Standard 7: Middle School Content

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

Why this standard?

Research shows that teachers' deep content knowledge will support their students' academic success. Middle school teacher candidates must develop sufficient expertise in their subjects to teach them effectively, particularly in increasingly rigorous classrooms.

What is the focus of the standard?

If a state does not have regulations that require that all middle school teacher candidates pass adequate subject-matter licensing tests, the program's subject preparation requirements are examined. At the undergraduate level, candidates should work toward an academic major if they are going to teach one subject (e.g., math) or two minors if they are going to teach unrelated subjects (e.g., math and science).

At the graduate level, the transcript review process is examined to check that programs are verifying that their incoming candidates have sufficient content knowledge in the area or areas they wish to teach.

Standard applies to secondary programs.

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 others education personnel.

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.

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 7: Middle School Content

The program ensures that teacher candidates have the content preparation necessary to successfully teach to increasingly rigorous state standards.
Standard applies to: Secondary programs.

Indicators that the program meets the standard:

7.1 Using an outcomes-based approach, in every subject a teacher will be qualified to teach, each pathway to middle school certification listed below requires either:

- Rigorous stand-alone tests.

OR

- A rigorous test of multiple subject areas that provides cut-scores for each specific subject on the test, or a series of rigorous stand-alone tests.

Absent such licensing tests used to verify competency, we look for institutions to require or certify courses of study as follows:

At the undergraduate level:

7.2 A middle school teacher candidate seeking certification in mathematics must have a major consisting of at least 30 semester credit hours, including at least 24 credit hours of general audience[1] mathematics coursework.

7.3 A middle school teacher candidate seeking certification in English/language arts must have a major consisting of at least 30 semester credit hours, including at least 24 credit hours of general audience English coursework.

7.4 A middle school teacher candidate seeking certification in the sciences must have either:

- A major in a single teachable science discipline (biology, chemistry, physics or earth science) of at least 30 semester credit hours including at least 24 credit hours of general audience coursework.

OR

- A major in general science that consists of at least 15 credit hours (the equivalent of one minor) in one teachable science discipline (biology, chemistry, physics or earth science).

7.5 A middle school teacher candidate seeking certification in the social sciences must have either:

- A major in a single teachable social science discipline (history, government/political science or economics) of at least 30 semester credit hours, including at least 24 credit hours of general audience coursework.

OR

[1] Courses which are intended for any student on campus, not just prospective teachers.

- A major in general social science that consists of at least 15 credit hours (the equivalent of one minor) in history.

7.6 If certification in multiple subjects is offered, a middle school teacher candidate seeking certification in multiple subjects must have at least 15 semester credit hours (the equivalent of a minor) in a single discipline relevant to each of the subject areas. (For example, dual certification in mathematics and science must consist of the equivalent of a minor in mathematics and a minor in biology, not the equivalent of a minor in mathematics and a minor in general science.)

At the graduate level:

7.7 The burden posed by a stringent credit count does not relieve the program of its responsibility to ensure that middle school teacher candidates in each pathway to certification (mathematics, English, the sciences, the social sciences, multiple subjects) meet requirements for content knowledge preparation. If candidates have significant weaknesses in content knowledge, the program works with the candidate to remedy them.

- When applications to the program, catalogs or other public documents do not describe such a process, the presumption will be made that no content preparation requirements are imposed on graduate teacher candidates.

Rationale

Standard 7: Middle School Content

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

Standard applies to secondary programs.

Why this standard?

Research generally shows that teachers' deep content knowledge will support their students' academic success. Middle school teacher candidates must develop sufficient expertise in their subjects to teach them effectively, particularly in increasingly rigorous classrooms.

What is the focus of the standard?

If a state does not have regulations that require that all middle school teacher candidates pass adequate subject-matter licensing tests, the program's subject preparation requirements are examined. At the undergraduate level, candidates should work toward an academic major if they are going to teach one subject (e.g., math) or two minors if they are going to teach unrelated subjects (e.g., math and science). At the graduate level, the transcript review process is examined to check that programs are verifying that their incoming candidates have sufficient content knowledge in the area or areas they wish to teach.

