3C

Information/Action

Professional Services Committee

Draft Revised CSET: Multiple Subjects, Single Subject English, and Single Subject Mathematics Subject Matter Requirements (SMRs) to Align with the California Common Core State Standards

Executive Summary: This item provides the draft revised Subject Matter Requirements (SMRs) for the CSET: Multiple Subjects, Single Subject English and Single Subject Mathematics examinations in alignment with the Common Core State Standards (CCSS) to the Commission for initial review.

Policy Question: Do the proposed revisions to the selected subject matter requirements adequately and appropriately address alignment with the California Common Core State Standards?

Recommended Action: That the Commission approve conducting a content validation study of the draft revised SMRs, including any potential modifications suggested by the Commission.

Presenters: Phyllis Jacobson, Administrator, and Mike Taylor, Consultant, Professional Services Division

Strategic Plan Goal

II. Program Quality and Accountability

- Develop and maintain rigorous, meaningful, and relevant standards that drive program quality and effectiveness for the preparation of the education workforce and are responsive to the needs of California's diverse student population.

Draft Revised CSET: Multiple Subjects, Single Subject English, and Single Subject Mathematics Subject Matter Requirements (SMRs) to Align with the California Common Core State Standards

Introduction
This item provides the draft revised Subject Matter Requirements (SMRs) for the CSET: Multiple Subjects, Single Subject English and Single Subject Mathematics examinations in alignment with the Common Core State Standards (CCSS) to the Commission for initial review.

Background
At the December 2012 Commission meeting, an update was provided on the work in progress relating to implementing the Common Core State Standards (http://www.ctc.ca.gov/commission/agendas/2012-12/2012-12-4C.pdf). Included in the update was a description of the process to revise and update the CSET: Multiple Subjects, Single Subject English and Single Subject Mathematics examinations to align with the CCSS. This agenda item further updates the Commission as to the progress of this work.

On February 4, 2013, the Commission's standing Bias Review Committee, and on February 5, 2013 expert panels of California educators participated in a Common Core Standards Alignment Objective Review Conference held at the facility of the Commission's CSET contractor, Evaluation Systems group of Pearson. Because this was a test development activity, the names of the participants are not made public; however, a description of the panel members for each of the three CSET content areas is provided in Appendix A.

Orientation activities focused the panel members on the objective of the meeting to align the current CSET: Multiple Subjects, Single Subject English and Single Subject Mathematics Subject Matter Requirements with the California Common Core State Standards. Participants were reminded that the SMRs define the content knowledge expected at the level of a beginning California teacher earning a preliminary credential. The proposed revisions were discussed first by the Bias Review Committee and their comments were subsequently provided to the three content expert panels for consideration. Commission staff attended the Bias Review Committee meeting as well as each of the three content expert panel meetings.

Discussion of the CSET: Multiple Subjects Proposed Revisions
The CSET Common Core State Standards Alignment Objective Review Conference for the Multiple Subjects Content Standards was held on February 5, 2013. A panel of eleven educators with expertise in the range of the Multiple Subjects subject matter content participated in the meeting.

Panel members were tasked to evaluate the current Multiple Subject SMRs to determine their alignment with the CCSS. The panel reviewed content specifications for Reading, Language, and Literature, which included content domains for Language and Linguistics, Non-Written and Written Communication, and Texts. The panel also reviewed the Subject Matter Skills and Abilities in Mathematics because the CCSS address mathematical problem solving, reasoning and proofs, communication, representation, and connections. Additionally, the panel reviewed content specifications for Subject Matter Skills and Abilities in History and Social Science and Science because the CCSS have identified literacy implications in these subjects and these content areas are integrated in the test structure of the CSET: Multiple Subjects examination, as shown in the following chart:

CSET: Multiple Subjects			
Subtest	**Domains**	**Number of**	
		Multiple-Choice Questions	**Constructed-Response Questions** (short [focused] responses)
I	Reading, Language and Literature	26	2
	History and Social Science	26	2
	Subtest Total	**52**	**4**
II	Science	26	2
	Mathematics	26	2
	Subtest Total	**52**	**4**
III	Physical Education	13	1
	Human Development	13	1
	Visual and Performing Arts	13	1
	Subtest Total	**39**	**3**

After an initial review of the current Multiple Subject content specifications, which included draft CCSS language, there was a discussion regarding the level of content knowledge needed by an entry-level teacher candidate. Panel members expressed concerns with the clarity of and/or familiarity that candidates might have with selected terminology used in the standards. As a result, selected vocabulary was added to the list of Glossary of Specialized Terms (see page 6 of the draft CSET: Multiple Subjects SMRs).

The panel also emphasized that the current SMRs did not address academic English and technology as extensively as the CCSS. Revisions of the current standards were made to include academic English and the use of technology as appropriate to the specific content domains.

The proposed revised SMRs for the CSET: Multiple Subjects examination are provided in Appendix B.

Discussion of CSET: Single Subject English Proposed Revisions

The CSET Common Core State Standards Alignment Objective Review Conference for the Single Subject English Content Standards was held on February 5, 2013. A panel of eleven educators with expertise in Single Subject English content participated in the meeting.

The panel members focused primarily on adding content reflective of three key English-related areas characteristic of Common Core State Standards: an emphasis on varied types of writing and of student writing across the curriculum; an emphasis on critical analysis of literary and other works and the application of that analysis to other curriculum areas (for example, relating historical contexts for literary works and the author's relationship to that context); and student access to reading and experiencing a broad range of texts, including informational, literary, and media-related, as well as texts and media illustrative of a range of complexity.

With respect to the area of Dramatic Performance, the panel included a draft new content objective relating to the analysis of dramatic works so that candidates would be required to analyze the work and provide textual evidence for informing play production values such as direction, lighting, and other dramatic elements (proposed new objective 4.3 (c)).

The proposed revised SMRs for the CSET: Single Subject English examination are provided in Appendix C.

Discussion of CSET: Single Subject Mathematics Proposed Revisions

The CSET Common Core State Standards Alignment Objective Review Conference for the Single Subject Mathematics Content Standards was held on February 5, 2013. A panel of ten educators with expertise in Single Subject Mathematics content participated in the meeting.

Panel members reviewed the adopted SMRs for secondary mathematics to determine their appropriateness for describing the content knowledge required of a beginning secondary mathematics teacher charged with teaching the CCSS. Panel members discussed each domain in great detail, discussing the relevance of each statement to the task at hand. The panel recommended fairly extensive revisions, including the addition of new sections, changing the name of at least one domain to reflect the added content, and the elimination of one domain, History of Mathematics. In discussing its recommendation to eliminate History of Mathematics as a domain from the CSET SMRs, the panel noted that the domain was very difficult to measure, that it was not covered by the CCSS, and that it was not knowledge they considered to be necessary for a beginning secondary math teacher to demonstrate.

In addition to recommending revisions based on the CCSS, the panel identified the specific skills in each domain which the members considered necessary and appropriate for candidates seeking a foundational-level mathematics authorization. The panel included mathematics content through Algebra II. This is an additional piece of input from stakeholders that will be considered in further discussions regarding the scope of the Foundational Level Mathematics content.

The proposed revised SMRs for the CSET: Single Subject Mathematics examination are provided in Appendix D.

Discussion of the CSET: Single Subject History-Social Science and Science Examinations

Although the expert panel for the CSET: Multiple Subjects examination addressed integration of literacy skills within the additional content areas of History-Social Science and Science since CCSS address literacy in these content areas and the CSET: MS examination structure integrates these content areas, this work was not done for the Single Subject History-Social Science and

Science content areas for several reasons. These two content areas currently are awaiting publication of national, or Common Core, standards that would integrate changes reflective of both integration of literacy and related activities within these content areas and of content-focused changes. Because of the resource-intensive process involved in revising SMRs and examinations along with subject matter and teacher preparation program standards that incorporate the SMRs, it would be appropriate to await the forthcoming publication of these standards and their potential adoption for use in California before revising the CSET examinations in these content areas. Commission staff continues to meet with staff of the California Department of Education to assure that the Commission has the most up to date information available regarding standards in these content areas. When there are new standards available in the areas of History-Social Science and Science, the process of revising and updating the CSET SMRs and program standards for these content areas will be addressed as well.

Staff Recommendation
Staff recommends that the Commission approve moving the draft revised CSET: Multiple Subject, Single Subject English, and Single Subject Mathematics SMRs forward to a content validation study. Staff further recommends that the content validation study include questions regarding the CSET: Mathematics panel's recommendation to eliminate the Single Subject Mathematics domain relating to the History of Mathematics.

Next Steps
If the Commission approves moving forward to conducting a validation study of the draft revised CSET: Multiple Subject, Single Subject English, and Single Subject Mathematics SMRs, the Commission's CSET testing contractor, Evaluation Systems group of Pearson, will proceed with the study.

Following completion of the content validation study, an agenda item will be presented for potential adoption of the revised subject matter requirements, and a plan for proceeding with item development based on the adopted revised SMRs will be presented.

Appendix A
Composition of the Subject Matter Advisory Panels

CALIFORNIA SUBJECT EXAMINATIONS FOR TEACHERS® (CSET®)
ENGLISH
MATHEMATICS
MULTIPLE SUBJECTS

OBJECTIVE REVIEW CONFERENCE
FEBRUARY 5, 2013

SUBJECT MATTER ADVISORY PANELS

	English	Mathematics	Multiple Subjects	Total
Total Number				
Participants	11	10	11	32
Ethnicity				
African American or Black	1	1	0	2
Asian American	0	0	2	2
Filipino	0	1	0	1
Southeast Asian American	0	0	0	0
Pacific Island American	0	0	0	0
Mexican American / Chicano	0	1	1	2
Latin American / Other Hispanic	0	0	0	0
White (non-Hispanic)	7	4	8	19
Other	0	0	0	0
Did Not Indicate	3	3	0	6
Gender				
Female	10	5	9	24
Male	1	5	2	8
Region				
North	3	1	6	10
South	8	9	5	22
Profession				
Public School Educator	6	5	8	19
College/University Educator	3	5	2	10
Other	2	0	1	3

Content Specifications in Reading, Language, and Literature

Content Domains for Subject Matter Understanding and Skill in Reading, Language, and Literature

Domain 1: Language and Linguistics

1.1 **Language Structure and Linguistics.** Candidates for Multiple Subject Teaching Credentials are able to identify and demonstrate an understanding of the fundamental components of human language, including phonology, morphology, syntax, and semantics, as well as the role of pragmatics in using language to communicate. In the context of these components, they reflect on both the potential for differences among languages and the universality of linguistic structures. Candidates can demonstrate knowledge of phonemic awareness (e.g., the processes of rhyming, segmenting, and blending). They apply knowledge of similarities and differences among groups of phonemes (e.g., consonants and vowels) that vary in their placement and manner of articulation. Candidates know the differences between phoneme awareness and phonics. They know the predictable patterns of sound-symbol and symbol-sound relationships in English (the Alphabetic Principle). Candidates identify examples of parts of speech, and their functions, as well as the morphology contributing to their classification. They recognize and use syntactic components (such as phrases and clauses, including verbals) to understand and develop a variety of sentence types (e.g., simple, compound, and complex sentences).

1.2 **Language Development and Acquisition.** Candidates for Multiple Subject Teaching Credentials apply knowledge of both the development of a first language and the acquisition of subsequent ones. They can describe the principal observable milestones in each domain, and identify the major theories that attempt to explain the processes of development and acquisition. Candidates demonstrate that they understand the range of issues related to the interaction of first languages and other languages. They are able to recognize special features that may identify a pupil's language development as exceptional, distinguishing such features from interlanguage effects.

1.3 Literacy. Candidates for Multiple Subject Teaching Credentials understand and use the major descriptions of developing literacy. ~~In both English speakers and English learners~~Across the continuum of English language acquisition, candidates can identify the progressive development of phonemic awareness, decoding, comprehension, word recognition, and spelling (including its complexities related to the interaction of phonology, the alphabetic principle, morphology, and etymology). Candidates understand how these processes interact with the development of concepts, of vocabulary (including relationships among etymologies and both denotative and connotative word meanings), and of contextual analysis. Candidates can identify indicators of reading fluency (i.e., accuracy, rate, and prosody). They understand interrelationships between decoding, fluency, vocabulary knowledge, and reading comprehension, and they can identify factors that affect comprehension.

1.4 Assessment. In assessing developing literacy, candidates for Multiple Subject Teaching Credentials apply knowledge of the implications that language development and language differences have for the processes of learning to read and reading to learn. They know and apply a range of assessment methods and instruments to the respective and interrelated developing abilities in listening ~~(for aural/oral languages)~~, speaking, reading (decoding and comprehension), writing, vocabulary, and spelling conventions.

