

## Fine Points:

# Changes in Secondary Content and Secondary Methods Standards – *Teacher Prep Review 2016*

In *Teacher Prep Review 2016*, NCTQ will be making several changes relating to the evaluation of secondary programs for content and methods preparation:

- Eliminating **Standard 7: Middle School Content**. For more information, see [What Happened to Standard 7: Middle School Content?](#)
- Eliminating **Standard 8: High School Content**, and substituting two new standards: **Standard 7: Secondary School Content in the Sciences** and **Standard 8: Secondary Content in the Social Sciences**. This change is discussed below.
- Evaluating **Standard 15: Secondary Methods** with English and mathematics methods courses for all programs rather than one randomly selected subject area chosen from English, mathematics, the sciences, and the social sciences. For more information, see [Teacher Prep Review 2016 Changes in Evaluation of the Secondary Methods Standard](#).

## Why NCTQ has created two new standards:

### Standard 7: Secondary Content in the Sciences and Standard 8: Secondary Content in the Social Sciences

As is explained in depth below, current analysis of secondary content preparation in English and mathematics under the single standard used in the first two editions of the *Review* simply attests to the fact that for the large majority of programs, candidates must demonstrate content mastery on a single-subject licensing test mandated by their state. In the instances when candidates are not tested, programs' coursework requirements in English and mathematics almost uniformly satisfy the standard. In contrast, analysis of content preparation in the sciences and social sciences involves a more complex interplay between state licensing and programs' coursework requirements in which there is much greater variation in adequacy. With two separate standards, it is possible to conduct more focused analyses in each of these two more problematic certification areas.

### English and mathematics content preparation

NCTQ's standard for secondary content preparation in English and mathematics is evaluated in a two-stage process: First, we analyze the adequacy of the licensing tests required in the program's state; second, if tests are inadequate, we evaluate the program's coursework requirements to determine if they entail a major of at least 30 semester credit hours (SCHs).<sup>1</sup>

Forty-three states and the District of Columbia require that English and mathematics secondary teacher candidates pass licensing tests. If coursework requirements had been evaluated, it appears that they would also be adequate. We base this conclusion on a study of required coursework for English and mathematics at 111 randomly selected teacher preparation programs in states with licensing tests and 67 programs included in *Teacher Prep Review 2014* in states without licensing tests.<sup>2</sup> Table 1 details findings:

1 Support for NCTQ's standard of requiring at least 30 SCHs for preparation can be found in state regulations. For the 33 states that define a credit minimum for teacher preparation programs, an average of 29.1 SCHs of content coursework is required to complete a major leading to certification in English and mathematics.

2 These programs reside in states in which program requirement evaluations in both editions of the *Teacher Prep Review* found that 97 percent of undergraduate English programs and 99 percent of undergraduate math programs meet the 30 SCHs standard.

Table 1. Average Semester Credit Hour (SCH) Requirements for Undergraduate Academic Majors Leading to Initial Teacher Certification in States with and without Licensing Tests

Certification area/major	Programs in states WITH a licensing test		Programs in states WITHOUT a licensing test	
	SCHs	N	SCHs	N
English	41.2	111	38.6	67
Mathematics	39.1	111	38.9	63

Only English courses are counted as part of the English total in this table. The math total includes statistics coursework. Courses in the supporting subjects of communications and computer science were not counted for English and mathematics, respectively.

The findings clearly suggest that the presence of a licensing test does nothing to diminish the coursework requirements imposed by teacher preparation programs, and that regardless of testing, English and mathematics certification routes require considerably more than 30 SCHs of content coursework.

### Science and social science content preparation

Most states offer certification in the sciences and social sciences in combinations of single- and multiple-subject certifications. For example, in South Carolina the available science certifications include the single-subject options of Biology, Chemistry, and Physics, and a multiple-subject General Science certification. More background information on these two types of certification can be [found here](#).

Although the average ratings for *single-subject* certifications in the sciences (Biology, Chemistry, Earth Science, and Physics) and the Social Sciences (History, Government, Economics, Geography and Psychology) are not as high as those for English and math certifications, they generally receive high marks due to state testing or program coursework requirements.