Rationale

Research base for this standard

Little "strong research"[1] exists on this topic.[2] However, one study found no correlation between teachers' content courses and students' achievement, but the study only looked at math and reading achievement and therefore would not have captured an effect of content courses on achievement in other areas, such as science or social studies.[3]

Additional research[4] indicates that strong subject-matter expertise makes for better teaching. However, while support for this principle is strong at the high school level, the evidence supporting how much expertise is

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[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 and Evidence of Effectiveness 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] For related strong research on the importance of subject-matter knowledge, see Dee, T., & Cohodes, S. (2008). Out-of-field teaching and student achievement: Evidence from matched-pairs comparisons. *Public Finance Review, 36*(1), 7-32. This study found a positive relationship between teachers' state-certification in a subject and students' academic achievement in that subject; this is suggestive (though not conclusive) of the importance of teachers' content knowledge.

[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] "Additional research" is research that is not designated as "strong" because it is not as recent and/or does not meet the highest standards for design methodology and/or use of student performance data.

enough is less clear at the middle school level.[5] There are few studies examining the effectiveness of a middle school teacher with a major versus one with just a minor. One study points to a potential ceiling effect at six mathematics courses for middle school mathematics teachers, roughly equivalent to a minor, meaning that additional coursework would not yield additional benefits to the teacher.[6]

A study of middle school physical science teachers found that when teachers could identify both the correct answer and a popular misconception on a science test, their students had greater learning gains. Furthermore, the study found little transfer of teacher knowledge between science concepts. These findings support the importance of building teacher candidates' content and pedagogical knowledge in the specific subjects they will teach.[7]

Other support for this standard

Middle school teaching requires more advanced subject knowledge than elementary school teaching; consequently, those seeking middle school endorsement must have adequate subject preparation, defined as a full academic major. In fact, the federal No Child Left Behind (NCLB) statute defines a "highly qualified" middle or high school teacher as one who either majors in the subject she or he teaches or passes a rigorous test in that subject.

NCTQ has long endorsed requiring an academic major for all secondary teachers, which NCLB established as the minimum credential that secondary teachers should have. For middle school teachers, NCTQ has endorsed an academic major for teachers of a single subject. However, requiring that middle school teachers who intend to teach two related subjects receive two minors rather than two majors may be more realistic.

From a pragmatic perspective, unless a teacher candidate has fulfilled a substantial part of the requirements for a college major outside of education or teacher-specific subjects such as social studies, if that teacher candidate fails student teaching, he or she may not earn a college degree. This consequence provides a strong disincentive for the education program to fail candidates even in the face of poor performance.

Several studies comparing the teacher preparation practices of different countries further supports this standard. One study found that in countries whose middle school students scored the highest on international math exams, middle school teacher candidates tended to devote half of their teacher preparation courses to formal mathematics. In the United States (where middle school students generally score around average on international math exams), middle school teacher candidates devoted only 40 percent of coursework to math and shifted the balance of their coursework to general pedagogy.[8] Another report on international practices found that high-performing countries generally required their middle school mathematics teacher candidates to take nine courses on mathematics content and methods, with a heavier focus on content. This study noted that in the United States, only a third (31 percent) of teacher candidates reached this benchmark.[9]

This standard also meets with support from school district superintendents.

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[5] Chaney, B. (1995). *Student outcomes and the professional preparation of eighth grade teachers in science and mathematics. NSF/NELS: 88 Teacher transcript analysis.* Rockville, MD: Westat; Goldhaber, D. D., & Brewer, D. J. (1997). Why don't schools and teachers seem to matter? Assessing the impact of unobservables on educational productivity. *Journal of Human Resources, 32*(3), 505-523; Goldhaber, D. D., & Brewer, D. J. (1998, October). When should we reward degrees for teachers? *Phi Delta Kappan, 80*(2),134-138; Goldhaber, D. D., & Brewer, D. J. (2000). Does teacher certification matter? High school teacher certification status and student achievement. *Educational Evaluation and Policy Analysis, 22*(2), 129-145; Monk, D. (1994). Subject area preparation of secondary mathematics and science teachers and student achievement. *Economics of Education Review, 13*(2): 125-145; Rothman, A. (1969). Teacher characteristics and student learning. *Journal of Research in Science Teaching, 6*(4), 340-348; Rowan, B., Chiang, F., & Miller, R. J. (1997, October). Using research on employees' performance to study the effects of teachers on students' achievement. *Sociology of Education, 70*, 256-284; Wenglinsky, H. (2000). *How teaching matters: Bringing the classroom back into discussions of teacher quality.* Princeton, NJ: Educational Testing Service; www.ets.org/Media/Research/pdf/PICTEAMAT.pdf

[6] Monk, D. (1994).