Domain 2: Non-Written and Written Communication

2.1 Conventions of Language. Applying their knowledge of linguistic structure, candidates for Multiple Subject Teaching Credentials identify and use the conventions associated with ~~what is called~~ standard English. They recognize, understand, and use a range of conventions in both spoken and written English, including varieties of sentence structure, preferred usage, and conventions~~al forms~~ of spelling, capitalization, and punctuation ~~in written English~~.

2.2 Writing Strategies. Candidates for Multiple Subject Teaching Credentials ~~describe~~demonstrate knowledge of the stages of the writing process. They understand the purpose and technique~~s~~ of various prewriting strategies for organizing and giving focus to their writing (e.g., outlining, ~~webbing~~using graphic organizers, note ~~-~~taking). Candidates develop and strengthen writing as needed by revis~~e~~ing, ~~and~~ editing, re~~-~~writing, or trying a new approach. They draw~~ing~~ upon their understanding of principles of organization, transitions, point-of-view, word ~~-~~choice~~s~~, and conventions to produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. Candidates demonstrate the ability to use technology, including the Internet, to produce and publish individual or shared writing products.

2.3 **Writing Applications.** Candidates for Multiple Subject Teaching Credentials demonstrate ~~their~~ knowledge of principles of composition~~,~~ such as appropriate structure, logical development of ideas.~~paragraphing, transitional phrases,~~ appropriate vocabulary, and context. Candidates compose and/or analyze writing ~~according to conventions~~ in different genres, including arguments~~narrative,~~, ~~interpretive, descriptive,~~informative/explanatory texts, ~~persuasive~~ and ~~expository writing~~narratives, as well as summaries, letters, and research reports. Candidates demonstrate the ability to write arguments to support claims using valid reasoning and relevant and sufficient evidence. Candidates demonstrate the ability to write informative/explanatory texts, including career development documents (e.g., business letters, job applications), and to examine and convey ideas, concepts, and information through the effective selection, organization, and analysis of content. When writing an argument or informative/explanatory text, candidates draw evidence from literary and/or informational texts to support research, analysis, and reflection. Candidates demonstrate the ability to write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences. ~~They understand and are able to use bibliographic citations in a standard format.~~

2.4 **Non-Written Communication.** Candidates for Multiple Subject Teaching Credentials demonstrate knowledge of non-written genres and traditions (storytelling), and of their characteristics (e.g., organization), including narratives, persuasive pieces, research presentations, poetry recitations, and responses to literature. Candidates analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation. They demonstrate the ability to delineate a speaker's argument and specific claims, evaluating the soundness of the speaker's reasoning and the relevance and sufficiency of evidence presented. They apply understanding~~s~~ of language development stages, from pre-production (beginning) to intermediate fluency, to plan instruction according to children's developing abilities in such areas. Candidates analyze speech in terms of ~~presentation components~~vocal characteristics (e.g., volume~~, pace~~), ~~pronunciation~~ fluency, and pronunciation (unrelated to accent or dialect).~~,~~ ~~and~~ They identify the integration of nonverbal components (e.g., gesture, eye contact) with verbal elements (e.g., tone, volume). Candidates demonstrate knowledge of dialects, idiolects, and changes in what is considered standard oral English usage and their effects on perceptions of speaker performance, with attention to the dangers of stereotyping and bias. They demonstrate the ability to adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. ~~They also demonstrate an understanding of the potential impact on non-written presentations of images, sound, and other features from electronic media.~~ Candidates demonstrate knowledge of techniques and strategies for initiating and engaging effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners, building on others' ideas and expressing their own clearly.

2.5 **Research ~~Strategies~~to Build and Present Knowledge.** Candidates for Multiple Subject Teaching Credentials demonstrate the~~ir~~ ability to gather relevant information from multiple authoritative print and digital ~~use a variety of~~ research sources~~, both print and electronic~~. They assess the credibility and accuracy of each source. They interpret ~~such research, putting to use~~ their research findings and interpretations to construct their own reports and narratives and present claims and findings (e.g., argument, narrative, response to literature), emphasizing salient points in a focused, coherent manner with relevant evidence, reasoning, and details. Candidates accurately paraphrase the data and conclusions of others without plagiarizing. ~~Candidates also~~They understand the importance of citing research sources, using recognizable and accepted conventions for doing so. They demonstrate knowledge of effective strategies for integrating technology, multimedia, and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. Candidates demonstrate knowledge of appropriate and effective use of eye contact, vocal elements (e.g., volume, rate, pitch), and clear pronunciation when presenting claims and findings.

Domain 3: ~~Texts~~Reading Comprehension and Analysis

3.1 **~~Concepts and Conventions~~Reading Literature.** Candidates for Multiple Subject Teaching Credentials analyze works from different literary genres (e.g., novels, short stories, folktales and fairy tales, poems) as they are represented in diverse cultures~~narrative and expository texts~~, with special attention to children's literature, ~~from a range of cultures,~~for both literary elements and structural features. They cite thorough textual evidence to support analysis of the explicit and implicit meaning of literary texts. When reading literary texts, they determine ~~identify~~ themes or central ideas, including those derived from cultural patterns and symbols found in rituals, mythologies, and traditions. Candidates analyze how dialogue and incidents in a work of fiction or drama move the action forward and/or reveal aspects of character. ~~Candidates identify and analyze evidence of an author's or narrator's perspective in both fiction and non-fiction.~~ Candidates identify and evaluate ~~structural~~literary devices in prose and poetry (~~such as~~e.g., rhyme, metaphor, ~~and~~ alliteration)~~.~~, Candidates determine the meaning of words and phrases as they are used in literary texts, including figurative and connotative meanings. ~~and they~~They analyze the impact of specific word choices on meaning and tone. They examine how an author's choices concerning structure contribute to a literary text's meaning and style. Candidates analyze how differences in the points of view of characters and the audience or reader create such effects as suspense or humor. ~~examine the connections among organizational structures, the writer's view point, and the goals of reading.~~

3.2 ~~Genres~~**Reading Informational Text.** Candidates for Multiple Subject Teaching Credentials analyze the structure, organization, and purpose of informational texts. ~~in different literary genres (novels, short stories, folk and fairy tales, and poetry of various types, for example), as they are represented in different cultures, according to their structure, organization, and purpose.~~ Candidates use thorough textual evidence to support analysis of the explicit and implicit meanings of texts. They demonstrate the ability to determine the central idea of an informational text and to analyze its development over the course of a text, including its relationship to supporting ideas. Candidates demonstrate the ability to provide an objective summary of an informational text, using academic language as appropriate. They determine the meaning of words and phrases as they are used in informational texts, including figurative, connotative, and technical meanings. They analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts. Candidates demonstrate an understanding of how the structure of informational texts, including popular print and digital media, is used to develop and refine key concepts. They analyze the use of text features (e.g., graphics, headers, captions) in consumer materials. ~~structural features and their applications in various types of expository and narrative materials, including popular media such as magazines and newspapers.~~ Candidates determine an author's point(s) of view and purpose(s) and analyze how the author acknowledges and responds to conflicting evidence or viewpoints. Candidates integrate and evaluate multiple sources of information presented in different media or formats, as well as in words. They evaluate the structure and purpose of visual text features such as graphics, illustrations, data, and maps. Candidates recognize and analyze instances of bias and stereotyping in informational texts. ~~They understand and evaluate the use of elements of persuasive argument in print, speech, videos, and in other media.~~

3.3 ~~Interpretation of Texts~~**Text Complexity.** ~~Candidates for Multiple Subject Teaching Credentials analyze both implicit and explicit themes and interpret both literal and figurative meanings in texts, from a range of cultures and genres, using textual support for inferences, conclusions, and generalizations they draw from any work. They evaluate the structure, purpose, and potential uses of visual text features, such as graphics, illustrations, and maps. Candidates recognize and analyze instances of bias and stereotyping in a text.~~ Candidates for Multiple Subject Teaching Credentials evaluate text complexity using quantitative tools and measures, as well as knowledge of qualitative dimensions such as levels of meaning, structure, language conventionality and clarity, and background knowledge demands. Candidates apply knowledge of text complexity to select appropriate texts for supporting student learning goals. When matching readers to a text and task, candidates apply knowledge of reader variables (e.g., language, culture, motivation, background knowledge, skill levels, and experiences), and of task variables such as purpose and complexity.

Glossary of Specialized Terms:
Content Specifications in Reading, Language, and Literature

Specialized Terms	Definitions of Specialized Terms
Derivational morpheme	Meaningful unit combined with roots or stems to form new words with new meanings, with the potential to change the part of speech (e.g., *-ish* added to the noun *boy* results in an adjective *boyish*).
Pragmatics	The system of principles and assumptions for using language and related gestures communicatively in social contexts; also, the study of language use for the discovery of this rule system.
Affix	A bound morpheme attached before (prefix), after (suffix), in (infix), around (circumfix), or above (suprafix) a root or base word to modify its meaning or linguistic function; includes prefixes and suffixes.
Denotative meaning	Dictionary meaning; what a word refers to.
Idiolect	The linguistic system (language forms, structures, and styles) used by an individual; distinguished from the term *dialect*, which refers to linguistic systems characteristic of communities.
Morphology	The study of meaningful units of language and how their patterns of distribution contribute to the forms and structure of words; distinct from *etymology*, which is the study of the historical and cultural origins of words.
Phoneme awareness	The conscious awareness that words and utterances are made up of segments of our own speech that are represented with letters in an alphabetic orthography; also called *phonemic awareness*.
Phonics	An approach to the study of the relationships between letters and the sounds they represent; also used to describe reading instruction that teaches sound-symbol correspondences, such as "the phonics approach."
Phonology	The rule system within a language by which phonemes are sequenced, patterned and uttered to represent meanings; also, the study of this rule system.

Specialized Terms	Definitions of Specialized Terms
Prosody	The rhythmic and tonal aspects of speech: the "music" of oral language; prosodic features are variations in pitch (intonation), stress patterns (syllable prominence), and duration (length of time) that contribute to expressive reading of a text.

Note: From Speech to Print: Language Essentials for Teachers (pp. 229–236), by L. Cook Moats, 2000, Baltimore: Paul H. Brookes Publishing Co., Copyright © 2000 by Paul H. Brookes Publishing Co., www.brookespublishing.com. Adapted with Permission.

Note: Adapted from "Reading Fluency: Critical Issues for Struggling Readers" (Chapter 7, p. 134), by Joseph K. Torgesen and Roxanne F. Hudson, in What Research Has to Say About Fluency Instruction (S. Jay Samuels and Alan E. Farstrup, eds.), 2006, Newark, DE: International Reading Association, Copyright © 2006 by the International Reading Association.

Content Specifications in History and Social Science

Part I: Content Domains for Subject Matter Understanding and Skill in History and Social Science

Domain 1: World History

1.1 **Ancient Civilizations.** Candidates for Multiple Subject Teaching Credentials trace the impact of physical geography on the development of ancient civilizations (i.e., Mesopotamian, Egyptian, Kush, Hebrew, Greek, Indian, Chinese, and Roman civilizations). They identify the intellectual contributions, artistic forms, and traditions (including the religious beliefs) of these civilizations. They recognize patterns of trade and commerce that influenced these civilizations.

1.2 **Medieval and Early Modern Times.** Candidates for Multiple Subject Teaching Credentials describe the influence of physical geography on the development of medieval and early modern civilizations (i.e., Chinese, Japanese, African, Arabian, Mesoamerican, Andean Highland, and European civilizations). They trace the decline of the Western Roman Empire and the development of feudalism as a social and economic system in Europe and Japan. They identify the art, architecture, and science of Pre-Columbian America. Candidates describe the role of Christianity in medieval and early modern Europe, its expansion beyond Europe, and the role of Islam and its impact on Arabia, Africa, Europe and Asia. They trace the development of the Renaissance and Scientific Revolution in Europe. They define the development of early modern capitalism and its global consequences. They describe the evolution of the idea of representative democracy from the Magna Carta through the Enlightenment.

Domain 2: United States History

2.1 **Early Exploration, Colonial Era, and the War for Independence.** Candidates for Multiple Subject Teaching Credentials identify and describe European exploration and settlement, and the struggle for control of North America during the Colonial Era, including cooperation and conflict among American Indians and new settlers. They identify the founders and discuss their religious, economic and political reasons for colonization of North America. They describe European colonial rule and its relationship with American Indian societies. Candidates describe the development and institutionalization of African slavery in the western hemisphere and its consequences in Sub-Saharan Africa. They describe the causes of the War for Independence, elements of political and military leadership, the impact of the war on Americans, the role of France, and the key ideas embodied within the Declaration of Independence.

