Standard 15: Secondary Methods

The program requires teacher candidates to practice instructional techniques specific to their content area.

Why this standard?

It is one thing to know a subject and quite another to teach it. Beyond knowing content, candidates should have skills related to how to introduce content to students. Best practices differ among content areas, so methods courses should be tailored to a candidate's chosen subject area.

What is the focus of the standard?

This standard examines whether secondary teacher candidates receive instruction on pedagogy related to their content area and have the opportunity to practice these skills in a classroom.

Standard applies to secondary programs.

Standard and Indicators ..... **page 2**

Rationale ..... **page 3**
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.

Methodology ..... **page 5**
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 ..... **page 9**
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 15: Secondary Methods

The program requires teacher candidates to practice instructional techniques specific to their content area. **Standard applies to: Secondary programs.**

Indicators that the program meets the standard:

15.1 The program requires teacher candidates to take a subject-specific methods course in the area of certification.

15.2 Methods courses focus on specific instructional strategies that will improve the delivery of content and include field work or a concurrent practicum that holds teacher candidates individually accountable for mastering instructional skills.

Rationale

Standard 15: Secondary Methods

The program requires teacher candidates to practice instructional techniques specific to their content area.

Standard applies to secondary programs.

Why this standard?

It is one thing to know a subject and quite another to teach it. Beyond knowing content, candidates should have skills related to how to introduce content to students. Best practices differ among content areas, so methods courses should be tailored to a candidate's chosen subject area.

What is the focus of the standard?

We evaluate whether secondary teacher candidates receive instruction on pedagogy related to their content area and have the opportunity to practice these skills in a classroom.

Rationale

Research base for this standard

Little "strong research"[1] exists on this topic. However, a strong study in Germany looking at the relative effects of different components of teacher education, including pedagogical content knowledge (PCK) (e.g., methods to effectively teach math), found that "it is PCK that has greater predictive power [than content knowledge] for student progress and is decisive for the quality of instruction."[2]

An additional research study[3] of high school math and science teachers found that teachers' pedagogical coursework positively correlated with students' achievement, and in some cases this pedagogical background yielded greater effects than their content knowledge.[4] Another study found that students had larger learning gains when their teacher had both content knowledge and the ability to identify common misconceptions about the content.[5] These studies demonstrate that teachers must have a firm basis in content knowledge and pedagogical techniques specific to that content to teach a subject effectively.

Other support for this standard

Teacher preparation programs in high-achieving nations frequently ensure that teachers not only know the content but also can communicate it. Mathematics-specific pedagogy is part of the preparation of mathematics

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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] Baumert, J., et al. (2010). Teachers' mathematical knowledge, cognitive activation in the classroom, and student progress. *American Educational Research Journal, 47*(1), 133-180.

[3] "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.

[4] Monk, D. (1994). Subject area preparation of secondary mathematics and science teachers and student achievement. *Economics of Education Review*, 13(2), 125-145.

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

teachers around the world, including in countries such as Singapore, Korea and Taiwan, whose students outperform our own.[6]

Like teaching lesson planning, teaching pedagogical skills is one of the central tasks of a teacher preparation program. While some components of teaching may be universal across all subjects, many techniques and strategies are specific to a content area. Therefore it is essential that teacher preparation programs teach these skills to teacher candidates, who are expected to practice them through assignments and eventually implement them in the field.

School district superintendents also support this standard.

[6] Communications with Mdm. Low Khah Gek. (2008, March). Deputy Director, Sciences, Curriculum Planning and Development Division, Ministry of Education, Singapore.

Scoring Methodology

How NCTQ scores the Secondary Methods Standard

Standard and indicators

Data used to score this standard

Evaluation of middle and high school teacher preparation programs on Standard 15: Secondary Methods uses the following sources of data:

- Course requirements and descriptions found in institution of higher education (IHE) catalogs
- Degree plans provided by IHEs
- Syllabi of required courses deemed relevant[1]

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 under this standard focuses on the required methods coursework in a single secondary teacher certification major selected from the **undergraduate** or **graduate** secondary program being evaluated.[2] The specific major was randomly selected from the core subject areas, or "pathways," of English, mathematics, the sciences or the social sciences.[3] The selected major might, for example, be an undergraduate high school mathematics major or a graduate middle school social sciences major. If the sciences or social sciences pathway chosen has multiple subpathways available (e.g., the social sciences pathway might involve majors in history, government or social studies), a subpathway major was randomly selected.