[7] Sadler, P. M., Sonnert, G., Coyle, H.P., Cook-Smith, N., Miller, J. L., (2013). The influence of teachers' knowledge on student learning in middle school physical science classrooms. *American Educational Research Journal, 50*(5), 1020-1049.

[8] Center for Research in Mathematics and Science Education. (2010). *Breaking the cycle: An international comparison of U.S. mathematics teacher preparation.* East Lansing, MI: Michigan State University.

[9] Schmidt, W., Burroughs, N., Cogan, L. (2013). World class standards for preparing teachers of mathematics (Working Paper). East Lansing, MI: Michigan State University Center for the Study of Curriculum and The Education Policy Center.

Scoring Methodology

How NCTQ scores the Middle School Content Standard

Standard and indicators

Data used to score this standard

Evaluation of middle school[1] teacher preparation programs on Standard 7: Middle School Content uses the following sources of data:

- State regulations that specify the types of middle school teacher certification available
- State documents that outline possible teaching assignments for teachers with each type of certification
- Course requirements and descriptions found in institution of higher education (IHE) catalogs
- Degree plans provided by IHEs
- Relevant IHE web pages, including web pages for the college of education and the registrar, and those relevant to graduate school admission
- Admissions-related documents, including transcript review forms

Who analyzes the data

Two general analysts evaluate each program using a detailed scoring protocol from which this scoring methodology is abstracted. For information on the process by which scoring discrepancies are resolved, see the "scoring processes" section of the General Methodology.

Scope of analysis

Analysis starts with an examination of the middle school certifications offered in each state. Next, an evaluation of licensure test adequacy is completed for each certification. The majors leading to certification are then identified for each middle school program. Finally, if licensure tests are not adequate for a specific certification, analysts examine the coursework preparation required for specific middle school majors.[2]

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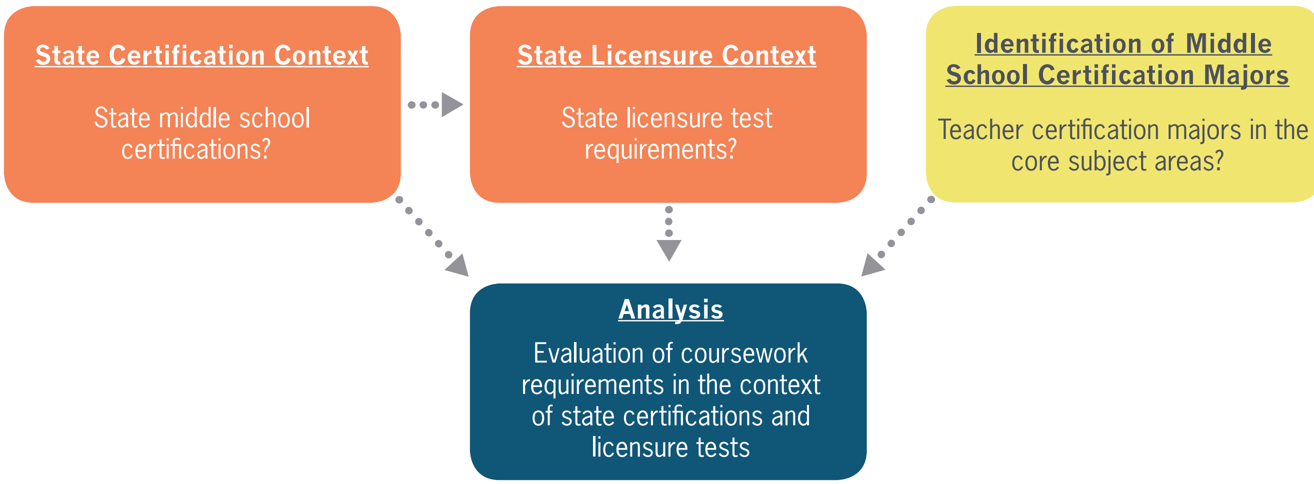
[1] For the purposes of this standard, middle school certification refers only to stand-alone degree programs that lead to certification in the middle school grade span. Certifications that encompass both the middle school and high school grade spans are evaluated under **Standard 8: High School Content**. Grade span information for each state can be found here.

[2] This may involve analysis of course descriptions. More discussion of evaluation using coursework descriptions is found here.



A detailed explanation of each step in this process follows. Because examples of coursework satisfying Indicators 7.2-7.6 are similar to the examples of coursework satisfying the High School Content Standard's Indicators 8.2-8.5 (found at the conclusion of the scoring methodology for Standard 8), they are not repeated here. Examples of the types of coursework satisfying Indicator 7.7 are found at the conclusion of this scoring methodology.

