syllabus includes a discussion of molecular geometry.	In the course description, the syllabus includes a laboratory on Lewis structures and molecular shapes.		

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	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference
	All terminology in the Scoring Component is clear. No clarification is needed.	Scoring Component is clear and explicit. No Evaluation Guideline is needed.	The syllabus should demonstrate instruction in gas laws to constitute sufficient evidence. Kinetic theory of gases may or may not be mentioned but should be implied.	For more information see page 5 of the AP Chemistry Course Description.
Samples of Evidence				
Sample 1	Sample 2	Sample 3		
The syllabus cites the text title and chapter of an AP Example Textbook.	In the gasses unit, the syllabus includes a discussion of Boyle's Law, Charles's Law and universal gas law.	In the gasses unit, the syllabus includes a discussion of kinetic molecular theory.		

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	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference
	All terminology in the Scoring Component is clear. No clarification is needed.	Scoring Component is clear and explicit. No Evaluation Guideline is needed.	Evidence can be demonstrated through the syllabus implicitly or explicitly including molecular attractions. Evidence may be found in discussion of solids rather than under liquids, and/or appear in discussion of phase diagrams. In addition to a unit in solutions and concentrations, the syllabus should include part of a chapter on solids and liquids (or phase diagrams).	For more information see page 5 of the AP Chemistry Course Description.
Samples of Evidence				
Sample 1	Sample 2	Sample 3		
The syllabus cites the text title and chapter of an AP Example Textbook.	In the liquids unit, the syllabus includes a discussion of intermolecular forces.	In the liquids unit, the syllabus includes a variety of topics that could include vapor pressure, evaporation, and boiling point.		

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	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference
	All terminology in the Scoring Component is clear. No clarification is needed.	Scoring Component is clear and explicit. No Evaluation Guideline is needed.	<p>Evidence of solids can be demonstrated through the inclusion of a unit about liquids and solids.</p> <p>Evidence can be demonstrated through discussion of phase diagrams within the list of topics.</p>	For more information see page 5 of the AP Chemistry Course Description.
	Samples of Evidence			
Sample 1	Sample 2	Sample 3		
Mention of phase diagrams within the list of topics is made within the syllabus.	In the solids unit, the syllabus includes a discussion of intermolecular forces.	In the solids unit, the syllabus includes a variety of topics that could include types of solids (amorphous and crystalline) and the relationship between the type of solids and their properties.		

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	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference
	All terminology in the Scoring Component is clear. No clarification is needed.	Scoring Component is clear and explicit. No Evaluation Guideline is needed.	<p>The syllabus should introduce units on concentration to constitute sufficient evidence.</p> <p>The syllabus should discuss colligative properties at both the molecular and non-molecular level to demonstrate sufficient evidence.</p>	For more information see pages 5-6 of the AP Chemistry Course Description.
Samples of Evidence				
Sample 1	Sample 2	Sample 3		
The syllabus cites the title of an approved chemistry book and a chapter on solutions.	In the solutions unit, the syllabus includes a discussion of colligative properties and concentration.	In the solutions unit, the syllabus includes evidence of a colligative properties lab, other than making ice cream.		

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	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference
	Reaction types: synthesis/composition, decomposition, single replacement, double replacement/displacement, which includes acid/base and precipitation, oxidation-reduction, complex ions and combustion reactions.	Scoring Component is clear and explicit. No Evaluation Guideline is needed.	Evidence of reaction types is sufficient if it is mentioned across several chapters, e.g. acid-base, redox (which may be included in electrochemistry). Some reaction types, e.g., synthesis, single and double replacement, are often mentioned in introductory chapters. Evidence may be inferred from practice, appearing in review materials for the exam, or may appear in multiple chapters. Organic reactions are not necessary to meet the scoring component.	For more information see page 6 of the AP Chemistry Course Description.
	Samples of Evidence			
Sample 1	Sample 2	Sample 3		
The course uses part of the review for the exam as review for the equations question.	The syllabus cites the title of an approved chemistry textbook and a chapter on reactions.	The syllabus cites a textbook and includes the mention of reaction types across several chapters.		