2.2 **The Development of the Constitution and the Early Republic.** Candidates for Multiple Subject Teaching Credentials describe the political system of the United States and the ways that citizens participate in it through executive, legislative and judicial processes. They define the Articles of Confederation and the factors leading to the development of the U.S. Constitution, including the Bill of Rights. They explain the major principles of government and political philosophy contained within the Constitution, especially separation of powers and federalism. Candidates trace the evolution of political parties, describe their differing visions for the country, and analyze their impact on economic development policies. They identify historical, cultural, economic and geographic factors that led to the formation of distinct regional identities. They describe the westward movement, expansion of U.S. borders, and government policies toward American Indians and foreign nations during the Early Republic. They identify the roles of Blacks (both slave and free), American Indians, the Irish and other immigrants, women and children in the political, cultural and economic life of the new country.

2.3 **Civil War and Reconstruction.** Candidates for Multiple Subject Teaching Credentials recognize the origin and the evolution of the anti-slavery movement, including the roles of free Blacks and women, and the response of those who defended slavery. They describe evidence for the economic, social and political causes of the Civil War, including the constitutional debates over the doctrine of nullification and secession. They identify the major battles of the Civil War and the comparative strengths and weaknesses of the Union and the Confederacy. They describe the character of Reconstruction, factors leading to its abandonment, and the rise of Jim Crow practices.

2.4 **The Rise of Industrial America.** Candidates for Multiple Subject Teaching Credentials recognize the pattern of urban growth in the United States, the impact of successive waves of immigration in the nineteenth century, and the response of renewed nativism. They understand the impact of major inventions on the Industrial Revolution and the quality of life.

Domain 3: California History

3.1 **The Pre-Columbian Period through the Gold Rush.** Candidates for Multiple Subject Teaching Credentials identify the impact of California's physical geography on its history. They describe the geography, economic activities, folklore and religion of California's American Indian peoples. They discuss the impact of Spanish exploration and colonization, including the mission system and its influence on the development of the agricultural economy of early California. They describe Mexican rule in California. They state the causes of the war between Mexico and the United States and its consequences for California. They describe the discovery of gold and its cultural, social, political and economic effects in California, including its impact on American Indians and Mexican nationals.

3.2 **Economic, Political, and Cultural Development Since the 1850's.** Candidates for Multiple Subject Teaching Credentials identify key principles of the California Constitution, including the Progressive-era reforms of initiative, referendum and recall, and they recognize similarities and differences between it and the U. S. Constitution. They identify patterns of immigration to California, including the Dust Bowl migration, and discuss their impact on the cultural, economic, social and political development of the state. They identify the effects of federal and state law on the legal status of immigrants. They describe historical and contemporary perspectives on cultural diversity in the United States and in California. Candidates understand the development and identify the locations of California's major economic activities: mining, large-scale agriculture, entertainment, recreation, aerospace, electronics and international trade. They identify factors leading to the development of California's water delivery system, and describe its relationship to California geography.

Part II: Subject Matter Skills and Abilities Applicable to the Content Domains in History and Social Science

Candidates for Multiple Subject Teaching Credentials utilize chronological and spatial thinking. They construct and interpret timelines, tables, graphs, maps and charts. They locate places based on ordinal directions, latitude and longitude, the equator, prime meridian, the tropics, the hemispheres, time zones and the international dateline. They identify and interpret major geographical features of the earth's surface including continents and other large landmasses, mountain ranges, forested areas, grasslands, deserts and major bodies of water and rivers. They describe the cultural, historical, economic and political characteristics of world regions, including human features of the regions such as population, land use patterns and settlement patterns.

Candidates apply and explain concepts from history and social studies, including political science and government, geography, economics, demography, anthropology, philosophy, and sociology.

They explain basic concepts of:

- political science and government, including political institutions, power and authority, monarchy, totalitarianism, republicanism, democracy, limited government, and the roles and responsibilities of citizenship;
- geography, including maps and globes, places and regions, the earth's physical and human systems, human settlement and migration, spatial relationships, cultural diffusion, and human-environment interactions;
- economics, including scarcity, opportunity cost, the operation of supply and demand, the circular flow model of economic exchanges, the business cycle, fiscal and monetary policy, and international trade and economic globalization;
- demography, including factors associated with human migration;
- anthropology, including the nature and content of culture and the historical and cultural development of human society, including hunting and gathering, nomadic pastoralism, domestication of plants and animals, and the creation and evolution of human settlements and cities;
- philosophy (including religion and other belief systems) and its impact on history and society; and
- sociology related to individuals; interpersonal relationships; institutions, including family and community; and social structure, including occupation, socio-economic class, ethnicity, and gender.

Candidates for Multiple Subject Teaching Credentials analyze, interpret and evaluate research evidence in history and the social sciences. They interpret primary and secondary sources, including written documents, narratives, photographs, art and artifacts revealed through archeology. In relation to confirmed research evidence they assess ~~textbooks~~ curricular materials and contrast differing points of view on historic and current events.

Candidates determine the meaning of academic language as used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text. They analyze in detail how a complex primary source is structured, including how key sentences, paragraphs, and larger portions of the text contribute to the whole.

Candidates for Multiple Subject Teaching Credentials determine the central ideas or information of a primary or secondary source and provide an accurate summary that makes clear the relationships between key details and ideas. They are able to cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole. Candidates evaluate various explanations for actions or events and determine which explanation is best supported by textual evidence and they acknowledge where the text leaves matters uncertain.

Candidates evaluate multiple sources of information presented in diverse formats and media. They integrate information from diverse primary and secondary sources into a coherent understanding of an idea or event, noting discrepancies between sources.

Candidates evaluate authors' differing points of view on the same historical event or issue by assessing the author's premises, claims, reasoning, and evidence by corroborating or challenging them with other information.

In the interpretation of historical and current events, candidates identify, explain and discuss multiple causes and effects. They recognize the differing ramifications of historical and current events for people of varying ethnic, racial, socio-economic, cultural and gender backgrounds.

Candidates for Multiple Subject Teaching Credentials write arguments that introduce and develop precise, knowledgeable claims and counterclaims, and prepare informative/explanatory texts, including the narration of historical events. Candidates are able to introduce a topic and organize complex ideas, concepts, and information into a unified whole. They select significant and relevant facts, definitions, details, and examples to develop their topic; use precise language and varied transitions and sentence structures to link major sections of a text, create cohesion, and clarify the relationships between ideas; and provide a concluding statement or section that follows from and supports the information or explanation provided.

~~Candidates draw on and apply concepts from history and other social studies including political science and government, geography, economics, anthropology, and sociology. They explain concepts related to human, government and political institutions, including power and authority, monarchy, totalitarianism, republicanism, democracy, limited government and the roles and responsibilities of citizenship. They draw on and apply basic economic concepts. They discuss basic concepts of sociology related to individuals, interpersonal relationships and institutions, including family and community; and concepts related to social structure, including occupation, socio-economic class, ethnicity and gender. Candidates explain major concepts of philosophy (including concepts of religion and other belief systems) and their impact on history and society. They explain basic concepts of demography including factors associated with human migration. They discuss basic concepts of anthropology including the nature and content of culture, and they understand the historical and cultural development of human society, including hunting and gathering, nomadic pastoralism, domestication of plants and animals, and the creation and evolution of human settlements and cities.~~

Content Specifications in Mathematics

Part I: Content Domains for Subject Matter Understanding and Skill in Mathematics

Domain 1: Number Sense

1.1 **Numbers, Relationships Among Numbers, and Number Systems.** Candidates for Multiple Subject Teaching Credentials understand base ten place value, number theory concepts (e.g., greatest common factor), and the structure of the whole, integer, rational, and real number systems. They order real numbers, including integers, mixed numbers, rational numbers (e.g., ~~including~~ fractions, decimals, ~~and~~ percents) and irrational numbers on a number line ~~real numbers~~. They represent and perform operations on numbers in exponential and scientific notation. They describe the relationships between the algorithms for addition, subtraction, multiplication, and division. They understand properties of number systems and their relationship to the algorithms, [e.g., 1 is the multiplicative identity; $27 + 34 = 2 \times 10 + 7 + 3 \times 10 + 4 = (2 + 3) \times 10 + (7 + 4)$]. Candidates perform operations with positive, negative, and fractional exponents, as they apply to whole numbers and fractions.

1.2 **Computational Tools, Procedures, and Strategies.** Candidates demonstrate fluency in standard algorithms for computation and evaluate the correctness of nonstandard algorithms. They demonstrate an understanding of the order of operations. They round numbers, estimate the results of calculations, and place numbers accurately on a number line. They demonstrate the ability to use technology, such as calculators or software, for complex calculations.

Domain 2: Algebra and Functions

2.1 Patterns and Functional Relationships. Candidates represent patterns, including relations and functions, through tables, graphs, verbal rules, or symbolic rules. They use proportional reasoning such as ratios, equivalent fractions, and similar triangles, to solve numerical, algebraic, and geometric problems. They use mathematics to represent and analyze quantitative relationships between dependent and independent variables in real-world problems.

2.2 Linear and Quadratic Equations and Inequalities. Candidates are able to find equivalent expressions for equalities and inequalities, explain the meaning of symbolic expressions (e.g., relating an expression to a situation and vice versa), find the solutions, and represent them on graphs. They recognize and create equivalent algebraic expressions (e.g., $2(a+3) = 2a + 6$), and represent geometric problems algebraically (e.g., the area of a triangle). They use mathematics to solve real-world problems using numerical and algebraic expressions and equations. Candidates have a basic understanding of linear equations and their properties (e.g., slope, perpendicularity); the multiplication, division, and factoring of polynomials; and graphing and solving quadratic equations through factoring and completing the square. They interpret graphs of linear and quadratic equations and inequalities, including solutions to systems of equations.

Domain 3: Measurement and Geometry

3.1 Two- and Three-dimensional Geometric Objects. Candidates for Multiple Subject Teaching Credentials understand characteristics of common two- and three-dimensional figures, such as triangles (e.g., isosceles and right triangles), quadrilaterals, and spheres. They are able to draw conclusions based on the congruence, similarity, or lack thereof, of two figures. They identify different forms of symmetry, translations, rotations, and reflections. They understand the Pythagorean theorem and its converse. They are able to work with properties of parallel lines.

3.2 Representational Systems, Including Concrete Models, Drawings, and Coordinate Geometry. Candidates use concrete representations, such as manipulatives, drawings, and coordinate geometry to represent geometric objects. They construct basic geometric figures using a compass and straightedge, and represent three-dimensional objects through two-dimensional drawings. They combine and dissect two- and three-dimensional figures into familiar shapes, such as dissecting a parallelogram and rearranging the pieces to form a rectangle of equal area.

3.3 Techniques, Tools, and Formulas for Determining Measurements. Candidates estimate and measure time, length, angles, perimeter, area, surface area, volume, weight/mass, and temperature through appropriate units and scales. They identify relationships between different measures within the metric or customary systems of measurements and estimate an equivalent measurement across the two systems. They calculate perimeters and areas of two-dimensional objects and surface areas and volumes of three-dimensional objects, and use mathematics to solve real-world problems involving the volume of cones, cylinders, and spheres. They relate proportional reasoning to the construction of scale drawings or models. They use measures such as miles per hour to analyze and solve problems.

Domain 4: Statistics, Data Analysis, and Probability

4.1 **Collection, Organization, and Representation of Data.** Candidates represent a collection of data through graphs, tables, or charts, incorporating technology as appropriate. They understand the mean, median, mode, and range of a collection of data. They have a basic understanding of the design of surveys, such as the role of a random sample.

4.2 **Inferences, Predictions, and Arguments Based on Data.** Candidates interpret a graph, table, or chart representing a data set. They investigate patterns of association in bivariate data (e.g., linear associations, goodness of fit) in scatter plots and frequency tables. They draw conclusions about a population from a random sample, and identify potential sources and effects of bias.

4.3 **Basic Notions of Chance and Probability.** Candidates can define the concept of probability in terms of a sample space of equally likely outcomes. They use their understanding of complementary, mutually exclusive, dependent, and independent events to calculate probabilities of simple events. They can express probabilities in a variety of ways, including ratios, proportions, decimals, and percents. They find probabilities of compound events using various representations (e.g., organized lists, tables, tree diagrams, simulations).

Part II: Subject Matter Skills and Abilities Applicable to the Content Domains in Mathematics

Candidates for Multiple Subject Teaching Credentials identify and prioritize relevant and missing information in mathematical problems. They make sense of problems and persevere in solving them. They look for and make use of structure, ~~They~~ analyzinge complex problems to identify similar simple problems that might suggest solution strategies. They model with mathematics, representing a problem in alternate ways, such as with words, symbols, concrete models, diagrams, and technology in order to gain greater insight. They consider examples and patterns as means to formulating a conjecture.