State certification context

There are several possible organizations of middle school certification, making it necessary to evaluate this standard within a state context. Evaluation begins by using state regulations to identify all single-subject certifications available to teach at the middle school level in the four core subject areas or "pathways"[3] of English, mathematics, the sciences and the social sciences.[4] Certifications that combine two of these pathways or all four ("generalist certification") are treated as a fifth pathway for the purpose of this evaluation.

Types of Middle School Certification		
Single Subject	**Dual Subject***	**Generalist**
English	English/Social Sciences	All Subjects
Social Sciences		
Mathematics	Mathematics/Sciences	
Sciences		

Evaluated under Indicators 7.2 – 7.5

Collectively evaluated under Indicator 7.6

* While some states and programs may allow for alternative pairings, these two combinations are the most common and are therefore used exclusively for analysis. A number of states require content preparation in two pathways but then allow candidates to pursue a lone single-subject certification. Similarly, some middle school programs require teacher candidates to pursue preparation in two subjects simultaneously even though the state offers only single-subject certifications. In both cases, we evaluate the preparation using dual-subject criteria.

[3] The term "pathways" is one used by NCTQ to provide a useful standard term for a grouping of certifications in one or more subject areas.

[4] While most states offer only a single middle school certification in the sciences and social sciences, a handful of states offer subject-specific certifications within those pathways.

State licensure context

With each state's approach to certification fully researched, evaluation of this standard continues with a review of the state licensing test(s) required for each certification. Under Indicator 7.1, if a test adequately measures content knowledge for the subject(s) for which certification is sought, content preparation is deemed adequate without any examination of course requirements for majors leading to those certifications. For this edition of the *Review,* a test is considered to adequately measure content knowledge if it has a cut-score that ensures that 5 percent or more of test takers do not pass.[5] Note that comprehensive tests covering the sciences and social sciences are accepted under this standard but not under the High School Content Standard.

The following examples of certification structures in **Kentucky, Texas** and **North Carolina** highlight our approach to evaluation of this standard in the context of differing certification structures.

Kentucky is an example of a state in which all middle school pathways satisfy this standard due to the adequacy of licensing tests. Note that both multiple-subject certifications require a separate test for each subject. This

Kentucky Middle School Certifications

Pathway	Certification	Licensure Test	Analysis Procedure
English	English and Communications	Middle School English Language Arts	Accept licensure test as adequate measure of content knowledge for corresponding majors
Mathematics	Mathematics	Middle School Mathematics	
Sciences	Science	Middle School Science	
Social Sciences	Social Studies	Middle School Social Studies	
Multiple-Subject Certifications	English and Communications/ Social Studies	Middle School English Language Arts/Middle School Social Studies	
	Mathematics/ Science	Middle School Mathematics/ Middle School Sciences	

testing structure ensures that teacher candidates obtaining all types of certifications have adequate content knowledge of the subject(s) they will teach. The structure of middle school certification in most states is similar to that in Kentucky.

[5] In the absence of technical report data that validate the passing rates for a licensure test, we will presume that such cut-scores are set too low to verify content knowledge.

Texas Middle School Certifications

Pathway	Certification	Licensure Test	Analysis Procedure
English	English Language Arts and Reading	English Language Arts and Reading 4–8	Accept licensure test as adequate measure of content knowledge for corresponding majors
Mathematics	Mathematics	Mathematics 4–8	
Sciences	Science	Science 4–8	
Social Sciences	Social Studies	Social Studies 4–8	
Multiple-Subject Certifications	English Language Arts and Reading/ Social Studies	English Language Arts and Reading/ Social Studies 4–8	Evaluate coursework requirements for corresponding majors
	Generalist	Mathematics/ Science 4–8	Evaluate coursework requirements for corresponding majors
	Social Studies	Generalist 4–8	Evaluate coursework requirements for corresponding majors

Texas is an example of a state in which the single-subject certifications are adequately tested, but in which each of the three multiple-subject certifications require only a single licensure test that covers more than one subject. These tests are problematic because—for example—it is possible that a teacher candidate seeking “Mathematics/Science” certification will score very well on the sciences portion of the test and do poorly on the math portion, obtain certification to teach both subjects, and then be assigned to teach one or more math classes. As a result, we examine the coursework requirements for middle school programs offering majors leading to any of the three multiple-subject certifications.

