Education and Certification Qualifications of Public Middle Grades Teachers of Selected Subjects:

Evidence From the 2011–12 Schools and Staffing Survey

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Executive Summary

This report examines the postsecondary majors and teaching certifications of middle grades teachers[1] in public schools in selected subject areas by using data from the 2011–12 Schools and Staffing Survey (SASS). SASS is a sample survey of elementary and secondary schools in the United States that collects data on American public and private elementary and secondary schools and their related components (teachers, principals, libraries, and districts, where applicable).

Prior research in the field of education has examined whether teachers with better education, training, and content expertise, demonstrated through years of experience, subject matter tests, or postsecondary education, show an association with students featuring greater gains in achievement (e.g., Boyd et al. 2007; Clotfelter, Ladd, and Vigdor 2010; Darling-Hammond 2000, 2010). Teacher qualifications are important in association with middle grades student outcomes. Middle school is a crucial time in children's development, and problems with disengagement, behavior, and achievement in middle school are positively related to negative high school academic experiences (Balfanz, Herzog, and Mac Iver 2007; Bowers 2010). The level and quality of coursework and support for students in middle school prepare them for strong high school achievement (Balfanz and Byrnes 2006; Kurlaender, Reardon, and Jackson 2008; Stein et al. 2011; Wang and Goldschmidt 2003). However, the distribution of qualified teachers is not uniform across schools and has been shown to vary by the racial/ethnic composition of student bodies, geographic location of schools, and the socioeconomic status of neighborhoods around the schools (Darling-Hammond 2010; Jackson 2009).

This report provides information on the extent to which middle grades teachers have relevant certification and content knowledge in the subject areas in which they teach. Given the interest in teachers' qualifications as they influence student outcomes and experiences, this report provides important context for understanding the extent to which middle grades teachers hold in-field qualifications in their class assignments.

This report classifies teachers by their main assignment, defined as the subject in which they teach the most classes. Because of differences in the classroom and teaching structures of departmentalized and nondepartmentalized teachers, the report separates middle grades teachers into departmentalized and nondepartmentalized categories. Departmentalized

[1] For the purposes of this report, middle grades teachers are defined as those who teach grades 5–8 but no grades lower than 5 and no grades higher than 9.

teachers are those who instruct several classes of different students most or all of the day in one or more subjects. Nondepartmentalized teachers are those who instruct the same group of students in different subjects or provide instructional services to small groups of students, for example, students who are "pulled out" of class for additional services.

For departmentalized teachers, the report provides results at the class and student level and examines 12 broad fields: English, mathematics, science, social science, French, German, Spanish, art/arts and crafts, music, dance/drama or theater, health education, and general elementary education. There are six subfields for which science and social science are analyzed with more granularity; these include biology/life sciences, physical science, earth science, geography, government/civics, and history. In nondepartmentalized settings, seven broad fields are examined: General elementary education, English, mathematics, science, social science, music, and health education.

While this report does not link teacher qualifications to student outcomes, it does examine the qualifications of middle grades teachers in four ways. The report examines the percentages of middle grades teachers (in departmentalized and nondepartmentalized classrooms) who earned a degree in an in-field major,[2] held an in-field certification,[3] had both in-field qualifications, or had neither in-field qualification. Among departmentalized teachers, the report looks at the percentages of grade 6–8 classes and students taught by teachers with one, both, or neither in-field qualifications. In addition to describing the qualifications discussed above, the report presents findings specific to how nondepartmentalized middle grades teachers distribute their paid instructional hours across the most common core subjects (English, mathematics, science, and social science).

The teacher sample and analytical decisions in this report are motivated by current federal education legislation—that is, the Elementary and Secondary Education Act of 1965, as amended in 2001 (ESEA)—and state teaching certification requirements. ESEA only pertains to schools in the public sector (No Child Left Behind Act, Public Law 107-110). Although ESEA guides the structure of the analyses, this report is meant neither to report percentages of highly qualified teachers nor to be a commentary on any part of the law in general.

Estimates are produced from cross-tabulations of the data, and *t* tests are performed to test for differences between estimates. All differences cited in the text of this report are statistically significant at the $p < .05$ level. In some cases, it may look like there is a difference between two numbers in a table, when the difference is not significant due to small sample sizes

[2] Teachers' main assignment was taken from question 16 of the SASS Teacher Questionnaire, which asks: "This school year, what is your MAIN teaching assignment field at THIS school? (Your main assignment is the field in which you teach the most classes)." "In-field major" means a teacher's main assignment is the same as the field in which the teacher has a bachelor's or higher degree.

[3] "In-field certification" means a teacher is certified in his or her main assignment.

and large standard errors. No corrections are made for multiple comparisons. As a result, the possibility of Type I error is increased. Type I error is the observation of a statistical difference when, in fact, there is none. Readers are cautioned not to make causal inferences from the data presented here. Some of the major findings are presented below.

Departmentalized Middle Grades Teacher Qualifications

- The four most frequently reported main assignments among U.S. departmentalized middle grades teachers in 2011–12 were English (139,100 teachers), mathematics (116,100), science (86,400), and social science (79,200) (table 1).
- More than 50 percent of departmentalized middle grades teachers in English, mathematics, science, biology, social science, geography, history, German, Spanish, art/arts and crafts, music, and health education instructed all their classes in their main assignment fields (table 1). [4]
- In English, mathematics, science, and social science, less than half of departmentalized middle grades teachers held both a major and certification in their main assignment. Compared to teachers in these four core subjects, more teachers in French, Spanish, art/arts and crafts, music, health education, and general elementary education held both a major and certification. For example, 36 percent of English teachers, 22 percent of mathematics teachers, 33 percent of science teachers, and 40 percent of social science teachers held both a postsecondary degree and a teaching certification in their main assignment compared to 88 percent and 73 percent of music and health education teachers, respectively (table 2).
- At the classroom level, less than 75 percent of English, mathematics, and science classes were taught by teachers with either a major or certification in the class subject. Specifically, 68 percent of English classes, 61 percent of mathematics classes, and 69 percent of science classes were taught by a teacher with a major or certification in that subject. In contrast, more than 75 percent of classes in German, Spanish, art/arts and crafts, music, health education, and general elementary education were taught by teachers with a major or certification in the respective class subject (table 4).[5]

[4] General elementary education is not included in these findings as these teachers, by definition, teach classes in multiple subjects.

[5] Figures for the percentage of classes taught by a teacher with a major and/or certification are obtained by subtracting the percentage of classes taught by a teacher who had no major and no certification in the subject area (column 7) from 100 percent.

Nondepartmentalized Middle Grades Teacher Qualifications

- Among nondepartmentalized teachers, the most common main assignment was general elementary education (107,100 teachers), followed by English (13,100) (table 6).
- Compared to other assignments, general elementary education teachers distributed their instructional time more evenly across English, mathematics, science and social science, which is not surprising given that these teachers specialize in teaching multiple subjects. On average, general elementary education teachers spent the most time on English (11 hours per week), followed by mathematics (6 hours per week) and 3 hours each per week in science and social science. Nondepartmentalized teachers certified in other fields, except music and health education, spent the most instructional hours per week teaching in their main assignment (table 7).
- More nondepartmentalized general elementary education teachers held a major and certification in their main assignment (54 percent) compared to nondepartmentalized English, mathematics, and science teachers. More music teachers held both a major and certification in their main assignment (91 percent) compared to teachers in other nondepartmentalized teaching assignments (table 8).

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Introduction

This report uses data from the Schools and Staffing Survey (SASS), a sample survey of elementary and secondary schools in the United States, sponsored by the National Center for Education Statistics (NCES) within the Institute of Education Sciences (IES) of the U.S. Department of Education (ED). SASS offers an opportunity to evaluate a number of issues in elementary and secondary school settings, such as teacher qualifications and satisfaction, school climate, and hiring and retention practices. SASS has been conducted seven times, beginning in the 1987–88 school year. Since the original design of SASS in the 1980s, questions have been included to support the analysis of teaching assignments, degree majors, and subject matter certification so that educators, researchers, and policymakers can better assess the qualifications of the nation's teachers. Past NCES reports using nationally representative data from SASS for 1993–94, 1999–2000, 2003–04, and 2007–08 have focused on outlining the extent of out-of-field teaching in secondary education (grades 7–12 or grades 9–12), with the exception of the 1999–2000 analysis, which included middle grades (5 through 8) (Hill 2011; Ingersoll 1996; Morton et al. 2008; Seastrom et al. 2004).[1] This report uses data from the 2011–12 administration of SASS to describe the postsecondary majors and teaching certification qualifications of public middle grades teachers. Qualifications are compared to a teacher's main subject matter assignments as well as in-field and out-of-field teaching and learning experiences of teachers and their students.[2]

Although the policy emphasis has changed, concern with the effects of teacher quality on students' learning has persisted over the 24-year period between the first and the most recent SASS. For example, the Elementary and Secondary Education Act of 1965 (ESEA), as amended in 2001, defines highly qualified teachers as having 1) a bachelor's degree; 2) full state certification; and 3) demonstrated competency, as defined by the state, in each core academic subject that they teach. In most states, teachers demonstrate subject matter competency with the passage of a state-developed test to gain certification (No Child Left Behind Act, Public Law 107-110). The ESEA motivated aspects of this report, including limiting the sample selection to public school teachers (traditional and charter) and defining teacher qualifications. Although the ESEA guided the structure of the analyses, this report is

[1] Due to differences in the analyses and changes in survey questions, readers are strongly cautioned against making comparisons of estimates in this report and previously published reports based on data from 1999–2000 or earlier SASS administrations.

[2] The population of teachers analyzed in the middle grades report includes public school teachers of any grades 5–8, but no grade lower than 5 and no grade higher than 9.

not meant to analyze percentages of highly qualified teachers, nor be a commentary on any part of the law in general.

Middle school is a crucial time in children's development, and problems with disengagement, behavior, and achievement in middle school are related to negative high school academic experiences (Balfanz, Herzog, and Mac Iver 2007; Bowers 2010). The level and quality of coursework and support for students in middle school prepare them for strong high school achievement (Balfanz and Byrnes 2006; Kurlaender, Reardon, and Jackson 2008; Stein et al. 2011; Wang and Goldschmidt 2003). Two key factors motivate the selection of analyses in this report: 1) the perceived importance of the middle grades experience and 2) the fact that relatively less is known about middle grades teachers' qualifications than about high school teachers' qualifications. Given the heightened interest in students' success in the middle grades as well as teachers' influence on student outcomes, this report provides important context on the extent to which middle grades teachers hold in-field expertise in the subjects they teach. There are six main areas addressed in the report, as described below.

For departmentalized teachers:

- the percentage of departmentalized middle grades teachers who held an in-field postsecondary major, an in-field certification, both qualifications, or neither qualification—in a selection of main assignment fields;[3]
- the percentage of grades 6–8 departmentalized classes taught by a teacher with one, both, or neither in-field qualifications—in a selection of course subject areas; and
- the percentage of grades 6–8 students in departmentalized classes taught by a teacher with one, both, or neither in-field qualifications—in a selection of core subject areas.

For nondepartmentalized teachers:

- the percentage of nondepartmentalized middle grades teachers in each type of classroom organization (self-contained, team teaching, or pull-out/push-in),[4]
- the average instructional hours of nondepartmentalized middle grades teachers spent in core subjects—in a selection of main assignment categories; and

[3] The SASS Teacher Questionnaire defines main assignment as the subject in which a teacher instructs the most classes.

[4] Self-contained classrooms include teachers who instruct the same group of students all or most of the day in multiple subjects. Team teaching classrooms include one of two or more teachers, in the same class at the same time, who are jointly responsible for teaching the same group of students all or most of the day. Pull-out and push-in teachers are those who instruct a small number of selected students released from or in their regular classes in specific skills.

- the percentage of middle grade-level nondepartmentalized teachers who held an in-field postsecondary major, an in-field certification, both qualifications, or neither qualification—in a selection of main assignment fields.

Study Considerations

This report focuses on teachers of students in grades 5–8, with no grades lower than 5 and no grades higher than 9, in an effort to be inclusive of the wide range of middle grades teachers.

Findings assess teachers' postsecondary education qualifications as the correspondence between the degree held in the major field(s) of study and the subject(s) taught. The analysis does not include academic minors. However, an additional table that examines teacher qualification including minor field of study is provided in appendix B. Three criteria determine teacher certification status: the certification type, content area(s), and grade level(s). To be considered certified in a given field, the teacher must hold at least a regular[5] or probationary[6] certification recognized by the state in which the teacher is teaching, and the certification's content area(s) and grade level(s)[7] must be consistent with the subject and grade levels that are being taught.

To report on the match between a teacher's assignment and college major or certification subject, a typology of subject matter specialties was developed based on the core subjects in ESEA and state teaching certification requirements (see the Data and Measures chapter). Matching analyses focus on a selection of broad fields and subfields within science and social science defined by this typology.

The findings chapters are further divided to address the teaching qualifications of departmentalized and nondepartmentalized middle grades teachers. Middle schools vary significantly in the extent to which teachers instruct students in a single topic or several core subjects, and this report provides information on both types of instruction. Departmentalized teachers are those who typically instruct several classes of different students most or all of the day in one or more subjects. Nondepartmentalized teachers instruct the same group of students all or most of the day in multiple subjects (self-contained classroom); work in classrooms with two or more teachers, in the same class at the same time, who are jointly responsible for teaching the same group of students all or most of the day (team teaching); or instruct a small number of selected students released from or in their regular classes in

[5] A regular or standard State certificate or advanced professional certificate.
[6] A certificate issued after satisfying all the requirements for a regular certificate except the completion of a probationary period.
[7] Middle grades teachers must report at least a grade level certification in grades 6–8, with the option of reporting certification at additional grade levels.

specific skills (pull-out or push-in instruction). Since departmentalized and nondepartmentalized teachers might have very different subject matter knowledge, the findings in this report address departmentalized and nondepartmentalized teachers separately.[8]

While each teacher reported one main assignment in SASS, some departmentalized teachers also instructed classes outside their main assignments. To capture the qualifications of teachers in all departmentalized middle grades classes, data also are displayed using classes and students, rather than teachers, as units of analysis. The class- and student-level analyses shed light on the qualifications of teachers in relation to teaching these "other" classes. Analyses using three levels of measurement—teacher, class, and student—is important to explore the prevalence of teachers' qualifications while considering variation in the number of classes they taught and the number of students in those classes.

Organization of This Report

This report presents findings from different types of classroom organization (departmentalized and nondepartmentalized) and multiple levels of analyses (teacher, student, and class) in order to provide a more comprehensive picture of middle grades teacher qualifications. The report's findings are presented in separate chapters for departmentalized and nondepartmentalized teachers. The chapter related to departmentalized teachers opens with a discussion of teachers' main assignment and the percentage of classes that they taught in their main assignment. Next, the findings show the percentage of departmentalized middle grades teachers in public schools with varying combinations of majors and certifications in relation to their main assignment. Tables 2 and 3 detail the percentage of middle grades teachers who held an in-field major, held an in-field certification, had both in-field qualifications, or had neither in-field qualification, within a selection of main assignments. The last section in this chapter shifts the unit of analysis by presenting the percentage of grade 6–8 classes (table 4) and students (table 5) taught by departmentalized teachers with

[8] Of middle grades teachers in the 2011–12 SASS data, 72 percent report a departmentalized classroom organization. The remaining 28 percent report a nondepartmentalized classroom organization. These percentages of departmentalized and nondepartmentalized teachers are higher than the 66 percent and 17 percent of departmentalized and nondepartmentalized teachers in the analytical sample used in this report since some main assignments in the 2011–12 SASS data are excluded from the sample. Teachers of subjects with small sample size in the middle grades (e.g., chemistry) and the fields of special education, English as a Second Language (ESL), and career and technical education (CTE) were not examined in this report due to analytical constraints (see appendix C for additional detail).

varying combinations of majors and certifications in relation to the course subject areas taught.[9]

The chapter related to nondepartmentalized teachers notes the types of nondepartmentalized teachers for each main assignment, indicating the percentages of teachers who instruct students in self-contained, team teaching, and pull-out/push-in classrooms (table 6). Next, the mean and proportion of paid instructional hours spent on core subjects (English, mathematics, science, social studies) in nondepartmentalized classrooms across teachers' main assignment are presented in table 7. Finally, table 8 highlights the in-field major and certification of middle grades teachers by their main assignment, similar to the departmentalized findings presented in table 2.

[9] Tables 4 and 5 are based on teacher reports by grade level of the individual classes they teach. Classes and students included in these tables are in any grades 6–8 and may or may not be taught by middle grades teachers.

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Background

Teachers with better education, training, and content expertise—demonstrated through years of experience, subject matter tests, or postsecondary education—show an association with students featuring greater gains in achievement (e.g., Boyd et al. 2007; Clotfelter, Ladd, and Vigdor 2010; Darling-Hammond 2000, 2010). The distribution of qualified teachers is not uniform across schools and has been shown to vary by the racial/ethnic composition of student bodies, geographic location of schools, and the socioeconomic status of neighborhoods around the schools (Darling-Hammond 2010; Statklis and Matthews 2012; Jackson 2009).

Much of the literature on teacher qualifications examines the proportion of teachers who earn degrees in, hold majors in, or obtain certifications specific to the subjects they teach. The literature largely focuses on the relationship between the types of qualifications and the subjects and grade levels teachers instruct (Goldhaber and Brewer 2000; Hill 2011; Hill and Dalton 2013; Holt, McGrath, and Seastrom 2006; McGrath, Holt, and Seastrom 2005). Further research investigates other components of teacher training including the role of credentials, experience, and graduate degrees in relation to student achievement (Clotfelter, Ladd, and Vigdor 2010; Goldhaber and Brewer 1999, 2000; Harris and Sass 2011; Rivkin, Hanushek, and Kain 2005) and the subjective evaluations of teachers in relation to teachers' contributions to the school (Harris and Sass 2009). Still other research highlights the importance of both subject matter expertise and classroom pedagogy for teacher success (Baumert et al. 2010).

The extent to which teachers' subject matter expertise improves student outcomes may vary by the core academic subject in question (Harris and Sass 2011; Williams, Krist, and Haertel 2010). Studies show wide variation in how teacher professional development, experience, and subject matter expertise affect student outcomes by grade level (e.g., elementary grades, middle grades, or high school grades) (Harris and Sass 2011). Typically, the literature on teacher qualifications and student achievement is not specific to middle grades education, though there are a few studies that highlight this issue in the middle grades population. For example, Kane and colleagues (2008) and Boyd and colleagues (2006) find teachers' experience is positively related to math and reading achievement in middle school. Given the nuances in the literature on teacher qualifications and student outcomes, readers should be mindful of the difficultly of determining causal relationship between teacher training and student achievement, as there are many confounding variables associated with training that affect student outcomes.