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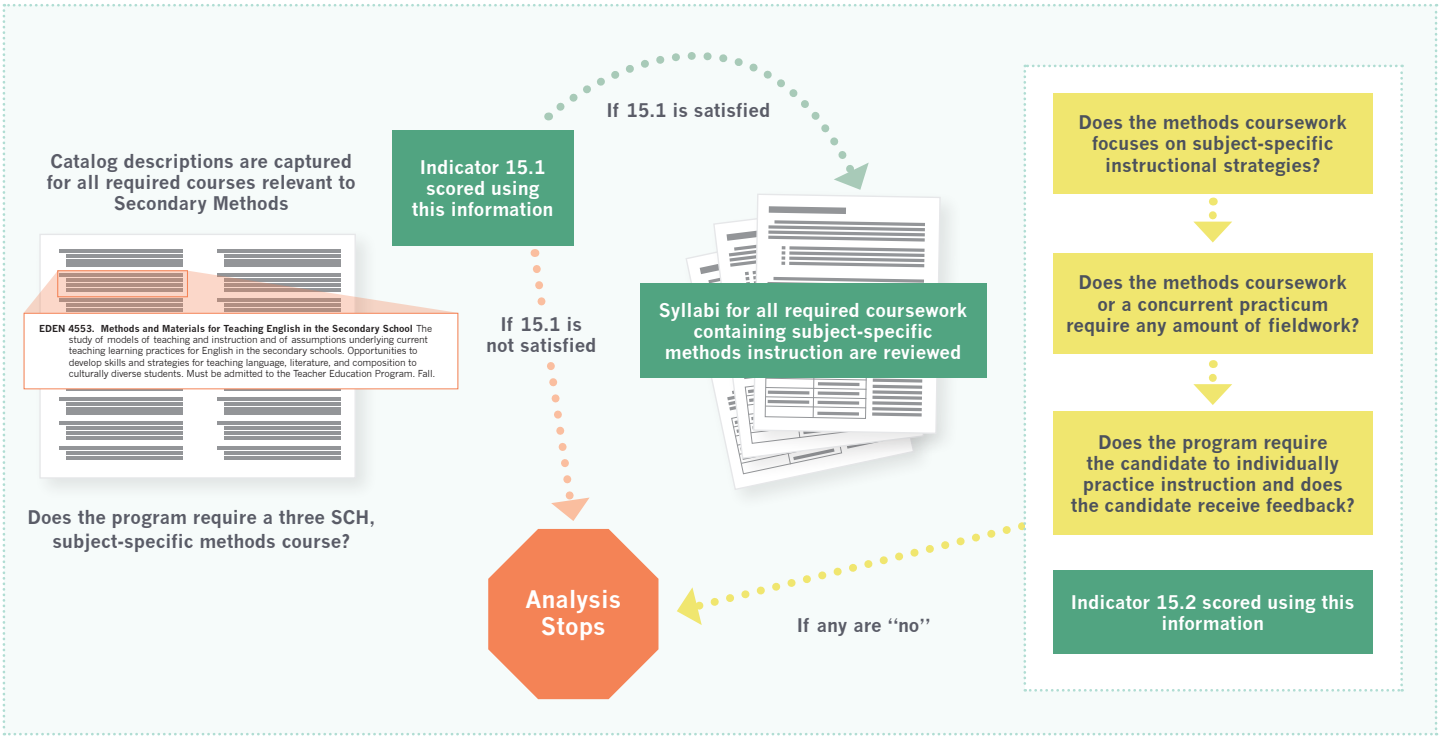
[1] Courses relevant to this standard are ones whose course titles and/or descriptions indicate coverage of instructional methods with terms such as *methods, instructional strategies, techniques, materials* and *teaching.* Most often, these terms are accompanied by a subject area, as in *Teaching Social Studies* or *Instructional Strategies in Secondary English.*

[2] Refer to the general methodology for more information about secondary program selection principles.