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	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference
	Stoichiometry: an encompassing term describing the balancing of chemical equations, mole to mole relationships, mass to mass relationships, empirical and molecular formulae, limiting reagent problems, and the percent composition and percent yield.	There must be mention of a review of stoichiometry for evidence to be sufficient.	The syllabus should address the following topics, e.g., moles, percent recovery, limiting reagents, and percent composition to demonstrate sufficient evidence. A syllabus citing an early chapter on reaction calculations is sufficient evidence.	For more information see page 6 of the AP Chemistry Course Description.
Samples of Evidence				
Sample 1	Sample 2	Sample 3		
The syllabus cites the title of an AP Chemistry Textbook and includes the mention of stoichiometry across several chapters.	In the stoichiometry unit, the syllabus includes a discussion of the concept of a mole and its application.	In the stoichiometry unit, the syllabus includes a review and its application to chemical problems from the first year Chemistry class.		

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	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference
	<p>Equilibrium: a theoretical and calculational description of chemical reactions in their long time behavior when the concentrations are unchanging. This includes Le Chatelier's Principle.</p>	Scoring Component is clear and explicit. No Evaluation Guideline is needed.	<p>The syllabus should mention application of Le Chatelier's principle to constitute sufficient evidence.</p> <p>The syllabus should demonstrate evidence of instruction in both the conceptual and mathematical basis of the topic.</p>	For more information see page 6 of the AP Chemistry Course Description.
Samples of Evidence				
Sample 1	Sample 2	Sample 3		
The syllabus cites the title of an approved Chemistry textbook and chapter titles including equilibrium, acid-base equilibrium, and solubility product equilibrium.	In the equilibrium unit, the syllabus provides evidence of a quantitative treatment of the concept of equilibrium.	In the equilibrium unit, the syllabus includes an application of Le Chatelier's Principle in problem solving.		

Curricular Requirement 1 (continued): The course provides instruction in each of the following five content areas outlined in the Course Description: <ul style="list-style-type: none"> • Structure of Matter (Atomic theory and atomic structure, Chemical bonding) • States of Matter (Gases, Liquids and solids, Solutions) • Reactions (Reaction types, Stoichiometry, Equilibrium, Kinetics, Thermodynamics) • Descriptive Chemistry (Relationships in the periodic table) • Laboratory (Physical manipulations; Processes and procedures; Observations and data manipulation; Communication, group collaboration, and the laboratory report) 	Scoring Component 10: The course provides instruction in Reactions: kinetics.			
	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference
	All terminology in the Scoring Component is clear. No clarification is needed.	Scoring Component is clear and explicit. No Evaluation Guideline is needed.	<p>The syllabus should include mention of rate constants (implicit or explicit).</p> <p>The inclusion of microscopic explanations of mechanisms including catalysis constitutes sufficient evidence.</p>	For more information see page 6 of the AP Chemistry Course Description.
Samples of Evidence				
Sample 1	Sample 2	Sample 3		
The syllabus cites an approved Chemistry textbook and chapter of an approved chemistry book on chemical kinetics.	In the course outline, the syllabus includes a quantitative lab on chemical kinetics.	In the kinetics unit, the syllabus includes evidence that students can write a rate law expression from experimental data.		

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	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference
	Thermodynamics: the study of the energetics of processes including the first and second law of thermodynamics (enthalpy, bond energies, entropy and <u>Gibbs</u> free energy).	The syllabus must include a discussion of both the first AND second laws of thermodynamics as well as the Gibbs energy.	Thermodynamics may be mentioned by subtopics such as, heat of reaction, enthalpy, entropy, and Gibbs free energy.	For more information see page 6 of the AP Chemistry Course Description.
Samples of Evidence				
Sample 1	Sample 2	Sample 3		
In the thermodynamics unit, the syllabus includes subtopics such as heat of reaction, enthalpy, entropy, and Gibbs free energy.	The syllabus cites the text title and chapter(s) of an AP Example Textbook.	The syllabus cites the interrelationship between thermodynamics, electrochemistry and equilibrium.		