Grade Configurations and Classroom Organization

There are several challenges to understanding qualifications and certifications among middle grades teachers alone, as opposed to the broader category of secondary education teachers. In particular, the middle school years are difficult to define across states, and even within some states. Public middle schools feature different grade configurations and classroom organization, in addition to varying types of middle grades-level teacher certifications required in each state. These issues are discussed in more detail below.

Middle grades schools feature a number of possible grade configurations nationwide that often include elementary and high school grades, with several possible grade divisions, such as K–8, K–6, 6–8, 7–8, and 7–9. In a recent shift, some researchers support a return to a K–8 model of education, removing the need for an additional transition during the middle grades (Bedard and Do 2005; Yecke 2006) and thereby improving achievement (Rockoff and Lockwood 2010). Other research suggests that grade configuration is not associated with schools' aggregate performance on standardized tests (Williams, Krist, and Haertel 2010). Middle schools housing grades 5–8, 6–8, or 7–8 remain the most common grade configurations around the middle grades. A national sample of 827 public middle schools (targeting only middle schools in separate buildings) found that 67 percent of such schools housed grades 6–8 compared to 21 percent housing grades 7–8 (McEwin and Greene 2011). In a study of 303 California middle grades schools, approximately 50 percent of schools housed grades 6–8, compared to 24 percent and 26 percent housing grades K–8 and 7–8 respectively (Williams, Krist, and Haertel 2010). The multiple grade configurations in middle schools pose a challenge to a report that aims to be inclusive of multiple middle school structures.

The classroom organization of middle schools also varies, often depending on the grade configuration of the school. Middle school may serve as students' introduction to a departmentalized classroom structure, where teachers instruct different groups of students in the same subjects. Williams and colleagues (2010) find that 58 percent and 57 percent of grades 6–8 and 7–8 schools, respectively, have a departmentalized structure, and the classroom organization is not associated with differences in standardized test scores across schools. Therefore, as noted above, this report addresses both departmentalized and nondepartmentalized classroom structures in separate chapters due to the divergent subject matter expertise of these teachers.

Postsecondary Majors

While some research indicates a positive relationship between teachers' majors and student test scores, especially in high school mathematics and science (Goldhaber and Brewer 1997,

1999, 2000), other research questions the presence of an effect or the significance of the effect size that teacher characteristics have on student achievement (Aaronson, Barrow, and Sander 2007; Harris and Sass 2011). Subject matter preparation may reflect on teachers' ability to disseminate information to students. Students often experience greater academic growth when paired with a teacher who holds more content knowledge (Clotfelter, Ladd, and Vigdor 2010; Wayne and Youngs 2003). Mathematics teachers who scored higher on subject matter assessments also had better subject matter preparation through courses taken (Hill 2007). Other research finds that observable teacher characteristics—such as undergraduate degree, major, certification, and undergraduate or graduate coursework—demonstrate minimal effects on student achievement (Aaronson, Barrow, and Sander 2007; Harris and Sass 2011). For example, Harris and Sass (2011) find no effects of teachers' college major or college coursework on student math and reading achievement in elementary, middle, or high school. Research continues to focus on this issue to understand how teachers' qualifications influence student achievement.

The level of subject matter preparation may vary by the age of the students. Middle grades teachers are more likely to be teaching a class subject different from their undergraduate major and coursework compared to high school teachers (Ingersoll 1999). This finding is supported by Alt and Choy (2000), who note that, compared to a high school teacher, a middle grades teacher is less likely, on average, to have a main teaching assignment that matches his/her postsecondary education and certification.

Certification

The literature suggests that certification provides a mechanism to ensure the professionalization of teaching, requiring that teachers exhibit a specialized set of skills and knowledge specific to their subject matter expertise (Darling-Hammond 2010; Goldhaber and Brewer 2000). Teachers' knowledge about teaching and pedagogy, often achieved through certification, also provides benefits to students (Darling-Hammond 2010).[10] Regulating formal certification routes and controlling the content of these programs may maintain baseline qualifications for knowledge in the teaching force, though tensions exist over the type of training teachers should receive as they enter diverse classrooms across the country (Tobin 2012). Another line of research questions whether the certification process should hold a prominent position in the evaluation of teacher qualifications. A study of New York

[10] Teachers may hold regular, emergency, provisional, temporary, and probationary certificates. The use of a state certification other than a regular certification is to accommodate novice teachers, teachers who are still completing requirements for full certification, or teachers given emergency credentials to teach. For this report, teachers are considered "certified" only if they hold regular certificates or have completed all requirements for certification except a probationary period.

City teachers found there were no statistical differences in teacher effectiveness among those certified (across different program types) and uncertified (Kane, Rockoff, and Staiger 2008).

Middle grades certification varies considerably across states. Currently, 46 states offer middle grades certification as an option (Association of Middle Level Education [AMLE] 2013). Often, teachers in the middle grades have the option to pursue certification for elementary education (K–6), secondary education (7–12), or some variation on these grade-level breakdowns (Nield, Farley-Ripple, and Brynes 2009). Licensing and certification focusing exclusively on middle grades are relatively rare. According to an AMLE study of schools with middle grades, 44 percent of the schools had less than 20 percent of core middle grades teachers with separate middle grades licensure (McEwin and Greene 2011, p. 23). Middle grades teachers are also the most likely to enter the field through alternative licensing programs (such as receiving a bachelor of arts degree in a field other than education and pursuing certification through a program outside of the university setting) compared to elementary and high school teachers (Feistritzer 2011).

Proponents of middle grades reform argue that teaching adolescents requires a specific understanding of how young adolescents absorb information. Research suggests middle grades teachers with middle grades-specific certification engage in improved classroom practices and develop a better rapport with students (Mertens, Flowers, and Mulhall 2002; White et al. 2013). Middle grades teachers certified in math at the secondary level (inclusive of grades 6–12) are associated with higher student gains in learning compared to teachers certified in elementary education, special education, and uncertified teachers (Nield, Farley-Ripple, and Byrnes 2009). Students of middle grades teachers certified in science at the secondary level show the largest increases in learning compared to students of uncertified teachers or teachers with elementary certification, controlling for student characteristics (Nield, Farley-Ripple, and Byrnes 2009). Other research suggests high school certification alone may be sufficient for middle grades teaching. Hill (2007) found middle grades mathematics teachers with high school certification and experience scored better on teacher knowledge assessments compared to teachers with only middle grades- or elementary grades-level experience and certification.

Data and Measures

Data used in this report come from the 2011–12 SASS Restricted-Use Public School Teacher Data File. The following section contains an explanation of the two populations explored (departmentalized and nondepartmentalized middle grades teachers), multiple levels of analysis, and measures (subjects taught and teacher qualifications) used in this report. Additional information about the SASS data and the measures used in this report can be found in detail in appendix C.

Subpopulations and Levels of Analysis

As noted in the previous chapter, middle grades teachers may work in several different classroom contexts, as there is wide variation in grade configuration and classroom organization. Based on 2011–12 SASS data, more than half (72 percent) of middle grades teachers are in departmentalized settings, and 28 percent of middle grades teachers are in nondepartmentalized classrooms.[11] Because departmentalized and nondepartmentalized teachers' subject matter expertise may differ considerably, and because both types of classroom organization are typical for middle grades classes, this report provides information on the two types of teachers in separate tables. The ESEA recognizes differences in subject matter expertise for departmentalized and nondepartmentalized populations by outlining separate policies to determine Highly Qualified Teacher status (ED 2004). The departmentalized teachers include any middle grades teachers who instruct several classes of different students in one or more subjects. Nondepartmentalized teachers include those who teach the same group of students all day in multiple subjects, teachers who work in a team environment, and those who instruct pull-out or push-in classes to address special needs.

For all teachers (departmentalized and nondepartmentalized), analyses provide a description of the teachers' qualifications by subject area. Teacher-level analyses in this report consider all degrees (bachelor's and higher) and certifications (probationary and higher) held by a teacher and compare these qualifications with the subject taught by the teacher most often (main assignment) or, in the case of classroom- or student-level analyses, the subject of a particular

[11] Among departmentalized middle grades teachers, 5.5 percent are classified as "Elementary Subject Specialists," which means they teach only one subject to different classes of students. While this group would generally be in elementary schools, these teachers meet the requirements (teach no grades lower than 5 and no grades higher than 9) to be considered a middle grades teacher and so are included within the departmentalized middle grades teacher population.

class. Therefore, the analyses explore the percent of teachers who hold a major or certification in particular subject areas.

This report presents findings from multiple levels of analysis (teacher, student, class) in order to provide a more comprehensive picture of teacher qualifications. At the teacher level, the teacher population includes teachers of departmentalized or nondepartmentalized classrooms who instruct classes in any grades 5–8, but no grades lower than 5 and no grades higher than 9.[12] For departmentalized teachers, the analyses also present tabulations at the class and student levels. These tabulations are not explored for nondepartmentalized teachers since, by definition, they do not teach multiple classes. Instead, the nondepartmentalized tables show the number of students in nondepartmentalized main assignments. Separate class- and student-level analyses are important for departmentalized instruction because not all teachers who instruct middle grade classes are classified as middle grades teachers, and not all teachers instruct the same number of classes and students. For departmentalized classrooms and students, the class- and student-level analyses include all teachers who taught classes or students in grades 6–8. For example, a class included in these analyses could be taught by a teacher who instructs students in grades 6 and 10. Fifth-grade classes are not included in class- or student-level analyses because 37 percent of 5th-grade classes are elementary-level classes where teachers do not instruct students above grade 5. To code these as middle grade classes would inaccurately represent the teacher qualifications of elementary-level 5th-grade teachers, as they would not be expected to have middle grades certifications. More information on the concepts and measures can be found in appendix C.

Subjects Taught: Main Assignment and Class Subject Area

The analyses presented in this report define teacher qualifications by their relationship to one of two measures of the subjects teachers instruct: *main assignment* and *class subject area taught*. For departmentalized teachers, tables present qualifications based on both of these measures. For nondepartmentalized teachers, tables present qualifications based on main assignment only. Each teacher may report only one main assignment, defined in the SASS Teacher Questionnaire as the field in which he or she teaches the most classes. Among departmentalized teachers, teaching the most classes does not necessarily mean teaching more than 50 percent of a teacher's total classes, especially if he or she teaches multiple subjects. Among nondepartmentalized teachers, main assignment is also the field in which he or she teaches the most classes, and the definition of this for nondepartmentalized teachers is open

[12] According to this definition, some 5th grade teachers are included in the analyses presented in this report. However, any teachers that instruct 5th grade as well as an earlier elementary grade are excluded. Only teachers that instruct 5th grade or 5th grade and any grade higher through 9th grade are included.

to interpretation according to a teacher's specific type of classroom organization (self-contained classroom, team teaching, or pull-out instruction).

For departmentalized teachers, this report examines a total of 18 main assignment fields and class subject areas, including some subfields of science and social studies. More information on the subjects can be found in appendices C and D. The broad subject areas include English, mathematics, science, social science, French, German, Spanish, art/arts and crafts, music, dance/drama/theater, health education, and general elementary education.[13] Analyses of subfields within these broad subject areas are presented. For example, the broad subject area of science includes the subfields of biology/life sciences and physical science, which includes a further subfield of earth science. The broad field of social science includes the subfields of geography, government/civics, and history. For nondepartmentalized teachers, the report examines seven main assignment fields including general elementary education, English, mathematics, science, social science, music, and health education.

These 12 broad subject areas and 6 subfields identified for departmentalized instruction represent academic subjects for which clear matches exist between teacher assignment and qualifications and for which there are a sufficient number of sampled teachers to support accurate estimates. The reported broad areas and subfields are generally the certification fields and the core subjects of ESEA. No subfields of English and mathematics are reported due to a lack of comparability of possible subfields for certification purposes. Additional information on the matching of the subject areas and subfield areas can be found in appendix D.

Teacher Qualifications: Major and Certification

This report addresses two primary measures of teacher qualifications—*teacher education* and *teaching certification*—as they relate to the teacher's main assignment and (for departmentalized teachers) the course subject area(s) taught. The definition of "in-field" qualifications included in this report generally reflects that put forth in the ESEA definition of Highly Qualified Teachers. One exception is health education. Health education is not considered a core subject under ESEA, and while we measure teacher qualifications in physical education by ESEA standards, in-field certification is not required for physical education under these standards. The SASS Teacher Questionnaire collects information on major, certification, and grade-level certification for all subjects regardless of ESEA requirements.

[13] Several main assignments are excluded from the analyses because they involve complicated methods to determine in-field instruction and certification that are not compatible with the measures used for the majority of core subjects included in this report. For example, special education teachers are excluded from the analyses because ESEA definitions require that they maintain certification in special education as well as the core subject in which they teach. This two-part requirement is not compatible with the analyses based on teachers' reports of main assignment. Additional detail about exclusions of main assignment areas can be found in appendix C.

The analyses include teachers of all academic backgrounds. No distinction is made between degrees awarded within or outside a department, college, or school of education (i.e., degrees from both education and subject-specific departments are included). The teacher major field of study measure was produced using the educational background items in the SASS Teacher Questionnaire. Teacher education was categorized using two components of teachers' academic majors: the level at which the postsecondary degree was earned and the major field of study. The measure considered a teacher to have an in-field major if the teacher held either a bachelor's or higher degree in a major corresponding to the subject of the main assignment, or held a bachelor's or higher degree corresponding to the subject of the class areas taught (for the analyses at the classroom and student levels). Teachers had the opportunity to report up to three majors. A minority of departmentalized and nondepartmentalized teachers also held a minor degree in their main assignment. Specifically, 15 percent and 3 percent of the analytic sample of departmentalized and nondepartmentalized teachers, respectively, held minor degrees. Table B-1 in appendix B shows the percent of departmentalized and nondepartmentalized teachers in each main assignment with a major or minor in their main assignment.

Teacher certification status was based on three criteria: certification type, content area(s), and grade level(s). The SASS Teacher Questionnaire allows the respondent to report a first and second certification, if applicable, and both are considered in the analyses. To satisfy the analytical requirements of the teacher certification measure, a teacher must have reported a regular or standard state certification, an advanced professional certificate, or a certificate issued after satisfying all certification requirements except the completion of a probationary period. In addition, the certification must have been granted by, or recognized in, the state in which the teacher currently teaches. Further, given this report's focus on middle grades teachers, all certificates must apply to any of grades 6–8, but teachers also may hold certification in grades K–5 or 9–12. The SASS Teacher Questionnaire does not specify whether teachers hold a certification specific to only grades 6–8 or one that may span grades 6–8 (e.g., grades 7–12).

Matching Subject Taught and Teacher Qualifications

Teachers (especially nondepartmentalized teachers) may teach more than one subject, and they may hold more than one postsecondary degree or certification. Nondepartmentalized teachers who specialize in teaching self-contained classrooms have the option to select Elementary Education, General for a main assignment. This specialty reflects the fact that teachers must demonstrate proficiency in several subjects, often in a multiple subject matter test at the discretion of each individual state (ED 2004). For departmentalized teachers, classroom analyses incorporate up to 10 classes that teachers report instructing. The departmentalized analyses consider a teacher to have an in-field major or in-field certification

if the major or certification the teacher holds matches the subjects taught and the certification includes grades 6–8. Therefore, matches need to be made across the main assignment listed, subjects taught, and qualifications held. For example, a mathematics teacher is considered to hold a mathematics major if he or she reported any of the following majors: mathematics, computer science, engineering, or physics. See appendix D and exhibit D-1 for information on how the matches between main assignment, subjects taught, and teacher qualifications were determined.

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Findings: Departmentalized Teachers, Classrooms, and Students

This chapter describes teacher qualifications among departmentalized teachers using the 2011–12 SASS Restricted-Use Public School Teacher Data File, focusing on teachers' main assignments, class subjects taught, majors, and certifications. Results highlight what portion of classes a teacher instructs in his or her main assignment. Then, the data illustrate how often middle grades teachers' majors and certifications cover the same subject area as their main assignment or, in the case of classroom- and student-level analyses, the class subject they teach.

Major and certification are considered "in-field" if a teacher reports teaching in the same area as the broad classification of his or her major or certification. More detail on major and certification can be found in the Data and Measures chapter or in appendix C. The crosswalk in appendix D provides a detailed reference of which majors and certifications match the broad main assignments and class subjects discussed in this report.

SASS estimates are based on samples. The sample estimates may differ somewhat from the values that would be obtained from the universe of respondents. As a sample survey, SASS data are weighted to produce the population estimates provided in the tables. The standard errors for each estimate (provided in appendix A) are based on the amount of variation in the responses and the size of the sample or subgroup for which the estimate is computed. The tables presented below provide cross-tabulation estimates, between which two-tailed *t* tests were used to compare differences for statistical significance. All differences cited in this report are statistically significant at the $p < 0.05$ level. In some cases, it may look like there is a difference between two numbers in a table, when the apparent difference is not significant due to small sample sizes and large standard errors. No corrections were made for multiple comparisons. As a result, the possibility of Type I error is increased. Type I error is the observation of a statistical difference when, in fact, there is none.

Subjects Taught in Main Assignment

This section presents findings specific to public school middle grades teachers in departmentalized classrooms. In the SASS Teacher Questionnaire, each teacher was asked to report a main teaching assignment—that is, the field in which he or she taught the most

classes. As stated earlier, teachers may have taught additional classes outside the reported main assignments, and these classroom- and student level findings are examined in tables 4 and 5 in a later section. Key middle grades assignments include 12 broad fields and 6 subfields (18 combined). Teachers can report only 1 of the 12 broad fields as a main assignment, but teachers are included in the data more than once if they also list 1 of the 6 relevant subfields in science or social science.

Table 1 shows the most frequently reported main assignments. Among public middle grades teachers who taught departmentalized classes in 2011–12, the four most common main assignments include English (139,100), mathematics (116,100), science (86,400) and social science (79,200).

Table 1 also presents the percent of classes that teachers taught in their main assignment, with the exception of general elementary education. General elementary education teachers teach multiple subjects by definition, so all their classes are in their main assignment. Therefore, the percentage of classes taught in general elementary education is listed as "not applicable."[14]

More than 50 percent of middle grades teachers taught all their classes in their main assignment, with the exception of physical science, earth science, government, French, and dance/drama or theater main assignments.[15]

[14] ESEA regulations of highly qualified teachers require that general elementary teachers pass a multiple subject exam, as administered by each state. While the term general elementary education implies that it is not an assignment applicable to middle grades teachers, teachers who reported this main assignment taught students meeting the SASS definition of middle grades. Of the total elementary general classrooms in grades 5–8, 59 percent were 5th-grade classrooms, 28 percent were 6th-grade classrooms, 6 percent were 7th-grade classrooms, and 7 percent were 8th-grade classrooms. Departmentalized, middle grades teachers who listed general elementary education as a main assignment often listed individual classes of students in general elementary education as well as English, mathematics, science and social sciences—the four most common core subjects. Departmentalized, general education teachers' qualifications in these individual class subjects are captured later in this chapter.