This is not the case for *multiple-subject* certifications, because tests and preparation both tend to be inadequate. In the case of testing, some states do not require licensing tests for initial certification,<sup>3</sup> and other states require a lone multiple-subject licensing test that does not specify cut-scores for each subject covered under the certification.<sup>4</sup> Without cut-scores for each individual subject, it is possible to score well enough to pass, for example, a general science licensing test without having answered a single chemistry question correctly, and then be assigned to teach chemistry.

In the case of preparation, candidates in both science and social science either complete a general major with coursework spread over many subjects,<sup>5</sup> or complete a single-subject major with minimal exposure to the other subjects covered under the certification. Both options typically fail to meet NCTQ's standard that candidates earn minors of at least 15 SCHs each in two of the subjects they will be certified to teach.<sup>6</sup>

To provide an example, in 28 states, biology can be taught with either a Biology or General Science certification. For the

<sup>3</sup> Alaska, California, Colorado, Montana, North Carolina, Tennessee, and Wyoming.

<sup>4</sup> Very few states offer acceptable testing requirements for multiple-subject certifications. In all cases where acceptable tests are found, candidates are required to complete several single-subject certification tests or sub-tests. For example, New Jersey and Ohio require teacher candidates pursuing physical science certification to pass both chemistry and physics tests. In cases where general science certification permits instruction in all subject areas, only Missouri, through its various Unified Science certifications, requires adequate testing by requiring teacher candidates to pass tests in biology, chemistry, earth science, and physics. For general certification in the social sciences, only California, Minnesota, and Missouri have acceptable tests; however, because California's test isn't required of all candidates, content knowledge is still not guaranteed for all teacher candidates in the state.

<sup>5</sup> For example, a Bachelor of Arts in General Science Education may include: 16 SCH of biology, 8 SCH of each chemistry and physics, and 4 SCH of earth science coursework.

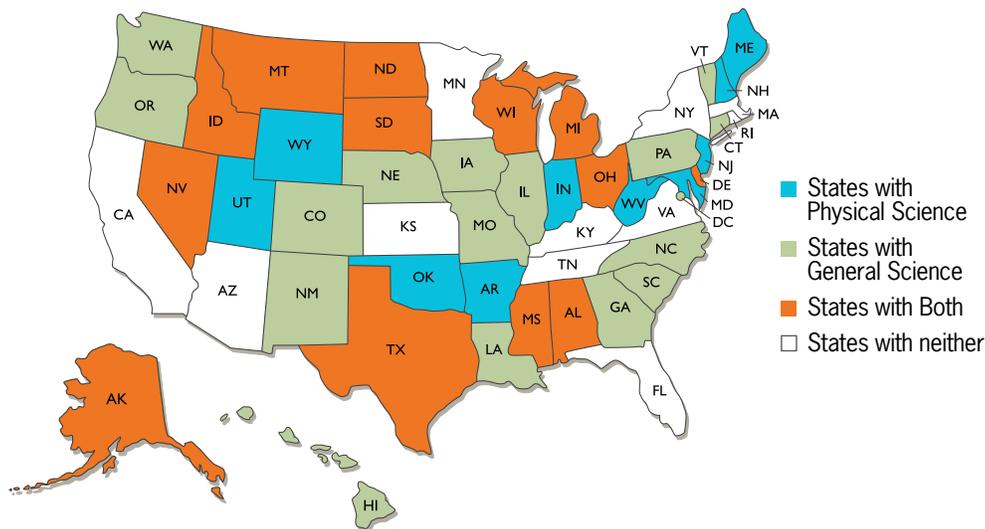
<sup>6</sup> Beyond two 15 SCHs minors for general social science certification, the certification route can also be satisfied with 30 SCHs in history, which is the teaching assignment most candidates with this certification will receive. Additionally, 50 SCH spread across the sciences or social sciences will also be considered acceptable preparation for the General Science or Social Studies certifications, respectively.

single-subject Biology certification, candidates complete an average of 34 SCHs of biology coursework and they typically must also pass a licensing test with as many as 125 questions focused exclusively on biological sciences. In contrast, candidates pursuing a General Science certification complete an average of 17 SCHs of biology coursework and answer as few as 24 questions about biology on the General Science licensing test, for which no sub-scores are provided.

### How common are multiple-subject certifications in the sciences?

As the map below highlights, multiple-subject certifications are very common in the sciences. Physical Science certification, which allows instruction in both chemistry and physics courses, is offered in 23 states, and General Science certification that permits instruction in all science courses is found in 30 states.<sup>7</sup> There are 13 states that offer both Physical Science and General Science, and 11 states that offer neither.