Candidates reason abstractly and quantitatively, and apply logical reasoning and techniques from arithmetic, algebra, geometry, and probability/statistics to solve mathematical problems. They look for and express regularity in repeated reasoning, use appropriate tools strategically, and ~~They~~ analyze problems to identify alternative solution strategies. They evaluate the truth of mathematical statements (i.e., whether a given statement is always, sometimes, or never true). They apply different solution strategies (e.g., estimation) to check the reasonableness of a solution. They demonstrate ~~that~~ whether or not a solution is correct.

Candidates explain their mathematical reasoning through a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and concrete models. They use academic language to construct viable arguments and critique the reasoning of others. They use appropriate mathematical notation with clear and accurate language, and they attend to precision. They explain how to derive a result based on previously developed ideas, and explain how a result is related to other ideas.

Content Specifications in Science

Part I~~1~~: Content Domains for Subject Matter Understanding and Skill in Science

Domain 1: Physical Science

1.1 **Structure and Properties of Matter.** Candidates for Multiple Subject Teaching Credentials understand the physical properties of solids, liquids, and gases, such as color, mass, density, hardness, and electrical and thermal conductivity. They know that matter can undergo physical changes (e.g., changes in state such as the evaporation and freezing of water) and chemical changes (i.e., atoms in reactants rearrange to form products with new physical and chemical properties). They know that matter consists of atoms and molecules in various arrangements, and can give the location and motions of the parts of an atom (protons, neutrons, and electrons). They can describe the constituents of molecules and compounds, naming common elements (e.g., hydrogen, oxygen, and iron), and explain how elements are organized on the Periodic Table on the basis of their atomic and chemical properties. They can describe characteristics of solutions (such as acidic, basic, and neutral solutions) and they know examples with different pH levels such as soft drinks, liquid detergents, and water. They know that mixtures may often be separated based on physical or chemical properties.

1.2 **Principles of Motion and Energy.** Candidates for Multiple Subject Teaching Credentials describe an object's motion based on position, displacement, speed, velocity, and acceleration. They know that forces (pushes and pulls), such as gravity, magnetism, and friction act on objects and may change their motion if these forces are not in balance. They know that "like" electrical charges or magnetic poles produce repulsive forces and "unlike" charges or poles produce attractive forces. They describe simple machines in which small forces are exerted over long distances to accomplish difficult tasks (e.g., using levers or pulleys to move or lift heavy objects). Candidates identify forms of energy including solar, chemical, electrical, magnetic, nuclear, sound, light, and electromagnetic. They know that total energy in a system is conserved but may be changed from one form to another, as in an electrical motor or generator. They understand the difference between heat, (thermal energy) and temperature, and understand temperature measurement systems. Candidates know how heat may be transferred by conduction, convection, and radiation (e.g., involving a stove, the Earth's mantle, or the sun). They describe sources of light including the sun, light bulbs, or excited atoms (e.g., neon in neon lights) and interactions of light with matter (e.g., vision and photosynthesis). They know and can apply the optical properties of waves, especially light and sound, including reflection (e.g., by a mirror) or refraction (e.g., bending light through a prism). They explain conservation of energy resources in terms of renewable and non-renewable natural resources and their use in society.

Domain 2: Life Science

2.1 **Structure of Living Organisms and Their Function (Physiology and Cell Biology).** Candidates for Multiple Subject Teaching Credentials describe levels of organization and related functions in plants and animals, including, organ systems (e.g., the digestive system), organs, tissues (e.g., ovules in plants, heart chambers in humans), cells, and subcellular organelles (e.g., nucleus, chloroplast, mitochondrion). They know structures and related functions of systems in plants and animals, such as reproductive, respiratory, circulatory, and digestive. They understand principles of chemistry underlying the functioning of biological systems (e.g., carbon's central role in living organisms, water and salt, DNA, and the energetics of photosynthesis).

2.2 **Living and Nonliving Components in Environments (Ecology).** Candidates for Multiple Subject Teaching Credentials know the characteristics of many living organisms (e.g., growth, reproduction, and stimulus response). They understand the basic needs of all living organisms (e.g., food, water, and space), and can distinguish between environmental adaptations and accommodations. They describe the relationship between the number and types of organisms an ecosystem can support and relationships among members of a species and across species. They illustrate the flow of energy and matter through an ecosystem from sunlight to food chains and food webs (including primary producers, consumers, and decomposers). They identify the resources available in an ecosystem, and describe the environmental factors that support the ecosystem, such as temperature, water, and soil composition.

2.3 **Life Cycle, Reproduction, and Evolution (Genetics and Evolution).** Candidates for Multiple Subject Teaching Credentials diagram life cycles of familiar organisms (e.g., butterfly, frog, mouse). They explain the factors that affect the growth and development of plants, such as light, gravity, and stress. They distinguish between sexual and asexual reproduction, and understand the process of cell division (mitosis), the types of cells and their functions, and the replication of plants and animals. They distinguish between environmental and genetic sources of variation, and understand the principles of natural and artificial selection. They know how evidence from the fossil record, comparative anatomy, and DNA sequences can be used to support the theory that life gradually evolved on earth over billions of years. They understand the basis of Darwin's theory, that species evolved by a process of natural selection.

Domain 3: Earth and Space Science

3.1 **The Solar System and the Universe (Astronomy).** Candidates for Multiple Subject Teaching Credentials identify and describe the planets, their motion, and that of other planetary bodies (e.g., comets and asteroids) around the sun. They explain time zones in terms of longitude and the rotation of the earth, and understand the reasons for changes in the observed position of the sun and moon in the sky during the course of the day and from season to season. They name and describe bodies in the universe including the sun, stars, and galaxies.

3.2 **The Structure and Composition of the Earth (Geology).** Candidates for Multiple Subject Teaching Credentials describe the formation and observable physical characteristics of minerals (e.g., quartz, calcite, hornblende, mica, and common ore minerals) and different types of rocks (e.g., sedimentary, igneous, and metamorphic). They identify characteristics of landforms, such as mountains, rivers, deserts, and oceans. They explain chemical and physical weathering, erosion, deposition, and other rock forming and soil changing processes and the formation and properties of different types of soils and rocks. They describe layers of the earth (crust, lithosphere, mantle, and core) and plate tectonics, including its convective source. They explain how mountains are created and why volcanoes and earthquakes occur, and describe their mechanisms and effects. They know the commonly cited evidence supporting the theory of plate tectonics. They identify factors influencing the location and intensity of earthquakes. They describe the effects of plate tectonic motion over time on climate, geography, and distribution of organisms, as well as more general changes on the earth over geologic time as evidenced in landforms and the rock and fossil records, including plant and animal extinction.

3.3 **The Earth's Atmosphere (Meteorology).** Candidates for Multiple Subject Teaching Credentials explain the influence and role of the sun and oceans in weather and climate and the role of the water cycle. They describe causes and effects of air movements and ocean currents (based on convection of air and water) on daily and seasonal weather and on climate.

3.4 **The Earth's Water (Oceanography).** Candidates for Multiple Subject Teaching Credentials compare the characteristics of bodies of water, such as rivers, lakes, oceans, and estuaries. They describe tides and explain the mechanisms causing and modifying them, such as the gravitational attraction of the moon, sun, and coastal topography.

Part II: Subject Matter Skills and Abilities Applicable to the Content Domains in Science

Candidates for Multiple Subject Teaching Credentials know how to plan and conduct a scientific investigation to test a hypothesis, including:

- using print and electronic resources for preparation and research;
- applying the principles of experimental design, including formulation of testable questions and hypotheses, and evaluation of the accuracy and reproducibility of data;
- distinguishing between dependent and independent variables and controlled parameters, and between linear and nonlinear relationships on a graph of data;
- using academic language appropriately (e.g., observation, organization, experimentation, inference, prediction, evidence, opinion, hypothesis, theory, law);
- following precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks;
- analyzing experimental results according to explanations in a text; and
- communicating accurately the steps and results of a scientific investigation in both verbal and written formats.

~~They apply principles of experimental design, including formulation of testable questions and hypotheses, and evaluation of the accuracy and reproducibility of data. They distinguish between dependent and independent variables and controlled parameters, and between linear and nonlinear relationships on a graph of data. They use scientific vocabulary appropriately(e.g., observation, organization, experimentation, inference, prediction, evidence, opinion, hypothesis, theory, and law) and can determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in grade-level scientific and technical contexts.~~

~~They~~ Candidates ~~can~~ select and use a variety of scientific tools ~~(e.g., microscopes) and~~. They know how to record length, mass, and volume measurements using the metric system. They interpret results of experiments and interpret events by sequence and time (e.g., relative age of rocks, phases of the moon) from evidence of natural phenomena. They ~~can~~ communicate the steps in an investigation, record data, and interpret and analyze numerical and non-numerical results using charts, maps, tables, models, graphs, and labeled diagrams.

Candidates integrate and evaluate multiple sources of information presented in diverse formats and media in order to address a question or solve a problem. They analyze a scientific or technical text to determine the central ideas or conclusions and accurately summarize complex information, concepts, and processes in a text by paraphrasing them in simpler terms. Candidates cite specific textual evidence to support analysis of scientific and technical texts, recognizing gaps or inconsistencies that may exist in the text.

Candidates analyze how informational texts structure the subject matter into categories and hierarchies. They determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in grade-level scientific and technical contexts. They analyze the author's purpose in presenting specific information in a text or passage.

Candidates evaluate hypotheses, data, analysis, and conclusions in a scientific or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. They synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept. ~~They make~~

~~appropriate use of print and electronic resources, including the World Wide Web, in preparing for an investigative activity. Candidates communicate the steps and results of a scientific investigation in both verbal and written formats.~~

English Subject Matter Requirements

Part I: Content Domains for Subject Matter Understanding and Skill in English

More than ever before, teachers of English in California's middle and high schools must deliver a complex and dynamic curriculum to students of ~~every~~diverse socioeconomic, linguistic, and cultural backgrounds. Furthermore, society is increasingly technologically and media oriented. The Reading/Language Arts Framework for California Public Schools: Kindergarten Through Grade Twelve (~~1999~~2007) forms the basis for the preparation of English teachers, who must equip their students to meet the challenges of this changing world. In this context, new paradigms and models are required for teaching English/Language Arts. Multiple forms of literacy demand a broad theoretical knowledge of language and literacy acquisition, while new information technologies require an emphasis on critical analysis of both print and non-print texts.

Candidates for Single Subject Teaching Credentials in English have a broad knowledge of literature, language and linguistics, rhetoric and composition, and communication studies. Candidates must be able to read and write well for a variety of purposes and communicate effectively within a variety of rhetorical contexts. In addition, candidates must ~~have experience in~~also be knowledgeable about theater arts, public speaking, journalism, textual analysis of nonfiction and electronic media, and production of technologically enhanced documents. This broad scope of background and skills ensures a greater degree of success in English/Language Arts classrooms for California's public school children.

Domain 1. Reading ~~Literature a~~Literature and Informational Texts~~nd Textual Analysis~~

Candidates demonstrate knowledge of the foundations and contexts of reading ~~the~~ literature and ~~textual analysis~~informational texts contained in ~~the English Language Arts Content Standards for California Public Schools (1997)~~California's Common Core State Standards for English Language Arts, Literacy in History/Social Studies, Science, and Technical Subjects (2010) and ~~as outlined in~~ the Reading/Language Arts Framework for California Public Schools: Kindergarten Through Grade Twelve (~~1999~~2007)~~–~~ at a post~~–~~secondary level of rigor. Candidates have both broad and deep conceptual knowledge of the subject matter. The candidate's preparation should include breadth of knowledge in literature, literary analysis and criticism, as well as ~~non-literary~~ informational text analysis. Literary analysis presumes in-depth exploration of the relationship between form and content. The curriculum should embrace representative selections from ~~different~~multiple literary traditions and major works from diverse cultures. Advanced study of ~~multicultural writers~~authors representing a broad range of literary periods and cultures is ~~also~~ fundamental preparation for teaching these works. Shakespeare remains integral to the secondary school curriculum; advanced study of his work is, therefore, essential to future secondary teachers. Candidates must ~~be enthusiastic readers and writers, who~~ know and apply effective reading strategies and compose thoughtful, well-crafted responses to literary and ~~non-literary~~informational texts. Candidates will be able to:

1.1 ~~**Literary Analysis**~~**Reading Literature**

a. Recognize, compare, and ~~evaluate~~analyze works from different literary traditions to include:
   - American (including works that ~~inclusive of~~represent cultural pluralism)
   - British (including works that ~~inclusive of~~represent cultural pluralism)
   - World literature and literature in translation (inclu~~sive of~~ding cross-cultural literature)
   - Mythology and oral tradition from a broad range of cultures

b. Trace development of major literary movements in historical periods (e.g., Homeric Greece, medieval, neoclassic, romantic, modern)

c. Describe the salient features of adolescent/Young Adult literature

d. Demonstrate critical thinking and analytic skills through close reading of texts

e. Cite strong and thorough textual evidence to support analysis of what a literary text says explicitly as well as inferences drawn from the text

f. Determine themes or central ideas of a literary text and analyze their development over the course of the text

g. ~~d~~Analyze and interpret major literary works ~~by representative writers~~in historical, aesthetic, political, and philosophical contexts