[15] The estimates for physical science, earth science, government, French, and dance/drama or theater are not significantly different from 50 percent.

Table 1.
Number of departmentalized public middle grades teachers who reported a particular main assignment and the percentage of teachers who taught various percentages of classes within that main assignment, by subject of main assignment: 2011–12

Selected main assignment	Number of teachers	Among teachers of a particular main assignment, the percentage who teach: 0 to 49.9 percent of their classes in their main assignment	50 to 99.9 percent of their classes in their main assignment	100 percent of their classes in their main assignment
English	139,100	2.1 !	24.1	73.8
Mathematics	116,100	3.3	20.2	76.5
Science	86,400	2.8	28.3	69.0
Biology/life sciences	12,100	7.9 !	28.3	63.8
Physical science	25,700	6.0 !	39.2	54.8
Earth sciences	9,100	5.4 !	41.2	53.4
Social science	79,200	3.6 !	21.3	75.1
Geography	5,200	‡	30.8	67.2
Government/civics	2,200	‡	26.5 !	64.0
History	29,500	8.0 !	30.3	61.8
French	3,600	‡	29.2 !	68.1
German	500	‡	‡	76.8
Spanish	10,900	‡	18.9	77.9
Art/arts and crafts	12,700	‡	17.8	81.8
Music	24,900	‡	9.0	90.7
Dance/drama or theater	2,500	‡	32.7 !	60.5
Health education	38,600	0.5 !	7.7	91.9
General elementary education	61,300	†	†	†

† Not applicable.

! Interpret data with caution. The standard error for this estimate is equal to 30 percent or more of the estimate's value.

‡ Reporting standards not met. The standard error for this estimate is equal to 50 percent or more of the estimate's value.

NOTE: Teachers include traditional public school and public charter school teachers who taught departmentalized classes to students in any of grades 5–8, and no grades lower than 5 or higher than 9. The denominator used (all classes taught) is the sum of all subjects reported by the teacher, not the sum of classes taught within the selected 18 subjects. Often a broad main assignment includes several subfields. Under science and social science, several subfields are examined in detail. These subfields are not inclusive of all subfields in the subject and, therefore, do not add to the broad field total. General Elementary Education teachers teach multiple subjects by definition, so all of their classes are in their main assignment. See appendices for technical notes and definitions of specific subjects within main assignment fields. Detail may not sum to totals because of rounding and because some data are not shown. Not all apparent differences shown in the table are statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

For example, among the 139,100 English teachers, 74 percent taught 100 percent of their classes in English, 24 percent taught 50–99.9 percent of classes in English, and 2 percent taught less than half of their classes in English. These findings are not surprising because the SASS Teacher Questionnaire defines main assignment as the subject in which a teacher instructs the most classes.

A larger percentage of health education teachers instructed 100 percent of their classes in their main assignment compared to other departmentalized teachers, with the exception of art/arts and crafts and music teachers.

Compared to most broad fields, teachers with main assignments in subfields of physical science, earth science, and history taught fewer of their classes in their main assignment. However, in several broad fields, including French, German, and dance/drama or theater, the percentage of teachers instructing all their classes in their main assignment is not significantly different from the percentages of teachers in the subfields of physical science, earth science, and history. The smaller percentage of subfield classes taught in a main assignment is likely because the subfield definitions are narrower than the broad fields. For broad fields, teachers were credited as being in-field if they reported classes in a relevant subfield *or* a broad field area. However, at the subfield level, teachers were credited as being in-field only if they reported a main assignment of any science or social science subfield *and* instructed courses within the same respective subfield.

Teacher Qualifications by Main Assignment

The following section describes the percentage distribution of middle grades teachers with a major in their main assignment, certification in main assignment, and the combination of these qualifications relative to their main assignment. Overall, 18 main assignment fields were reviewed.

Major in main assignment

There is wide variation in the extent to which middle grades teachers held a major in their respective main assignment (table 2). In the four most common main assignments (English, mathematics, science, and social science), between 28 percent and 52 percent of teachers held a major in their main assignment. More than 50 percent of teachers in mathematics (72 percent) and science (55 percent) lacked a major in their main assignment. In several other broad fields (French, Spanish, art/arts and crafts, music, health education, and general education), more than half of teachers (66–96 percent) held a major in their main assignment.[16] With the exception of French and German, a larger percentage (96 percent) of music teachers held a major in their main assignment relative to teachers with other main assignments. The subfields of physical science and earth science had the lowest percentage (17 percent and 18 percent, respectively) of teachers with a major in their main assignment, with the exception of dance/drama and theater.

[16] The estimate for German (72 percent) is not significantly different from 50 percent.

Table 2.
Number of departmentalized public middle grades teachers who reported a particular main assignment and the percentage with a major and certification in that main assignment, by subject of main assignment: 2011–12

Selected main assignment	Number of teachers	Percent with a major in main assignment			Percent with no major in main assignment			Total certified
		Total	Certified	Not certified	Total	Certified	Not certified	
English	139,100	46.1	36.3	9.8	53.9	20.4	33.4	56.7
Mathematics	116,100	28.1	21.9	6.3	71.9	31.0	40.9	52.9
Science	86,400	44.9	33.1	11.7	55.1	23.7	31.5	56.8
Biology/life sciences	12,100	44.7	22.5	22.2	55.3	10.7	44.6	33.2
Physical science	25,700	16.6	7.3	9.4	83.4	13.9	69.5	21.2
Earth sciences	9,100	18.0	6.2 !	11.8!	82.0	14.0	68.0	20.2
Social science	79,200	51.6	40.4	11.3	48.4	22.1	26.2	62.5
Geography	5,200	‡	#	‡	98.7	11.5	87.2	11.5
Government/civics	2,200	‡	‡	‡	95.8	‡	78.8	‡
History	29,500	33.0	17.3	15.8	67.0	15.1	51.8	32.4
French	3,600	84.8	76.2	‡	15.2 !	‡	‡	88.6
German	500	72.1	55.3 !	‡	‡	‡	#	83.2
Spanish	10,900	65.7	56.1	9.6!	34.3	26.5	7.8!	82.6
Art/arts and crafts	12,700	80.0	72.2	7.8	20.0	11.1 !	8.9!	83.3
Music	24,900	95.6	87.9	7.7!	4.4 !	3.5 !	‡	91.4
Dance/drama or theater	2,500	32.1 !	28.2 !	‡	67.9	40.1	27.8!	68.3
Health education	38,600	79.7	72.9	6.9	20.3	15.0	5.3	87.8
General elementary education	61,300	77.2	51.4	25.8	22.8	11.9	10.9!	63.3

Rounds to zero.

! Interpret data with caution. The standard error for this estimate is equal to 30 percent or more of the estimate's value.

‡ Reporting standards not met. The standard error for this estimate is equal to 50 percent or more of the estimate's value.

NOTE: Teachers include traditional public school and public charter school teachers who taught departmentalized classes to students in any of grades 5–8, and no grades lower than 5 or higher than 9. Often a main assignment includes several subfields. Under science and social science, several subfields are examined in detail. These subfields are not inclusive of all subfields in the subject and, therefore, do not add to the broad field total. Majors are included regardless of whether they were held within or outside the school/college of education. Majors in main assignment are credited if they were held at the bachelor's degree level or higher. A certification is credited if it is a regular or standard state certificate or a probationary certification in- subject and includes any grades 6 through 8. Detail may not sum to totals because of rounding and because some data are not shown. Not all apparent differences shown in the table are statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Certification in main assignment

With the exception of mathematics and dance/drama and theater teachers, more than 50 percent of middle grades teachers in each of the broad main assignments held a certification[17] in their main assignment. Lower percentages of teachers in the broad fields of English, mathematics, science, and social science were certified in their main assignment (with certification rates ranging from 53–63 percent) compared to teachers in French, music, or health education (with certification rates ranging from 88–91 percent). Certification rates for main assignments were considerably lower for subfields than for broad fields. The rate at which teachers of subfields were certified for those subfields was 32 percent or less.

Major and certification in main assignment

Similar to the findings discussed above for major only and certification only, smaller percentages of teachers in the four most common main assignments (English, mathematics, science, and social science) held both a major and certification compared to most other broad field assignments (French, Spanish, art/arts and crafts, music, health education, and general education). Percentages of teachers with both a major and certification in the four most common main assignments ranged from 22 to 40 percent. With the exception of biology, the more narrowly defined subfields showed less than 25 percent of teachers with both a major and certification in their subfield.

[17] For the purposes of these analyses, teachers must pass a subject matter test (designed at the state level) specific to their main assignment in grades 6–8. Additional analyses determined that including teachers certified in grades 6–8 *or* any grade higher would not significantly affect the estimates. The percent of teachers certified in each main assignment increases on average between 1 and 2 percentage points when including high school grades as certified for middle school. For example, 56.7 percent of middle grades teachers with English as their main assignment are certified in any grade 6–8 in English, while 57.5 percent of middle grades teachers with English as their main assignment are certified in any grades 6 or higher. The rates are not measurably different after accounting for possible sampling error based on *t* test calculations.

Teacher Qualifications by Main Assignment and Percentage of Classes Taught in Main Assignment

Table 3 presents how the percentage of classes instructed in a teacher's main assignment corresponds with different types of teaching qualifications. The table focuses on the four most common main assignments or core subject fields of English, mathematics, science, and social science.[18]

Major and certification in main assignment

Elements presented in tables 1 and 2 are combined in table 3 to analyze the correspondence of main teaching assignment and varying combinations of teaching qualifications: table 3 shows that relatively more teachers instructing students in an assignment 100 percent of the time held both a major and certification in that assignment compared to teachers who taught classes in that assignment 50–99.9 percent of the time. For example, among teachers who taught 100 percent of their classes in the subject of English, 41 percent held both a major and certification in English compared to 24 percent of teachers who taught 50–99.9 percent of their classes in English. Of mathematics teachers with 100 percent of their classes in their main assignment, 25 percent held both qualifications compared to 12 percent of teachers who taught 50–99.9 percent of their classes in mathematics. Of science teachers with 100 percent of their classes in their main assignment, 37 percent held both qualifications compared to 25 percent of teachers who taught 50–99.9 percent of their classes in science. Finally, a higher percentage of social science teachers (44 percent) who taught 100 percent of their classes in their main assignment held both a major and certification in social sciences, compared to 31 percent of those teaching 50–99.9 percent of classes and 18 percent of those teaching 0–49.9 percent of classes in social sciences.

Neither major nor certification in main assignment

In English, mathematics, science, and social science, less than 45 percent of teachers who taught all their classes in their main assignment held neither a major nor certification. Specifically, 31 percent of English teachers, 37 percent of mathematics teachers, 26 percent of science teachers, and 23 percent of social science teachers who taught all their classes in their main assignment held neither a major nor certification.

[18] The analyses in table 3 focused on the four most common main assignments because sample size limitations prohibited analyses of smaller main assignment categories.

Table 3.
Number of departmentalized public middle grades teachers who reported a particular main assignment and the percentage of teachers with various qualifications, by subject of main assignment and percentage of classes taught in main assignment: 2011–12

Selected main assignment	Number of teachers	Percent with a major and certification in their main assignment	Percent with only a major or only a certification in their main assignment	Percent with neither a major nor a certification in their main assignment
English	139,100	36.3	30.3	33.4
Percentage of classes taught in English				
0 to 49.9	2,900	‡	36.3 !	44.9
50 to 99.9	33,600	23.9	35.2	40.9
100	102,600	40.8	28.5	30.7
Mathematics	116,100	21.9	37.3	40.9
Percentage of classes taught in mathematics				
0 to 49.9	3,800	‡	32.1 !	57.6
50 to 99.9	23,400	11.6	36.8	51.6
100	88,800	25.1	37.6	37.3
Science	86,400	33.1	35.4	31.5
Percentage of classes taught in science				
0 to 49.9	2,400	‡	30.7 !	52.7
50 to 99.9	24,400	25.4	31.5	43.1
100	59,600	37.0	37.2	25.9
Social science	79,200	40.4	33.4	26.2
Percentage of classes taught in social science				
0 to 49.9	2,900	17.7 !	25.5 !	56.8
50 to 99.9	16,900	31.2	35.4	33.4
100	59,500	44.0	33.3	22.7

! Interpret data with caution. The standard error for this estimate is equal to 30 percent or more of the estimate's value.

‡ Reporting standards not met. The standard error for this estimate is equal to 50 percent or more of the estimate's value.

NOTE: Teachers include traditional public school and public charter school teachers who taught departmentalized classes to students in any of grades 5–8, and no grades lower than 5 or higher than 9. Majors are included regardless of whether they were held within or outside the school/college of education. Majors in main assignment are credited if they were held at the bachelor's degree level or higher. A certification is credited if it is a regular or standard state certificate or a probationary certification in-subject and in any grades 6 through 8. Detail may not sum to totals because of rounding and because some data are not shown. Not all apparent differences shown in the table are statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Except for English, teachers who taught less than 100 percent of their classes in their main assignment had higher rates of not having a major or certification in their main assignment field compared to teachers who taught 100 percent of their classes in their main assignment. For example, the percentages of those with neither a major nor certification were higher for teachers who taught less than half of their classes in their main assignment: 58 percent, 53 percent, and 57 percent for mathematics, science, and social science respectively.

Class- and Student-Level Findings: Selected Subject Areas

Class- and student-level analyses show the qualifications of teachers who instruct students across different classes. Rather than focusing the sample on departmentalized middle grades *teachers*, the class- and student-level analyses consider classrooms and students in grades 6–8 that can be taught by any teachers in the survey, regardless of whether they are classified as middle grades teachers. In this way, analyses capture the information that may be hidden if examined only at the teacher level.[19] This section presents an analysis of classes and students in grades 6–8, highlighting teacher qualifications across various subject areas by teachers who hold different combinations of majors and certifications.

Grade 6–8 Classes by Teacher Qualifications and Subject Area

Table 4 shows the number of classes in each subject area and the major and certification status of teachers within those subject areas. The four most frequently taught classes in the middle grades are English (628,100), mathematics (517,000), science (393,200), and social science (391,600). Together, classes in these four subjects account for 74 percent of the departmentalized, grades 6–8 classes in the 12 broad fields included in the report population (computed from the data in table 4).

[19] While the definition of middle grades teachers allows for 5th grade, the classroom and student level analyses are limited to grades 6–8 because only a portion (59 percent) of total departmentalized 5th-grade classrooms meets the report's definition of middle grades. The remaining 5th-grade classrooms are taught by teachers that also teach grades lower than grade 5. For example, a portion of the 5th-grade classrooms are taught by a teacher that instructs classes in grades K–5, while another portion of 5th-grade classrooms are taught by a teacher that instructs classes in grades 5–7. Since it is difficult to limit the sample of 5th-grade classrooms without creating bias, these classrooms are not included in the analyses.

Table 4.
Number and percentage of grade 6–8 departmentalized public school classes of various subjects taught by a teacher with a major and/or certification in that subject area, by selected subject areas: 2011–12

		Percent with a major in subject area			Percent with no major in subject area			
Selected subject area	Number of classes	Total	Certified	Not certified	Total	Certified	Not certified	Total certified
English	628,100	47.9	37.8	10.0	52.1	20.1	32.0	57.9
Mathematics	517,000	29.8	22.9	6.9	70.2	31.1	39.1	54.0
Science	393,200	44.5	33.7	10.9	55.5	24.9	30.6	58.6
Biology/life sciences	60,500	35.7	18.3	17.4	64.3	10.5	53.8	28.8
Physical science	131,500	14.1	6.7	7.4	85.9	13.4	72.5	20.1
Earth sciences	44,500	13.3	‡	8.7 !	86.7	12.6	74.0	17.3
Social science	391,600	51.6	39.5	12.1	48.4	20.8	27.6	60.3
Geography	32,600	‡	#	‡	98.9	7.5 !	91.4	7.6 !
Government/civics	12,500	‡	‡	#	97.6	‡	82.2	‡
History	153,100	33.4	17.1	16.3	66.6	13.9	52.7	31.0
French	22,500	82.4	76.6	‡	17.6!	‡	‡	88.6
German	2,700	59.9 !	54.4!	‡	‡	‡	#	94.5
Spanish	61,100	63.8	54.7	9.1	36.2	26.9	9.3!	81.6
Art/arts and crafts	90,400	77.9	70.8	7.0	22.1	9.9	12.3	80.7
Music	178,800	94.7	87.5	7.2	5.3	3.9	1.4!	91.4
Dance/drama or theater	15,700	20.2	16.9!	‡	79.8	33.6	46.2	50.4
Health education	276,600	77.1	70.6	6.5	22.9	13.5	9.4	84.1
General elementary education	40,300	79.2	56.9	22.2 !	20.8	10.5 !	10.4	67.4

Rounds to zero.
! Interpret data with caution. The standard error for this estimate is equal to 30 percent or more of the estimate's value.
‡ Reporting standards not met. The standard error for this estimate is equal to 50 percent or more of the estimate's value.
NOTE: Table includes any classes taught in any grades 6-8 . Classrooms are limited to traditional public and public charter schools. Each subject area may include several subfields. Under science and social science, several subfields are examined in detail. These subfields are not inclusive of all subfields in the subject and, therefore, do not add to the broad field total. Majors are included regardless of whether they were held within or outside the school/college of education. Majors in main assignment are credited if they were held at the bachelor's degree level or higher. A certification is credited if it is a regular or standard state certificate or a probationary certification in-subject and in any grades 6-8. Detail may not sum to totals because of rounding and because some data are not shown. Not all apparent differences shown in the table are statistically significant.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Major and/or certification in subject area

With respect to total majors in the four most common assignments, less than 50 percent of mathematics and science classes were taught by teachers with a major in the class subject. More than 50 percent of classes in the subjects of French, Spanish, arts/arts and crafts, music, health education, and general elementary education were taught by teachers who majored in the class subject.

Music classes had the highest percentage of classes (95 percent) taught by a teacher with an in-field major.[20] Less than 20 percent of classes in physical science or earth science were taught by a teacher who held a major in the class subject.

