



Understanding Our Elementary Content Standard

The program ensures that teacher candidates have the broad content preparation necessary to teach to increasingly rigorous state standards.

WHY THIS STANDARD?

Elementary teachers usually teach across multiple subjects, meaning that candidates must be themselves broadly educated to meet the needs of today's increasingly rigorous classroom. The importance of broad subject matter knowledge (literature and composition, history and geography, science, and fine arts) has gained even more urgency with the advent of increasingly rigorous state English Language Arts standards, which will demand that teachers cover a wide variety of nonfiction topics.

WHAT IS THE FOCUS OF THE STANDARD?

At the undergraduate level, required coursework is examined to ascertain the breadth and depth of the subject matter instruction candidates receive. At the graduate level, the transcript review process is examined to check that the program identifies and addresses any content gaps that incoming candidates might have. Programs meeting the "strong design" indicator ensure that candidates are grounded in the fine arts as well as all other requisite subjects.

Standard applies to: Elementary programs.

Standard and Indicators

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Rationale

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The rationale summarizes research about this standard. The rationale also describes practices in the United States and other countries related to this standard, as well as support for this standard from school leaders, superintendents, and other education personnel.

Methodology

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The methodology describes the process NCTQ uses to score institutions of higher education on this standard. It explains the data sources, analysis process, and how the standard and indicators are operationalized in scoring.

Research Inventory

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The research inventory cites the relevant research studies on topics generally related to this standard. Not all studies in the inventory are directly relevant to the specific indicators of the standard, but rather they are related to the broader issues that the standard addresses. Each study is reviewed and categorized based on the strength of its methodology and whether it measures student outcomes. The strongest "green cell" studies are those that both have a strong design and measure student outcomes.

Standard and Indicators

Standard 6: Elementary Content

The program ensures that teacher candidates have the broad content preparation necessary to teach to increasingly rigorous state student learning standards.

Standard applies to: Elementary programs.

To be effective, elementary school teachers have always needed to have solid, wide-ranging knowledge on many subjects. With the advent of more rigorous state standards, the bar for elementary teachers' content preparation has only been raised higher. Traditional state "English Language Arts" standards, which in many states were agnostic about content knowledge, are being replaced with far more rigorous standards that demand that students (and hence their teachers) have background knowledge across all subject areas, including topics in history, social science, and science.

Given the content deficiencies with which many high school graduates, including teacher candidates, enter college, it is imperative that a teacher preparation program clearly articulates its expectation that applicants demonstrate their content mastery before admission, through either appropriate content tests or coursework.

Indicator relating to outcomes that the program meets the standard at the undergraduate or graduate level:

- 6.1** The institution requires as a condition of admission that elementary teacher candidates show proficiency in some or all of the topics addressed in indicator 6.2 either by passing a single rigorous content exam with separate cut-scores provided for all subjects (such as the Praxis II Elementary Education: Multiple Subjects test) or subject-specific exams (such as Advanced Placement, College Level Examination Program (CLEP) or SAT II tests).

Indicator relating to courses of study that the program meets the standard at the undergraduate level:

- 6.2** To the extent that an elementary teacher candidate does not demonstrate content mastery as described in indicator 6.1 in all of the topics below, the institution requires candidates take at least one course in each topic, with these requirements:
- All coursework except children's literature should only be taught in liberal arts departments and be designed for general college audiences.
 - Course content must be broad enough to give candidates the knowledge base to teach the elementary curriculum.

Subject A: Literature and composition

Topic (1): World literature

Topic (2): American literature

Topic (3): Writing, grammar, and composition

Topic (4): Children's literature

Subject B: History and geography

Topic (5): Early American history

Topic (6): Modern American history or Government

Topic (7): World history – ancient

Topic (8): World history – modern

Topic (9): Geography

Subject C: Science (at least one course with lab)

Topic (10): Biology

Topic (11): Chemistry

Topic (12): Physics/physical science/earth science

Elementary mathematics (see Standard 5)

Three courses (or two courses in highly selective institutions) designed for the teacher candidate and imparting content in numbers and operations, algebra, geometry, and data analysis.

AND

- 6.3** In addition to satisfying indicators 6.1 or 6.2, the teacher candidate completes an 18-semester credit hour concentration in a subject relevant to the elementary curriculum. (For purposes of concentration credit hour calculations, general education coursework may be counted regardless of whether an institution would allow it to count towards a major.)

Indicator relating to courses of study that the program meets the standard at the graduate level:

- 6.4** The burden posed by a stringent credit count does not relieve the program of its responsibility to ensure that elementary teacher candidates have adequate content knowledge preparation. Graduate elementary candidates must have both sufficient breadth of knowledge (as indicated by completion of undergraduate courses in the topic areas as delineated in indicator 6.2, or by passing rigorous tests of knowledge in those areas), as well as sufficient depth of knowledge as shown by completing an 18-semester credit hour concentration in a single subject relevant to the elementary curriculum. If a candidate has significant weaknesses in content knowledge, the program works with the candidate to remedy those weaknesses. When program applications, catalogs or other public documents do not describe such a process and its requirements, the presumption will be made that no content preparation requirements are imposed on graduate teacher candidates.

Indicator that the program has strong design:

- 6.5** A program will earn a "strong design" designation if coursework: (1) fulfills two to four requirements in Literature and Composition, three to five in History and Geography, two to three (with at least one lab) in Science, AND one to two in a fourth subject area, Fine Arts (Music history and/or Art history), not evaluated in indicator 6.2, or (2) fulfills topics requirements in all four subject areas with somewhat lesser coverage than specified in (1), but with credit also awarded for a concentration.

Rationale

Standard 6: Elementary Content

The program ensures that teacher candidates have the broad content preparation necessary to teach to increasingly rigorous state standards.

Standard applies to: Elementary programs.

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WHAT IS THE FOCUS OF THE STANDARD?

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RATIONALE

Research base for this standard

"Strong research"¹ on teacher preparation programs (both traditional and alternative) in New York City found that the amount of English Language Arts (ELA) coursework completed by teacher candidates correlated with increased ELA student achievement in the second year of teaching.² Although a different study found no correlation between teachers' content courses and students' achievement, this study only made use of data from an ELA assessment that did not expect students to have a broad base of content knowledge to be effective readers.³ By contrast, Common Core State Standards explicitly and rightly link overall content knowledge with success in reading and ELA more generally.