(~~English-Language Arts Content Standards for California Public Schools, Grade 6, Reading: 2.4; Grades 11–12, Reading: 2.2, 3.5–7~~California's Common Core State Standards for English Language Arts, RL.6–12.1–3)

1.2 Craft and Structure of Literature ~~Literary Elements~~

a. Distinguish salient features of genres (e.g., short stor~~ies~~y, ~~non-fiction,~~ drama, poetry, novel, creative nonfiction)

b. Define and analyze basic elements of literature (e.g., plot, setting, character, point of view, theme, narrative structure, figurative language, tone, diction, style)

c. Analyze the impact of the author's choices regarding how to develop and relate elements of a story or drama (e.g., where a story is set, how the action is ordered, how the characters/archetypes are introduced and developed)

~~c~~d. Articulate the relationship between the expressed purposes and the characteristics of different forms of dramatic literature (e.g., comedy, tragedy~~, drama, dramatic monologue~~)

~~d~~e. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings

f. Analyze the impact of an author's specific word choices on meaning and tone, including words with multiple meanings ~~Develop critical thinking and analytic skill through close reading of texts~~

g. Analyze how an author's choices concerning how to structure specific parts of a text (e.g., the choice of where to begin or end a story, the use of flashbacks) contribute to its overall structure and meaning as well as its aesthetic impact

h. Analyze point of view, including how authors develop and contrast points of view of different characters or narrators and particular points of view or cultural experiences reflected in works of world literature

(~~English Language Arts Content Standards for California Public Schools, Grade 6, Reading: 1.1-2, 2.1, 2.4, 2.6, 2.8, 3.0; Grade 7, Reading: 1.1, 2.4, 3.1-5; Grade 8, Reading: 1.1, 2.7, 3.0; Grades 9-10, Reading: 1.1, 2.8, 3.1-4, 3.7-10; Grades 11-12, Reading: 2.2, 3.1-4~~California's Common Core State Standards for English Language Arts, RL.6–12.2–7, RL.6–12.9)

~~**1.3 Literary Criticism**~~

~~a. Research and apply criticism of major texts and authors using print and/or electronic resources~~

~~b. Research and apply various approaches to interpreting literature (e.g., aesthetic, historical, political, philosophical)~~

~~(English Language Arts Content Standards for California Public Schools, Grade 6, Reading: 2.1-2, 2.6-8, 3.6; Grade 7, Reading: 2.1, 2.4, 2.6, 3.0; Grade 8, Reading: 2.2, 2.6, 3.0; Grades 9-10, Reading: 2.2, 2.4, 2.8, 3.5-7, 3.11-12, Writing 1.6-7; Grades 11-12, Reading: 2.2, 2.4, 3.8-9, Writing 1.6-7)~~

1.~~4~~3 ~~Analysis of~~Reading ~~Non-Literary~~ Informational Texts

a. Cite strong and thorough textual evidence to support analysis of what an informational text (e.g., literary nonfiction, historical, scientific, technical texts) says explicitly as well as inferences drawn from the text

b. Determine central ideas of an informational text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis

c. Provide an objective summary of an informational text

d. Analyze a complex set of ideas or sequence of events in an informational text and explain how specific individuals, ideas, or events interact and develop over the course of the text

e. Compare various features of print and ~~visual~~non-print media (e.g., film, television, ~~i~~Internet)

~~b~~f. Evaluate the structure and content of a variety of consumer, workplace, and public documents

~~c~~g. Interpret individual informational ~~works~~texts in their cultural, social, and political contexts

~~(English-Language Arts Content Standards for California Public Schools,~~ (California's Common Core State Standards for English Language Arts, RI.6–12.1–3)

1.4 Craft and Structure of Informational Texts

a. Determine the meaning of words and phrases as they are used in an informational text, including figurative, connotative, and technical meanings, and analyze how an author uses and refines the meaning of a key term or terms over the course of a text
b. Analyze and evaluate the effectiveness of the structure an author uses in his or her exposition or argument, including whether the structure makes points clear, convincing, and engaging
c. Analyze the use of text features (e.g., graphics, headers, captions) in public documents
d. Determine an author's point of view and/or purpose in an informational text and analyze how style and content advance that point of view and/or purpose, including how effective rhetoric and content contribute to the power, persuasiveness, or aesthetics of the text

(California's Common Core State Standards for English Language Arts, RI.6–12.4–6)

1.5 Integration of Knowledge and Ideas in Informational Texts

a. Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively, spoken, performed, written) in order to address a question or solve a problem
b. Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning and the premises, purposes, and arguments in works of public advocacy
c. Analyze seventeenth-, eighteenth-, and nineteenth-century foundational U.S. documents of historical and literary significance for their themes, purposes, and rhetorical features

(California's Common Core State Standards for English Language Arts, RI.6–12.7–9)

1.6 Text Complexity

a. Evaluate text complexity using quantitative tools and measures, as well as knowledge of qualitative dimensions such as levels of meaning, structure, language conventionality and clarity, and background knowledge demands
b. Identify levels of text complexity within grade band ranges
c. Apply knowledge of reader variables such as language, motivation, background knowledge, skill levels, and experiences, as well as task variables such as purpose and complexity when matching readers to a text and task

(California's Common Core State Standards for English Language Arts, RL.6–12.10, RI.6–12.10, Appendix A: Reading)

~~(English Language Arts Content Standards for California Public Schools, Grade 6, Reading: 2.0, 3.0; Grade 7, Reading: 2.1-5, 2.2, 3.0; Grade 8, Reading: 2.1-7, 3.0; Grades 9-10, Reading: 2.1, 2.2, 2.4-7, 3.0; Grades 11-12, Reading: 2.1-3, 2.6, 3.0)~~

Domain 2. Language, Linguistics, and Literacy

Candidates demonstrate knowledge of the foundations and contexts of the language, linguistics, and literacy contained in ~~the English Language Arts Content Standards for California Public Schools (1997),~~ California's Common Core State Standards for English Language Arts, Literacy in History/Social Studies, Science, and Technical Subjects (2010) ~~as outlined in~~and the Reading/Language Arts Framework for California Public Schools: Kindergarten Through Grade Twelve (~~1999~~2007) at a post-secondary level of rigor. Candidates have both broad and deep conceptual knowledge of the subject matter. ~~Many California students, coming from a variety of linguistic and sociocultural backgrounds, face specific challenges in mastering the English language.~~ The diversity of ~~this~~ the California student population requires the candidate to understand the principles of language acquisition and development. Candidates must become knowledgeable about the nature of human language, language variation, and historical and cultural perspectives on the development of English. In addition, candidates must acquire a complex understanding of the development of English literacy among both native and non-native speakers. Candidates will be able to:

2.1 Human Language Structures

a. ~~Recognize~~Demonstrate knowledge of the nature of human language, differences among languages, the universality of linguistic structures, and language change across time, locale, and communities
b. Demonstrate knowledge of word analysis, including sound patterns (phonology) and inflection, derivation, compounding, roots and affixes (morphology)
c. Demonstrate knowledge of sentence structures (syntax), word and sentence meanings (semantics), and language function in communicative context (pragmatics)
~~d. Use appropriate print and electronic sources to research etymologies; recognize conventions of English orthography and changes in word meaning and pronunciation~~

(~~English Language Arts Content Standards for California Public Schools, Grade 6, Reading: 1.1-5; Grades 7-8, Reading: 1.2; Grades 9-10, Reading: 1.1-3~~California's Common Core State Standards for English Language Arts, L.6–12.3–4)

2.2 Acquisition and Development of Language and Literacy

a. Explain the influences of cognitive, affective, and sociocultural factors on language acquisition and development
b. Explain the influence of a first language on ~~second~~ the acquisition of a subsequent language ~~development~~
c. Describe methods and techniques for developing academic literacy (e.g., tapping prior knowledge through semantic mapping, word analogies, cohesion analysis)
d. Demonstrate the ability to consult general and specialized reference materials (e.g., college-level dictionaries, rhyming dictionaries, bilingual dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of words and/or determine or clarify their precise meaning, part of speech, etymology, and/or standard usage
e. Apply knowledge of general academic and domain-specific words and phrases
f. Apply knowledge of Greek, Latin, and Anglo-Saxon roots and affixes to draw inferences concerning the meaning of scientific and mathematical terminology
g. Describe and explain cognitive elements of reading and writing processes (e.g., decoding and encoding, constructing meaning, recognizing and using text conventions of different genres)
h. Explain metacognitive strategies for making sense of text (e.g., pre-reading activities, predicting, questioning, word analysis, concept formation)

(~~English Language Arts Content Standards for California Public Schools, Grades 6–12, Reading: 1.0~~California's Common Core State Standards for English Language Arts, W.6–12.4–5, L.6–12.3–4)

~~**2.3 Literacy Studies**~~

~~a. Recognize the written and oral conventions of Standard English, and analyze the social implications of mastering them~~
~~b. Describe and explain cognitive elements of reading and writing processes (e.g., decoding and encoding, construction of meaning, recognizing and using text conventions of different genres)~~
~~c. Explain metacognitive strategies for making sense of text (e.g., pre-reading activities, predicting, questioning, word analysis, concept formation)~~

~~(English Language Arts Content Standards for California Public Schools, Grades 6-12, Reading: 1.0)~~

2.43 Grammatical Structures of English

a. Identify methods of sentence construction (e.g., sentence combining with coordinators and subordinators; sentence embedding and expanding with clausal and phrasal modifiers)
b. Analyze parts of speech and their distinctive structures and functions (e.g., noun phrases including count and noncount nouns and the determiner system; prepositions, adjectives, and adverbs; word transformations)
c. Describe the forms and functions of the English verb system (e.g., modals, verb complements, verbal phrases)
d. Recognize conventions of English orthography and changes in word meaning and pronunciation

(~~English Language Arts Content Standards for California Public Schools, Grade 8, Reading: 1.2~~California's Common Core State Standards for English Language Arts, L.6–12.1)

Domain 3. Composition and Rhetoric

Candidates demonstrate knowledge of the foundations and contexts of the composition and rhetoric contained in ~~the English Language Arts Content Standards for California Public Schools (1997),~~ California's Common Core State Standards for English Language Arts, Literacy in History/Social Studies, Science, and Technical Subjects (2010) ~~as outlined in~~and the Reading/Language Arts Framework for California Public Schools: Kindergarten Through Grade Twelve (~~1999~~2007) at a post secondary level of rigor. Candidates have both broad and deep conceptual knowledge of the subject matter. Candidates face dynamic challenges in the domains of oral and written communication. They must make appropriate use of current text-production technologies and develop ~~sensitivity to~~ awareness of patterns of communication used by ~~different~~diverse social and cultural groups. Candidates are competent writers and speakers who are able to communicate appropriately in various rhetorical contexts, using effective text structures, word choice, sentence options, standard usage conventions, and advanced research methods as needed. ~~The subject matter preparation program provides opportunities for c~~Candidates ~~to~~ develop skills and confidence in public speaking. Candidates will be able to:

3.1 Writ~~ten~~ing ~~Composing~~ Processes (Individual and Collaborative)

a. Reflect on and describe their own writing processes

b. Develop and strengthen writing as needed by freewriting, planning, ~~Investigate and apply alternative methods of prewriting, drafting, responding,~~ revising, editing, rewriting, or trying a new approach, focusing on what is most significant for a specific purpose and audience~~and evaluating~~

c. Clarify and record meaning ~~Employ such strategies as~~ using strategies such as creating graphic organizers, outlines, notes, charts, summaries, or précis ~~to clarify and record meaning~~

~~Integrate a variety of software applications (e.g., databases, graphics, spreadsheets) to produce print documents and multi-media presentations~~

(~~English Language Arts Content Standards for California Public Schools, Grade 6, Reading: 2.1-2, 2.4, Writing: 1.4-6; Grade 7, Reading: 2.3-4, Writing: 1.3-4, 1.6-7; Grade 8, Reading: 2.4, Writing: 1.1, 1.4-1.6, Listening and Speaking: 1.4; Grades 9-10, Reading: 2.4, Writing: 1.8-9; Grades 11-12, Writing: 1.4, 1.7-9, Listening and Speaking: 2.4~~California's Common Core State Standards for English Language Arts, W.6–12.5–6)

3.2 Text Types and Purposes ~~Rhetorical Features of Literary and Non-Literary, Oral and Written Texts~~

a. Recognize and use a variety of writing applications (e.g., argument, informative/explanatory text, narrative, ~~short story, biographical, autobiographical, expository, persuasive,~~ business and technical documents, historical investigation)
b. Demonstrate awareness of audience, purpose, and context
c. Recognize and use various text structures (e.g., narrative and non-narrative organizational patterns)
d. Apply a variety of methods to develop ideas within an essay (e.g., analogy, cause and effect, compare and contrast, definition, illustration, description, hypothesis)
e. Demonstrate the ability to write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence

~~e~~f. Apply rhetorical techniques~~critical thinking strategies~~ to develop arguments~~evaluate methods of persuasion~~, including ~~but not limited to:~~

~~- Types of appeal (e.g., a~~appeals to logic through inductive/deductive reasoning~~,~~ and appeals to emotion~~,~~ or ~~morality~~ethical belief~~)~~

~~-~~g. Demonstrate the ability to write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content~~Types of persuasive speech (e.g., propositions of fact, value, problem, policy)~~

~~- Logical fallacies (e.g., bandwagon, red herring, glittering generalities, ad hominem)~~
~~- Advertising techniques (e.g., Maslow's hierarchy of needs)~~
~~- Logical argument (e.g., inductive/deductive reasoning, syllogisms, analogies)~~
~~•Classical argument (e.g., claim, qualifiers, rules of evidence, warrant)~~

h. Use evidence from literary texts to support analysis and reflection and to compose creative and aesthetically compelling responses to literature

(~~English-Language Arts Content Standards for California Public Schools, Grade 6, Reading: 2.1-2, 2.4, 2.6, 2.8, Writing: 1.1-3, 1.6, 2.1-5, Listening and Speaking: 1.8-9; Grade 7, Reading: 1.3, 2.2-3, Writing: 1.1-3, 1.7, 2.1-5, Listening and Speaking: 1.1, 1.3; Grade 8, Reading: 1.3, 2.2, Writing: 1.1-3, 1.52.1-6, Listening and Speaking: 1.8; Grades 9-10, Writing: 1.1-2, 1.4, 1.9, 2.1-6, Listening and Speaking: 1.5, 1.10, 1.13; Grades 11-12, Reading: 1.3, 2.2, 2.4-6, Writing: 1.1-5, 1.9, 2.1-6, Listening and Speaking: 1.4, 1.12-13~~California's Common Core State Standards for English Language Arts, W.6–12.1–3)

3.3 Production and Distribution of Writing~~Rhetorical Effects of Grammatical Elements~~

a. Produce clear writing by e~~E~~mploying precise and extensive vocabulary and effective diction to control voice, style, and tone

b. Produce coherent writing by u~~U~~se~~e~~ing clause~~-~~–joining techniques (e.g., coordinators, subordinators, punctuation) to express logical connections between ideas

c. Identify and use clausal and phrasal modifiers to control flow, pace, and emphasis (e.g., adjective clauses, appositives, participles and verbal phrases, absolutes)

d. Identify and use devices to control focus in sentence and paragraph (e.g., active and passive voice, expletives, concrete subjects, transitional phrases)

e. ~~Maintain coherence through use of cohesive devices~~Demonstrate the ability to use technology, including the Internet, to produce, publish, and update individual or shared writing products

(~~English-Language Arts Content Standards for California Public Schools, Grade 6, Reading: 1.1, Writing: 1.2, 1.6, Written and Oral English Language Conventions: 1.1-5; Grade 7, Writing: 1.1, 1.7, Written and Oral English Language Conventions: 1.1-7; Grade 8, Writing: 1.2, 1.6, Written and Oral English Language Conventions: 1.1-6, Listening and Speaking: 1.5-6; Grades 9-10, Writing: 1.1-2, 1.6, 1.9, Written and Oral English Language Conventions: 1.1-5; Grades 11-12, Reading: 2.1-2, Writing: 1.2-5, 1.9, Written and Oral English Language Conventions: 1.1-3, Listening and Speaking: 1.5~~California's Common Core State Standards for English Language Arts, W.6–12.4–6)

3.4 Conventions of Oral and Written Language

a. Apply knowledge of linguistic structure to identify and use the conventions of ~~S~~standard ~~Edited~~ English

b. Recognize, understand, and use a range of conventions in both spoken and written English, including:

- Conventions of effective sentence structure (e.g., clear pronoun reference, parallel structure, appropriate verb tense)
- Preferred usage (e.g., verb/subject agreement, pronoun agreement, idioms)
- ~~Conventions of pronunciation and intonation~~
- Conventional forms of spelling
- Capitalization and punctuation

c. Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate

(~~English Language Arts Content Standards for California Public Schools, Grade 6, Reading: 1.1, Written and Oral English Language Conventions: 1.1-5: Grade 7, Written and Oral English Language Conventions: 1.1-7; Grade 8, Writing: 1.2, Written and Oral English Language Conventions: 1.1-6, Listening and Speaking: 1.6: Grades 9-10, Writing: 1.9, Written and Oral English Language Conventions: 1.9; Grades 11-12, Writing: 1.4, Written and Oral English Language Conventions: 1.1-3, Listening and Speaking: 1.8~~California's Common Core State Standards for English Language Arts, L.6–12.1–3)

3.5 Research ~~Strategies~~to Build and Present Knowledge

a. Demonstrate knowledge of strategies for d~~D~~eveloping and applying research questions
b. Demonstrate knowledge of methods of inquiry and investigation
c. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and knowledge;~~Identify and use multiple resources (e.g., oral, print, electronic; primary and secondary),~~ and critically evaluate the quality of the sources
d. Interpret and apply findings
e. Integrate information into a written text selectively to maintain the flow of ideas, ~~Use~~avoiding plagiarism and overreliance on any one source and following professional conventions and ethical standards of citation and attribution, including footnotes and endnotes

~~f.Demonstrate effective presentation methods, including multi-media formats~~

(~~English-Language Arts Content Standards for California Public Schools, Grade 6, Reading: 1.1, 2.1, 2.3, 2.6-8, Writing: 1.4-5, Listening and Speaking: 1.1-2, 1.6-7, 2.1, 2.3; Grade 7, Reading: 2.2, 2.6, Writing: 1.4-5, Listening and Speaking: 1.2, 1.6-7, 2.1, 2.3; Grade 8, Reading: 2.2, 2.7, Writing: 1.3-6, Listening and Speaking: 1.2-3, 1.6-8, 2.3; Grades 9-10, Reading: 2.2-5, 2.8, Writing: 1.3-8, Listening and Speaking: 1.7, 2.2; Grades 11-12, Writing: 1.4, 1.6-8, Listening and Speaking: 2.4~~California's Common Core State Standards for English Language Arts, W.6–12.7–8)

Domain 4. Communications: Speech, Media, and Creative Performance

Candidates demonstrate knowledge of the foundations and contexts of the speech, media, and creative performance contained in ~~the English-Language Arts Content Standards for California Public Schools (1997),~~ California's Common Core State Standards for English Language Arts, Literacy in History/Social Studies, Science, and Technical Subjects (2010) ~~as outlined in~~and the Reading/Language Arts Framework for California Public Schools: Kindergarten Through Grade Twelve (~~1999~~2007) at a post-secondary level of rigor. Candidates have both broad and deep conceptual knowledge of the subject matter. The Reading/Language Arts Framework for California Public Schools (~~1999~~2007) puts consistent emphasis on analysis and evaluation of oral and media communication as well as on effective public speaking and performance. The candidate must possess the breadth of knowledge needed to integrate journalism, technological media, speech, and dramatic performance~~, and creative writing~~ into the language arts curriculum, including ~~sensitivity to~~awareness of cultural approaches to communication. ~~The subject matter preparation program should include opportunities for candidates to obtain knowledge and experience in these areas.~~ The candidate skillfully applies the artistic and aesthetic tools ~~and sensitivities~~ required for creative expression. Candidates will be able to:

4.1 ~~Oral~~Non-Written Communication ~~Processes~~

a. Identify features of, and deliver oral performance in, a variety of forms (e.g., impromptu, extemporaneous, persuasive, expository, interpretive, debate)

b. Demonstrate ~~and evaluate individual~~knowledge of performance skills (e.g., diction, clear enunciation, vocal rate, range, pitch, and volume~~,~~; ~~body language~~gestures and posture~~,~~; appropriate eye contact~~,~~; response to audience)

c. Articulate principles of speaker/audience interrelationship (e.g., interpersonal communication, group dynamics, public address)

d. Evaluate a speaker's point of view, reasoning and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone

~~d~~e. Identify and demonstrate collaborative communication skills in ~~a~~ discussions (e.g., one on one, in groups, teacher led) and in a variety of roles (e.g., listening supportively, facilitating, synthesizing, stimulating higher level critical thinking through inquiry)

f. Present information, findings, and supporting evidence (e.g., reflective, historical investigation, response to literature presentations), conveying a clear and distinct perspective and a logical argument, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks

g. Demonstrate knowledge of skills needed for planning and delivering a reflective narrative that explores the significance of a personal experience, event, or concern; uses sensory language to convey a vivid picture; includes appropriate narrative techniques (e.g., dialogue, pacing, description); and draws comparisons between the specific incident and broader themes

h. Demonstrate knowledge of skills needed for planning and presenting an argument that supports a precise claim; provides a logical sequence for claims, counterclaims, and evidence; uses rhetorical devices to support assertions (e.g., analogy, appeal to logic through reasoning, appeal to emotion or ethical belief); uses varied syntax to link major sections of the presentation to create cohesion and clarity; and provides a concluding statement that supports the argument presented

(~~English-Language Arts Content Standards for California Public Schools, Grade 6, Reading: 1.1, Listening and Speaking: 1.1-8, 2.0; Grade 7, Listening and Speaking: 1.1-7, 2.0; Grade 8, Listening and Speaking: 1.1-8, 2.0; Grades 9-10, Listening and Speaking: 1.1, 1.3-6, 1.8-13, 2.0; Grades 11-12, Reading: 2.6, Listening and Speaking: 1.4-6, 1.8-13, 2.0~~California's Common Core State Standards for English Language Arts, SL.6–12.1, SL.6–12.3–5)

4.2 Media Analysis ~~and Journalistic~~ and Applications

a. Analyze the impact on society of a variety of media forms (e.g., television, advertising, radio, ~~i~~Internet, film)

b. Recognize and evaluate strategies used by ~~the~~ media to inform, persuade, entertain, and transmit culture, including rhetorical techniques such as logical fallacies, appeals to emotion, and analogies

c. Analyze persuasive speech in media and understand the patterns of organization and the use of persuasive language, reasoning, and proof

~~c~~d. Identify aesthetic effects of a media presentation

e. Integrate multiple sources of information presented in diverse media and formats (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data

f. Demonstrate knowledge of how to make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest

~~d. Demonstrate effective and creative application of these strategies and techniques to prepare presentations using a variety of media forms and visual aids~~

(~~English-Language Arts Content Standards for California Public Schools, Grade 6, Reading: 2.1-2, 2.6, Listening and Speaking: 1.9; Grade 7, Reading: 2.1, Listening and Speaking: 1.8-9; Grade 8, Reading: 2.1, 2.3, Listening and Speaking: 1.8-9; Grades 9-10, Reading: 2.1, Listening and Speaking: 1.1-2, 1.7, 1.9, 1.14; Grades 11-12, Reading: 2.1, Writing: 2.6, Listening and Speaking: 1.1-4, 1.9, 1.14, 2.4;~~ Visual and Performing Arts Content Standards for California Public Schools, Theatre, Grades 6–12, 5.0: Connections, Relationships, Applications; California's Common Core State Standards for English Language Arts, SL.6–12.2, SL.6–12.5)

4.3 Dramatic Performance

a. Describe and use a range of rehearsal strategies to effectively mount a production (e.g., teambuilding, scheduling, organizing resources, setting priorities, memorization techniques, improvisation, physical and vocal exercises)

b. Employ basic elements of character analysis and approaches to acting, including physical and vocal techniques, that reveal character and relationships

c. ~~Demonstrate basic knowledge of the language of visual composition and principles of theatrical design (e.g., set, costume, lighting, sound, props)~~Analyze dramatic works and use textual evidence to inform play production choices (e.g., direction, lighting, sound, costumes, scenery)

d. Apply fundamentals of stage directing, including conceptualization, blocking (movement patterns), tempo, and dramatic arc (rising and falling action)

e. Demonstrate facility in a variety of oral performance traditions (e.g., storytelling, epic poetry, recitation)

(~~English-Language Arts Content Standards for California Public Schools, Grade 6, Listening and Speaking: 2.1, 2.3; Grade 7, Listening and Speaking: 2.1; Grade 8, Listening and Speaking: 1.1, 2.1-2, 2.5; Grades 9-10, Listening and Speaking: 2.1, 2.4; Grades 11-12, Listening and Speaking: 1.7, 1.9-10, 2.5;~~ Visual and Performing Arts Content Standards for

California Public Schools, Theatre, Grades 6–12, 1.0: Artistic Perception, 2.0: Creative Expression, 3.0: Historical and Cultural Context, 4.0: Aesthetic Valuing)

~~**4.4 Creative Writing**~~

~~a. Demonstrate facility in creative composition in a variety of genres (e.g., poetry, stories, plays, film)~~

~~b. Understand and apply processes and techniques that enhance the impact of the creative writing product (e.g., workshopping; readings; recasting of genre, voice, perspective)~~

~~c. Demonstrate skill in composing creative and aesthetically compelling responses to literature~~

~~(English Language Arts Content Standards for California Public Schools, Grade 6-12, Writing: 2.1)~~

Mathematics Subject Matter Requirements

Part I: Content Domains for Subject Matter Understanding and Skill in Mathematics

Domain 1. Algebra

Candidates demonstrate an understanding of the foundations of ~~the~~ algebra ~~contained in the Mathematics Content Standards for California Public Schools (1997)~~ as outlined in ~~the Mathematics Framework for California Public Schools: Kindergarten Through Grade Twelve (1999) from an advanced standpoint~~California's Common Core Content Standards for Mathematics (Grade 7, Grade 8, and High School). Candidates demonstrate a depth and breadth of conceptual knowledge ~~T~~to ensure a rigorous view of algebra and its underlying structures~~, candidates have a deep conceptual knowledge~~. They are skilled at symbolic reasoning and use algebraic skills and concepts to model a variety of problem-solving situations. They understand the power of mathematical abstraction and symbolism.