Scoring Component 12: The course provides instruction in Descriptive Chemistry: relationships in the periodic table.					
Curricular Requirement 1 (continued): The course provides instruction in each of the following five content areas outlined in the Course Description: <ul style="list-style-type: none"> • Structure of Matter (Atomic theory and atomic structure, Chemical bonding) • States of Matter (Gases, Liquids and solids, Solutions) • Reactions (Reaction types, Stoichiometry, Equilibrium, Kinetics, Thermodynamics) • Descriptive Chemistry (Relationships in the periodic table) • Laboratory (Physical manipulations; Processes and procedures; Observations and data manipulation; Communication, group collaboration, and the laboratory report) 	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference	
		Relationships in the periodic table: periodic trends in physical and chemical properties of elements that establish a connection between electronic structure and periodic trends. This does not include organic reactions.	Scoring Component is clear and explicit. No Evaluation Guideline is needed.	<p>Evidence can be demonstrated through the mention of a relationship between electronic structure and physical and chemical properties of the elements. This may include such terms as electronegativity.</p> <p>Relationships in the periodic table are not the study of individual groups (in chapters), but rather the relationships to atomic structure and periodic trends. Evidence is sufficient when relationships between atomic structure and periodic trends are stressed.</p> <p>Inclusion of organic reactions in the syllabus is not required.</p>	For more information see page 7 of the AP Chemistry Course Description.
	Samples of Evidence				
	Sample 1	Sample 2	Sample 3		
	The course includes instruction in systematics of size and reactivity as a function of position in the periodic table.	The syllabus cites the text title and chapter(s) of an approved chemistry book.	In the course outline, the syllabus includes periodic trends of electronegativity and types of compounds formed.		

Curricular Requirement 1 (continued): The course provides instruction in each of the following five content areas outlined in the Course Description: <ul style="list-style-type: none"> • Structure of Matter (Atomic theory and atomic structure, Chemical bonding) • States of Matter (Gases, Liquids and solids, Solutions) • Reactions (Reaction types, Stoichiometry, Equilibrium, Kinetics, Thermodynamics) • Descriptive Chemistry (Relationships in the periodic table) • Laboratory (Physical manipulations; Processes and procedures; Observations and data manipulation; Communication, group collaboration, and the laboratory report) 	Scoring Component 13: The course provides instruction in Laboratory: physical manipulations.			
	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference
	All terminology in the Scoring Component is clear. No clarification is needed.	There must be a hands-on laboratory as part of the course to meet this scoring component.	A virtual laboratory does not constitute sufficient evidence.	For more information see page 32 of the AP Chemistry Course Description.
	Samples of Evidence			
Sample 1	Sample 2	Sample 3		
The syllabus implies that students manipulate chemicals and equipment (glassware, instrumental, etc).	The syllabus states that students manipulate glassware, etc., or can describe equipment used which implies physical manipulation.	In the laboratory section, the syllabus includes the names of labs from an approved laboratory manual.		

Curricular Requirement 1 (continued): The course provides instruction in each of the following five content areas outlined in the Course Description: <ul style="list-style-type: none"> • Structure of Matter (Atomic theory and atomic structure, Chemical bonding) • States of Matter (Gases, Liquids and solids, Solutions) • Reactions (Reaction types, Stoichiometry, Equilibrium, Kinetics, Thermodynamics) • Descriptive Chemistry (Relationships in the periodic table) • Laboratory (Physical manipulations; Processes and procedures; Observations and data manipulation; Communication, group collaboration, and the laboratory report) 	Scoring Component 14: The course provides instruction in Laboratory: laboratory report.			
	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference
	<p>Laboratory report: a written or typed document describing the elements of what occurred in the laboratory, including the purpose, procedure, data, data analysis, error analysis, and conclusion, in a formal report. Informal reports may be somewhat shortened by omitting some elements for an occasional laboratory experiment.</p>	Scoring Component is clear and explicit. No Evaluation Guideline is needed.	<p>The syllabus should note the definition of the laboratory report as a document with a number of components to constitute sufficient evidence.</p> <p>The syllabus should include the elements of the laboratory report from the definition to constitute sufficient evidence.</p>	For more information see pages 7 and 34 of the AP Chemistry Course Description.
Samples of Evidence				
Sample 1	Sample 2	Sample 3		
The syllabus includes laboratory reports from approved laboratory manuals.	In the course outline, the syllabus requires a written or typed document describing the elements of what occurred in the laboratory, including the purpose, procedure, data, data analysis, error analysis, and conclusion, in a formal report. Informal reports may be somewhat shortened by omitting some elements for an occasional laboratory experiment.	In the assignments section, the syllabus requires laboratory reports as defined as a written or typed document describing the elements of what occurred in the laboratory, including the purpose, procedure, data, data analysis, error analysis, and conclusion, in a formal report. Informal reports may be somewhat shortened by omitting some elements for an occasional laboratory experiment.		