With respect to both a major and certification, less than 50 percent of English, mathematics, science, and social science classes were taught by teachers who held both a major and certification in the subject. For example, in mathematics and science, only 23 percent and 34 percent of classes, respectively, were taught by teachers with both a major and certification in the subject. More than 50 percent of French, art/arts and crafts, music, and health education classes were taught by teachers with a major and certification in the class subject; again, music classes had the highest percentage of teachers with both a major and certification in music at 88 percent.[21] Among the subfields with reportable information, the rates for teacher with both major and certification ranged from 0 percent for geography and 7 percent for physical science to 17 percent and 18 percent for history and biology, respectively.

Addressing "total certified," more than 50 percent of the classes for all broad field subject areas were taught by teachers with an in-field certification. Of these broad subject area classes, 58 percent of English classes, 54 percent of mathematics classes, 59 percent of science classes, and 60 percent of social science classes were taught by a teacher with grades 6–8 certification in the class subject area. The percent of classes in the six subfields taught by a teacher with in-field certification ranged from 8 percent of geography classes to 31 percent of history classes.

Looking at rates of classes taught by teachers with one or both qualifications,[22] 68 percent of English classes, 61 percent of mathematics classes, 69 percent of science classes, and 72 percent of social science classes were taught by a teacher with a major or certification; the percentages in these three core subjects are lower than those in several other broad field subjects, including German, Spanish, art/arts and crafts, music, health education, and general elementary education.

[20] The percentages of French and German teachers who majored in their main assignment were not measurably different from the percentage of music teachers who majored in their main assignment.
[21] The percentages of French and German teachers with a major and certification in their main assignment were not measurably different from the percentage of music teachers with a major and certification in their main assignment.
[22] Figures for the percentage of classes taught by a teacher with a major and/or certification are obtained by subtracting the percentage of classes taught by a teacher who had no major and no certification in the subject area (column 7) from 100 percent.

By contrast, more than 75 percent of the classes in German, Spanish, art/arts and crafts, music, health education, and general elementary education were taught by a teacher with one or both qualifications. The percentage of classes with a teacher with one or both qualifications is particularly low in the science and social science subfields, which range from 9–47 percent of classes.

Neither major nor certification in subject area

Among English, mathematics, science, and social science classes, less than half of the classes were taught by a teacher with neither a major nor certification, with percentages ranging from 28–39 percent. In several class subject areas (German, Spanish, music, and health education), less than 10 percent of classes were taught by a teacher with neither a major nor certification. In contrast, there were four class subfield subjects (physical science, earth science, geography, and government) where more than 50 percent of classes were taught by a teacher with neither a major nor certification, with the highest of these being geography, where 91 percent of classes were taught by a teacher with neither a major nor certification in the subject. These findings suggest substantial variation in teacher qualifications across subject areas in middle grades classes.

Students in Grade 6–8 Classes by Teacher Qualifications and Subject Area

Table 5 shows the number and percentage of students in grade 6–8 classes instructed by a teacher with a major and certification in the subject area. The four subjects with the largest number of students were English (14,275,700), mathematics (12,454,200), science (10,239,800), and social science (10,058,200).

Major and/or certification in subject area

Table 5 also displays information on the percentage of students in each subject area who were taught by a teacher with an in-field major. In mathematics and science, less than 50 percent of students were taught by a teacher with an in-field major. More than 50 percent of students in French, Spanish, art/arts and crafts, music, health education, and general elementary education were taught by a teacher with an in-field major. Less than 25 percent of physical science and earth science students were taught by a teacher with an in-field major.

Table 5.
Number and percentage of students in grade 6-8 departmentalized public school classes of various subjects taught by a teacher with a major and/or certification in that subject area, by selected subject areas: 2011–12

		Percent with a major in subject area			Percent with no major in subject area			
Selected subject area	Number of students	Total	Certified	Not certified	Total	Certified	Not certified	Total certified
English	14,275,700	47.7	37.5	10.2	52.3	20.4	31.9	57.9
Mathematics	12,454,200	30.8	23.7	7.1	69.2	30.7	38.5	54.4
Science	10,239,800	45.5	34.3	11.1	54.5	23.8	30.8	58.1
Biology/life sciences	1,699,600	38.9	19.0	19.9	61.1	10.3	50.8	29.3
Physical science	3,415,700	14.6	7.1	7.5	85.4	14.2	71.2	21.3
Earth sciences	1,166,100	12.6	‡	7.4!	87.4	12.9	74.5	18.2
Social science	10,058,200	51.7	39.6	12.1	48.3	20.9	27.4	60.6
Geography	815,000	‡	#	‡	99.1	8.1 !	91.0	8.1 !
Government/civics	296,800	‡	‡	#	97.8	‡	86.9	‡
History	3,909,400	34.3	17.3	17.0	65.7	14.1	51.6	31.4
French	477,900	82.3	76.7	‡	17.7 !	‡	‡	87.4
German	56,200	60.6 !	54.1 !	‡	‡	‡	#	93.6
Spanish	1,552,000	64.3	55.7	8.6	35.7	23.8	11.9 !	79.5
Art/arts and crafts	2,580,300	77.6	71.2	6.4!	22.4	10.7 !	11.7	82.0
Music	5,625,700	94.6	86.8	7.8	5.4	3.5	2.0!	90.3
Dance/drama or theater	488,600	22.7	18.7!	‡	77.3	34.5	42.8	53.2
Health education	8,674,600	75.5	68.3	7.2	24.5	14.5	9.9	82.8
General elementary education	938,200	76.8	53.2	23.6 !	23.2	11.7 !	11.5	64.9

Rounds to zero.
! Interpret data with caution. The standard error for this estimate is equal to 30 percent or more of the estimate's value.
‡ Reporting standards not met. The standard error for this estimate is equal to 50 percent or more of the estimate's value.
NOTE: Table includes any classes taught to students in any of grades 6-8 . Students are in traditional public and public charter schools. Each subject area includes several subfields. Under science and social science, several subfields are examined in detail. These subfields are not inclusive of all subfields in the subject and, therefore, do not add to the broad field total. Majors are included regardless of whether they were held within or outside the school/college of education. Majors in main assignment are credited if they were held at the bachelor's degree level or higher. A certification is credited if it is a regular or standard state certificate or a probationary certification in-subject and in any grades 6-8. Detail may not sum to totals because of rounding and because some data are not shown. Not all apparent differences shown in the table are statistically significant.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Less than 50 percent of students in English, mathematics, science, and social science were taught by a teacher with both a major and certification. By contrast, more than 50 percent of students in several broad subject areas (French, art/arts and crafts, music, and health education) were taught by a teacher with both a major and certification in that subject area. The only subject where more than 75 percent of students were taught by a teacher with both qualifications in the subject was music. Less than a quarter of students in physical sciences, geography, and history were taught by a teacher with both a major and certification in the subfield subject area.

With the exceptions of dance/drama and theater and general elementary education, more than 50 percent of students in the broad subject areas were taught by a teacher with an in-field certification. In the broad fields of French, German, music, and health education, the percentage of students taught by a teacher with an in-field certification was greater than 75 percent. In contrast, less than a third of students in the science and social science subfields of physical science, earth science, and geography were taught by a teacher with in-field certification. For example, in physical science, 21 percent of students were taught by a teacher with in-field certification.

Neither major nor certification in subject area

Less than 50 percent of students in grade 6–8 broad subject classes were taught by a teacher with neither a major nor certification in the class subject area, with the exception of dance/drama and theater. Among the four most common broad fields (English, mathematics, science, and social science), the percent of students taught by a teacher with neither in-field major nor certification ranged from 27–38 percent. In several broad fields (German, Spanish, art/arts and crafts, music, health education, and general elementary education), less than 20 percent of students were taught by a teacher with neither a major nor certification. The percentage of students taught by a teacher with neither a major nor certification is noticeably higher in the science and social science subfields of physical science, earth science, geography, and government, where 51–75 percent of students in the science subfields and 52–91 percent of students in the social science subfields are taught by a teacher with neither a major nor certification in the main assignment field.

Findings: Nondepartmentalized Teachers

This chapter describes teacher qualifications among nondepartmentalized teachers using the 2011–12 SASS Restricted-Use Public School Teacher Data File. Results focus on classroom organization, teachers' main assignment, and teacher major and certification. The first section discusses the type of nondepartmentalized classroom organization in the main assignment. The next section presents the core subjects taught in the main assignment. The final section shows teacher qualifications in the main assignment.

As described earlier, middle grades teachers are defined as teachers who instruct students in grades 5–9, but no grades lower than 5 and no grades higher than 9. Nondepartmentalized teachers instruct the same group of students all or most of the day in multiple subjects (self-contained classroom); work in classrooms with two or more teachers, in the same class at the same time, who are jointly responsible for teaching the same group of students all or most of the day (team teaching); or instruct a small number of selected students released from or in their regular classes in specific skills (pull-out or push-in instruction). Nondepartmentalized teachers account for 28 percent of middle grades teachers; however, given the exclusion of special education and assignments with low sample sizes, this sample of nondepartmentalized teachers represents 17 percent of public middle grades teachers. This chapter provides information on the nature of instructional time, major and certification among a diverse set of teachers. The sample size within each main assignment limits further subcategories by the specific type of nondepartmentalized teacher, self-contained classroom, pull-out/push-in instruction, or team teaching.

Each section presents the number of nondepartmentalized teachers and students in each main assignment. The total students are calculated by combining nondepartmentalized teachers' report of either the total number of students enrolled in their class (for teachers in self-contained or team teaching classrooms) or the average number of students they teach at any one time (for teachers in pull-out/push-in classrooms). These responses are combined to create an indicator of the total number of students taught in a particular nondepartmentalized main assignment. Results highlight whether a teacher's major and certification cover the same broad subject field as his or her main assignment. Major and certification are considered "in-field" if a teacher reports teaching in the same area as the broad classification of his or her major or certification. More detail on major and certification can be found in the chapter on Data and Measures or in appendix C. The crosswalk in appendix D provides a detailed reference of which majors and certifications match the broad main assignments discussed in this report.

Classroom Organization in Main Assignment

Among nondepartmentalized teachers, the most common main assignment was general elementary education (107,100), followed by English (13,100).

The most common classroom organization for the main assignment varied considerably by teachers' main assignment. Most general elementary education teachers (92 percent) were in self-contained classrooms compared to team-teaching or pull-in/push-out settings. Among nondepartmentalized English and mathematics teachers, rates were not significantly different in each of the possible classroom arrangements—self-contained, team teaching, and pull-in/push-out classrooms. A larger percentage of nondepartmentalized science teachers were in team-teaching classrooms compared to nondepartmentalized general elementary education, English, or music teachers.[23] A larger percentage of nondepartmentalized music teachers were in pull-in/push-out settings compared to those in team-teaching classrooms, and a larger percentage of music teachers were in pull-in/push-out settings compared to the other main assignment areas.

[23] The estimates for mathematics (42 percent) and social science (43 percent) are not statistically significantly different from the estimate for science (67 percent).

Table 6.
Number of nondepartmentalized public middle grades teachers who reported a particular main assignment and classroom organization, by subject of main assignment: 2011–12

Selected main assignment	Number of teachers	Number of students	Among teachers of a particular main assignment, percentage of teachers by classroom organization		
			Self-contained classroom	Team teaching	Pull-in or push-out classroom
General elementary education	107,100	2,749,400	91.5	7.5 !	1.0 !
English	13,100	343,900	23.4 !	36.4	40.2
Mathematics	8,200	260,900	21.3	42.5	36.2
Science	2,100	88,600	‡	67.0	‡
Social science	3,100	131,800	‡	42.6 !	‡
Music	6,400	258,100	‡	19.8 !	77.2
Health education	4,600	195,200	‡	75.8	19.3 !

! Interpret data with caution. The standard error for this estimate is equal to 30 percent or more of the estimate's value.
‡ Reporting standards not met. The standard error for this estimate is equal to 50 percent or more of the estimate's value.
NOTE: Teachers include traditional public school and public charter school teachers who taught nondepartmentalized classes to students in any of grades 5–8, and no grades lower than 5 or higher than 9. Each broad main assignment includes several subfields, with the exception of General Elementary Education and Special Education. Due to small sample sizes, several subjects are not examined in detail. See appendixes for technical notes and definitions of specific subjects within main assignment fields. Detail may not sum to totals because of rounding and because some data are not shown. Not all apparent differences shown in the table are statistically significant.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Core Subjects Taught in Main Assignments

The SASS 2011–12 Teacher Questionnaire asks each nondepartmentalized teacher to report how many hours he or she spent teaching in the four core subjects of English, mathematics, science, and social science during his or her most recent full week at the school. Table 7 indicates the average weekly instructional hours spent in each of these four core subjects and the percentage of paid instructional hours spent in each of the top four core subjects by main assignment of nondepartmentalized teachers.

Average weekly hours in core subjects

Comparing time spent instructing the classroom in the four core subjects provided as response options in the Teacher Questionnaire, general elementary education teachers spent the most instructional time on English (11 hours per week), followed by mathematics (6 hours per week) and 3 hours each for science and social science.

Table 7.
Number of nondepartmentalized public middle grades teachers who reported a particular main assignment, the average instructional hours, and the percentage of instructional hours in core subjects, by subject of main assignment: 2011–12

			Among teachers of a particular main assignment, average instructional hours per week in				Among teachers of a particular main assignment, percentage of paid instructional hours per week in			
Selected main assignment	Number of teachers	Number of students	English	Math	Science	Social science	English	Math	Science	Social science
General elementary education	107,100	2,749,400	10.7	6.2	3.2	2.9	34.3	19.9	10.3	9.2
English	13,100	343,900	17.3	‡	‡	1.8	58.5	‡	‡	5.9 !
Mathematics	8,200	260,900	2.2	17.1	2.0	‡	7.8	59.8	6.2	3.3 !
Science	2,100	88,600	‡	2.2	11.4	1.3 !	11.8 !	7.3 !	44.1	‡
Social science	3,100	131,800	6.9	0.8 !	‡	14.3	23.4	2.5 !	‡	46.6
Music	6,400	258,100	‡	‡	‡	‡	‡	‡	‡	‡
Health education	4,600	195,200	2.5 !	1.1 !	‡	‡	14.6 !	‡	‡	‡

! Interpret data with caution. The standard error for this estimate is equal to 30 percent or more of the estimate's value.

‡ Reporting standards not met. The standard error for this estimate is equal to 50 percent or more of the estimate's value.

NOTE: Teachers include traditional public school and public charter school teachers who taught nondepartmentalized classes to students in any of grades 5–8, and no grades lower than 5 or higher than 9. Each broad main assignment includes several subfields, with the exception of General Elementary Education. Due to small sample sizes, several main assignments are not examined in detail. Teachers in core subjects who did not report instructional hours in any core subject are excluded from the analyses. See appendixes for technical notes and definitions of specific subjects within main assignment fields. Detail may not sum to totals because of rounding and because some data are not shown. Not all apparent differences shown in the table are statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Nondepartmentalized teachers in the remaining main assignments spent the most instructional hours per week, on average, teaching in their main assignments. For example, mathematics teachers reported instructing students for an average of 17 hours in mathematics, compared to 2 hours in English and science, in their most recent week of school.

Percentage of instructional hours in key subjects

Table 7 also shows the time nondepartmentalized teachers spent in English, mathematics, science, and social science as a percentage of their total weekly paid instructional hours. Teachers reported the number of hours spent on these subjects in the most recent week of teaching as well as total weekly hours spent delivering instruction (excluding planning or monitoring students outside of class time).[24] Findings show similar trends to those noted above, where general elementary education teachers spent the largest proportion of instructional time (34 percent) in English compared to the other three subjects, with 20 percent of their time in mathematics and 9–10 percent of their time in social science and science, respectively. Teachers with a main assignment in English, mathematics, science or social science spent the largest percentage of paid instructional hours teaching in their main assignment. For example, nondepartmentalized teachers with their main assignment in English spent 58 percent of their time teaching English compared to 6 percent of their time teaching social science.

Teacher Qualifications by Main Assignment

Table 8 shows the percentage distribution of nondepartmentalized, middle grades teachers with a major in their main assignment, certification in their main assignment, and the combination of these qualifications.

Major in main assignment

A lower percentage of teachers of English, mathematics, and science majored in their main assignment compared to teachers of music, health education, and general elementary education. For example, among nondepartmentalized English teachers, 42 percent held an in-field major, while 79 percent of teachers of health education courses held an in-field major.

[24] The totals in the last four columns of table 7 do not add to 100 because teachers also instruct students in other subjects not listed as an option in the SASS 2011–12 Teacher Questionnaire.

Certification in main assignment

Over half of general elementary education teachers hold in-field certification, and more than 80 percent of music teachers hold in-field certification. Music teachers have the highest percent of in-field certified teachers compared to teachers in other main assignments. Smaller percentages of English, mathematics, and science teachers hold in-field certifications than do nondepartmentalized general elementary education teachers, with estimates ranging from 38–50 percent.

Major and/or certification in main assignment

In the most common main assignment, general elementary education, 54 percent of teachers held a major and certification in general elementary education. Similar to findings for departmentalized middle grades teachers, more music teachers held a major and certification in their main assignment compared to other fields. Less than 50 percent of teachers with a main assignment in English, mathematics, and science held a major and certification in their main assignment.

Table 8.
Number of nondepartmentalized public middle grades teachers who reported a particular main assignment and the percentage with a major and/or certification in that main assignment, by subject of main assignment: 2011–12

Selected main assignment	Number of teachers	Number of students	Percent with a major in main assignment			Percent with no major in main assignment			Total certified
			Total	Certified	Not certified	Total	Certified	Not certified	
General elementary education	107,100	2,749,400	79.1	53.8	25.3	20.9	11.0	9.9	64.8
English	13,100	343,900	41.9	28.4	13.5	58.1	21.8 !	36.3	50.3
Mathematics	8,200	260,900	23.5	11.1 !	12.4 !	76.5	30.3	46.2	41.4
Science	2,100	88,600	38.5 !	24.1 !	‡	61.5	‡	47.7	37.9!
Social science	3,100	131,800	44.5 !	‡	‡	55.5 !	‡	47.8 !	41.0!
Music	6,400	258,100	100.0	91.4	‡	#	#	#	91.4
Health education	4,600	195,200	79.4	67.4	12.1 !	20.6 !	#	20.6 !	67.4

Rounds to zero.

! Interpret data with caution. The standard error for this estimate is equal to 30 percent or more of the estimate's value.

‡ Reporting standards not met. The standard error for this estimate is equal to 50 percent or more of the estimate's value.