1.1 Algebraic Structures

a. ~~Know~~ Demonstrate knowledge of why the real and complex numbers are each a field, and that particular rings are not fields (e.g., integers, polynomial rings, matrix rings)
b. Apply basic properties of real and complex numbers in constructing mathematical arguments (e.g., if $a < b$ and $c < 0$, then $ac > bc$)
c. ~~Know~~ Demonstrate knowledge that the rational numbers and real numbers can be ordered and that the complex numbers cannot be ordered, but that any polynomial equation with real coefficients can be solved in the complex field
d. Identify and translate between equivalent forms of algebraic expressions and equations using a variety of techniques (e.g., factoring, applying properties of operations)
e. Justify the steps in manipulating algebraic expressions and solving algebraic equations and inequalities
f. Represent situations and solve problems using algebraic equations and inequalities

(~~Mathematics Content Standards for California Public Schools, Grade 6, Number Sense: 1.0, 2.0; Grade 7, Algebra and Functions: 1.0; Algebra I: 1.0, 3.0-7.0, 9.0-15.0, 24.0, 25.0; Geometry: 1.0, 17.0; Algebra II: 1.0-8.0, 11.0, 24.0, 25.0; Trigonometry: 17.0; Mathematical Analysis: 2.0; Linear Algebra: 9.0, 11.0;~~ California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: The Real Number System, High School [N-RN]; The Complex Number System, High School [N-CN]; Seeing Structure in Expressions, High School [A-SSE]; Reasoning with Equations and Inequalities, High School [A-REI]; Creating Equations, High School [A-CED])

1.2 Polynomial Equations and Inequalities

~~a.Know why graphs of linear inequalities are half planes and be able to apply this fact (e.g., linear programming)~~

~~b.Prove and use the following:~~

- ~~The Rational Root Theorem for polynomials with integer coefficients~~
- ~~The Factor Theorem~~
- ~~The Conjugate Roots Theorem for polynomial equations with real coefficients~~
- ~~The Quadratic Formula for real and complex quadratic polynomials~~
- ~~The Binomial Theorem~~

~~c.~~a. Analyze and solve polynomial equations with real coefficients using~~ the Fundamental Theorem of Algebra~~:

- ♦ the Fundamental Theorem of Algebra
- ♦ the Rational Root Theorem for polynomials with integer coefficients
- ♦ the Conjugate Root Theorem for polynomial equations with real coefficients
- ♦ the Binomial Theorem

b. Prove and use the Factor Theorem and the quadratic formula for real and complex quadratic polynomials

c. Solve polynomial inequalities

(~~Mathematics Content Standards for California Public Schools, Grade 7, Algebra and Functions: 2.0-4.0; Algebra I: 1.0, 2.0, 4.0-10.0, 12.0-15.0, 17.0-23.0; Algebra II: 2.0-11.0, 16.0, 17.0; Trigonometry: 17.0, 18.0; Mathematical Analysis: 4.0, 6.0;~~ California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: Reasoning with Equations and Inequalities, High School [A-REI]; Arithmetic with Polynomials and Rational Expressions, High School [A-APR]; Linear, Quadratic, and Exponential Models, High School [F-LE])

1.3 Functions

a. Analyze ~~and prove~~ general properties of functions (i.e., domain and range, one-to-one, onto, inverses, composition, and differences between relations and functions) and apply arithmetic operations on functions

b. Analyze properties of linear functions (e.g., slope, intercepts) using a variety of representations

c. Demonstrate knowledge of why graphs of linear inequalities are half planes and be able to apply this fact

~~b.~~d. Analyze properties of polynomial, rational, radical, and absolute value functions in a variety of ways (e.g., graphing, solving problems)

e. Analyze properties of exponential and logarithmic functions in a variety of ways (e.g., graphing, solving problems)

f. Model and solve problems using nonlinear functions

(~~Mathematics Content Standards for California Public Schools, Grade 6, Algebra and Functions: 1.0; Grade 7, Number Sense: 1.0, 2.0; Algebra and Functions: 3.0; Algebra I: 3.0-6.0, 10.0, 13.0, 15.0-18.0, 21.0-23.0; Algebra II: 1.0-4.0, 6.0-17.0, 24.0, 25.0; Trigonometry: 2.0, 4.0-8.0, 19.0; Mathematical Analysis: 6.0, 7.0; Calculus: 9.0;~~ California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: Interpreting Functions, High School [F-IF]; Building

Functions, High School [F-BF]; Linear, Quadratic, and Exponential Models, High School [F-LE])

1.4 Linear Algebra

a. Understand and apply the geometric interpretation and basic operations of vectors in two and three dimensions, including their scalar multiples ~~and scalar (dot) and cross products~~
b. Prove the basic properties of vectors (e.g., perpendicular vectors have zero dot product)
c. Understand and apply the basic properties and operations of matrices and determinants (e.g., to determine the solvability of linear systems of equations)
d. Analyze the properties of proportional relationships, lines, linear equations, and their graphs, and the connections between them
e. Model and solve problems using linear equations, pairs of simultaneous linear equations, and their graphs

(~~Mathematics Content Standards for California Public Schools, Algebra I: 9.0; Algebra II: 2.0; Mathematical Analysis: 1.0; Linear Algebra: 1.0-12.0;~~ California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: Vector and Matrix Quantities, High School [N-VM]; Expressions and Equations, Grade 8; Linear, Quadratic, and Exponential Models, High School [F-LE]; Ratios and Proportional Relationships, Grade 7 [7.RP])

Domain 2. Geometry

Candidates demonstrate an understanding of the foundations of ~~the~~ geometry ~~contained in the Mathematics Content Standards for California Public Schools (1997)~~ as outlined ~~in the Mathematics Framework for California Public Schools: Kindergarten Through Grade Twelve (1999) from an advanced standpoint~~in California's Common Core Content Standards for Mathematics (Grade 7, Grade 8, and High School). Candidates demonstrate a depth and breadth of conceptual knowledge ~~T~~to ensure a rigorous view of geometry and its underlying structures~~, candidates have a deep conceptual knowledge~~. They demonstrate an understanding of axiomatic systems and different forms of logical arguments. Candidates understand, apply, and prove theorems relating to a variety of topics in two- and three-dimensional geometry.

~~**2.1 Parallelism**~~

~~a.Know the Parallel Postulate and its implications, and justify its equivalents (e.g., the Alternate Interior Angle Theorem, the angle sum of every triangle is 180 degrees)~~
~~b.Know that variants of the Parallel Postulate produce non-Euclidean geometries (e.g., spherical, hyperbolic)~~

~~(Mathematics Content Standards for California Public Schools, Algebra I: 8.0, 24.0; Geometry: 1.0-3.0, 7.0, 13.0)~~

2.~~2~~1 Plane Euclidean Geometry

a. Apply the Parallel Postulate and its implications and justify its equivalents (e.g., the Alternate Interior Angle Theorem, the angle sum of every triangle is 180 degrees)

b. Demonstrate knowledge of complementary, supplementary, and vertical angles

~~a.~~c. Prove theorems, justify steps, and solve problems involving similarity and congruence

~~b.~~d. ~~Understand, a~~Apply~~,~~ and justify properties of triangles (e.g., the Exterior Angle Theorem, concurrence theorems, trigonometric ratios, ~~T~~triangle ~~I~~inequality, Law of Sines, Law of Cosines, the Pythagorean Theorem and its converse)

~~c.~~e. ~~Understand, a~~Apply~~,~~ and justify properties of polygons and circles from an advanced standpoint (e.g., derive the area formulas for regular polygons and circles from the area of a triangle)

~~d.~~f. Identify and ~~J~~justify ~~and perform~~ the classical constructions (e.g., angle bisector, perpendicular bisector, replicating shapes, regular ~~n-gons~~polygons ~~for n equal to~~with 3, 4, 5, 6, and 8 sides)

(California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: Geometry, Grade 7 [7.G]; Geometry, Grade 8; Congruence, High School [G-CO]; Similarity, Right Triangles, and Trigonometry, High School [G-SRT]; Circles, High School [G-C]; Geometric Measurement and Dimension, High School [G-GMD])

2.2 Coordinate Geometry

~~c.~~a. Use techniques in coordinate geometry to prove geometric theorems

b. Model and solve mathematical and real-world problems by applying geometric concepts to two-dimensional figures

c. Translate between the geometric description and the equation for a conic section

d. Translate between rectangular and polar coordinates and apply polar coordinates and vectors in the plane

(~~Mathematics Content Standards for California Public Schools, Grade 6, Algebra and Functions: 2.0, 3.0; Measurement and Geometry: 2.0; Grade 7, Measurement and Geometry: 1.0-3.0; Algebra I: 8.0, 24.0; Geometry: 1.0-6.0, 8.0-16.0, 18.0-21.0; Algebra II: 16.0, 17.0; Trigonometry: 12.0-14.0, 18.0, 19.0; Mathematical Analysis: 5.0;~~ California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: Geometry, Grade 8; Expressing Geometric Properties with Equations, High School [G-GPE]; Geometric Measurement and Dimension, High School [G-GMD]; Modeling with Geometry, High School [G-MG]; Polar Coordinates and Curves, High School)

2.3 Three-Dimensional Geometry

a. Demonstrate ~~an understanding of parallelism and perpendicularity of lines and planes in three dimensions~~knowledge of the relationships between lines and planes in three dimensions (e.g., parallel, perpendicular, skew, coplanar lines)

b. ~~Understand, a~~Apply~~,~~ and justify properties of three-dimensional objects ~~from an advanced standpoint~~ (e.g., ~~derive~~ the volume and surface area formulas for prisms, pyramids, cones, cylinders, ~~and~~ spheres)

c. Model and solve mathematical and real-world problems by applying geometric concepts to three-dimensional figures

(~~Mathematics Content Standards for California Public Schools, Grade 6, Measurement and Geometry: 1.0; Grade 7, Measurement and Geometry: 2.0; Algebra I: 24.0; Geometry: 2.0, 3.0, 12.0, 17.0; Mathematical Analysis: 5.0;~~ California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: Congruence, High School [G-CO]; Similarity, Right Triangles, and Trigonometry, High School [G-SRT]; Geometric Measurement and Dimension, High School [G-GMD]; Modeling with Geometry, High School [G-MG])

2.4 Transformational Geometry

a. Demonstrate ~~an understanding of the basic properties~~knowledge of isometries in two- and three-dimensional space (e.g., rotation, translation, reflection), including their basic properties in relation to congruence

b. ~~Understand and prove the basic properties of~~ Demonstrate knowledge of dilations (e.g., similarity transformations or change ~~of scale~~in scale factor), including their basic properties in relation to similarity, volume, and area

(~~Mathematics Content Standards for California Public Schools, Geometry: 11.0, 22.0;~~ California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: Geometry, Grade 8; Congruence, High School [G-CO])

Domain 3. Number ~~Theory~~and Quantity

Candidates demonstrate an understanding of ~~the~~ number theory and a command of ~~the~~ number sense ~~contained in the Mathematics Content Standards for California Public Schools (1997)~~ as outlined ~~in the Mathematics Framework for California Public Schools: Kindergarten Through Grade Twelve (1999) from an advanced standpoint~~in California's Common Core Content Standards for Mathematics (Grade 6, Grade 7, Grade 8, and High School). Candidates demonstrate a depth and breadth of conceptual knowledge ~~T~~to ensure a rigorous view of number theory and its underlying structures~~, candidates have a deep conceptual knowledge~~. They prove and use properties of natural numbers. They formulate conjectures about the natural numbers using inductive reasoning, and verify conjectures with proofs.