<p>Curricular Requirement 1 (continued): The course provides instruction in each of the following five content areas outlined in the Course Description:</p> <ul style="list-style-type: none"> • Structure of Matter (Atomic theory and atomic structure, Chemical bonding) • States of Matter (Gases, Liquids and solids, Solutions) • Reactions (Reaction types, Stoichiometry, Equilibrium, Kinetics, Thermodynamics) • Descriptive Chemistry (Relationships in the periodic table) • Laboratory (Physical manipulations; Processes and procedures; Observations and data manipulation; Communication, group collaboration, and the laboratory report) 	<p>Scoring Component 15: The course provides instruction in Laboratory: collection of laboratory reports in a notebook or portfolio.</p>			
	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference
	<p>Laboratory report: a written or typed document describing the elements of what occurred in the laboratory, including the purpose, procedure, data, data analysis, error analysis, and conclusion, in a formal report. Informal reports may be somewhat shortened by omitting some elements for an occasional laboratory experiment.</p>	<p>Scoring Component is clear and explicit. No Evaluation Guideline is needed</p>	<p>Evidence is sufficient if there is indication the lab reports for the course are to be retained by the student.</p>	<p>For more information see page 7 of the AP Chemistry Course Description.</p>
	<p>Samples of Evidence</p>			
	Sample 1	Sample 2	Sample 3	
<p>In the assignments section, the syllabus includes a statement that a laboratory notebook is used.</p>	<p>In the assignments section, the syllabus includes a statement that a portfolio of laboratory reports is collected and returned to the student.</p>	<p>In the course outline, the syllabus includes an indication that the student receives back and maintains for the year a compendium of all their experiments.</p>		

Curricular Requirement 2: The course emphasizes chemical calculations and the mathematical formulation of principles.	Scoring Component 16: : The course emphasizes chemical calculations and the mathematical formulation of principles.			
	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference
	Mathematical formulation of principles: indicates that mathematical equations are presented to establish a quantitative basis of the principles presented.	Scoring Component is clear and explicit. No Evaluation Guideline is needed.	Chemical calculations in the course can be demonstrated through the inclusion of discussion of problem sets. Mathematical formulations can be demonstrated through their inclusion in a number of different chapters (subjects), e.g., gas laws, equilibrium, and thermodynamics within the syllabus.	For more information see page 29-30 of the AP Chemistry Course Description.
	Samples of Evidence			
	Sample 1	Sample 2	Sample 3	
The syllabus includes application of gas laws (universal, Boyles, Charles, and Dalton).	The syllabus includes quantitation of limiting reagent.	A detailed listing of the assigned problems is included in the syllabus.		

Scoring Component 17: A minimum of one double period per week or its equivalent is spent engaged in laboratory work.					
Curricular Requirement 3: The course includes a laboratory component comparable to college-level chemistry laboratories. A minimum of one double-period per week or its equivalent is spent engaged in laboratory work. A hands-on laboratory component is required. Each student should complete a lab notebook or portfolio of lab reports. Note: Online course providers utilizing virtual labs (simulations rather than hands-on) should submit their laboratory materials for the audit. If these lab materials are determined to develop the skills and learning objectives of hands-on labs, then courses which use these labs may receive authorization to use the "AP" designation. (For information on the requirements for an AP Chemistry laboratory program, the Guide for the Recommended Laboratory Program is included in the Course Description.)	Key Term(s)	Evaluation Guideline(s)	Important Consideration(s)	Reference	
		Equivalent of double period per week: May allow for before/after/Saturday sessions of extended length, or 2 out of 5 class periods for laboratory each week.	<p>The syllabus must include one of the following:</p> <ul style="list-style-type: none"> In the laboratory section, the syllabus includes 22 total laboratory experiences and sufficient names of laboratories. In the laboratory section, the syllabus includes 34 laboratory hours and sufficient names of laboratories. In the laboratory section, the syllabus includes a double lab period and sufficient names of laboratories. 	<p>Early start / late end (afternoon) / lunch / Saturday sessions can be mentioned to provide additional evidence that 34 laboratory hours have been completed.</p> <p>Evidence of one lab can be demonstrated through the inclusion of molecular modeling / geometries.</p> <p>Evidence of two laboratories can be demonstrated through the inclusion of qualitative analysis of cations and anions.</p>	For more information see page 29-30 of the AP Chemistry Course Description.
		Samples of Evidence			
	Sample 1	Sample 2	Sample 3		
	In the laboratory section, the syllabus includes 22 total laboratory experiences and sufficient names of laboratories.	In the laboratory section, the syllabus includes a double period and sufficient names of laboratories.	In the laboratory section, the syllabus states, "Students meet once a week for less than 2 hours but schedule additional lab time outside of the formal class time, then this meets the requirements.		