Strong research conducted in another large urban district also revealed a positive relationship between teachers' science knowledge and student achievement, although this study did not identify a pattern based on teachers' course completion.⁴

- 1 NCTQ has created "research inventories" that describe research conducted within the last decade or so that has general relevance to aspects of teacher preparation also addressed by one or more of its standards (with the exceptions of the Outcomes, Evidence of Effectiveness, and Rigor standards). These inventories categorize research along two dimensions: design methodology and use of student performance data. Research that satisfies our standards on both is designated as "strong research" and will be identified as such. That research is cited here if it is directly relevant to the standard; strong research is distinguished from other research that is not included in the inventory or is not designated as "strong" in the inventory. Refer to the [introduction](#) to the research inventories for more discussion of our approach to categorizing research. If a research inventory has been developed to describe research that generally relates to the same aspect of teacher prep as addressed by a standard, the inventory can be found in the back of this standard book.
- 2 Boyd, D. J., Grossman, P. L., Lankford, H., Loeb, S., & Wyckoff, J. (2009). Teacher preparation and student achievement. *Education Evaluation and Policy Analysis*, 31(4), 416-440.
- 3 Harris, D. N., & Sass, T. R. (2011). Teacher training, teacher quality and student achievement. *Journal of Public Economics*, 95, 798-812. Note: This study relates to several NCTQ standards. Although it meets the criteria for strong research, the study's findings run contrary to the conclusions of most strong research in the field.
- 4 Diamond, B. S., Maerten-Rivera, J., Rohrer, R. E., & Lee, O. (2014). Effectiveness of a curricular and professional development intervention at improving elementary teachers' science content knowledge and student achievement outcomes: Year 1 results. *Journal of Research in Science Teaching*, 51(5), 635-658.

However, another study in which teachers completed coursework aimed at improving their content knowledge also found improvement in student performance relative to a control group.⁵

Other support for this standard

Teachers need to be able to adequately convey content to students because students' content understanding improves their reading comprehension, an area in which American students languish.⁶ Although little conclusive research links a teacher's liberal arts coursework with student achievement, the more a person knows about many different subject areas, the stronger are his or her levels of literacy as measured by vocabulary and scores on tests of reading comprehension.⁷ A body of robust research spanning many decades connects a teacher's level of literacy or verbal ability and the achievement of that teacher's students.⁸ In sum: The more broadly educated a teacher is, the stronger that teacher's vocabulary, and teachers with strong vocabularies are more likely to be effective in the classroom. In addition, with the implementation of increasingly rigorous state standards, teachers will face even higher expectations for their ability to teach content.⁹

With regard to an area of expertise, while there is no research evidence that such expertise in a single academic field makes a teacher more effective, it has been posited that a strong grounding in the "disciplinary ways of knowing"¹⁰ will make for greater teacher effectiveness,¹¹ and that it is reasonable to assume that a concentration in an elementary content area (which can help one develop these disciplinary ways of knowing) is likely to help when teaching that content.

- 5 This study relied on professional development coursework designed for teachers, rather than the general population, and therefore would not meet the course expectations for this standard. However, it provides supporting evidence that teachers' content knowledge influences student learning. Heller, J. I., Daehler, K. R., Wong, N., Shinohara, M., & Miratrix, L. W. (2012). Differential effects of three professional development models on teacher knowledge and student achievement in elementary science. *Journal of Research in Science Training*, 49(3), 333-362.
- 6 Willingham, D. T. (2006). How knowledge helps: It speeds and strengthens comprehension, learning — and thinking. *American Educator*, 30(1), 30-37.
- 7 Numerous research studies have established the strong relationship between teachers' vocabulary (a proxy for being broadly educated) and student achievement. For example, see Whitehurst, G. J. (2002); Ehrenberg, R., & Brewer, D. (1995). Did teachers' verbal ability and race matter in the 1960s? Coleman Revisited. *Economics of Education Review*, 14, 1-21.
- 8 Ferguson, R., & Ladd, H. (1991). How and why money matters: An analysis of Alabama schools. In H. Ladd (Ed.), *Holding schools accountable* (pp. 265-298). Washington, DC: Brookings Institution; Hanushek, E. (1971). Teacher characteristics and gains in student achievement: Estimation using micro-data. *The American Economic Review*, 61(2), 280-288; McLaughlin, M., & Marsh, D. (1978). Staff development and school change. *College*, 80(1), 69-94; Strauss, R., & Sawyer, E. (1986). Some new evidence on teacher and student competencies. *Economics of Education Review*, 5(1), 41-48; Wayne, A., & Youngs, P. (2003). Teacher characteristics and student achievement gains: A review. *Review of Educational Research*, 71(1), 89-122; Winkler, D. (1975). Educational achievement and school peer composition. *Journal of Human Resources*, 10, 189-204.
- 9 In response to thousands of teachers' reports that they felt ill-prepared to teach the content needed to meet increasingly rigorous state standards, the Core Knowledge Foundation developed a college-level curriculum for elementary teacher candidates. This curriculum consists of 18 courses, each accompanied by a detailed course guide (available at http://www.coreknowledge.org/mimik/mimik_live_data/view.php?id=1833&record_id=326). The *Teacher Prep Review's* elementary content standard is largely based on this work and its detailed analysis of what critical features must be included in content courses for teacher candidates. The Core Knowledge Foundation. (2002). *What elementary teachers need to know: College course outlines for teacher preparation*. Charlottesville, VA: The Core Knowledge Foundation. Retrieved April 8, 2014 from http://www.coreknowledge.org/mimik/mimik_uploads/documents/482/What%20Elem%20Teachers%20Need%20to%20Know-College%20Course%20Outlines.pdf
- 10 Langer, J. A., Confer, C., & Sawyer, M. (1993). *Teaching disciplinary thinking in academic coursework*. Albany, NY: National Research Center on Literature Teaching and Learning, University at Albany, State University of New York. Retrieved February 7, 2013, from <http://www.albany.edu/cela/reports/langer/langerteachingdiscipthink.pdf>. This paper argues that understanding an academic discipline requires two components: (a) content knowledge and (b) "ways of knowing and reasoning that are accepted as appropriate and necessary for learning and understanding within the particular field." These ways of knowing could include the types of evidence that are acceptable, the ways arguments are produced, and the ways information is shared in a specific field.
- 11 Grossman, P., & Schoenfeld, A. (2005). Teaching subject matter. In L. D. Hammond, & J. Bransford (Eds.), *Preparing teachers for a changing world*. San Francisco: Jossey-Bass; Slekar, T. D., & Haefner, L. A. (2010). Syntactic knowledge in history and science education: Teacher education and neglect in the academy. *Journal of Thought*, 45(1-2), 7-16.