[3] When a middle school certification is selected, multiple-subject certifications (e.g., dual certification in English and the social sciences) are another possible pathway. When a multiple-subject certification is evaluated, the requirements under this standard must be met in each subject area covered under the certification. For the English/social sciences example, the program must satisfy the standard for methods coursework in both English and the social sciences.

The graphic below depicts the general evaluation approach used for this standard:



For both **undergraduate** and **graduate** programs, Indicator 15.1 is evaluated using course titles and descriptions in catalogs and syllabi as necessary and available. More discussion of evaluation using coursework descriptions is found here; more discussion of analysis using syllabi is found here.

Analysis focuses on the requirement of a three-semester credit hour (SCH), subject-specific course in the methods of instruction in the relevant subject area. General methods courses[4] and subject-specific courses with fewer than three SCHs[5] do not satisfy this indicator. If Indicator 15.1 is satisfied, analysis continues to Indicator 15.2. In cases in which Indicator 15.1 is not satisfied, there is no further analysis of the program.[6]

Indicator 15.2 is evaluated using syllabi for all courses that satisfy Indicator 15.1, as well as for any practicums that are taken concurrently with subject-specific methods coursework. Analysis proceeds sequentially, and the program may be deemed not to satisfy the indicator if any of the three criteria below are not satisfied:

- *Does the methods course focus on specific instructional strategies?* Analysts are trained to use the broadest possible interpretation of "instructional strategies." For example, even general references to teaching strategies, methods and materials, or curriculum planning in a syllabus course description are deemed to satisfy.
- *Is there a requirement of any amount of fieldwork as part of the methods course or a concurrent practicum?*

[4] Courses lacking subject specificity--for example, *Methods of Secondary Instruction*, as opposed to *Secondary Mathematics Methods*.

[5] Except when the sum of credits entailed in a methods course and a corequisite practicum course total three or more SCHs.

[6] In such instances, findings for Indicator 15.1 and Indicator 15.2 will indicate that neither is satisfied.

- *Does the methods course or concurrent practicum require the teacher candidate to individually practice instructional strategies through a teaching experience for which feedback is provided?* The teaching experience must take place in a classroom of students relevant to the certification sought and must be for full-class instruction (not tutoring or small group instruction).[7] Feedback on instruction can be in the form of any kind of evaluation or graded assignment based on the teaching experience.

If an evaluation of Indicator 15.2 is not possible due to a missing or incomplete syllabus, the program is removed from the sample.

Common misconceptions about how analysts evaluate the Secondary Methods Standard:

- *General methods coursework is equivalent to content-specific methods coursework.* These two types of coursework are not considered equivalent in evaluation because a teacher candidate receiving methods instruction specific to his/her content area is more likely to be better prepared for the secondary classroom than one prepared by general secondary methods instruction.
- *A program can receive credit for an optional teaching experience offered in conjunction with a methods course.* Only a *required* teaching experience receives credit in evaluation of this standard.
- *Any teaching experience "counts" in evaluation of this standard:* The only teacher experience considered in evaluation is whole-class instruction for which feedback is provided.

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

Requirement of a subject-specific methods course (Indicator 15.1)

✔ · fully satisfies the indicator	✘ · does not satisfy the indicator
A program satisfies the indicator if it requires: ■ *A single course or a combination of courses that provides at least three SCHs of subject-specific methods instruction.* ■ *A combination of a two SCH, subject-specific course in the methods of content instruction, plus a concurrent one SCH practicum.*	A program does not satisfy the indicator if it requires: ■ *Only a course in the general methods of secondary instruction.* ■ *A subject-specific course in the methods of content instruction requiring fewer than three SCHs or addressing methods in only one aspect of the relevant content area (for example, an English methods course that only addresses the methods of literature instruction and not methods of teaching writing).*

[7] Peer teaching, or micro-teaching (a common requirement of many methods courses) does not satisfy this aspect of Indicator 15.2.