3.1 The Real and Complex Number Systems

a. Demonstrate knowledge of the properties of the real number system and of its subsets
b. Perform operations and recognize equivalent expressions using various representations of real numbers (e.g., fractions, decimals, exponents)
c. Solve real-world and mathematical problems using numerical and algebraic expressions and equations
d. Apply proportional relationships to model and solve real-world and mathematical problems
e. Reason quantitatively and use units to solve problems (i.e., dimensional analysis)
f. Perform operations on complex numbers and represent complex numbers and their operations on the complex plane

(California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: The Number System, Grade 7 [7.NS]; The Real Number System, Grade 8; Quantities, High School [N-Q]; Expressions and Equations, Grade 7 [7.EE]; Ratios and Proportional Relationships, Grade 7 [7.RP]; The Real Number System, High School [N-RN]; The Complex Number System, High School [N-CN])

3.~~1~~2 ~~Natural Numbers~~Number Theory

a. Prove and use basic properties of natural numbers (e.g., properties of divisibility)
b. Use the ~~P~~principle of ~~M~~mathematical ~~I~~induction to prove results in number theory
c. ~~Know and a~~Apply the Euclidean Algorithm
d. Apply the Fundamental Theorem of Arithmetic (e.g., find the greatest common factor and the least common multiple~~,~~; show that every fraction is equivalent to a unique fraction where the numerator and denominator are relatively prime~~,~~; prove that the square root of any number, not a perfect square number, is irrational)

(~~Mathematics Content Standards for California Public Schools, Grade 6, Number Sense: 2.0; Grade 7, Number Sense: 1.0; Algebra I: 1.0, 2.0, 12.0, 24.0, 25.0; Geometry: 1.0; Algebra II: 21.0, 23.0, 25.0; Mathematical Analysis: 3.0~~California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: The Number System, Grade 6 [6.NS])

Domain 4. Probability and Statistics

Candidates demonstrate an understanding of ~~the~~ statistics and probability distributions ~~for advanced placement statistics contained in the Mathematics Content Standards for California Public Schools (1997)~~ as outlined ~~in the Mathematics Framework for California Public Schools: Kindergarten Through Grade Twelve (1999) from an advanced standpoint~~in California's Common Core Content Standards for Mathematics (Grade 7, Grade 8, and High School). Candidates demonstrate a depth and breadth of conceptual knowledge ~~T~~to ensure a rigorous view of probability and statistics and their underlying structures~~, candidates have a deep conceptual knowledge~~. They solve problems and make inferences using statistics and probability distributions.

4.1 Probability

a. Prove and apply basic principles of permutations and combinations
b. Illustrate finite probability using a variety of examples and models (e.g., the fundamental counting principles, sample space)
c. Use and explain the concepts of conditional probability and independence
d. Compute and i~~I~~nterpret the probability of an outcome, including the probabilities of compound events in a uniform probability model
e. Use normal, binomial, and exponential distributions to solve and interpret probability problems
f. Calculate expected values and use them to solve problems and evaluate outcomes of decisions

(~~Mathematics Content Standards for California Public Schools, Grade 6, Statistics, Data Analysis, and Probability: 3.0; Algebra II: 18.0-20.0; Probability and Statistics: 1.0-4.0; Advanced Probability and Statistics: 1.0-4.0, 7.0, 9.0, 17.0, 18.0;~~ California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: Statistics and Probability, Grade 7 [7.SP]; Conditional Probability and the Rules of Probability, High School [S-CP]; Using Probability to Make Decisions, High School [S-MD])

4.2 Statistics

a. Compute and interpret the mean~~,~~ and median~~, and mode~~ of both discrete and continuous distributions
b. Compute and interpret quartiles, range, ~~variance~~interquartile range, and standard deviation of both discrete and continuous distributions
c. Select and evaluate sampling methods appropriate to a task (e.g., random, systematic, cluster, convenience sampling) and display the results
d. ~~Know the method of least squares and a~~Apply ~~it~~ the method of least squares to linear regression~~ and correlation~~
e. ~~Know and a~~Apply the chi-square test
f. Interpret scatter plots for bivariate data to investigate patterns of association between two quantities (e.g., correlation), including the use of linear models
g. Interpret data on a single count or measurement variable presented in a variety of formats (e.g., dot plots, histograms, box plots)
h. Demonstrate knowledge of P-values and hypothesis testing
i. Demonstrate knowledge of confidence intervals

(~~Mathematics Content Standards for California Public Schools, Grade 6, Statistics, Data Analysis, and Probability: 1.0, 2.0; Grade 7, Statistics, Data Analysis, and Probability: 1.0; Probability and Statistics: 5.0-7.0; Advanced Probability and Statistics: 4.0-6.0, 8.0, 10.0-13.0, 15.0-17.0, 19.0;~~ California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: Statistics and Probability, Grade 8; Interpreting Categorical and Quantitative Data, High School [S-ID])

Domain 5. Calculus

Candidates demonstrate an understanding of ~~the~~ trigonometry and calculus ~~contained in the Mathematics Content Standards for California Public Schools (1997)~~ as outlined ~~in the Mathematics Framework for California Public Schools: Kindergarten Through Grade Twelve (1999) from an advanced standpoint~~in California's Common Core Content Standards for Mathematics (~~Grade 7, Grade 8, and~~ High School). Candidates demonstrate a depth and breadth of conceptual knowledge ~~T~~to ensure a rigorous view of trigonometry and calculus and their underlying structures~~, candidates have a deep conceptual knowledge~~. They apply the concepts of trigonometry and calculus to solving problems in real-world situations.

5.1 Trigonometry

a. Prove that the Pythagorean Theorem is equivalent to the trigonometric identity $\sin^2 x + \cos^2 x = 1$ and that this identity leads to $1 + \tan^2 x = \sec^2 x$ and $1 + \cot^2 x = \csc^2 x$
b. Prove and apply the sine, cosine, and tangent sum formulas for all real values~~, and derive special applications of the sum formulas (e.g., double angle, half angle)~~
c. Analyze properties of trigonometric functions in a variety of ways (e.g., graphing and solving problems, using the unit circle)
d. ~~Know and a~~Apply the definitions and properties of inverse trigonometric functions (i.e., arcsin, arccos, and arctan)
e. ~~Understand and a~~Apply polar representations of complex numbers (e.g., DeMoivre's Theorem)
f. Model periodic phenomena with periodic functions

g. Recognize equivalent identities, including applications of the half-angle and double-angle formulas for sines and cosines

(~~Mathematics Content Standards for California Public Schools, Algebra I: 24.0; Geometry: 3.0, 14.0, 18.0, 19.0; Algebra II: 24.0, 25.0; Trigonometry: 1.0-6.0, 8.0-11.0, 19.0; Mathematical Analysis: 1.0, 2.0; Calculus: 18.0, 20.0;~~ California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: Trigonometric Functions, High School [F-TF])

5.2 Limits and Continuity

a. Derive basic properties of limits and continuity, including the Sum, Difference, Product, Constant Multiple, and Quotient Rules, using the formal definition of a limit
b. Show that a polynomial function is continuous at a point
c. ~~Know and a~~Apply the ~~I~~intermediate ~~V~~value ~~T~~theorem, using the geometric implications of continuity

(~~Mathematics Content Standards for California Public Schools, Algebra I: 24.0; Geometry: 3.0; Algebra II: 1.0, 15.0; Mathematical Analysis: 8.0; Calculus: 1.0-4.0~~California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: Calculus Standards, High School)

5.3 Derivatives and Applications

a. Derive the rules of differentiation for polynomial, trigonometric, and logarithmic functions using the formal definition of derivative
b. Interpret the concept of derivative geometrically, numerically, and analytically (i.e., slope of the tangent, limit of difference quotients, extrema, Newton's method, and instantaneous rate of change)
c. Interpret both continuous and differentiable functions geometrically and analytically and apply Rolle's ~~T~~theorem, the ~~M~~mean ~~V~~value ~~T~~theorem, and L'H~~o~~ôpital's rule
d. Use the derivative to solve rectilinear motion, related rate, and optimization problems
e. Use the derivative to analyze functions and planar curves (e.g., maxima, minima, inflection points, concavity)
f. Solve separable first-order differential equations and apply them to growth and decay problems

(~~Mathematics Content Standards for California Public Schools, Algebra I: 5.0-8.0, 10.0, 11.0, 13.0, 21.0, 23.0; Geometry: 3.0; Algebra II: 1.0, 9.0, 10.0, 12.0, 15.0; Trigonometry: 7.0, 15.0-19.0; Mathematical Analysis: 5.0, 7.0; Calculus: 1.0, 4.0-12.0, 27.0~~California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: Calculus Standards, High School)

5.4 Integrals and Applications

a. Derive definite integrals of standard algebraic functions using the formal definition of integral
b. Interpret the concept of a definite integral geometrically, numerically, and analytically (e.g., limit of Riemann sums)
c. Prove the ~~F~~fundamental ~~T~~theorem of ~~C~~calculus, and use it to interpret definite integrals as antiderivatives
d. Apply the concept of integrals to compute the length of curves and the areas and volumes of geometric figures

(~~Mathematics Content Standards for California Public Schools, Algebra I: 24.0; Geometry: 9.0; Calculus: 13.0-23.0~~California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: Calculus Standards, High School)

5.5 Sequences and Series

a. Derive and apply the formulas for the sums of finite arithmetic series and finite and infinite geometric series (e.g., express repeating decimals as a rational number)
b. Determine convergence of a given sequence or series using standard techniques (e.g., ~~R~~ratio, ~~C~~comparison, ~~I~~integral ~~T~~tests)
c. Calculate Taylor series and Taylor polynomials of basic functions

(~~Mathematics Content Standards for California Public Schools, Algebra I: 24.0, 25.0; Algebra II: 21.0-23.0; Mathematical Analysis: 8.0; Calculus: 23.0-26.0~~California's Common Core Content Standards for Mathematics, including Standards for Mathematical Practice 1–8: Seeing Structure in Expressions, High School [A-SSE]; Calculus Standards, High School)

~~Domain 6. History of Mathematics~~

~~Candidates understand the chronological and topical development of mathematics and the contributions of historical figures of various times and cultures. Candidates know important mathematical discoveries and their impact on human society and thought. These discoveries form a historical context for the content contained in the Mathematics Content Standards for California Public Schools (1997) as outlined in the Mathematics Framework for California Public Schools: Kindergarten Through Grade Twelve (1999; e.g., numeration systems, algebra, geometry, calculus).~~

~~6.1 Chronological and Topical Development of Mathematics~~

~~a. Demonstrate understanding of the development of mathematics, its cultural connections, and its contributions to society~~
~~b. Demonstrate understanding of the historical development of mathematics, including the contributions of diverse populations as determined by race, ethnicity, culture, geography, and gender~~

Part II: Subject Matter Skills and Abilities Applicable to the Content Domains in Mathematics

Candidates for Single Subject Teaching Credentials in mathematics use inductive and deductive reasoning to develop, analyze, draw conclusions, and validate conjectures and arguments. As they reason both abstractly and quantitatively, they use counterexamples, construct proofs using contradictions, construct viable arguments, and critique the reasoning of others. They ~~and~~ create multiple representations of the same concept. They know the interconnections among mathematical ideas, ~~and~~ use appropriate tools strategically, and apply techniques and concepts from different domains and sub-domains to model the same problem. They explain mathematical interconnections with other disciplines. They are able to communicate their mathematical thinking clearly and coherently to others, orally, graphically, and in writing~~, through~~. They attend to precision, including the use of precise language and symbols.

Candidates ~~solve~~ make sense of routine and complex problems, solving them by ~~drawing~~ selecting from a variety of strategies. They look for and make use of structure while demonstrating ~~an attitude of~~ persistence and reflection in their approaches. They analyze problems through pattern recognition, look for and express regularity in repeated reasoning, and ~~the~~ use ~~of~~ analogies. They formulate and prove conjectures, and test conclusions for reasonableness and accuracy. They use counterexamples to disprove conjectures.

Candidates select and use different representational systems (e.g., coordinates, graphs). They understand the usefulness of transformations and symmetry to help analyze and simplify problems. They ~~make mathematical~~ model~~s~~ with mathematics to analyze mathematical structures in real contexts. They use spatial reasoning to model and solve problems that cross disciplines.

(~~Mathematics Content Standards for California Public Schools, Grade 6, Mathematical Reasoning: 1.0–3.0; Grade 7, Mathematical Reasoning: 1.0–3.0;~~ California's Common Core Content Standards for Mathematics [Grade 7, Grade 8, and High School], including Standards for Mathematical Practice 1–8)