NOTE: Teachers include traditional public school and public charter school teachers who taught nondepartmentalized classes to students in any of grades 5–8, and no grades lower than 5 or higher than 9. Each broad main assignment includes several subfields, with the exception of General Elementary Education and Special Education. Due to small sample sizes, several subjects are not examined in detail. Majors in main assignment are credited if they were held at the bachelor's degree level or higher. A certification is credited if it is a regular or standard state certificate or a probationary certification in-subject and in any grades 6-8. Detail may not sum to totals because of rounding and because some data are not shown. See appendixes for technical notes and definitions of specific subjects within main assignment fields. Detail may not sum to totals because of rounding and because some data are not shown. Not all apparent differences shown in the table are statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Neither major nor certification in main assignment

The percent of teachers with no major or certification in their main assignment in English, mathematics, science, and social science ranged from 36–48 percent. In general elementary education and music, less than a quarter of teachers had no major or certification in their main assignment, with estimates of 0 percent for music teachers and 10 percent for general elementary education teachers. A larger percentage of English, mathematics, and science teachers had no major or certification compared to music or general elementary education teachers.[25]

[25] The estimate for social science (48 percent) is not significantly different from the estimate for general elementary education (9 percent).

Summary and Limitations

Departmentalized Teachers

In 2011–12, the four most frequently reported main assignments included English (139,100), mathematics (116,100), science (86,400), and social science (79,200), which accounted for 74 percent of departmentalized teachers analyzed in this report (table 1). With the exception of physical science, earth science, government, French, and dance/drama or theater, more than 50 percent of middle grades teachers taught all their classes in their main assignment.

In English, mathematics, science, and social science (the four most common main assignments), fewer than 60 percent of teachers held a major in their main assignment (table 2). In French, Spanish, art/arts and crafts, music, health education, and general elementary education, more than 50 percent of teachers held a major in their main assignment, with an estimate as high as 96 percent in music. With the exception of mathematics and dance/drama and theater, more than 50 percent of teachers were certified in their broad field assignment. Typically, higher percentages of teachers in foreign languages, music, and health education had one or both in-field qualifications than did teachers in other main assignment fields. The science and social science subfields often had the lowest percentages of teachers with a major or certification in their main assignment.

Teachers may instruct different numbers of classes and teach other classes outside their main assignment. In grades 6–8 classrooms, less than 50 percent of classes in English, mathematics, science, and social science were taught by teachers with both a major and certification in the class subject (table 3). More than 50 percent of classes in French, Spanish, arts/arts and crafts, music, health education, and general elementary education were taught by a teacher with an in-field major, and more than 50 percent of classes in these same subjects were taught by a teacher with an in-field certification (table 4). In mathematics and science, less than 50 percent of students were taught by a teacher with an in-field major (table 5). With the exceptions of English, social science, German, and dance/drama or theater, more than 50 percent of students in the remaining broad subject areas were taught by a teacher with an in-field major.

Nondepartmentalized Teachers

Nondepartmentalized general elementary education teachers (107,100) accounted for the largest percent of nondepartmentalized teachers analyzed in this report, and these teachers . most often taught in self-contained classroom settings (table 6). Among nondepartmentalized English and mathematics teachers, rates were not significantly different across each of the possible classroom arrangements, including self-contained, team teaching, and pull-in/push-out classrooms. A larger percentage of nondepartmentalized music teachers were in pull-in/push-out classrooms relative to team teaching classrooms.

Comparing time spent instructing students in the four core subjects, general elementary education teachers spent the most instructional time on English, followed by mathematics (table 7). Nondepartmentalized teachers in English, mathematics, science, and social science spent the most instructional hours per week, on average, teaching in their main assignments.

A larger percentage of general elementary education teachers had a major and certification in their main assignment compared to English, mathematics, science, or social science teachers (table 8). Among general elementary education teachers, 54 percent held a major and certification in their main assignment. Less than 50 percent of teachers with a main assignment in English, mathematics, or science held a major and certification in their main assignment.

Limitations

Readers should be aware of limitations in the analysis of this report. Among departmentalized teachers, direct comparisons across the teacher-, class-, and student-level estimates should be interpreted with caution. Although the subpopulations in these analyses largely overlap, the differences should not be disregarded. The teacher-level subpopulation counts teachers only once, based on their broad main assignments, and only counts teachers whose main assignment is in one of the 18 selected subjects in any of grades 5–8, with no grade lower than 5 and no grade higher than 9. In the teacher-level subpopulation, some teachers are included in the data more than once if they also list one of the six relevant subfields in science or social science. At the class and student levels, the teacher subpopulation includes all departmentalized teachers who taught classes or students in grades 6–8, regardless of other grades taught. Therefore, an individual teacher's qualifications may be represented multiple times in the class- and student-level estimates. Additionally, readers should be careful not to generalize beyond the populations of departmentalized and nondepartmentalized teachers included in this report, which represent 66 percent and 17 percent, respectively, of all middle grades public school teachers.

Readers should be aware of the narrow definition of in-field qualifications for the subfields of science and social science. Direct certification matches at the subfield level are difficult to obtain for all specific subject areas. Not all subjects included in the broad fields of science and social science are represented in the subfields. Therefore, inconsistencies may be observed when comparing subfield-level estimates with broad field-level estimates. Furthermore, the scope of this report does not include an investigation into whether states offer certifications in subfield areas of science and social science. States may not offer certification in the subfields, and this would result in lower percentages of teachers who hold certifications in subfield areas.

Given the small sample sizes of nondepartmentalized teachers in several main assignments, it is difficult to make informative comparisons between groups. The findings provide an overview of the classroom organization and qualifications of nondepartmentalized teachers, but sample sizes do not always allow stable comparisons between main assignments.

Finally, although teachers' majors and certifications offer substantial information regarding their qualifications, other measures could be used. Alternative measures may include teachers' highest degree achieved or certification from the National Board for Professional Teaching Standards. Readers are encouraged to explore alternative measures available in the SASS data.

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Appendix A—Standard Error Tables

Table A-1.
Standard errors for Table 1: Number of departmentalized public middle grades teachers who reported a particular main assignment and the percentage of teachers who taught various percentages of classes within that main assignment, by subject of main assignment: 2011–12

Selected main assignment	Number of teachers	Among teachers of a particular main assignment, the percentage who teach: 0 to 49.9 percent of their classes in their main assignment	50 to 99.9 percent of their classes in their main assignment	100 percent of their classes in their main assignment
English	5,880	0.71	1.94	2.09
Mathematics	5,390	0.80	1.74	1.85
Science	4,170	0.80	2.43	2.40
Biology/life sciences	1,410	3.25	5.77	5.62
Physical science	2,460	2.18	5.34	5.68
Earth sciences	1,160	2.50	6.55	7.12
Social science	4,130	1.54	2.19	2.24
Geography	660	†	5.99	6.03
Government/civics	600	†	9.80	10.09
History	2,710	2.61	3.69	4.10
French	870	†	12.69	12.75
German	190	†	†	13.03
Spanish	1,170	†	4.09	4.63
Art/arts and crafts	1,540	†	4.31	4.57
Music	1,980	†	1.92	2.05
Dance/drama or theater	690	†	12.68	12.95
Health education	2,620	0.23	1.51	1.53
General elementary education	6,000	†	†	†

† Not applicable. Reporting standards not met.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Table A-2.
Standard errors for Table 2: Number of departmentalized public middle grades teachers who reported a particular main assignment and the percentage with a major and certification in that main assignment, by subject of main assignment: 2011–12

		Percent with a major in main assignment			Percent with no major in main assignment			
Selected main assignment	Number of teachers	Total	Certified	Not certified	Total	Certified	Not certified	Total certified
English	5,880	2.62	1.82	2.15	2.62	1.65	2.26	2.04
Mathematics	5,400	1.77	1.73	0.90	1.77	1.96	2.40	2.48
Science	4,170	2.31	2.46	1.57	2.31	1.92	2.09	2.46
Biology/life sciences	1,410	6.29	5.42	5.12	6.29	2.68	5.96	5.32
Physical science	2,460	3.34	2.02	2.48	3.34	3.25	3.79	3.53
Earth sciences	1,170	4.74	2.99	3.80	4.74	3.84	5.55	4.23
Social science	4,130	2.71	2.62	2.01	2.71	2.73	2.39	2.99
Geography	660	†	†	†	1.37	3.34	3.71	3.34
Government/civics	600	†	†	†	3.19	†	9.54	9.95
History	2,710	3.63	3.02	2.68	3.63	3.23	4.19	4.15
French	870	6.89	9.16	†	6.89	†	†	6.71
German	190	15.48	18.23	†	†	†	†	13.90
Spanish	1,170	5.50	6.08	2.97	5.50	4.89	3.13	4.06
Art/arts and crafts	1,540	4.42	4.68	2.32	4.42	3.34	2.93	3.47
Music	1,980	1.43	2.91	2.86	1.43	1.27	†	2.86
Dance/drama or theater	690	10.67	11.01	†	10.67	10.95	10.72	10.91
Health education	2,620	2.28	2.33	1.44	2.28	2.00	1.20	1.65
General elementary education	6,000	4.62	4.61	4.23	4.62	3.00	4.05	4.64

† Not applicable. Reporting standards not met.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Table A-3.
Standard errors for Table 3: Number of departmentalized public middle grades teachers who reported a particular main assignment and the percentage of teachers with various qualifications, by subject of main assignment and percentage of classes taught in main assignment: 2011–12

Selected main assignment	Number of teachers	Percent with a major and certification in their main assignment	Percent with only a major or only a certification in their main assignment	Percent with neither a major nor a certification in their main assignment
English	5,880	1.82	2.18	2.26
Percentage of classes taught in English				
0 to 49.9	1,000	†	15.04	12.19
50 to 99.9	2,930	3.65	4.68	4.59
100	5,420	2.46	2.49	2.61
Mathematics	5,400	1.73	2.03	2.40
Percentage of classes taught in mathematics				
0 to 49.9	950	†	11.32	11.95
50 to 99.9	2,280	2.42	6.02	6.17
100	4,600	2.08	2.06	2.28
Science	4,170	2.46	2.27	2.09
Percentage of classes taught in science				
0 to 49.9	680	†	10.57	13.86
50 to 99.9	2,650	4.77	5.24	4.90
100	3,080	2.80	2.69	2.61
Social science	4,130	2.62	2.80	2.39
Percentage of classes taught in social science				
0 to 49.9	1,300	8.39	11.82	16.78
50 to 99.9	1,800	4.92	5.38	6.08
100	3,660	3.03	3.48	2.54

† Not applicable. Reporting standards not met.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Table A-4.
Standard errors for Table 4: Number and percentage of grade 6–8 departmentalized public school classes of various subjects taught by a teacher with a major and/or certification in that subject area, by selected subject areas: 2011–12

Selected subject area	Number of classes	Percent with a major in subject area			Percent with no major in subject area			Total certified
		Total	Certified	Not certified	Total	Certified	Not certified	
English	26,220	2.05	1.69	1.79	2.05	1.63	1.62	1.81
Mathematics	21,210	1.77	1.63	1.04	1.77	1.60	1.82	1.86
Science	16,550	2.22	2.32	1.50	2.22	1.94	1.85	2.18
Biology/life sciences	5,520	4.70	3.76	3.36	4.70	2.81	4.63	4.13
Physical science	11,790	2.91	1.92	1.79	2.91	2.66	3.38	3.11
Earth sciences	5,010	3.89	†	3.14	3.89	3.23	4.70	3.63
Social science	19,730	2.25	2.48	1.68	2.25	2.15	1.96	2.57
Geography	4,030	†	†	†	1.08	2.38	2.65	2.39
Government/civics	3,420	†	†	†	2.65	†	10.03	†
History	12,610	3.53	3.03	2.48	3.53	3.06	4.19	3.93
French	5,390	6.70	7.57	†	6.70	†	†	4.76
German	1,110	21.22	20.47	†	†	†	†	5.08
Spanish	6,010	4.46	5.23	2.41	4.46	4.15	2.90	3.80
Art/arts and crafts	8,800	4.21	4.09	2.10	4.21	2.81	2.91	3.20
Music	11,790	1.36	2.34	2.14	1.36	1.12	0.51	2.18
Dance/drama or theater	3,280	5.47	5.29	†	5.47	8.52	8.89	8.60
Health education	14,930	1.99	1.99	1.27	1.99	1.46	1.45	1.65
General elementary education	6,680	4.73	7.60	8.92	4.73	4.13	2.72	8.37

† Not applicable. Reporting standards not met.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Table A-5.
Standard errors for Table 5: Number and percentage of students in grade 6–8 departmentalized public school classes of various subjects taught by a teacher with a major and/or certification in that subject area, by selected subject areas: 2011–12

Selected subject area	Number of students	Percent with a major in subject area			Percent with no major in subject area			Total certified
		Total	Certified	Not certified	Total	Certified	Not certified	
English	539,880	2.22	1.75	1.74	2.22	1.58	1.74	1.80
Mathematics	483,600	1.85	1.78	1.04	1.85	1.74	2.05	2.16
Science	409,940	2.13	2.31	1.47	2.13	1.75	1.86	2.13
Biology/life sciences	157,180	4.93	3.85	3.94	4.93	2.71	4.68	4.08
Physical science	281,490	3.03	1.89	2.12	3.03	3.20	3.34	3.44
Earth sciences	131,920	3.69	†	2.76	3.69	3.30	4.34	3.67
Social science	408,080	2.17	2.41	1.77	2.17	2.14	1.79	2.61
Geography	100,340	†	†	†	1.04	2.42	2.67	2.43
Government/civics	71,980	†	†	†	2.47	†	7.18	†
History	286,700	3.45	3.07	2.66	3.45	2.74	3.85	3.83
French	112,680	6.67	7.63	†	6.67	†	†	5.19
German	22,230	20.63	20.39	†	†	†	†	4.68
Spanish	153,940	4.72	5.39	2.36	4.72	3.90	4.11	4.66
Art/arts and crafts	263,830	4.92	4.77	2.00	4.92	3.63	3.46	3.83
Music	377,060	1.33	2.40	2.17	1.33	0.97	0.79	2.30
Dance/drama or theater	95,990	6.24	6.17	†	6.24	8.05	8.15	8.03
Health education	434,120	2.39	2.23	1.44	2.39	1.87	1.62	1.72
General elementary education	173,970	5.67	8.26	9.83	5.67	5.16	3.05	9.05

† Not applicable. Reporting standards not met.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Table A-6.
Standard errors for Table 6: Number of nondepartmentalized public middle grades teachers who reported a particular main assignment and classroom organization, by subject of main assignment: 2011–12

Selected main assignment	Number of teachers	Number of students	Among teachers of a particular main assignment, percentage of teachers by classroom organization: Self-contained classroom	Team teaching	Pull-in or push-out classroom
General elementary education	8,500	151,860	2.87	2.89	0.45
English	1,890	50,800	7.53	5.88	5.74
Mathematics	1,170	51,400	5.62	7.94	7.22
Science	590	29,890	†	12.24	†
Social science	1,120	68,600	†	18.51	†
Music	1,910	72,380	†	6.25	6.73
Health education	910	48,520	†	9.39	9.49

† Not applicable. Reporting standards not met.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Table A-7.
Standard errors for Table 7: Number of nondepartmentalized public middle grades teachers who reported a particular main assignment, the average instructional hours, and the percentage of instructional hours in core subjects, by subject of main assignment: 2011–12

Selected main assignment	Number of teachers	Number of students	Among teachers of a particular main assignment, average instructional hours per week in				Among teachers of a particular main assignment, percentage of paid instructional hours per week in			
			English	Math	Science	Social science	English	Math	Science	Social science
General elementary education	8,500	151,860	0.40	0.20	0.13	0.11	1.30	0.62	0.46	0.37
English	1,890	50,800	1.48	†	†	0.52	4.82	†	†	1.88
Mathematics	1,170	51,400	0.48	1.73	0.57	†	1.71	5.07	1.64	1.53
Science	590	29,890	†	0.58	2.07	0.62	5.86	2.24	9.74	†
Social science	1,120	68,600	2.03	0.35	†	2.83	6.69	1.18	2.35	8.15
Music	1,910	72,380	†	†	†	†	†	†	†	†
Health education	910	48,520	1.13	0.47	†	†	5.81	†	†	†

† Not applicable. Reporting standards not met.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Table A-8.
Standard errors for Table 8: Number of nondepartmentalized public middle grades teachers who reported a particular main assignment and the percentage with a major and/or certification in that main assignment, by subject of main assignment: 2011–12

			Percent with a major in main assignment			Percent with no major in main assignment			
Selected main assignment	Number of teachers	Number of students	Total	Certified	Not certified	Total	Certified	Not certified	Total certified
General elementary education	8,500	151,860	3.26	3.82	3.21	3.26	2.60	2.51	3.82
English	1,890	50,800	7.26	5.90	3.70	7.26	7.07	5.56	5.41
Mathematics	1,170	51,400	6.19	4.58	5.20	6.19	6.07	6.28	6.02
Science	590	29,890	12.85	11.79	†	12.85	†	12.28	12.59
Social science	1,120	68,600	19.43	†	†	19.43	†	21.01	18.87
Music	1,910	72,380	0.00	5.52	†	†	†	†	5.52
Health education	910	48,520	9.34	9.35	5.12	9.34	†	9.34	9.35

† Not applicable. Reporting standards not met.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Appendix B—Supplementary Table: Major/Minor in Main Assignment

Table B-1.
Number of departmentalized and nondepartmentalized public middle grades teachers who reported a particular main assignment and the percentage with a major or minor in that main assignment, by subject of main assignment: 2011–12

	Departmentalized			Nondepartmentalized		
Selected main assignment	Number of teachers	Major or minor	Neither major nor minor	Number of teachers	Major or minor	Neither major nor minor
English	139,100	55.8	44.2	13,100	48.1	51.9
Mathematics	116,100	39.8	60.2	8,200	33.8	66.2
Science	86,400	52.5	47.5	2,100	46.4	53.6
Biology/life sciences	12,100	50.1	49.9		‡	‡
Physical science	25,700	21.5	78.5		‡	‡
Earth sciences	9,100	18.6	81.4		‡	‡
Social science	79,200	61.5	38.5	3,100	44.5 !	55.5 !
Geography	5,200	‡	96.3		‡	‡
Government/civics	2,200	‡	95.8		‡	‡
History	29,500	37.9	62.1		‡	‡
French	3,600	87.2	12.8 !		‡	‡
German	500	88.0	‡		†	†
Spanish	10,900	76.2	23.8		‡	‡
Art/arts and crafts	12,700	85.8	14.2		‡	‡
Music	24,900	96.1	3.9 !	6,400	100.0 !	#
Dance/drama or theater	2,500	34.4 !	65.6		‡	‡
Health education	38,600	82.0	18.0	4,600	79.4	20.6
General elementary education	61,300	80.3	19.7	107,100	80.1	19.9

† Not applicable.

Rounds to zero.

! Interpret data with caution. The standard error for this estimate is equal to 30 percent or more of the estimate's value.