Moreover, the practical implications of a teacher candidate taking only pedagogy courses could be severe. Unless a teacher candidate has a major or has fulfilled a substantial part of the requirements for a major in a content area, the ramifications of failing student teaching are great, namely, the loss or serious delay of a college degree.¹² This absence of a fall-back plan creates a strong disincentive for the education program to fail candidates who cannot demonstrate an acceptable level of performance in the classroom, which may result in teachers entering the classroom even though they have demonstrated that they are not prepared to do so.

Furthermore, school district superintendents support this standard.

12 When a California education school attempted to fail a student-teaching candidate in the mid-1990s, the case was litigated for three years, and the education school's attorney indicated that in the entire history of teacher preparation in California to date there was no record of a credential candidate actually failing student teaching. In all other cases, candidates were "counseled" out of the program and free to apply to another program. The education school prevailed in the litigation with evidence from nursing programs that do fail nurse candidates in their clinicals.

Methodology

How NCTQ scores the Elementary Mathematics Standard

Standards and Indicators

DATA USED TO SCORE THIS STANDARD

Evaluation of elementary teacher preparation programs on Standard 6: Elementary Content uses the following sources of data:

- Undergraduate and graduate catalogs
- Degree plans provided by institutions of higher education (IHEs)
- Relevant IHE websites (e.g., websites for the college of education or the registrar, or graduate school application pages)
- Syllabi (when available and as necessary)
- Textbook listings made available by the IHE bookstore
- Admissions-relevant documents, including transcript review forms and advising sheets
- State regulations regarding content preparation of elementary teacher candidates

WHO ANALYZES THE DATA

A general analyst evaluates each program using a detailed scoring protocol from which this scoring methodology is abstracted. Twenty percent of programs are randomly selected for analysis by a second general analyst. For information on the process by which scoring discrepancies are resolved, see the “scoring processes” section of the [General Methodology](#).

SCOPE OF ANALYSIS

In **undergraduate programs**, absent administration of an appropriate test¹³ as a condition of admission to a teacher preparation program (which fulfills indicator 6.1), the evaluation of this standard under Indicator 6.2 begins with a review to determine whether the IHE exempts any student (including teacher candidates) from specific course requirements on the basis of standardized assessments commonly recognized as demonstrating content mastery at the level provided by post-secondary or rigorous secondary instruction.

Analysis then proceeds to the catalog-based identification of all of the content coursework that the IHE requires teacher candidates to take in order to meet general education requirements and/or teacher preparation program requirements.¹⁴ Catalog course descriptions are used to evaluate whether the courses address the topics specified in the standard and are rigorous and comprehensive enough to ensure that graduates will be able to add value above and beyond that provided by elementary grade textbooks and curriculum guides.¹⁵ Courses too narrowly focused on a particular topic instead of the comprehensive scope needed by elementary teachers are not deemed adequate. When necessary and available, syllabi

13 Any standardized test of content mastery will suffice, including a demonstration through any high school or college-level examination generally accepted as a substitute for college coursework or a suitably rigorous elementary content test (such as those normally used for licensing purposes) with scores provided for all subjects.

14 Course prerequisites are also included in our evaluation.

15 Course descriptions are admittedly short and cannot convey full information about the scope of a course, but they can be appropriately used in a very circumspect and circumscribed manner. Often, the complete absence of course requirements in a specific area is the basis for evaluation, meaning that it is not even necessary to look at a course description. If examination of the description is necessary, the examples provided at the conclusion of this scoring methodology provide clear demonstrations of the discriminatory power afforded by even a few sentences of description. More discussion of evaluation using coursework descriptions is found [here](#).

and/or bookstore listings of required textbooks are consulted to assist in this evaluation.

Programs adequately preparing elementary teacher candidates require evidence of content mastery or at least one course (equivalent to three semester credit hours (SCHs)) addressing at least a majority of topics in each of the first three subject areas in the standard: literature and composition, history and geography, and science.¹⁶

Lastly, analysts determine under Indicator 6.3 if the program requires that teacher candidates complete at least an 18 SCH concentration in a subject relevant to the elementary curriculum (if the concentration is social studies or science, at least 12 credit hours must be within the same discipline, such as biology or history). The requirement of a concentration boosts a program's score by one star.

More information about analysis of requirements

How do analysts evaluate a menu of course choices?

Allowing teacher candidates to select from a menu of course choices can result in a lower score if it means that candidates can opt out of coursework that is considered essential or if one or more of the course selections is deemed inadequate. In other words, an option that allows a candidate to choose one of a number of courses from a menu might result in a lower score if even one of the courses is too narrow in scope or not in a relevant topic area. Similarly, if the menu is too long (seven or more courses), it is deemed insufficient because it is too likely that one or more courses from which candidates can choose will be inadequate.

For example, at one undergraduate elementary preparation program we evaluated, candidates are not provided any guidance on their choice of science coursework. They can choose any two courses (some with labs, some without) from a list that includes *41 different courses in nine different departments*. While some of these courses would certainly fulfill our science topic requirements, the program would not receive credit in the science subject area because *any two* of them would not.

Can coursework be taught by education school faculty?

With the exception of children's literature coursework, coursework must be taught in liberal arts departments rather than in the education department,¹⁷ and all liberal arts department coursework must be designed for the general audience and not the teacher audience.¹⁸

What about courses taught with a religious perspective?

Courses offering religious perspectives on liberal studies coursework do not receive credit in the evaluation of this standard.¹⁹ This includes science coursework that explicitly endorses pseudo-scientific principles such as creationism or intelligent design, literature courses that entail religious study of the Bible (as opposed to analysis of the Bible as literature) and history courses that focus exclusively on the establishment or development of religions.