Subject-specific instructional strategies and practice (Indicator 15.2)

✔ · fully satisfies the indicator	✘ · does not satisfy the indicator
A program satisfies the indicator if the syllabus for the subject-specific methods course: References teaching/instructional strategies, methods or planning that focus on the full range of topics covered within the subject area; requires fieldwork; and specifies that teacher candidates must teach a lesson in a classroom appropriate to the subject and grade level for the relevant certification, and that the teaching experience is evaluated through one of the following: ■ A formal evaluation (graded or ungraded) by either the supervising teacher or a university supervisor: *During the course of your time in a school classroom, you will prepare and teach two days (consecutive is best). Your cooperating teacher and I will evaluate your lesson plans, and the cooperating teacher will evaluate your teaching.* ■ A graded reflection assignment based on the teaching experience: *As part of the practicum, you will be required to:* *1) Grade a set of student papers* *2) Teach a whole-class lesson* *3) Write three papers (three-four pages) reflecting on the specific required assignments/activities and addressing the ways in which you are integrating the experience to develop a personal, coherent view of teaching language arts to adolescents* ■ Analysis of a videotaped lesson by an audience, including either the supervising teacher or university supervisor (graded or ungraded): *Each student will be required to tape a 15-30-minute segment of classroom teaching. We will view the video and provide a critique. After the roundtable critique, each student will write a summary of the roundtable with suggestions for improving his or her teaching.*	A program fails to satisfy the indicator if the syllabus for the subject-specific methods course: Indicates limited coverage of the instructional strategies within a subject area (for example, a science course that only covers laboratory experiences). OR Does not indicate that a fieldwork experience is required, or requires a fieldwork experience for a subject and/or grade level not appropriate to the certification sought. OR Does not indicate that there will be a teaching experience or that the candidate will not receive formal or graded feedback from that experience, as in the following examples: ■ *As part of this course, you are required to complete 10 hours of field observations and submit brief written and oral reflective reports.* ■ *You are strongly encouraged to participate in teaching in the classroom at whatever level your mentor teacher allows (working with students one-on-one, teaching lessons, planning lessons, taking attendance, recording grades, reflecting on lessons, etc.).* ■ *Forty-five hours of fieldwork is required.* ■ *You will participate in a 30-hour field experience and write a report that summarizes this experience. This report must include documentation of your field experience visits and signatures of your cooperating teacher(s).* ■ *You are required to spend 30 hours in observation of a high school classroom and to keep a reflective journal of your observations.*

Research Inventory

Researching Teacher Preparation: Studies investigating the preparation of teacher candidates in secondary methods

These studies address issues most relevant to Standard 15: Secondary Methods

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	1 Citation: 1	0	0	9 Citations: 2–10

Note: Citation 2 is cross-listed with RI 11: Lesson Planning; Citations 1 and 4 are cross-listed with RI 6–8: Elementary, Middle, and High School Content (standard 8).

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. 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.

2. Berg, D. E. (2010). Creative mathematics for all? A survey of preservice teachers's attitudes. *International Online Journal of Educational Sciences, 2*(2), 309–318.

3. Conklin, H. G. (2007). Methods and the middle: Elementary and secondary preservice teachers' views on their preparation for teaching middle school social studies. *RMLE Online: Research in Middle Level Education, 31*(4), 1–16.

4. 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.

5. Gal, H. (2011). From another perspective—training teachers to cope with problematic learning situations in geometry. *Educational Studies in Mathematics, 78*(2), 183–203.

6. Johnson, D., & Chandler, F. (2009). Pre-service teachers' fieldtrip to the battleship: Teaching and learning mathematics through an informal learning experience. *Issues in the Undergraduate Mathematics Preparation of School Teachers, 2*.

7. Munakata, M. (2010). The mathematics education debates: Preparing students to become professionally active mathematics teachers. *Primus, 20*(8), 712–720.

8. Russell, W. (2010). Teaching social studies in the 21st century: A research study of secondary social studies teachers' instructional methods and practices. *Action in Teacher Education, 32*(1), 65–72.

9. Star, J., & Strickland, S. (2008). Learning to observe: Using video to improve preservice mathematics teachers' ability to notice. *Journal of Mathematics Teacher Education, 11*(2), 107–125.

10. Wellenreiter, B. R., Lucey, T. A., & Hatch, D. D. (2010). Looking back at their futures: Preservice middle level teachers' examination of past educational experiences. *RMLE Online: Research in Middle Level Education, 34*(1), 1–11.