‡ Reporting standards not met. The standard error for this estimate is equal to 50 percent or more of the estimate's value.

NOTE: Teachers include middle grades traditional public school and public charter school teachers who taught classes to students in any of grades 5–8, and no grades lower than 5 or higher than 9. Often a main assignment includes several subfields. Under science and social science, several subfields are examined in detail. These subfields are not inclusive of all subfields in the subject and, therefore, do not add to the broad field total. Majors are included regardless of whether they were held within or outside the school/college of education. Majors in main assignment are credited if they were held at the bachelor's degree level or higher. Minors are credited if a teacher reports an undergraduate minor in any of the subject fields. Detail may not sum to totals because of rounding and because some data are not shown. Not all apparent differences shown in the table are statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Table B-2.
Standard errors for Table B-1: Number of departmentalized and nondepartmentalized public middle grades teachers who reported a particular main assignment and the percentage with a major or minor in that main assignment, by subject of main assignment: 2011–12

	Departmentalized			Nondepartmentalized		
Selected main assignment	Number of teachers	Major or minor	Neither major nor minor	Number of teachers	Major or minor	Neither major nor minor
English	5,880	2.89	2.89	1,890	6.35	6.35
Mathematics	5,390	1.99	1.99	1,170	7.37	7.37
Science	4,170	2.28	2.28	590	13.44	13.44
Biology/life sciences	1,410	6.19	6.19	†	†	†
Physical science	2,460	3.69	3.69	†	†	†
Earth sciences	1,160	4.76	4.76	†	†	†
Social science	4,130	2.45	2.45	1,120	19.43	19.43
Geography	660	†	2.65	†	†	†
Government/civics	600	†	3.19	†	†	†
History	2,710	4.04	4.04	†	†	†
French	870	6.20	6.20	†	†	†
German	190	10.49	†	†	†	†
Spanish	1,170	5.78	5.78	†	†	†
Art/arts and crafts	1,540	3.46	3.46	†	†	†
Music	1,980	1.38	1.38	1,910	†	†
Dance/drama or theater	690	10.92	10.92	†	†	†
Health education	2,620	2.38	2.38	910	9.34	9.34
General elementary education	6,000	4.28	4.28	8,500	3.12	3.12

† Not applicable. Reporting standards not met.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12.

Appendix C—Technical Notes and Methodology

The data used in this report come from the 2011–12 Schools and Staffing Survey (SASS) Restricted-Use Public School Teacher Data File. The following section contains an overview of SASS and an explanation of the multiple levels of analysis, differing subpopulations, and the measures (subjects taught and teacher qualifications) used in this report.

Overview of the Schools and Staffing Survey

The Schools and Staffing Survey (SASS) is sponsored by the National Center for Education Statistics (NCES) of the Institute of Education Sciences (IES) within the U.S. Department of Education (ED) and is conducted by the U.S. Census Bureau. SASS is a nationally representative sample survey of public[1] and private K–12 schools, principals, and teachers in the 50 States and the District of Columbia. School districts associated with public schools and library media centers in public schools are also part of SASS. Conducted seven times, SASS data cover school years 1987–88, 1990–91, 1993–94, 1999–2000, 2003–04, 2007–08, and 2011–12.

For additional information on the specific SASS-related topics discussed in this appendix, consult the *Documentation for the 2011–12 Schools and Staffing Survey* (Graham et al. Forthcoming) or the *User's Manual for the 2011–12 Schools and Staffing Survey*, vols. 1–6 (Goldring et al. 2013). For general information on SASS, visit http://nces.ed.gov/surveys/sass.

Teacher Questionnaire (Form SASS-4A)

The data in this report come from the 2011–12 Teacher Questionnaire, which was designed to obtain information on topics such as classroom organization, teaching assignment, education and training, certification, workload, and perceptions and attitudes about teaching. Questionnaires from all SASS administrations are available online at http://nces.ed.gov/surveys/sass/questionnaire.asp.

[1] Public schools include traditional public and charter schools.

SASS Teacher-Level Estimates and Target Population

SASS is designed to produce national, regional, and state estimates for public elementary and secondary schools and their related components (teachers, principals, school districts, and school library media centers). Data from the SASS Teacher Questionnaire are designed to support comparisons of public school teachers with different levels of experience (1 year of experience, 3 years or less of experience, or more than 3 years of experience) at the state level. Comparisons by race/ethnicity and full- or part-time status are supported at the national level.

Sample Selection

Public schools. The starting point for the 2011–12 SASS public school sampling frame was the preliminary 2009–10 Common Core of Data (CCD) Nonfiscal School Universe Data File. The sampling frame was adjusted from the CCD in order to fit the definition of a school eligible for SASS. To be eligible for SASS, a school was defined as an institution or part of an institution that provides classroom instruction to students; has one or more teachers to provide instruction; serves students in one or more of grades 1–12 or the ungraded equivalent; and is located in one or more buildings apart from a private home. It was possible for two or more schools to share the same building; in this case, they were treated as different schools if they had different administrators (i.e., principal or school head).

The SASS definition of a school is generally similar to the CCD definition, with some exceptions. SASS is confined to the 50 states plus the District of Columbia and excludes the other jurisdictions and U.S. Department of Defense overseas schools. The CCD includes some schools that do not offer teacher-provided classroom instruction in grades 1–12 or the ungraded equivalent. In some instances, schools in the CCD are essentially administrative units that may oversee entities that provide classroom instruction, or that may only provide funding and oversight. The CCD schools with the same location, address, and phone number were collapsed during the SASS frame building on the assumption that the respondent would consider them to be one school. Because SASS allows schools to define themselves, Census Bureau staff observed that schools generally report themselves as one entity in situations where the administration of two or more schools in the CCD is the same. A set of rules was applied in certain states to determine in which instances school records should be collapsed together. When school records were collapsed together, the student and teacher counts, grade ranges, and names as reported to the CCD were all modified to reflect the change.

Finally, additional school records were added to the sampling frame. Most of these records were for alternative, special education, or juvenile justice facilities in California, New York, and Pennsylvania. For a detailed list of frame modifications, see the *Documentation for the 2011–12 Schools and Staffing Survey* (Graham et al. Forthcoming). After adding, deleting, and collapsing

school records, the SASS public school sampling frame consisted of 90,530 traditional public schools and 5,080 public charter schools.

The SASS sample is a stratified probability-proportionate-to-size (PPS) sample, and all public schools underwent multiple levels of stratification. The sample was allocated so that national-, regional-, and state-level elementary, secondary, and combined public school estimates could be made. The sample was allocated to each state by grade range (elementary, secondary, and combined for charters; primary, middle, high, and combined for traditional public schools) and school type (traditional public versus public charter). For a full description of the allocation procedure, see the *Documentation for the 2011–12 Schools and Staffing Survey* (Graham et al. Forthcoming). Within each stratum, all public schools were systematically selected using a PPS algorithm. The measure of size used for the schools was the square root of the number of full-time-equivalent teachers reported or imputed for each school during the sampling frame creation. Any school with a measure of size greater than the sampling interval (the inverse of the rate at which the sample is selected) was included in the sample with certainty and thus automatically excluded from the probability sampling operation. These sampling procedures resulted in a total public school sample of about 10,250 traditional public schools and 750 public charter schools**.**

Public school teachers. Teachers in SASS are defined as staff who teach regularly scheduled classes to students in any of grades K–12. Teacher rosters (Teacher Listing Forms) were collected from sampled schools, primarily by mail, and compiled at the Census Bureau. This compilation was done on an ongoing basis throughout the roster collection period. Along with the names of teachers, respondents at the sampled schools were asked to provide information about each person's teaching experience (1 year, 2–3 years, 4–19 years, or 20 or more years), teaching status (full- or part-time), and subject matter taught (special education, general elementary, math, science, English/language arts, social studies, vocational/technical, or other).

Sampling of teachers was also done on an ongoing basis throughout the roster collection period. The Census Bureau first stratified teachers into four groups: beginning teachers (in their 1st year of teaching); early-career teachers (in their 2nd or 3rd years of teaching); mid-career teachers (in their 4th through 19th years of teaching); and experienced teachers (in their 20th or later years of teaching). Beginning and early-career teachers were oversampled to improve the survey estimates for these subpopulations. Teachers within a school were sorted by the teacher stratum code, the subject matter taught, and the teacher line number code. The teacher line number was assigned to identify the individual within the teacher list. Within each teacher stratum in each school, teachers were selected systematically with equal probability.

Sampling rates for teachers varied between the strata listed above. The maximum number of teachers per school was set at 20 so that a school would not be overburdened by sampling

too large a proportion of its teachers. About 20 percent of the eligible public schools did not provide teacher lists. For these schools, no teachers were selected. Within each teacher stratum in each school, teachers were selected systematically with equal probability. About 51,100 teachers from public schools were sampled.

Data Collection Procedures

In 2011–12, SASS used a combination of mail and Web reporting with subsequent telephone and in-person field follow-up. Prior to the beginning of data collection, research applications were submitted to public school districts that required them to conduct research in the schools. Starting in June 2011, all districts were contacted by telephone to verify or to collect information about the district and sampled school(s) needed for data collection, to identify the best person to receive the district questionnaire, and to determine if the district would provide an electronic teacher list for sampled school(s). Survey packages were mailed to districts in October 2011.[2] Follow-up was conducted sequentially by mail, telephone, and in person to districts that did not provide the requested questionnaire and/or teacher list.

In preparation for school-level data collection, advance letters were mailed to the sampled schools in June 2011 to verify their addresses. School packages were mailed in October 2011.[3] Next, schools were telephoned using a computer-assisted telephone-interviewing (CATI) instrument to verify school information, to establish a survey coordinator (who became the main contact person at the school for subsequent communication), and to follow up on the Teacher Listing Form if the school district had not already provided an electronic teacher list.

Once selected for SASS, teachers were mailed an invitation to complete the web-based questionnaire that also informed them they could request a paper version of the questionnaire. Beginning in January 2012, nonresponding teachers were sent a paper questionnaire. Among teachers who responded to SASS, 67 percent of public school teachers completed the survey via the web instrument. Teacher questionnaires were mailed to schools on a flow basis as teachers were sampled from the data provided on the Teacher Listing Form or electronic teacher list. The field follow-up period was preceded by phone calls from

[2] The SASS district package contained a cover letter, the School District Questionnaire, and postage-paid return envelope. Districts that indicated they would provide electronic list(s) of teachers for their selected school(s) received a letter that explained the purpose of the teacher list and provided instructions for uploading the file. In districts with only one school, the school received the Public School Questionnaire (With District Items) in lieu of the School District Questionnaire and School Questionnaire.

[3] The SASS school package contained a cover letter to the principal; a cover letter to the survey coordinator; the Teacher Listing Form if the district could not provide it; the Public School Principal Questionnaire or Private School Principal Questionnaire; the Public School Questionnaire; the Public School Questionnaire (With District Items), or Private School Questionnaire; the School Library Media Center Questionnaire (for public schools only); postage-paid return envelopes; and the *Statistical Abstract of the United States: 2011* CD.

the telephone centers to remind the survey coordinators to have staff complete and return all forms. Data collection ended in June 2012.

Data Processing and Imputation

The Census Bureau used both central processing and headquarters staff to check returned questionnaires, key data, and implement quality control procedures. Questionnaires that had a preliminary classification of a complete interview were submitted to undergo a series of computer edits consisting of a range check, a consistency edit, a blanking edit,[4] and a logic edit. After these edits were run and reviewed by analysts, the records were put through another edit to make a final determination as to whether the case was eligible for the survey and whether sufficient data had been collected for the case to be classified as a complete interview.

After the final edits were run, cases with "not-answered" values for items remained. Two main approaches were used in imputing values. Donor respondent methods, such as hot-deck imputation, were used. If no suitable donor case could be matched, the few remaining items were imputed using the mean or mode from groups of similar cases to impute a value to the item with missing data. After each stage of imputation, computer edits were run again to verify that the imputed data were consistent with the existing questionnaire data. If that was not the case, an imputed value was blanked out by one of these computer edits due to inconsistency with other data within the same questionnaire or because it was out of the range of acceptable values. In these situations, Census Bureau analysts looked at the items and tried to determine an appropriate value. Edit and imputation flags, indicating which edit or imputation method was used, were assigned to each relevant survey variable. For further information, see the sections on data processing and imputation in *Documentation for the 2011–12 Schools and Staffing Survey* (Graham et al. Forthcoming).

Response Rates

Unit response rates. The unit response rate indicates the percentage of sampled cases that met the definition of a complete interview. The weighted SASS unit response rate was produced by dividing the base-weighted number of respondents who completed questionnaires by the base-weighted number of eligible sampled cases.[5] Table C-1 presents a summary of the base-weighted unit response rates for public school teachers.

[4] Blanking edits delete answers to questions that should not have been filled in (e.g., if a respondent followed a wrong skip pattern) and also add a "not-answered" code to items that should be answered but were left blank.
[5] For the formula used to calculate the unit response rate, see *NCES Statistical Standards* (ED 2003).

Table C-1.
Unweighted, base-weighted, and base-weighted overall response rates for the public school teacher survey population: 2011–12

Survey population	Unweighted unit response rate	Base-weighted unit response rate	Base-weighted overall response rate[1]
Public school Teacher Listing Form	82.4	79.6	†
Public school teacher	76.8	77.7	61.8

† Not applicable.
[1] The base-weighted overall response rate is estimated using the base-weighted questionnaire response rate times the base-weighted response rate for the public school Teacher Listing Form.

NOTE: To obtain base-weighted response rates, unweighted response rates are weighted using the inverse of the probability of selection.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *User's Manual for the 2011–12 Schools and Staffing Survey, Volume 1: Overview.*

Overall response rates. The overall response rate represents the response rate to the survey, taking into consideration each of its stages. For teachers, the overall response rate is calculated as the product of the response rate to two stages: the Teacher Listing Form and the Teacher Questionnaire.[6] The base-weighted overall response rate for public school teachers was 61.8 percent.

Item response rates. The item response rate indicates the percentage of respondents who answered a given survey question or item. The weighted SASS item response rate is calculated by dividing the base-weighted number of respondents who provided an answer to an item by the base-weighted number of respondents who were eligible to answer that item. For the public school teacher data, eight of the survey items used in this report have item response rates of less than 85 percent. These items include the number of students in the 8th class taught, 9th class taught, and 10th class taught by the teacher (83 percent, 81 percent, and 78 percent, respectively); the three grade range options for another certificate (84 percent each); and the three grade range options for a third content area (84 percent each). For further information on nonresponse bias analysis and item response rates, see *Documentation for the 2011–12 Schools and Staffing Survey* (Graham et al. Forthcoming).

Nonresponse Bias Analysis

Because the *NCES Statistical Standards* (4-4) require analysis of nonresponse bias for any survey stage with a base-weighted response rate of less than 85 percent, all SASS files were evaluated for potential bias (ED 2003). As shown in table C-1, the base-weighted response rate for the Teacher Listing Form was 79.6 percent for public schools. The base-weighted response rate for the teacher survey was 77.7 percent for public school teachers.

[6] For the formula used to calculate the unit response rate, see *NCES Statistical Standards* (ED 2003).

For the public school Teacher Listing Form and public school teacher files, national-level estimates were first evaluated within charter and noncharter schools. Next, the base-weighted[7] unit response rate was calculated by state strata. If the base-weighted response rate for any state stratum was less than 85 percent, a detailed comparison of respondents to the frame population was conducted by examining characteristics. For public school teachers, these characteristics were teaching subject, community type, and school level.

For the Teacher Listing Form, a difference between the frame and respondent population was considered noteworthy if the difference was statistically significant and the following three conditions were met:

- The relative difference between the frame and respondent population was greater than 10 percent;
- The absolute difference was greater than 1 percentage point; and
- The cell for each subpopulation contained at least 30 interviews.

A comparison between the frame and the base-weighted estimates for the public school Teacher Listing Form showed evidence of bias in 8 percent of the characteristics compared at the national level and in 16 percent of the characteristics compared at the state level. When the estimates were recomputed using the nonresponse-adjusted weights and compared to the frame estimates for the public school Teacher Listing Form, the estimates show that in the set of national estimates, bias remained in 4 percent of the characteristics compared. In the state-level estimates, 15 percent were significantly biased after nonresponse adjustments.

For the public school teacher file, the criteria for noteworthy differences were changed. Given the low overall response rates for public school teachers, a decision was reached to consider all significant differences observed in the comparisons conducted for the nonresponse bias analysis (i.e., disregarding the three conditions articulated above). Using this more conservative approach, a comparison between the frame and the base-weighted estimates for the public school teacher estimates showed evidence of bias in 6 percent of the characteristics compared at the national level and in 11 percent of the characteristics compared at the state level. The same comparison for the public school teacher data showed that after nonresponse adjustments were applied to the weights, the percentage of estimates with measurable bias decreased to 2 percent at the national level but remained at 9 percent at the state level.

[7] Unit nonresponse bias analysis was conducted using the base weight, defined as the product of the initial base weight (the inverse of the probability of selection) and the sampling adjustment factor. The sampling adjustment factor is an adjustment that accounts for circumstances that affect the school's probability of selection that are identified after the data collection has begun, such as a merger, duplication, or incorrect building-level collapsing (for example, a junior high school and a senior high school merge to become a junior/senior high school).

These variables used in the analyses of nonresponse bias were limited to those used in sampling; however, much more frame information is available at the universe level for teachers. Given the extent of nonresponse in the overall response rates for teachers, NCES is taking a conservative approach of not publishing estimates where the overall response rate falls below 50 percent until such time as more extensive nonresponse bias analyses can be conducted using the more complete set of information available on the schools and districts in which the teachers work. For further information on unit response rates and nonresponse bias analysis, see *Documentation for the 2011–12 Schools and Staffing Survey* (Graham et al. Forthcoming).

Weighting

The general purpose of weighting is to scale up the sample estimates to represent the target survey population. For SASS, a base weight (e.g., the inverse of the sampled teacher's probability of selection) is used as the starting point. Next, a series of nonresponse adjustment factors are calculated and applied based on a weighting cell adjustment. Weighting cells are developed using tree search algorithms. These cells are selected to be homogeneous in response propensity within cells and heterogeneous in response propensity across cells. The adjustment is the inverse of the weighted response rate within each cell, and each respondent in the cell receives this adjustment. Nonrespondents are given a weight of zero: the respondents are reweighted to represent the nonrespondents. Finally, a ratio adjustment factor is calculated and applied to the sample to adjust the sample totals to the frame totals. The product of these factors is the final weight for each SASS respondent, which appears as TFNLWGT in the SASS Teacher data files. The teacher final weight was used for all analyses in this report. Estimates of classes and students were produced as ratios using a SAS procedure, PROC SURVEYMEANS with a RATIO option. For further information on weighting, see *Documentation for the 2011–12 Schools and Staffing Survey* (Graham et al. Forthcoming).