As the graphic on the next page illustrates, an individual course fulfilling requirements for both general education and program preparation might be evaluated for Indicators 6.1 and 6.2

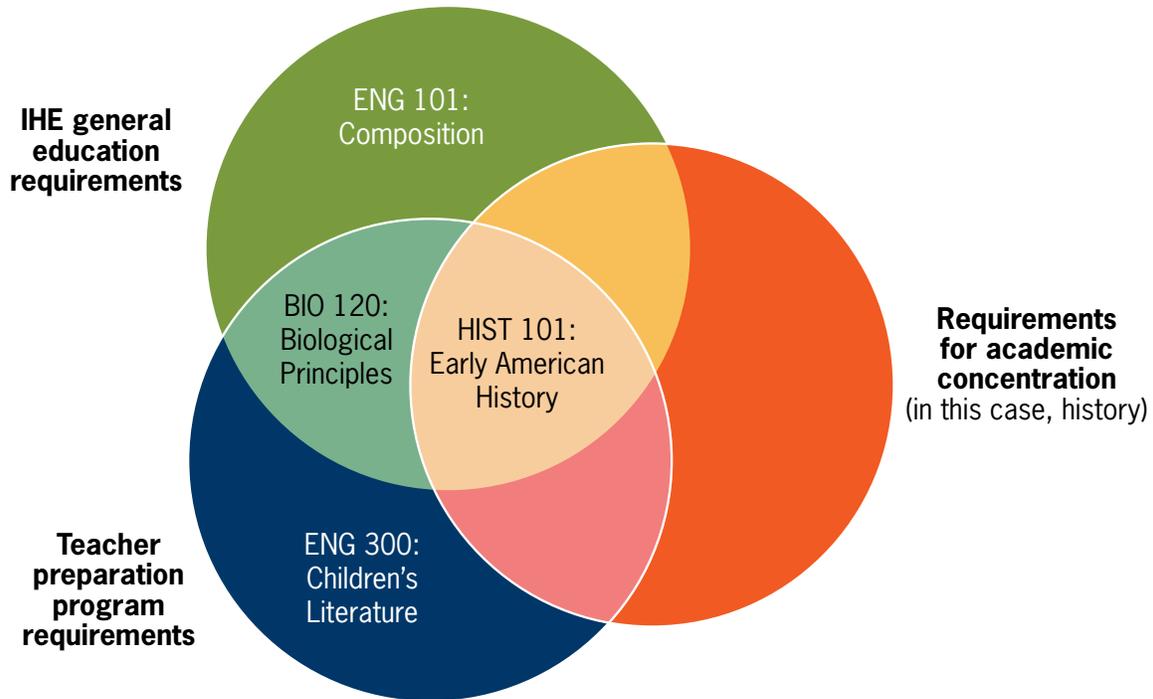
16 While coursework in the fine arts is noted in this evaluation, it is considered only in evaluation of "strong design."

17 Children's literature coursework taught in the education department must have a content, rather than a pedagogical focus.

18 As evidenced by **Standard 5: Elementary Mathematics**, in the area of elementary math preparation, there is merit in liberal arts department coursework that is designed for teacher candidates.

19 If the programs offering these courses only prepared educators to teach in private religious K-12 schools, such coursework would be appropriate. All programs in the Review, however, are publicly approved to prepare public school teachers.

Evaluating undergraduate elementary content preparation coursework requirements



Due to the availability of information on content preparation in publicly available materials, it was possible to evaluate all undergraduate programs in the sample on this standard.

If a graduate program does not fulfill indicator 6.1 by requiring a standardized content test as part of admission, analysts determine under Indicator 6.4 if the catalog, admissions documents (such as applications and transcript review forms) or other publicly available materials show a clear institutional commitment to ensuring that elementary teacher candidates meet requirements for content knowledge preparation, with the potential for requirements for remedial coursework and acceptable undergraduate majors and/or minors explicitly mentioned. Because state regulations provide an added dimension of information about coursework requirements, analysts also review these regulations referenced by the program to evaluate graduate preparation.²⁰

Analysts review available information on transcripts' prerequisites, graduate course requirements, and states' required content preparation for subject requirements (i.e., English/language arts, social studies, sciences), and then specific topics (e.g., composition, American history, biology). A program can nearly meet this standard by requiring at least nine SCHs in all three subject areas or at least nine SCHs in two subject areas and six to eight SCHs in the third subject area. To fully meet the standard, in addition to requiring at least nine SCHs per subject area, a program must either specify at least one adequate topic requirement in all three subject areas or require content knowledge equivalent to the undergraduate requirement (Indicator 6.2).

If analysts are unable to locate any material pertaining to graduate programs' expectations for applicants' prior coursework programs do not receive credit for requiring preparation in any topic areas and/or for a concentration. Because we take the lack of mention of expectations in this area in any public documents to mean that no content preparation requirements are imposed on graduate teacher candidates, it was possible to evaluate all graduate programs in the sample on this standard.

²⁰ Applicable regulations are found in: **Alabama, Arkansas, Kentucky, Louisiana, Maryland, Minnesota, Mississippi** (public IHEs only), **Oklahoma, South Dakota** (public IHEs only), **Tennessee** (Board of Regents IHEs only), **Texas**, and **Utah** (Utah System of Higher Education institutions only).

Common misconceptions about how analysts evaluate the Elementary Content Standard:

- *Pedagogical or teacher audience courses impart the same level of content knowledge as general audience coursework and should receive equal credit.* Teacher candidates need rigorous content coursework to prepare them to teach in the classroom. Pedagogical and/or teacher audience coursework lacks the appropriate content depth.
- *Elective content coursework can receive credit.* Teacher preparation programs must require content coursework to ensure that teacher candidates have the necessary background knowledge when they enter the classroom.
- *Concentrations in non-teachable subjects can receive credit.* Concentrations must be in teachable subjects to receive credit; if possible areas of concentrations include topics such as health education or psychology, no credit for requiring a concentration is given.

How a program earns a “strong design” rating

Undergraduate and graduate programs receive a “strong design” designation if they satisfy the standard (which is possible by either requiring an appropriate standardized content-based admission test under indicator 6.1, adequate coverage in each of the three subject areas evaluated under Indicator 6.2, or somewhat lesser coverage in combination with a concentration evaluated under Indicator 6.3), as well as requiring coursework in the fine arts.