Figure 1. Available multiple-subject certifications in the sciences



A General Social Science certification, which allows candidates to teach any U.S. history, world history, political science/government, economics, geography, psychology, anthropology, or sociology course, is found in every state except Arizona, Georgia, Indiana, and Tennessee. The other 46 states and the District of Columbia offer a multiple-subject certification in the social sciences, with 26 states offering this general certification as the *only* option.

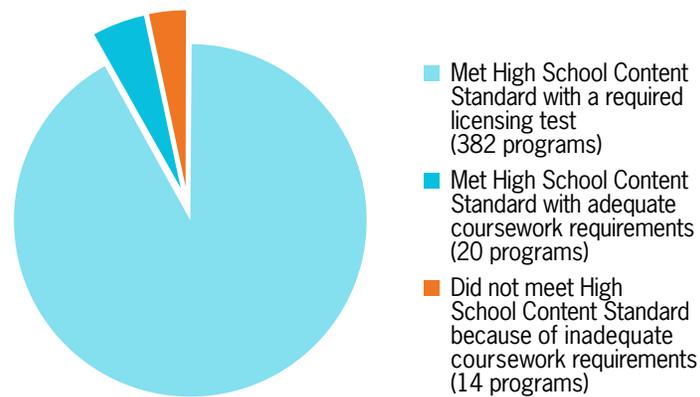
NCTQ's [High School Certification Framework Infographics](#) provide a picture of all secondary certifications in each state, including all subjects and all single- and multiple-subject certifications.

### What we found when we examined multiple-subject certifications in *Teacher Prep Review 2014* Science Pathways

There are 722 undergraduate secondary programs offering at least one certification route in the sciences. More than half of those programs (416) offer only single-subject certifications (biology, chemistry, etc.), while the remaining programs offer certification in physical science, general science, or both. The findings for all programs, reprinted from the *Teacher Prep Review 2014*, are below:

<sup>7</sup> Arizona, California, Missouri, Rhode Island, and West Virginia each offer a general science certification that limits instruction to “foundational science” courses and these states are not included in this count. In these five states, General Science is considered a single-subject certification. Also of note, while Illinois does not offer an obvious General Science certification, all of the sciences can be taught with any science certification. So a “Science - Biology” and a “Science - Physics” certification have no bearing on what a teacher actually teaches, as both certifications allow any assignment in the sciences.

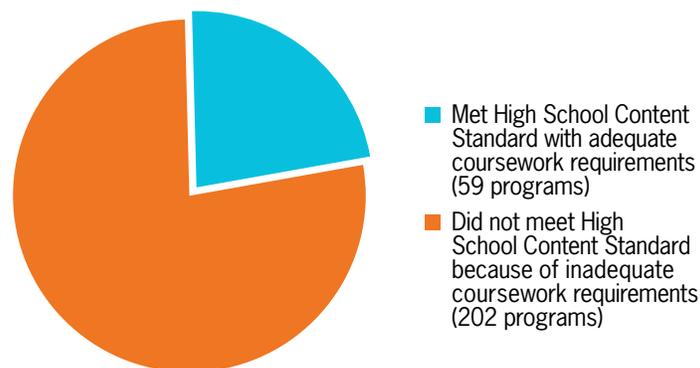
Figure 2. Undergraduate programs offering only single-subject certifications in the sciences (N=416)



It is clear that most states are adequately testing single-subject certifications in the sciences, and even when such tests are not required, more than half of the programs require at least 30 SCHs of coursework in the subject area.

When reviewing programs with at least one General Science certification, a certification for which no states were found to require an adequate licensing test,<sup>8</sup> we find a significantly different outcome, as shown in the graphic below, reprinted from the *Teacher Prep Review 2014*:

Figure 3. Undergraduate programs offering at least one route leading to General Science certification (N=261)



An additional 45 undergraduate programs offer a Physical Science certification route in the absence of General Science certification. Twelve of those programs were located in Ohio, which requires teacher candidates to pass both the Chemistry and Physics licensing tests to earn certification. Of the remaining 33 programs that are located in states without adequate testing, only one-third require teacher candidates to complete 15 SCHs minors in both chemistry and physics.