North Carolina Middle School Certifications

Pathway	Certification	Licensure Test	Analysis Procedure
English	Middle Grades Language Arts	No test required for initial licensure	Evaluate coursework requirements for corresponding majors
Mathematics	Middle Grades Mathematics	No test required for initial licensure	Evaluate coursework requirements for corresponding majors
Sciences	Middle Grades Science	No test required for initial licensure	Evaluate coursework requirements for corresponding majors
Social Sciences	Middle Grades Social Studies	No test required for initial licensure	Evaluate coursework requirements for corresponding majors
Multiple-Subject Certifications	Middle School Language Arts/ Middle School Social Science	No test required for initial licensure	Evaluate coursework requirements for corresponding majors
	Middle School Mathematics/ Middle School Science	No test required for initial licensure	Evaluate coursework requirements for corresponding majors

North Carolina is an example of a state that does not require licensure tests for initial certification. To ensure that middle school teacher candidates in North Carolina have adequate content preparation, we evaluate coursework requirements for all middle school majors.

Identification of middle school certification majors

The majors leading to middle school certification offered by each program are identified. Because this identification is central to evaluation, two analysts independently complete this work and a third analyst reconciles the results, investigating all discrepancies. The end product for each state is an extensive database identifying the pathways offered at each IHE. Below are examples of entries for programs in **Kentucky, Texas** and **North Carolina.** The majors requiring coursework evaluation because of inadequate licensure testing are circled in red:

University	State	Middle School Pathways							
		Initial Cert.	Undergraduate						
			Eng	Math	SS	Sci	Eng/SS	Math/Sci	General
Sample IHE	Kentucky	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

University	State	Middle School Pathways							
		Initial Cert.	Undergraduate						
			Eng	Math	SS	Sci	Eng/SS	Math/Sci	General
Sample IHE	Texas	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

University	State	Middle School Pathways							
		Initial Cert.	Undergraduate						
			Eng	Math	SS	Sci	Eng/SS	Math/Sci	General
Sample IHE	North Carolina	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

Analysis

After the state context is established and identification of all majors leading to middle school certification is complete, majors are evaluated using the following criteria established by the standard:

Indicator/Pathway	Passing Criteria
7.2 – Mathematics	• 30 SCH in Mathematics content coursework
7.3 – English	• 30 SCH in English content coursework
7.4 – Sciences	• 30 SCH in either Biology, Chemistry, Earth Science, or Physics content coursework, or • 15 SCH in one of those fields with an additional 15 SCH in the listed sciences
7.5 – Social Sciences	• 30 SCH in either History, Economics, or Political Science/Government content coursework, or • 15 SCH in one of those fields with an additional 15 SCH in the listed social sciences
7.6 – Multiple Subjects	• 15 SCH in Mathematics, English, one of: Biology, Chemistry, Earth Science, or Physics, and one of: History, Economics, or Political Science (where appropriate)

In each pathway, all possible majors must satisfy the criteria for the pathway to “pass.” The final program rating for an **undergraduate** or **graduate** middle school program on this standard is based on the proportion of the five pathways offered by the program for which content preparation is determined to be adequate either by licensure test at the state level or coursework evaluation at the program level.

The following examples illustrate how several **undergraduate** middle school majors in **Kentucky, Texas** and **North Carolina** are evaluated under this standard:

University	State	Certification	Majors	Subject-area Credit Counts									Pathway Outcome	Final Score
				Math	English	Biology	Chem	Earth	Physics	History	Econ	Gov't		
Wingate University	North Carolina	Mathematics	Mathematics	35									7.2: Pass	4
		Language Arts	Language Arts		30								7.3: Pass	
		Science	Science			19	4	3	(6)*				7.4: Pass	
		Social Studies	Social Studies							19	3	3	7.5: Pass	
University of North Carolina at Pembroke	North Carolina	Mathematics	Mathematics	30									7.2: Pass	2
		Language Arts	Language Arts		36								7.3: Pass	
		Science	Science			11	4	8	8				7.4: Fail	
		Social Studies	Social Studies							39	6	3	7.4: Pass	
Western Kentucky University	Kentucky	Mathematics	Mathematics	Passes with state licensure test in Mathematics – coursework evaluation not required									7.2: Pass	4
		English	Language Arts	Passes with state licensure test in English Language Arts – coursework evaluation not required									7.3: Pass	
		Science	Science	Passes with state licensure test in Science – coursework evaluation not required									7.4: Pass	
		Social Studies	Social Studies	Passes with state licensure test in Social Science – coursework evaluation not required									7.5: Pass	
		Mathematics/Science	Mathematics/Science	Passes with state licensure test in Mathematics/Science – coursework evaluation not required									7.6: Pass	
		English/Social Studies	English/Social Studies	Passes with state licensure test in ELA and Social Studies – coursework evaluation not required										
LeTourneau University	Texas	Mathematics/Science	Mathematics/Science	17		16	–	8	–				7.6: Fail	0
		English/Social Studies	ELA/Social Studies		18					21	–	3		
		Generalist	4–8 Certification	9	9	4	–	8	–	12	–	3		
Hardin–Simmons University	Texas	Mathematics	Mathematics	Passes with state licensure test in Mathematics – coursework evaluation not required									7.2: Pass	4
		English Language Arts	English Language Arts	Passes with state licensure test in English Language Arts – coursework evaluation not required									7.3: Pass	
		Science	General Science	Passes with state licensure test in Science – coursework evaluation not required									7.4: Pass	
		ELA/Social Studies	ELA/Social Studies		15					18	3	6	7.6: Pass	
Texas A&M University	Texas	English Language Arts	English Language Arts	Passes with state licensure test in English Language Arts – coursework evaluation not required									7.3: Pass	0
		Mathematics/Science	Mathematics/Science	17		8	4	4	4				7.6: Fail	
		ELA/Social Studies	ELA/Social Studies		15					12	3	12		

*__Wingate University__ has a coursework requirement of “advanced science electives (6–8 credits),” which we count as part of the “additional 15 SCHs in the listed sciences.” (The “listed science” in this case is biology.)

You'll note that two programs may receive different evaluations for course requirements that at first glance look similar. For example, **Wingate University** and the **University of North Carolina at Pembroke (UNCP)** appear to have similar coursework requirements for their science certifications and both require more than 30 SCHs in total, but Wingate earns a "pass" whereas UNCP earns a "fail." The reason for the scoring difference is that Wingate requires more than 15 SCHs in a single science subject, whereas UNCP requires only 11 SCHs.

More information about analysis of coursework requirements

How do analysts evaluate course menus? A major that allows teacher candidates to select from a menu of course choices can affect the credit count in coursework evaluation when it includes courses in subjects that do not suffice for content preparation for any given pathway. For example, a social studies major may allow candidates to choose eight courses from among seven social science subject areas with the only restriction being that credits be distributed over at least three of them. While a candidate might select courses that fall almost entirely within the criteria for Indicators 7.5 or 7.6, it is also possible that none of the eight courses will do so. For this reason, the major would fail on analysis and the middle school program would fail on evaluation of the social sciences pathway.

Below is an example of a menu of course choices for the social sciences with five of the possible distributions listed. In such cases it is impossible to discern where credits should be assigned, and we assume that candidates will select the least rigorous option.

Course Choice Menu Example

Choose five of the following courses:

- ANTH 121 – Cultural Anthropology (3)
- ANTH 221 – Physical Anthropology (3)
- ECON 201 – Principles of Macroeconomics (3)
- ECON 202 – Principles of Microeconomics (3)
- GEOG 101 – Introduction to Geography (3)
- HIS 120 – American History until 1877 (3)
- HIS 121 – American History since 1877 (3)
- HIS 201 – Ancient World History (3)
- HIS 202 – Medieval World History (3)
- HIS 211 – State History (3)
- PS 221 – Legislative Process (3)
- PS 272 – Judicial Process (3)
- PSYCH 101 – General Psychology (3)
- SOC 101 – Introduction to Sociology (3)

	HIS	PS	ECON	PSYCH	GEOG	SOC	ANTH
Possibility #1	6	3	–	3	–	3	–
Possibility #2	15	–	–	–	–	–	–
Possibility #3	–	–	6	–	3	–	6
Possibility #4	3	3	3	–	3	3	–
Possibility #5	–	6	–	3	–	–	6

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How do analysts evaluate courses taught with a religious perspective? Courses offering religious perspectives do not receive credit in the evaluation of this standard.[6] This includes science coursework that explicitly endorses religion or 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.

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[6] 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.

Coursework evaluation at the **undergraduate level** is facilitated by the specificity with which most secondary teacher preparation programs outline course requirements in catalogs. In **graduate programs**, where this specificity is less common, analysts determine 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 graduate middle school teacher candidates meet the same requirements as outlined above, with explicit mention of acceptable undergraduate majors and/or minors and an indication of the potential for imposition of remedial coursework requirements. It is important to note that at the graduate level, the program may offer only a single middle school education major with multiple certifications within that major. In such cases, identification focuses on the possible certification options.