Examples of what satisfies or does not satisfy the standard’s indicators

Exempting candidates from coursework on the basis of standardized assessment (Indicator 6.1)

 fully satisfies the indicator	 does not satisfy the indicator
<p>The IHE outlines a policy for prospective candidates to pass a specific standardized content test composed of independently scored subtests prior to admission to the teacher preparation program.</p> <p>Tests that receive full credit include the College Basic Academic Subject Examination (CBASE).</p> <p>Tests that receive partial credit include Praxis II Elementary Education (5001), which sufficiently covers history, geography, and science, and MEGA Elementary Education Multi-Subject test, which sufficiently covers literature and composition.</p> <p>Tests that receive specific course credit are Advanced Placement (AP), SAT II Subject Tests, College Level Examination Program (CLEP), Defense Activity for Non-Traditional Education Support (DANTES), and/or International Baccalaureate (IB).</p>	<p>The IHE provides no means for students to test out of coursework or the IHE requires tests such as SAT, Praxis I, and Praxis II Elementary Education (5017, 5018, 5019) that either do not cover content knowledge or do not break down scores by subtests.</p>

Evaluating coursework requirements for topic coverage (Indicator 6.2)

Subject A: Literature and Composition**Topic: World Literature**

A survey course that covers major literary genres and the significant works and movements of Western literature beginning with ancient Greek and/or Roman sources. The course may also include movements and timelines from elsewhere throughout history. Courses that address only portions of world literature, such as courses exclusively on British literature, do not receive credit.

✓ fully satisfies the indicators	✗ does not satisfy the indicators
<p>ENGL 2332 – World Literature I This is a survey of the major works of literature produced across the world from early civilizations to 1650. Students who take this course will increase their awareness of historical cultures; sharpen their critical reading, thinking and writing skills and deepen their cultural sensitivity. English majors and non-majors may take this course.</p> <ul style="list-style-type: none"> ■ Covers world literature over a sufficiently expansive time period. 	<p>ENGL 211 – English Literature Beginnings to 1800. Surveys medieval and early modern literary works written in England. Readings may include Beowulf, Chaucer, Spenser, Mary Wroth, and Milton; 18th-century satire, drama, novels.</p> <ul style="list-style-type: none"> ■ English literature is too narrow in focus.

Subject A: Literature and Composition**Topic: American Literature**

A course that covers major authors and themes in American literature from roughly the colonial period to the modern era. Courses that exclusively address themes or time periods in American literature do not receive credit.

✓ fully satisfies the indicator	✗ does not satisfy the indicator
<p>ENG 313 – American Literature Survey I: Colonial to WW II Focuses on master works from the Colonial Era, Dickinson, Poe and Whitman, to World War II. Includes Colonial, Enlightenment, Romantic and Realistic periods.</p> <ul style="list-style-type: none"> ■ Addresses the major movements and seminal authors of American Literature. 	<p>ENG 225 – Survey of 20th Century American Literature Survey of selected major American authors in the 20th century.</p> <ul style="list-style-type: none"> ■ Too narrow in scope.

Subject A: Literature and Composition**Topic: Writing, Grammar, & Composition**

A course that addresses composition, in particular the writing of expository, argumentative, descriptive, and narrative essays. An outstanding course reviews or expects mastery of the rules of traditional grammar, but this is not a requirement.

✓ fully satisfies the indicator	✗ does not satisfy the indicator
<p>ENG 101 – Composition I Emphasis on critical thinking, reading and writing clear and coherent essays that reflect an understanding of the writing process, rhetorical analysis, argumentation and academic discourse.</p> <ul style="list-style-type: none"> ■ Addresses the major themes associated with written communication. 	<p>ENGL 321 - Persuasive Speech and Writing Focuses on the practice of persuasive discourse in speech, writing and visual media. Includes projects and readings in debate, written argument and rehearsed and extemporaneous speaking. Students investigate such subjects as rhetorical foundations and applications, language choice and stylistic variations, popular culture, literature and communication dynamics.</p> <ul style="list-style-type: none"> ■ Including public speaking and visual media topics makes the focus of this course too broad.

Subject A: Literature and Composition

Topic: Children's Literature

A course that provides an introduction to major authors, works and forms of children's literature. The course should include some examination of children's literature as an historical phenomenon. Courses on methods of instruction in children's literature, which do not provide a survey of authors and works in that literature, do not receive credit.

 fully satisfies the indicator	 does not satisfy the indicator
<p>EDUC 325 – Children's Literature Criteria for the selection and study of literature written especially for children in elementary school; classical and contemporary literature enjoyed by children globally. Required of Elementary Education majors.</p> <ul style="list-style-type: none"> ■ Covers important topics in children's literature, such as the selection and analysis of texts. 	<p>ED 325 – Teaching Language Arts and Children's Literature The theory and practice of teaching oral and written communication skills. Special emphasis is given to the interrelationship between literature for young people and the language arts skills of listening, speaking, reading and writing.</p> <ul style="list-style-type: none"> ■ Focuses too much on teaching strategies. <p>EDUC 357 – Lit for Children and Adolescents A survey of youth and adolescent literature and teaching strategies to encourage application of languages and literacy genre, to foster personal-social growth and to encourage lifelong enjoyment of literature.</p> <ul style="list-style-type: none"> ■ Including adolescent literature limits the amount of time that the course can focus on children's literature. Additionally, this course includes teaching strategies.

Subject B: History and Geography

Topic: Early American History

A course focusing on U.S. history from the colonial period or founding of the republic to the Civil War or Reconstruction. Acceptable start dates or periods: 1492-1776. Acceptable end dates or periods: 1865-1900. A single course that covers both early and modern American history will only receive credit for early American history.

 fully satisfies the indicator	 does not satisfy the indicator
<p>HIST 1301 – United States History I This is a course that studies the historical development of the United States up to 1877. Students will study the people, events and ideas that influenced United States history in the Colonial, Revolutionary, Early National, Jacksonian, Civil War and Reconstruction eras. Readings, lectures and discussions will consider the American experience as a unique experiment in enlightened liberty and self-government.</p> <ul style="list-style-type: none"> ■ Fully addresses relevant topics in early United States history. 	<p>HIST 226 – Age of Jefferson and Jackson How the old republican ideal of a virtuous agrarian society struggled to confront the new age of economic modernization, social diversity and sectional tension.</p> <ul style="list-style-type: none"> ■ A focus of American history under two of its presidents is not sufficient.