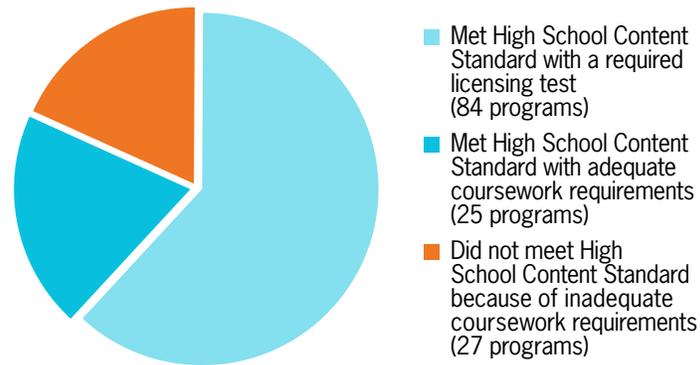
In total, 73 percent of programs offering either General Science or Physical Science certification fail to require adequate testing or at least 15 SCHs in two content areas that can be taught under the certification.

8 Since the release of the *Teacher Prep Review 2014*, this picture has improved somewhat because Missouri has implemented a collection of single-subject licensing tests that Unified Science teacher candidates must pass to qualify to teach all science subjects. These exams and certifications are not to be confused with Missouri's General Science certification, which limits instruction to foundational science courses.

## Social Sciences Pathways

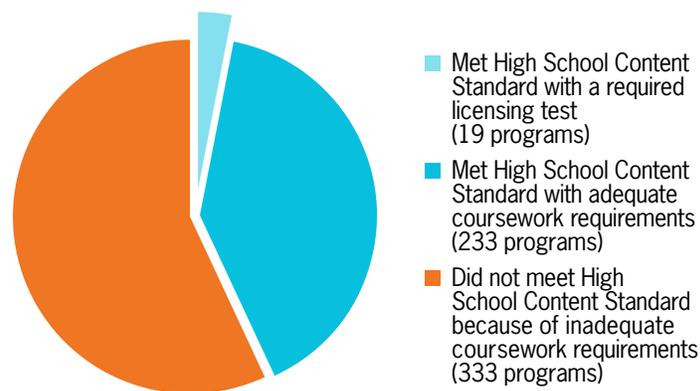
There are 721 secondary programs offering at least one certification route in the social sciences. Less than 20 percent of those programs (136 programs) offer only multiple-subject certifications (history, political science, etc.), while the remaining 585 programs offer at least one route leading to a social studies certification. The analysis of single-subject and multiple-subject certification routes from the *Teacher Prep Review 2014* are presented below:

Figure 4. Undergraduate programs offering only single-subject certifications in the social sciences (N=136)



The single-subject routes that failed NCTQ's standard require fewer than 30 SCHs of certification-specific coursework in subjects that were not adequately tested. As the chart above highlights, this occurs in 20 percent of the programs we analyzed, which is a considerably higher rate than English, mathematics, or the sciences. Yet, when a program offered at least one route to general Social Studies certification, the results were considerably worse, as 57 percent of programs were found to fail.

Figure 5. Undergraduate programs offering at least one route leading to Social Studies certification (N=585)



These variations in scores of different routes in secondary programs were masked in the first two editions of the *Review* by the manner in which the High School Content Standard lumped analysis for all subjects (English, math, the sciences, and the social sciences) into a single score.

## The path forward in *Teacher Prep Review 2016*

As previously discussed, English and mathematics will no longer be evaluated under the High School Content Standard, but both subjects will now be evaluated under the Secondary Methods Standard. The remaining evaluation of the sciences and social sciences will be split into two different standards: **Standard 7: Secondary Content in the Sciences** and **Standard 8: Secondary Content in the Social Sciences**.

Previously, the **High School Content Standard** reported only that the Science or Social Science pathways passed or failed, with no details about which degree routes were evaluated and how they fared in evaluation. By completing a separate analysis for each subject, *Teacher Prep Review 2016* will provide much more information about teacher preparation in the sciences and social sciences. Final scores will be reported on a five-point scale that separately considers single-subject and multiple-subject degree routes. It is now likely that certification routes previously found to fail will now receive partial credit. Consequently, the new standards will provide more detailed information for aspiring teacher candidates and hiring school districts about which routes are likely to adequately prepare candidates, and which are not.



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