Information on content preparation is generally accessible in publicly available materials. If after an exhaustive search of IHE catalogs and websites we find no public mention of expectations for content preparation, we presume that none exists and score accordingly. All middle school programs in the sample could therefore be evaluated on this standard.

Common misconceptions about how analysts evaluate the Middle School Content Standard:

- *Because all licensing tests required for certification adequately evaluate content knowledge, coursework preparation is not relevant for certifications for which licensing tests are mandatory. Licensing tests serve as an adequate measure of content knowledge only when all possible teaching assignments allowed under the certification are tested with independent cut-scores, the cut-scores are set at a sufficiently high level to ensure rigor, and the test is required for initial licensure.*

- *Evaluation of the sciences and social sciences considers only general content preparation. We consider the licensing tests in middle school science and middle school social science as adequate measures of content knowledge. Where licensing tests are not required for middle school certification, coursework requirements must include at least 15 SCHs in a single accepted content area as part of a total of 30 SCHs in the sciences or social sciences.*

- *Recommended coursework can receive credit. Teacher preparation programs must require coursework to ensure that teacher candidates receive the necessary background knowledge on subjects they will teach.*

Examples of what does and does not satisfy the standard's indicators

Determining the adequacy of content preparation on the basis of licensure tests (Indicator 7.1)

✔ - fully satisfies the indicator	✘ - does not satisfy the indicator
The state requires a single-subject licensing test or a series of tests that evaluate content knowledge for any subjects covered under the certification. *Tests considered for this indicator include Praxis II, AEPA, CSET, FTCE, GACE, ICTS, MTEL, MTTC, MTLE, NMTA, NYSTCE, CEOE, ORELA, TExES, and WEST-E.*	Multiple-subject certifications are tested but do not have independent cut-scores for each subject covered under the certification. Licensing tests are not required by the state.

Considerations for coursework evaluation of majors in mathematics, English, the sciences and the social sciences pathways (Indicators 7.2-7.6)

The criteria for this standard are the same as for Standard 8: High School Content.

Please refer to the last section of that standard's scoring methodology for examples of coursework evaluation.

Consideration of requirements for evaluation of content preparation in mathematics, English, the sciences, the social sciences and multiple-subject certification pathways in graduate programs (Indicator 7.7)

Content Preparation	
✔ - fully satisfies the indicator	✘ - does not satisfy the indicator
For all certifications that are not adequately tested, the program requires undergraduate coursework entailing: 1) For **single-subject certifications**, either a) a 30 SCHs content-area major, or b) for the sciences and social sciences, a total of 30 SCHs, with 15 SCHs in the content area and an additional 15 SCHs in the sciences or social sciences. 2) For **multiple-subject certifications**: 15 SCHs in a single content area for each pathway covered under the certification. (For example, 15 SCHs in history coursework — not general social sciences coursework.)	*The program fails to specify undergraduate coursework requirements.* *The program specifies that candidates for **single-subject certification** may be admitted with fewer than 30 SCHs in the relevant content area or 30 total SCHs with 15 SCHs in a single subject.* *The program specifies that candidates for **multiple-subject certifications** may be admitted with fewer than 15 SCHs in a single subject for each pathway covered under the certification.*

Research Inventory

Researching Teacher Preparation: Studies investigating the preparation of teacher candidates in elementary, middle, and high school content

These studies address issues most relevant to Standards 6–8: Elementary Content, Middle School Content, and High School Content.

Area of Research	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
Std. 6	16	3 Citations: 3, 11, 13	2 Citations: 15, 25	0	11 Citations: 1, 6, 12, 16, 17, 19, 21, 23, 24, 27, 28
Std. 7	9	3 Citations: 3, 7, 13	2 Citations: 9, 26	0	4 Citations: 1, 8, 18, 22
Std. 8	13	4 Citations: 2, 4, 10, 13	2 Citations: 9, 26	0	7 Citations: 1, 5, 14, 20, 22, 23, 29

Note: Citation 1 and 13 are cross-listed with RI 6, 7, and 8; Citation 2 is cross-listed with RI 15: Secondary Methods; Citation 3 is cross-listed with RI 5: Elementary Mathematics, RI 6 and 7, and RI 14: Student Teaching; Citation 5 is cross-listed with RI 15: Secondary Methods; Citation 14 is cross-listed with RI 9: Content for Special Education and RI 5: Elementary Mathematics; Citations 6, 12, 16, 18, 21 and 25 are cross-listed with RI 5: Elementary Mathematics.