Subject B: History and Geography**Topic: Modern American History/Political Science²¹**

A course focusing on U.S. history from the Civil War or Reconstruction era to the modern period (beginning anywhere from 1865 to 1900 and concluding near the present). Courses that cover a narrower span of U.S. history (e.g., 1945-present) do not receive credit unless an additional course is required that completes the time span, *OR* the course focuses on the constitutional underpinnings, the specific branches, and state and national features of our democracy. A single course that covers both early and modern American history will only receive credit for early American history.

 fully satisfies the indicator	 does not satisfy the indicator
<p>HY 208 – History of the United States from 1865 to Present From the Reconstruction period to the present. The aftermath of the Civil War, the Reform movements, America Becomes a World Power, the World Wars and the years since 1945.</p> <ul style="list-style-type: none"> ■ Addresses major developments in modern United States history. <p>PLSC 112 – American Government An overview of the structure and function of American national government, focusing on how government is designed, how individuals form and act on their political preferences, how these preferences are transmitted to government and how government acts (and does not act) on what its citizens want.</p> <ul style="list-style-type: none"> ■ Course addresses major themes in American government. 	<p>EDT 362 – Social Science for Teachers II Political and economic institutions and processes as related to the American experience. Emphasizes historical and contemporary interrelationships of economic and political institutions in American society.</p> <ul style="list-style-type: none"> ■ Covers both economic and history, rather than history alone, and is designed specifically for a teacher audience. On either ground it does not satisfy. <p>HIS 152 – The American Experience. A thematic survey of United States history Topics and period to be emphasized varies, but major developments in political, social, intellectual and economic history are examined.</p> <ul style="list-style-type: none"> ■ There is no defined time period or historical focus in this course and no guarantee that students will receive adequate coverage of modern United States history topics. <p>PHI 104 – The Ideal of Democracy Critical examination of the nature and moral justification of democracy, particularly as it is practiced in the United States.</p> <ul style="list-style-type: none"> ■ Focus is on the philosophical idea of democracy.

²¹ We note that if a teacher candidate may choose between early and modern American history courses and a required course in political science, a program would not receive credit for early American history and modern American history/political science. Our reasoning is that the candidate could choose to take both modern American history and political science, entirely avoiding coursework in early American history.

Subject B: History and Geography

Topic: Ancient World History

This course provides general narratives of all major civilizations in ancient times. NCTQ generally respects the division between ancient and modern world history chosen by the institution. A single course that covers both ancient and modern world history receives credit ancient world history only.

 fully satisfies the indicator	 does not satisfy the indicator
<p>HIST 1020 – World History I Earliest civilizations of Mesopotamia, Egypt, India, China and the Aegean; classical civilizations of Greece and Rome; medieval civilizations of the Middle East, India, East Asia, and Western Europe; Africa and the Americas before European contact; the Renaissance; the Reformation; wars of religion; and age of exploration.</p> <p>HIST 103 – World History I Principal political, economic, cultural and social developments in world history through the 16th century, relating the past to the present. Equal weight given to the history of Asia, Africa, the Americas and Europe.</p> <ul style="list-style-type: none"> ■ Courses include extensive geographic coverage over a broad time period. 	<p>HIST110 – The Ancient World Interpretation of select literature and art of the ancient Mediterranean world with a view to illuminating the antecedents of modern culture; religion and myth in the ancient near East; Greek philosophical, scientific and literary invention; and the Roman tradition in politics and administration.</p> <ul style="list-style-type: none"> ■ Focuses on too narrow a time period and geographic region. <p>HIST 110 – World Civilizations I Integrated study of social, political and philosophical/religious systems in early civilizations, with an introduction to distinctive art forms.</p> <ul style="list-style-type: none"> ■ There is no defined time period for this course, and it lacks a sufficient focus on historical developments.

Subject B: History and Geography

Topic: Modern World History

This course provides general narratives of all major civilizations in modern times. NCTQ generally respects the division between ancient and modern world history chosen by the institution. A single course that covers both ancient and modern world history receives credit ancient world history only.

 fully satisfies the indicator	 does not satisfy the indicator
<p>HIST 1220 – World History II European interactions with the people of Asia, Africa and the Americas from 1660; absolutism, the Scientific Revolution and the Enlightenment; civilizations of Africa, the Middle East and Asia; the French Revolution; the Industrial Revolution; nationalism; zenith and decline of European hegemony; 20th century wars and ideologies.</p> <ul style="list-style-type: none"> ■ Offers thorough coverage of modern world history topics. 	<p>HS 012 – Atlantic World II This course will focus on the effects of rapid technological and economic development upon European and Atlantic society, politics and ecology. The readings and lectures will explore the dilemmas that industrial civilization created and the various responses to these problems. Our goal is to gain a better understanding of how these forces transformed from “traditional” society to our “modern” world.</p> <ul style="list-style-type: none"> ■ Too narrow in scope.

Subject B: History and Geography**Topic: World Regional Geography**

A course that analyzes the world from a geographic perspective emphasizing the unique qualities of world regions, the spatial interactions of people, elements, and regions, and major regional and global problems and prospects. The course should address both physical and cultural geography.

✓ fully satisfies the indicator	✗ does not satisfy the indicator
<p>GEOG 110 – World Regions Geographic evaluation of the human imprint on the world, focusing on how peoples of various societies have approached the problems of living in their natural environments and with each other. A requirement for both the major and minor in geography.</p> <p>GEOG 103 – World Regional Geography The interconnectivity and interrelationship of the world regions by stressing physical and economic development and agricultural, cultural and population characteristics. Strengthening of one's mental world map.</p> <ul style="list-style-type: none"> ■ Both courses provide thorough coverage of geography. 	<p>GEO 111 – Integrated Social Studies I This course facilitates excellence in teachers by exploring the interdisciplinary study of integrated social studies curricula, including history; geography; economics; government; citizenship; culture; and science, technology and society.</p> <ul style="list-style-type: none"> ■ Specifically designed for a teacher audience and includes too many disciplines to adequately focus on geographic concepts. <p>CGEOG 1888 – Selected Topics: Geography This course focuses on a specific topic in geography.</p> <ul style="list-style-type: none"> ■ Too narrow in scope. <p>SST 1133 – Cultural Geography Use of cartographic media as a means of communication. Instruction in techniques of interpretation of such media. Meets state requirements for elementary and secondary teachers. Meets the Global Studies requirement of the Core Curriculum.</p> <ul style="list-style-type: none"> ■ Focus is on map-reading, which is too limited. However, just because this meets the requirement for teachers does not mean that it is a course designed specifically for a teacher audience.