Variance Estimation

In surveys with complex sample designs, such as SASS, direct estimates of sampling errors that assume a simple random sample typically underestimate the variability in the estimates. The SASS sample design and estimations include procedures that deviate from the assumption of simple random sampling, such as stratifying the school sample, oversampling new teachers, and sampling with differential probabilities.

One method of calculating sampling errors of complex sample designs is replication. Replication methods involve constructing a number of subsamples (i.e., replicates) from the full sample and computing the statistic of interest for each replicate. The mean square error of the replicate estimates around the full sample estimate provides an estimate of the variance of the statistic.

Each SASS data file includes a set of 88 replicate weights designed to produce variance estimates. The set of replicate weights for each file should be applied to the respondents in that file. The replicate weights for the SASS public teacher file are TREPWT1–TREPWT88.

Reliability of Data

SASS estimates are based on samples. The sample estimates may differ somewhat from the values that would be obtained from the universe of respondents using the same questionnaire, instructions, and field representatives. The difference occurs because a sample survey estimate is subject to two types of errors: nonsampling and sampling. Estimates of the magnitude of sampling error for SASS data can be derived or calculated. Nonsampling errors are attributed to many sources, including definitional difficulties, the inability or unwillingness of respondents to provide correct information, differences in the interpretation of questions, an inability to recall information, errors made in collection (e.g., in recording or coding the data), errors made in processing the data, and errors made in estimating values for missing data. Quality control and edit procedures were used to reduce errors made by respondents, coders, and interviewers.

Tests of Significance

The tests of significance used in this analysis are based on Student's *t* statistics. The formula used to compute Student's t statistic is as follows:

$$t = \frac{E_1 - E_2}{\sqrt{se_1^2 + se_2^2}}$$

where E_1 and E_2 are the first and second estimates being compared, and se_1 and se_2 are the corresponding standard errors. All *t*-test comparisons assume independent samples. No corrections are made for multiple comparisons. The report employs two-tailed *t* tests using a null hypothesis and no assumption about the direction of the relationship being tested. This is consistent with the *NCES Statistical Standards* , which provide additional information on the criterion for judging statistical significance (Department of Education 2003). The computation of standard errors can be done easily with one of the following software programs: WesVar Complex Sample Software, SAS version 9 and higher, SUDAAN (written within a SAS statistical package), Stata 10, or AM Statistical Software.[8] All differences cited in the text of this report are statistically significant at the $p < .05$ level.

[8] For information on each of these software programs, see their respective websites: http://www.westat.com/expertise/information_systems/wesvar, http://www.sas.com/en_us/software/sas9.html, http://www.rti.org/SUDAAN, http://www.stata.com, and http://www.am.air.org.

Report Subpopulations: Departmentalized and Nondepartmentalized Teachers

This report focuses on public school teachers. Public school teachers include both traditional public school and public charter school teachers.

Middle grades teachers are defined using items from question 13 in the SASS Teacher Questionnaire: "Do you currently teach students in any of these grades at THIS school?" Teachers are included if they instructed students in any of grades 6−8 but no grade lower than 5 or higher than 9. This report presents findings from two subpopulations of teachers (departmentalized and nondepartmentalized) in order to provide a more comprehensive analysis of middle grade-level teachers' qualifications.

The SASS Teacher Questionnaire defines departmentalized teachers as teachers with either of the two following characteristics: teachers who instruct several classes of different students most or all of the day in one or more subjects, or elementary school teachers who teach only one subject to different classes of students.

Nondepartmentalized teachers must fit one of three defining descriptions. Self-contained classroom teachers are teachers who instruct the same group of students all or most of the day in multiple subjects. Teachers who team teach are one of two teachers, in the same class, at the same time, and are jointly responsible for teaching the same group of students all or most of the day. Teachers of pull-out or push-in classes instruct a small number of selected students released from or in their regular classes in specific skills or to address specific needs. Any of these three types of teachers are classified as nondepartmentalized teachers.

As mentioned above, departmentalized and nondepartmentalized teachers are analyzed separately because of their very different class structures. At the middle grades level, there were 870,657 public school teachers in 2011–12. Of these teachers, 72 percent (629,561) taught in departmentalized classrooms, of whom 91 percent (575,843) taught one of the 12 broad fields or 6 subfields examined in this report. Therefore, the departmentalized subpopulation of teachers in this report represents 66 percent of all public middle grades teachers. In the sample of all public middle grades teachers, 28 percent (241,096) of teachers are not in departmentalized classrooms, of whom 40 percent (96,480) did not teach in one of the seven broad fields included in this report. In particular, 36 percent of middle grades nondepartmentalized teachers taught special education, a main assignment excluded from the report. Therefore, the nondepartmentalized subpopulation of teachers in this report represents 17 percent of all public middle grades teachers.

Departmentalized Levels of Analysis: Teacher, Class, and Student

Among departmentalized teachers, this report examines three levels of analysis: teacher, class, and student levels each yielding different descriptive information about teachers. Although all tables present middle grades findings, important distinctions exist between the teacher subpopulations in the departmentalized teacher-level tables and the departmentalized teacher subpopulation in the class- and student-level tables. The class- and student-level analyses are critical to exploring variations in the number of classes and students instructed by teachers with different qualifications. Separate class- and student-level analyses are important because not all teachers instruct the same number of classes and not all classes have the same number of students. Taking these variations into account, the three levels of analyses offer a more precise picture of the numbers and percentages of classes and students being taught by teachers with various types of qualifications.

The following scenario provides an example of the relationship among the three levels: a teacher teaches four mathematics classes and one English class, has a major and certification in mathematics, and reports mathematics as his/her main assignment. At the teacher level, this teacher would be considered "in-field" in his/her main assignment. At the class level, the teacher's mathematics classes would be reported as having an "in-field" teacher, but not the English class. This would result in a class-level measure of 80 percent of his/her classes taught by an "in-field" teacher. If all five of these classes had identical numbers of students, the student-level measure would be the same (e.g., if the enrollment of the 4 mathematics classes totaled 80 students and the English class had 20 students, the student-level measure would also be 80 percent). However, if a total of 60 students were enrolled in the 4 mathematics classes and the 1 English class had 40 students, the student-level measure would indicate 60 percent of this teacher's students were taught by an "in-field" teacher.

Teacher Level

Teacher-level analyses in this report are presented separately for the departmentalized and nondepartmentalized teacher subpopulations. Analyses in this report consider all degrees (bachelor's and higher) and certifications (probationary and higher) held by teachers and compare these qualifications with the subject of their main assignments. Some teachers may or may not have in-field qualifications for additional classes they teach in subjects other than their main assignments. Tables 1–3 in this report present the percentages of departmentalized teachers who instruct classes in their main assignments as well as the percentages of teachers who hold degrees and certifications in their main assignments. Tables 6–8 report the same percentages for nondepartmentalized teachers.

Class and Student Levels

Since nondepartmentalized teachers do not report individual class assignments, class- and student-level analyses are limited to those of departmentalized teachers. These class- and student-level analyses explore all classes taken by students in grades 6–8 in the 12 broad fields and 6 subfields discussed in this report. The degrees and certifications of all teachers who teach these classes are considered and compared for correspondence with each of the subject areas. At the class and student levels, teachers who instruct classes in more than one subject appear multiple times for each subject they teach.

Class- and student-level analyses use information from question 24 of the SASS Teacher Questionnaire, which asked departmentalized teachers to report the subject name, subject matter code, grade level code, and number of students for each class period or section instructed. Teachers were able to report a maximum of 10 classes.[9] Both the class- and student-level measures consider all classes taught by a teacher, not just classes within a teacher's reported main assignment.

Important distinctions exist between the departmentalized teacher subpopulation in the teacher-level tables and the departmentalized teacher subpopulation in the class- and student-level tables. At the teacher level, the teacher subpopulation of analysis includes departmentalized teachers who strictly fall into the middle grades teacher definition. That is, a teacher is considered a middle grades teacher if he or she instructs classes in any of grades 5–8 but no grade lower than 5 or higher than 9. At the class and student levels, the teacher subpopulation includes all departmentalized teachers who taught classes or students in grades 6–8. That is, teachers who taught a 4th-grade class and also a 6th-grade class would be included in the class- and student-level analyses but not in the teacher-level analyses. The teacher-level tables use a teacher's main assignment area as the unit of analysis, considering only one observation per teacher. Class- and student-level tables count teachers based on the different classes and assignment areas taught.

The class- and student-level analyses exclude students in 5th grade because a significant proportion of those students (41 percent) are taught by teachers classified as elementary school teachers. This means that these teachers instruct up to grade 5, but no grade higher by definition. Selecting only the 59 percent of the 5th-grade classes and students classified as middle grades would have introduced bias, given that these teachers would be more likely to meet the criteria for certification for middle grades classes and students. On the other hand,

[9] Less than 1 percent of the teachers in this report taught more than 10 classes. However, teachers were only given space on the questionnaire to report the subject area of up to 10 classes. Because the subject area was used to match teacher qualifications, it is not possible to say whether these teachers have in-field qualifications for classes beyond the 10 that were reported. Given the small fraction of teachers who reported more than 10 classes, examining only the first 10 classes reported should not introduce significant bias into the findings.

including the entire sample of 5th-grade classes and students would introduce bias by including cases in the middle grades sample that were in reality elementary level. Therefore, in an effort to reduce bias and produce conservative estimates of the qualifications of middle grades teachers, class and student analyses are restricted to classes and students in grades 6–8.

The class-level analysis (table 4) presents the percentage of grade 6−8 classes taught by traditional public or public charter school teachers of departmentalized classes who held various combinations of majors and certifications. The class-level analysis accounts for the variation in the number of classes taught by teachers. The student-level measure (table 5) examines the percentage of students in grade 6−8 classes taught by public school teachers of departmentalized classes who held various combinations of majors and certifications. The student-level findings compensate for variations in the number of classes as well as the number of students in each class instructed by each teacher.

Readers should remember these differences when examining and comparing teacher-, class-, and student-level results. Although the purpose of these analyses is to provide a more complete picture of teacher qualifications, readers should take caution in making direct comparisons between tables. Comparing teacher-level results with those from class- and student-level analyses can provide information regarding the percentage of classes or students instructed by teachers with qualifications outside their main assignments, but important distinctions should be considered. The percentage of teachers who hold in-field qualifications in a particular main assignment may be higher than the percentage of classes taught by teachers who hold in-field qualifications. This result may indicate that some teachers teach subjects outside of their main assignments without in-field qualifications for those subjects, or that teachers with in-field qualifications on average instruct fewer classes than teachers without in-field qualifications.

Student-level results (table 5) further explain differences both in the number of classes taught by a teacher and the number of students enrolled in those classes. Using a hypothetical example, the percentage of classes instructed by teachers who hold in-field qualifications could be larger than the percentage of students instructed by teachers who hold in-field qualifications. This would suggest that classes taught by teachers with in-field qualifications are smaller than classes taught by teachers without in-field qualifications. It is important to note that SASS was designed as a representative sample of teachers. Class- and student-level estimates are based on classes and students *taught by teachers* in SASS and may not be nationally representative of classes and students.

Measures: Subjects Taught and Teacher Qualifications

Subjects Taught: Main Assignment and Class Subject Area

For purposes of the analyses presented here, teacher qualifications are considered as they relate to one of two measures of the subjects that teachers instruct: *main assignment* and *course subject area taught*. Each teacher has one main assignment, the field in which he or she reported teaching the most classes. Used for all teacher-level analyses (tables 1–3 and 6–8), the information comes directly from question 16 (T0090) of the SASS Teacher Questionnaire: "This school year, what is your MAIN teaching assignment field at THIS school? (Your main assignment is the field in which you teach the most classes)."

The class subject area measure includes all subjects (or fields) taught by a teacher. This measure is used for all class- and student-level analyses (tables 4 and 5, respectively). Some teachers may instruct all their classes within their main assignment, and other teachers may instruct one or more classes outside their main assignment. During SASS data collection, detailed information was requested from teachers on up to 10 of the classes they taught in question 24 (T0110–T0119) of the Teacher Questionnaire.

This report examines a selection of 18 main assignment fields and class subject areas, including some subfields of general (i.e., broad) subjects. The broad subject areas are English, mathematics, science, social science, French, German, Spanish, art/arts and crafts, music, dance/drama or theater, health education, and general elementary education. The reported broad areas and subfields are generally the certification fields and the core subjects of ESEA. No subfields of English and mathematics and not all subfields of science and social science are reported due to a lack of comparability of possible subfields for certification purposes. Although health education is not considered a core subject of ESEA and, therefore, teachers of health education are not required to receive certification for highly qualified teacher status, it is included in the report given that health education teachers account for 4 percent of middle grades teachers.

Separate foreign languages are broad areas rather than subfields because of the way that state certification standards are set up—each foreign language is considered to be its own content area, and one cannot be substituted for another. That is, a teacher with a Spanish major cannot be certified as a French teacher based on a Spanish major or vice versa. Therefore, each separately coded foreign language has to be treated as a broad subject field rather than as a subfield, in which the broad field of certification can cover a number of subfields that may or may not have separate certification areas recognized by a particular state. There is no general certification content area of "foreign languages." Within these broad subject areas, analyses of subfields are presented in the tables.

The broad subject area of science includes the subfield areas of biology/life sciences and physical science, in which the latter includes a further subfield of earth sciences. The broad subject area of social science includes the subfields of geography, government/civics, and history. These 12 broad subject areas and 6 subfield areas represent academic subjects for which clear matches exist between teacher assignment and teacher qualifications. Further, the sample sizes for these subject areas and subfields include sufficient numbers of teachers to support stable estimates. For example, chemistry and physics teachers are not included in the middle grades sample due to low sample size since these are subjects more often taught at the high school level.

Teachers of chemistry, physics, economics, special education; English as a Second Language (ESL); career and technical education (CTE); driver's education; library or information science; military science or ROTC; philosophy; religious studies; theology or divinity; other foreign languages; and "other" were not examined in this report due to analytical constraints. For example, all of the fields aside from CTE, ESL, and special education lack a sufficient number of responses for analysis at the middle grades level. In the case of these other fields, certification requirements may vary from those included in this report. While special education is reported as a main assignment among 3 percent of departmentalized middle grades teachers and 36 percent of nondepartmentalized teachers, it is not included due to different certification and in-field requirements in both core content and pedagogy. ESEA requirements state that special education teachers must hold certification in both a special education area and the core subject in which they teach. Additionally, teachers of CTE subjects often lack any postsecondary degree and may be state-certified by virtue of a postsecondary vocational certificate or vocational work experience.

Prior to matching teacher assignment with qualifications, a typology of subject matter specialties was determined to classify teachers into various assignment fields. The typology includes main disciplinary fields and certain subfields consistent with previous studies that investigated broad fields and subfields of science and social science (Ingersoll 1996; Murnane and Schwinden 1989). Subfields are typically separated from the larger disciplinary field for certification purposes and for investigation of teacher demand and quality in the subfields. Although not all states certify science and social science subfields distinctly from the broad fields, to be consistent with previous research and state certification requirements (where implemented), the analyses in this report include the following subfields of science: biology/life sciences and physical science. They also include the following subfield of physical science: earth sciences (Ingersoll 1996; Murnane and Schwinden 1989). The following subfields of social science are also included: geography, government/civics, and history.

The middle grades sample of teachers also includes a number of teachers (19 percent of the middle grades teacher population) that identify as general elementary education teachers. These teachers most often instruct students in grades 5 and 6, but also in higher grades.

ESEA regulations require that these teachers pass a state-level certification that includes a multiple subject matter test.

The analyses in this report include ESEA core subjects (general education, English, mathematics, science, social science, geography, government/civics, history, foreign language, and arts). When interpreting these results, it is important to note that the law allows states to decide what specific fields should be included under arts and foreign language. This report uses the subjects of French, German, and Spanish—commonly defined by states as specific fields of "foreign language"—and art/arts and crafts, music, and dance/drama or theatre as specific fields of "arts." Generally, English and mathematics are not reported at the subfield levels, not only because there are few comparable certification matches, but also because the ESEA list of core subjects does not include subfields for English or mathematics.

Teacher Qualifications: Major and Certification

This report addresses two primary measures of teacher qualifications—*teacher education* and *teaching certification*—as they relate to the main assignment and course subject area(s) taught. The definition of "in-field" qualifications included in this report is aligned with the ESEA definition of Highly Qualified Teachers and is consistent with the definition used in a prior publication analyzing data from the 2007–08 SASS administration (Hill 2011), but it is different from that used in prior publications (Seastrom et al. 2004). Due to differences in the analyses and changes in survey questions, readers are strongly cautioned against making comparisons of estimates in this report and previously published reports based on data from 1999–2000 or earlier SASS administrations. Structural changes to the certification items in the school year 2003−04 Teacher Questionnaire (and maintained in subsequent surveys in school years 2007–08 and 2011–12) could affect the data and result in misleading conclusions. See appendix D and exhibit D-1 for information on how the matches between subjects taught and teacher qualifications were determined.

Teacher major field of study

The analyses include teachers of all academic backgrounds. The teacher major field of study measure was produced using the educational background items in the SASS Teacher Questionnaire. Teacher education was categorized using two components of teachers' academic majors: the level at which the postsecondary degree was earned and the major field of study.

Teachers satisfied the analytical requirement if they had an in-field degree, whether or not it was awarded by a department, college, or school of education. The measure considered a teacher to have an in-field major if he or she either held a bachelor's or higher degree in a major corresponding to the subject of the main assignment (tables 1–3, 6–8), or held a degree corresponding to the subject of the class areas (tables 4 and 5). The measure considered

degrees to be at the bachelor's-degree level or higher if they included a first[10] or second bachelor's degree, a first or second master's degree, an educational specialist or professional diploma, a Certificate of Advanced Graduate Studies, or a doctorate or first professional degree. Teachers who did not hold degrees in the subjects they taught were reported as those with majors in other subjects and those whose highest degree was a vocational certificate or associate's degree. The analysis did not include academic minors, with the exception of the table included in appendix B.

Thus, according to the major field of study measure, teachers who did not hold degrees in the subjects that they taught included those with majors in other subjects and those with degrees below a bachelor's degree.