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 – June 2012

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. Baumert, J., Kunter, M., Blum, W., Brunner, M., Voss, T., Jordan, A., & ... Tsai, Y. (2010). Teachers' mathematical knowledge, cognitive activation in the classroom, and student progress. *American Educational Research Journal, 47*(1), 133–180.

3. 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.

4. Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2010). Teacher credentials and student achievement in high school. *Journal of Human Resources, 45*(3), 655–681.

5. Conner, A., Edenfield, K. W., Gleason, B. W., & Ersoz, F. (2011). Impact of a content and methods course sequence on prospective secondary mathematics teachers' beliefs. *Journal of Mathematics Teacher Education, 14*(6), 483–504.

6. Cramer, K. (2004). Facilitating teachers' growth in content knowledge. *Yearbook (National Council of Teachers of Mathematics), 66*, 180–194.

7. Dee, T. S., & Cohodes, S. R. (2008). Out-of-field teachers and student achievement: Evidence from matched-pairs comparisons. *Public Finance Review, 36*(1), 7–32.

8. Feuerborn, L. L., Chinn, D., & Morlan, G. (2009). Improving mathematics teachers' content knowledge via brief in-service: A US case study. *Professional Development in Education, 35*(4), 531–545.

9. Gleason, J. (2010). Reliability of the content knowledge for teaching-mathematics instrument for pre-service teachers. *Issues in the Undergraduate Mathematics Preparation of School Teachers, 1.*

10. Goldhaber, D. D., & Brewer, D. J. (2000). Does teacher certification matter? High school teacher certification status and student achievement. *Educational Evaluation and Policy Analysis, 22*(2), 129–145.

11. 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.

12. Hart, L. C., & Swars, S. L. (2009). The lived experiences of elementary prospective teachers in mathematics content coursework. *Teacher Development, 13*(2), 159–172.

13. Harris, D. N., & Sass, T. R. (2011). Teacher training, teacher quality, and student achievement. *Journal of Public Economics, 95*(7), 798–812.

14. Livy, S., & Vale, C. (2011). First year pre-service teachers' mathematical content knowledge: Methods of solution for a ratio question. *Mathematics Teacher Education and Development, 13*(2), 22–43.

15. 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.

16. Matthews, M. E., & Seaman, W. I. (2007). The effects of different undergraduate mathematics courses on the content knowledge and attitude towards mathematics of preservice elementary teachers. *Issues in the Undergraduate Mathematics Preparation of School Teachers: The Journal, 1*.

17. May, M. (2005). Improving teacher preparation. *Journal of Social Studies Research, 29*(2), 4–8.

18. McLeod, K., & Huinker, D. (2007). University of Wisconsin–Milwaukee mathematics focus courses: Mathematics content for elementary and middle grades teachers. *International Journal of Mathematical Education in Science & Technology, 38*(7), 949–962.

19. 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.

20. Nathan, M. J., & Petrosino, A. (2003). Expert blind spot among preservice teachers. *American Educational Research Journal, 40*(4), 905–928.

21. Norton, S. (2010). How deeply and how well? How ready to teach mathematics after a one-year program?. *Mathematics Teacher Education and Development, 12*(1), 65–84.

22. Saderholm, J. C., & Tretter, T. R. (2008). Identification of the most critical content knowledge base for middle school science teachers. *Journal of Science Teacher Education, 19*(3), 269–283.

23. Sanchez, R. M. (2010). The six remaining facts: Social studies content knowledge and elementary preservice teachers. *Action in Teacher Education, 32*(3), 66–78.

24. 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.

25. Schmidt, W. H., Cogan, L., & Houang, R. (2011). The role of opportunity to learn in teacher preparation: An international context. *Journal of Teacher Education, 62*(2), 138–153.

26. Swackhamer, L., Koellner, K., Basile, C., & Kimbrough, D. (2009). Increasing the self-efficacy of inservice teachers through content knowledge. *Teacher Education Quarterly, 36*(2), 63–78.

27. 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.

28. 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.

29. Wilburne, J. M., & Long, M. (2010). Secondary pre-service teachers' content knowledge for state assessments: Implications for mathematics education programs. *Issues in the Undergraduate Mathematics Preparation of School Teachers: The Journal, 1*.