Subject C: Science**Topic: Biology**

An introductory course covering biology and matter related to biological processes, including topics such as cellular structures and dynamics, genetics, taxonomy, evolution, plant and animal physiology, developmental biology and ecology. Cellular and molecular biology should be a more significant feature of a course than evolution and/or ecology. Alternatively, an introduction to life sciences, of which a substantial portion is biology content. Courses must emphasize basic themes in biological science, not current issues or methods of instruction.

 fully satisfies the indicator	 does not satisfy the indicator
<p>BIOL 1010/1011 – Principles of Life (and lab) A course for non-science majors. Topics covered include scientific methodology, the nature of living organisms, cell structure and function, cell chemistry and division, nature of heredity and gene action, the theory of evolution and principles of ecology.</p> <ul style="list-style-type: none"> ■ Offers a rigorous study of biological principles and includes a lab. 	<p>BIO 108 – Introduction to Organismal Biology This is an introductory level general biology course designed to meet the needs of non-science and science majors. It reviews evolution and speciation, the diversity and function of living things including bacteria, plants and complex animals, and the major systems of the human body. The class ends with an overview of ecology and conservation biology. The course includes both lecture and laboratory instruction.</p> <ul style="list-style-type: none"> ■ Covers only one topic within biology (organismal). No mention of cellular structures, genetics, etc. <p>BIOL 1050 – General Biology I An introduction to biology with a Christian-creationist perspective on the major concepts in life science that affect our society and concept of self: DNA and chemical effects on living cells; reproduction and life before birth; genetic principles, general animal and plant studies, ecology, origin and history of life on earth; understanding scientific thinking.</p> <ul style="list-style-type: none"> ■ Although this course focuses on a variety of biological principles, it conveys a religious perspective on science.

Subject C: Science**Topic: Chemistry**

An introductory courses covering topics such as measurement, matter and energy, atomic theory and structure, the periodic table, chemical reactions, stoichiometry, chemical bonding, states of matter, reaction rates and equilibria, acids and bases, nuclear chemistry and biochemistry. Alternatively, an introduction to physical science in which chemistry is the primary content presented.

 fully satisfies the indicator	 does not satisfy the indicator
<p>CHEM 131 – General Chemistry I A non-calculus-based introduction to the fundamentals of modern chemical practice; nuclear, electronic, and physical structure of matter; periodicity of the elements; dynamics of chemical reactions and equilibria. Includes one 3-hour lab per week.</p> <ul style="list-style-type: none"> ■ A rigorous lab course that covers essential chemistry concepts. 	<p>CHM 20000 – Fundamentals Of Chemistry Integrative study of core concepts in chemistry that play a major role in governing the physical world. These core concepts are taught within the framework of important societal issues, such as atmospheric chemistry and nutrition. The pedagogy of this course is designed to provide reflective, interactive and hands-on learning experiences that will assist elementary education majors to develop useful instructional strategies for their own classrooms. Required of students in the elementary education program in the School of Education. Not available for credit toward graduation in the School of Science.</p> <ul style="list-style-type: none"> ■ Designed for a teacher audience and includes pedagogical strategies.

Subject C: Science**Topic: Physics²²**

An introductory course covering motion, energy, conservation laws, gravity, phase changes, thermodynamics, electricity, magnetism, sound, light and wave dynamics. Alternatively, an introduction to physical science in which physics is the primary content presented. Courses in which three to four earth science topics (geology, meteorology, astronomy and oceanography) are included may also be accepted. Courses must emphasize basic themes in physics, not current issues or methods of instruction.

 fully satisfies the indicator	 does not satisfy the indicator
<p>GEPH 101 – Physical Science A survey course with emphasis on understanding the fundamental laws of nature and the logical application of these laws to specific situations; particular areas covered include analysis of motion, Newton’s Law, energy, momentum, the nature of heat and the nature of sound.</p> <ul style="list-style-type: none"> ■ Addresses fundamental topics in physical science. <p>ESCI-100 – Elements of Earth-Space Sciences This course provides an introduction to the scientific method through a study of the basic elements of the earth sciences: physical geography, meteorology, geology, oceanography and astronomy. The course provides a broad understanding of the Earth system and the interrelationships between the various components of the Earth system. Students learn concepts and theories pertaining to the scientific method and the earth sciences in lectures and then are expected to apply those concepts in labs and on exams. The course meets for two hours of lecture and two hours of lab each week.</p> <ul style="list-style-type: none"> ■ Thoroughly addresses earth science concepts and includes a lab. 	<p>PHYS 107 – Physics Concepts for Nonscientists Overview of physical science, from subatomic particles to cosmology. Intended to help students understand the importance of scientific research in society with emphasis on basic ideas about how the Universe operates. Readings from popular books by leading scientists for non-science majors. For students without high school physics or with limited mathematics background.</p> <ul style="list-style-type: none"> ■ Lacks rigorous coverage of physics concepts. <p>ESC 111 – Physical Geology. Survey of geologic materials and processes.</p> <ul style="list-style-type: none"> ■ Too narrow in scope, focusing only on geology without coverage of other earth science topics.

22 In order to consistently evaluate a wide range of courses in the sciences, we classify as “physics” three different types of courses: 1) physics, 2) physical science coursework that is evenly divided between coverage of physics and chemistry, and 3) earth science.

Undergraduate concentrations (Indicator 6.3)

A program could receive credit for a concentration in either of two ways:

- A credit-by-credit count based on required coursework.
- A program-mandated major or minor in which all majors or minors offered are in a teachable area.²³

Concentration	Possible coursework counted toward concentration
English/Language Arts	Literature, writing, composition, grammar
Social Studies	History, government, political science, economics, geography
Mathematics	Mathematics, statistics
Science	Biology, life sciences, chemistry, physics, geology, earth science, physical science, environmental science
Foreign Language	Coursework in any one language, including American Sign Language
Fine Arts	Art history, theory, practice; OR music history, theory, practice

 fully satisfies the indicator		 does not satisfy the indicator	
<p>One of the following majors is required: Biology, English, French, Geography, History, Math, Political Science or Spanish.</p>	<p>Required coursework totals 21 SCHs in history, geography and economics.</p> <p><i>Note: Some of this coursework may have also received credit for subject area coverage under Indicator 6.1.</i></p>	<p>An undergraduate major in an unspecified subject is required.</p> <p>A minor in one of the following areas is required: Biology, Early Childhood Education, English, French, Geography, History, Math, Political Science, Psychology, Reading, Spanish.</p> <p><i>Note: This list includes minors in non-teachable subjects such as Early Childhood Education, Psychology, and Reading.</i></p>	<p>The total number of SCHs of required coursework in any of the above areas of concentration totals fewer than 18 SCHs.</p>

²³ In many cases, state regulations mandate that teacher candidates have majors or minors. However, our evaluation found that programs do not generally comply with state regulations in this area. Both because of a general lack of compliance and because our requirement that a concentration be in a teachable subject is more restrictive than some regulations, we evaluate program requirements independently of state regulations. The following states require majors: **Colorado, Massachusetts** and **New Mexico**. The following states require minors or concentrations: **California, Indiana, Iowa, Michigan, Mississippi, Missouri, New Hampshire, New Jersey, New York, Oklahoma, Tennessee, Texas, Vermont** and **Virginia**.

Graduate preparation requirements (6.4)

Content Preparation		
 fully satisfies the indicator	 partly satisfies the indicator	 does not satisfy the indicator
<p>The program requires that entering candidates have completed undergraduate coursework entailing:</p> <p>1) Nine credits each of written communication (The Structure of English must be one of the courses); 2) Six credits of history; 3) three credits in geography (GEO 201 Introduction to Geography is required); 4) Ten credits in science (NSCI 310 Natural Science is required).</p> <p><i>All three subject areas require at least nine SCHs. Since all subject areas have topic specificity, this program earns credit.</i></p> <p>1) Twelve credits in writing to include a course in expository or research writing; may include experience in writing intensive courses with appropriate documentation; 2) Children's literature (Kindergarten through middle school); 3) Social studies: to include U.S. history, world history, geography, economics, civics/political science (especially American government), and Pacific Northwest history; 4) Twelve credits in science: to include biology, earth/space science (e.g. geology, astronomy, meteorology), and a physical science such as physics, chemistry, or environmental science, and lab experience.</p> <p><i>This program level of topic specificity meets our undergraduate requirement, meaning that it earns full credit and is awarded Strong Design.</i></p>	<p>The program requires that candidates have completed undergraduate coursework comprising:</p> <p>Three English courses, four social studies courses (acceptable fields: history, geography, political science, economics), biology lab science, and a natural science course in a field other than biology.</p> <p><i>Program would receive partial credit because it requires nine or more credits in two subject areas and six or more credits in the third. Although requirements are substantive, since only one topic (biology) was specified, full credit cannot be awarded.</i></p>	<p>The program states that applicants should “have a broad range of coursework appropriate for the elementary classroom.”</p>

Graduate preparation requirements (6.4)

Content	
 fully satisfies the indicator	 does not satisfy the indicator
<p>The program indicates that applicants should “show evidence of an 18 credit concentration in English/Language Arts, History, Math, or Science.”</p>	<p>The program indicates that applicants should have a major in a Liberal Arts subject.</p>

Research Inventory

Researching Teacher Preparation: Studies investigating the preparation of teacher candidates in elementary content

These studies address issues most relevant to Standard 6: Elementary Content

Total number of studies	Studies with stronger design		Studies with weaker design	
	Measures student outcomes	Does not measure student outcomes	Measures student outcomes	Does not measure student outcomes
10	2	1	0	7
	Citations: 2,3	Citations: 4		Citations: 1, 5, 6-10

Note: Backhus & Thompson (2006) is cross-listed with RI 7: Secondary Content in the Sciences; Boyd et al. (2009) is cross-listed with RI 5: Elementary Mathematics, RI 7: Secondary Content in the Sciences, and RI 14: Student Teaching.

Citations for articles categorized in the table are listed below.

Databases: Education Research Complete and Education Resource Information Center (peer-reviewed listings of reports on research including United States populations).

Publication dates: Jan 2000 – August 2016

See [Research Inventories: Rationale and Methods](#) for more information on the development of this inventory of research.

1. Backhus, D. A., & Thompson, K. (2006). Addressing the nature of science in preservice science teacher preparation programs: Science educator perceptions. *Journal of Science Teacher Education*, 17(1), 65–81.
2. Boyd, D. J., Grossman, P. L., Lankford, H., Loeb, S., & Wyckoff, J. (2009). Teacher preparation and student achievement. *Educational Evaluation and Policy Analysis*, 31(4), 416–440.
3. Goldhaber, D. (2007). Everyone's doing it, but what does teacher testing tell us about teacher effectiveness? *Journal of Human Resources*, 42(4), 765–794.
4. Luera, G. R., Moyer, R. H., & Everett, S. A. (2005). What type and level of science content knowledge of elementary education students affect their ability to construct an inquiry-based science lesson? *Journal of Elementary Science Education*, 17(1), 12–25.
5. May, M. (2005). Improving teacher preparation. *Journal of Social Studies Research*, 29(2), 4–8.
6. Morgan, P. W. (2008). Elementary education candidates' background knowledge and attitudes toward science: Are liberal arts teacher preparation and core courses enough? *AILACTE Journal*, 5, 45–60.
7. Sanchez, R. M. (2010). The six remaining facts: Social studies content knowledge and elementary preservice teachers. *Action in Teacher Education*, 32(3), 66–78.

8. Sanger, M. J. (2007). The effect of inquiry-based instruction on elementary teaching majors' chemistry content knowledge. *Journal of Chemical Education*, 84(6), 1035-1039.
9. Tairab, H. (2010). Assessing science teachers' content knowledge and confidence in teaching science: How confident are UAE prospective elementary science teachers? *International Journal of Applied Educational Studies*, 7(1), 59–71.
10. Weinburgh, M. (2007). The effect of “Tenebrio obscurus” on elementary preservice teachers' content knowledge, attitudes, and self-efficacy. *Journal of Science Teacher Education*, 18(6), 801–815.



National Council on Teacher Quality

1120 G Street, NW, Suite 800
Washington, D.C. 20005
Tel: 202 393-0020 Fax: 202 393-0095
Web: www.nctq.org