Only a selection of science and social science subfields are presented in this report's tables. In the middle grades, teachers of many of the subfields (e.g., chemistry, physics, and economics) represented too small a population to achieve stable estimates of teacher qualifications. However, the estimates for the broad fields of science and social science consider all their subfields. For example, the social science subfields of social studies (general), anthropology, Native American studies, psychology, and sociology are subfields that are not reported in detail, but they are included in the broad field category of "social science." Because not all subfields are reported, the subfield levels do not sum to the totals reported at the broad field level. For example, a teacher with a main assignment of sociology would be included in the broad field of social science and would be considered in-field if the teacher held any of the social science majors.[11] However, sociology is not examined in detail, and therefore, it is not reported in any of the social science subfields.

Teacher certification

Teacher certification status was determined based on three criteria—certification type, content area(s), and grade level(s). The SASS Teacher Questionnaire allows the respondent to report a first and second certification, if applicable. Analyses considered both first and second teacher certifications.[12] To satisfy the analytical requirements of the teacher certification measure, a teacher must have reported a regular or standard state certification, an advanced

[10] Teachers could report two majors for their first degree and one major for their second degree. Approximately 72 percent, 24 percent, and 1 percent of middle grades teachers, respectively, reported one, two, and three majors.

[11] Social science subfield majors included anthropology, area or ethnic studies, criminal justice, cultural studies, economics, geography, government/civics, history, international studies, law, Native American studies, political science, psychology, sociology, and other social sciences.

[12] Because SASS collects information on only two certifications, it was not known how many teachers have three or more certifications or the additional fields in which they may be certified. Among the teachers cited in this report, about 19 percent held a second certification. The percentage of teachers with a third or more certifications was likely to be small; hence, potential problems with underestimating the rates of teachers with in-field certifications were likely to be minor.

professional certificate, or a certificate issued after satisfying all certification requirements except the completion of a probationary period. In addition, the certification must have been granted by, or recognized in, the state in which the teacher currently teaches. Teachers not considered certified were those who reported a certificate that requires some additional coursework, student teaching, or passage of a test before regular certification can be obtained; a certificate issued to persons who still must complete a certification program in order to continue teaching; or no certification in the state in which they teach.

Further, given this report's focus on middle grades teachers, all certificates must apply to any of grades 6–8. At the subfield level, some states do not grant secondary-level certifications in all of the subfields examined in this report. As a result, the percentage of in-field certifications in the subfield subject might be underestimated. For this reason, it is important to take both the broad field- and subfield-level findings into account.

Matching Subject Taught and Teacher Qualifications

Matching Process

Teachers not only may teach more than one subject, but also may have earned more than one postsecondary degree or more than one certification. The analyses in this report consider a teacher to have an in-field major or in-field certification if the major or certification that the teacher holds matches the subjects taught. Therefore, matches need to be made across all the subjects taught and all the qualifications held. For example, a mathematics teacher is considered to hold a mathematics major if he or she reported any of the following majors: mathematics, computer science, engineering, or physics. See appendix D and exhibit D-1 for information on how the matches between subjects taught and teacher qualifications were determined.

It is particularly important to remember these matching criteria when interpreting results for the broad fields and subfields of science and social science. Teachers who appear in the science or social science rows are not mutually exclusive from teachers who appear in the subfield rows within those subjects. The analyses in the broad field allowed more-lenient requirements. For example, a teacher with a main assignment of history appears in the broad social science row and the subfield history row. This teacher is considered to hold an in-field major or certification in the broad field of social science if he or she holds a major or certification in any of the following fields: social studies (general), anthropology, area/ethnic studies, criminal justice, cultural studies, economics, geography, government/civics, history, international studies, law, Native American studies, political science, psychology, sociology, or other social sciences. However, this same teacher must hold a major or a certification in history to be counted as in-field in the specific subfield of history.

The construction of the major field of study and certification measures considered teachers' majors and certifications in several combinations. Taken collectively, qualifications were examined in relation to the subjects that teachers taught (both main assignment and course subject area). While the unit of analysis varies throughout the report, the numerators are based on the number of teachers meeting the specified criteria (in-field major and/or in-field certification), and the denominators are based on all teachers of that subject. In some cases, the unit of analysis is the number of teachers; in others, it is the number of classes or students taught by teachers who meet the specified criteria.

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Appendix D—Description of Variables Used in This Report

General Table Variables

Teacher level

The SASS restricted-use data files allow users to identify middle school teachers in several ways, and readers must give special attention to understanding the meaning of "middle grades teachers" in this analysis, which is a measure of the grade level of students taught by the teacher. This teacher-level measure must be distinguished from the SASS definition of a "middle school," which is a measure of the grade level offered at the school. SASS defines a middle school as any school in which no grade lower than 5 or higher than 8 is offered. However, the teacher-level analyses (tables 1–3 and 6–8) of this report define middle grades-level teachers as those who instruct students in grades 5–8, and no grades lower than 5 or higher than 9; the definition of teacher grade levels are constructed from responses to variables T0070–T0084.

Class and student levels: As with the 2003–04 and 2007–08 questionnaires, the 2011–12 Teacher Questionnaire asked teachers of departmentalized and elementary enrichment classes to report information on up to 10 classes or sections they taught, including the subject, enrollment, and grade level of each class. Classes (table 4) and the students enrolled in them (table 5) were included if taught at the 6–8 grade level.

Classroom organization: This report includes data on departmentalized teachers, defined as teachers who instruct several classes of different students most or all of the day in one or more subjects, or elementary school teachers who teach only one subject to different classes of students—as well as nondepartmentalized teachers, defined as teachers who instruct the same group of students all or most of the day in multiple subjects or teachers participating in team teaching or "pull-in" or "push-out" classes. Teachers' classroom organization was defined using question 18 (T0092): "Which statement best describes the way YOUR classes at THIS school are organized?"

Main assignment: Tables 1–3 report the qualifications of departmentalized teachers while tables 6–8 report the qualifications of nondepartmentalized teachers with respect to their main assignments. All teachers (departmentalized and nondepartmentalized) answered this

question. These tables are constructed using question 16 (T0090): "This school year, what is your MAIN teaching assignment field at THIS school? (Your main assignment is the field in which you teach the most classes.)" Each teacher has one reported main assignment field.

Course subject area(s) taught: Departmentalized teachers only are asked to report the subject area of up to 10 classes taught in column B of question 24 in the Teacher Questionnaire (T0110-T00119). These classes make up the course subject(s) taught, and were used to construct tables 4 and 5. Course subject area(s) taught include both classes taught within the reported main assignment and in other assignments (where applicable).

Students taught: Departmentalized teachers were asked to report the number of students taught in each of the course subjects recorded for up to 10 classes. These were recorded in column D of question 24 in the Teacher Questionnaire (T0130-T0139). Table 5 was constructed using teachers' reports of the number of students taught in each course subject. Nondepartmentalized teachers in self-contained or team teaching classrooms were asked to report the total number of students enrolled in the classes they taught during the most recent full week of teaching in question 20 of the Teacher Questionnaire. Nondepartmentalized teachers in pull-out or push-in classrooms were asked to report on the average number of students taught at any one time during the most recent full week of teaching in question 21 of the Teacher Questionnaire. The number of students in these settings is used in the second data column of tables 6–8.

Instructional Hours: Nondepartmentalized teachers were asked to report the number of instructional hours spent teaching English (including reading as a subcategory), mathematics, science, and social science during the most recent full week at their schools. Hours were reported to the nearest whole hours; if teachers instructed multiple topics at the same time, they were asked to choose one. These answers were recorded in parts a through d in question 22 in the Teacher Questionnaire (T0096–T0100).

Paid Instructional Hours: Teachers provided the number of hours each week they were paid to deliver instruction to a class of students. Question 54 in the Teacher Questionnaire (T0390) instructed respondents to exclude responsibilities outside of instruction, such as planning time or monitoring students. All respondents answered this question, but the variable was only used to analyze information for nondepartmentalized teachers.

Using exhibit D-1, readers are able to crosswalk the majors and certification areas that were matched to the subjects that teachers instructed, either main assignments or course subject areas taught (i.e., the "in-field" qualifications for each subject). In general, the subjects and corresponding "in-field" qualifications included in this report are closely aligned with prior NCES publications (Hill 2011; Morton et al. 2008).

The following section describes in detail the analytical requirements for in-field certifications and in-field majors for each main assignment or course subject area.

English teachers: English teachers were those who taught communications, composition, English, journalism, language arts, reading, or speech. In order to have a major in the subject, these teachers were required to hold a major in communications, composition, English, journalism, language arts, linguistics, literature/literary criticism, reading, or speech. English teachers were considered certified in the subject if they reported a certification in communications, composition, English, journalism, language arts, reading, or speech.

Mathematics teachers: Mathematics teachers were those who taught algebra I, algebra II, algebra III, basic and general mathematics, business and applied math, calculus and precalculus, computer science, geometry, prealgebra, statistics and probability, or trigonometry. In order to have a major in the subject, these teachers were required to hold a major in mathematics, computer science, engineering, or physics. Mathematics teachers were considered certified in the subject if they reported a certification in mathematics, computer science, or physics.

Exhibit D-1.
Coding of main assignment or course subject areas, major fields, and certification areas, by subject area: 2011–12

Subject area	Main assignment/ course subject area	Major field	Certification area
English	Communications (151) Composition (152) English (153) Journalism (154) Language arts (155) Reading (158) Speech (159)	Communications (151) Composition (152) English (153) Journalism (154) Language arts (155) Linguistics (156) Literature/literary criticism (157) Reading (158) Speech (159)	Communications (151) Composition (152) English (153) Journalism (154) Language arts (155) Reading (158) Speech (159)
Mathematics	Algebra I (191) Algebra II (192) Algebra III (193) Basic and general mathematics (194) Business and applied math (195) Calculus and precalculus (196) Computer science (197) Geometry (198) Prealgebra (199) Statistics and probability (200) Trigonometry (201)	Mathematics (190) Computer science (197) Engineering (214) Physics (217)	Mathematics (190) Computer science (197) Physics (217)
Science	Science, general (210) Biology/life sciences (211) Chemistry (212) Earth sciences (213) Engineering (214) Integrated science (215) Physical science (216) Physics (217)	Biology/life sciences (211) Chemistry (212) Earth sciences (213) Engineering (214) Physics (217) Other natural sciences (218)	Science, general (210) Biology/life sciences (211) Chemistry (212) Earth sciences (213) Physical science (216) Physics (217) Other natural sciences (218)
Biology/life sciences	Biology/life sciences (211)	Biology/life sciences (211)	Biology/life sciences (211)
Physical science	Chemistry (212) Earth sciences (213) Engineering (214) Integrated science (215) Physical science (216) Physics (217)	Chemistry (212) Earth sciences (213) Engineering (214) Physics (217)	Chemistry (212) Earth sciences (213) Physical science (216) Physics (217)

See notes at end of exhibit.

Exhibit D-1.
Coding of main assignment or course subject areas, major fields, and certification areas, by subject area: 2011–12—Continued

Subject area	Main assignment/ course subject area	Major field	Certification area
Earth sciences	Earth sciences (213)	Earth sciences (213)	Earth sciences (213)
Social Science	Social studies, general (220) Anthropology (221) Economics (225) Geography (226) Government/civics (227) History (228) Native American studies (231) Psychology (233) Sociology (234)	Social studies, general (220) Anthropology (221) Area/ethnic studies (222) Criminal justice (223) Cultural studies (224) Economics (225) Geography (226) Government/civics (227) History (228) International studies (229) Law (230) Native American studies (231) Political science (232) Psychology (233) Sociology (234) Other social sciences (235)	Social studies, general (220) Anthropology (221) Economics (225) Geography (226) Government/civics (227) History (228) Native American studies (231) Psychology (233) Sociology (234) Other social science (235)
Geography	Geography (226)	Geography (226)	Geography (226)
Government/civics	Government/civics (227)	Government/civics (227)	Government/civics (227)
History	History (228)	History (228)	History (228)
French	French (171)	French (171)	French (171)
German	German (172)	German (172)	German (172)
Spanish	Spanish (174)	Spanish (174)	Spanish (174)
Art/arts or crafts	Art/arts or crafts (141)	Art/arts or crafts (141) Art history (142)	Art/arts or crafts (141)
Music	Music (145)	Music (145)	Music (145)
Dance/Drama or theater	Dance (143) Drama/theatre (144)	Dance (143) Drama/theatre (144)	Dance (143) Drama/theatre (144)
General Elementary Education	Elementary grades, general (102)	Elementary grades, general (102) Middle grades, general (103) Secondary grades, general (104)	Elementary grades, general (102) Middle grades, general (103) Secondary grades, general (104)
Health Education	Health education (181) Physical education (182)	Health education (181) Physical education (182)	Health education (181) Physical education (182)

NOTE: Numbers in parentheses correspond to the main assignment and subject matter codes, major field of study codes, and certification content area codes in the 2011–12 SASS Teacher Questionnaire. In the questionnaire, main assignment and subject matter codes can be found on page 11, table 1; major field of study codes can be found on page 15, table 2; and certification content area codes can be found on page 23, table 3.
SOURCE: Graham, S., Parmer, R., Strizek, G., and Thomas, T. (Forthcoming). *Documentation for the 2011–12 Schools and Staffing Survey*. National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

Science teachers: Science teachers are reported in a broad science row in the tables. These science teachers included teachers of science (general), biology/life sciences, chemistry, earth sciences, integrated science, physical science, or physics. In order to have a major in the subject, these teachers were required to hold a major in biology/life sciences, chemistry, earth sciences, engineering, physics, or other natural sciences. Science teachers were considered certified in the subject if they reported a certification in science (general), biology/life sciences, chemistry, earth sciences, physical science, physics, or other natural sciences.

Many middle grades science teachers teach specific subfields within the science field. **Biology/life sciences** teachers were required to hold both a major and certification in biology/life sciences. **Physical science** teachers were considered in-field teachers with a major in chemistry, earth sciences, engineering, or physics and a certification in chemistry, earth science, physical science, or physics. Within physical science, qualifications were further specified for teachers of **earth sciences**. These teachers were required to hold a major and certification in earth sciences. This was done both to account for more-specific qualification requirements in some states and to align with the requirements cited in past NCES reports on teacher qualifications (Seastrom et al. 2004; Morton et al. 2008; Hill 2011).

Social science teachers: Social science teachers are reported in a general social science row. These social science teachers included teachers of social studies (general), anthropology, economics, geography, government/civics, history, Native American studies, psychology, or sociology. In order to have a major in the subject, these teachers were required to hold a major in social studies (general), anthropology, area/ethnic studies, criminal justice, cultural studies, economics, geography, government/civics, history, international studies, law, Native American studies, political science, psychology, sociology, or other social science. Social science teachers were considered certified in the subject if they reported a certification in social studies (general), anthropology, economics, geography, government/civics, history, Native American studies, psychology, sociology, or other social science.

Within the individual rows, teachers of the social science subfields of **geography**, **government/civics**, and **history** were each held to stricter standards at the subfield level than at the broad field level. At the broad field level, any social science major or certification was considered in-field. However, in order to be considered as having an in-field major and certification, teachers of the social science subfields were required to have a major and certification in the respective subfield (e.g., geography teachers had to earn a major and certification in geography). Again, this was done both to account for more specific qualification requirements in some states and to align with the requirements cited in past NCES reports on teacher qualifications.

Foreign language teacher: In order to meet qualification conditions, **French** teachers were required to hold a major and certification in French. The same requirements were applied to

teachers of **German** and **Spanish**. In order to meet qualifications requirements, foreign language teachers were required to hold a major and certification in their respective foreign language. As mentioned above, teachers of other foreign languages were not included in the tables due to small sample sizes.

Art/arts and crafts teachers: Art/arts and crafts teachers were required to hold a major in art/arts and crafts or art history, and were required to have a certification in art/arts and crafts.

Music teachers: Music teachers were required to hold a major and certification in music.

Dance/drama or theater teachers: Dance/drama or theater teachers were required to hold a major and certification in dance/drama or theater.

Health education teachers: Health education teachers were required to hold a major or certification in either physical education or health education. Although health education is not listed as a core academic subject under ESEA, health education teachers are included in the sample because they constitute a significant percentage of the middle grades teacher population and also report health education as a major and certification.

General elementary education: General elementary education teachers were required to hold majors or certifications in any of the general education subjects, including elementary, middle and high school general education. Although these teachers are generalists by definition, certification or a major in any single other subject matter is not counted as an in-field certification or major. For example, a general elementary education teacher that is certified in English but not in the general education field is not considered as holding an in-field certification.

Variables Used in the Creation of the Columns

Major field of study: Teachers' major fields of study were calculated using variables T0163 (first bachelor's, first major), T0165 (first bachelor's, second major), T0174 (first master's, major), T0187 (second bachelor's, major), T0190 (second master's, major), T0193 (educational specialist/professional diploma), T0196 (Certificate of Advanced Graduate Studies), and T0199 (doctorate or first professional degree). Codes provided in these variables were matched to teachers' main assignment/subject areas taught and certification areas.

Certification type: Certification type was measured using questions 37a (T0250) and 38b (T0276) for the first and, if applicable, second certification held in the state in which teachers taught. Teachers were required to hold a regular or standard state certification or advanced certification or a certificate issued after satisfying all requirements except the completion of a

probationary period. All other certification types, such as those requiring some additional coursework, student teaching, passage of a test, or completion of a certification program, along with those teachers without a certification, make up the "not-certified" category.

Because SASS collects information on two certifications, it is not known how many teachers have three or more certifications or the additional fields in which they may be certified. About 21 percent of middle grades teachers held a second certification. It can be surmised that fewer teachers hold three or more certifications. Certainly, having data on three or more certifications would have provided more information on the fields in which a teacher is qualified to teach and would have potentially caused some estimates of the rates of teachers with in-field certifications to increase slightly.

Certification content area: Teachers were asked to report the content area(s) covered by their first and, if applicable, second certification in questions 37b[1]–37d[4] (T0251, T0256, T0260, T0264, and T0268) and 38c[1]–38e[4] (T0277, T0282, T0286, T0290, and T0294). Codes provided in these variables were matched to teachers' main assignment/subject areas taught and majors.

Certification grade range(s): The 2011–12 SASS Teacher Questionnaire includes items that measured the grade range(s) for which teachers' certifications applied. This report requires in-field certifications to apply to "At least one of grades 6-8" in the Grade Range of Certificate. The specific questions used are 37b[2], 37d[1], 37d[2], 37d[3], and 37d[4] (T0253, T0258, T0262, T0266, and T0270) for the first certification and 38c[2], 38e[1], 38e[2], 38e[3], and 38e[4] (T0279, T0284, T0288, T0292, and T0296) for the second certification.

Appendix E—Glossary of Terms

Certification: A license or certificate awarded to teachers by the state to teach in a public school. The Schools and Staffing Survey (SASS) includes four types of certification plus the category of 'none': a regular or standard state certification or advanced professional certificate; a certificate issued after satisfying all requirements except the completion of a probationary period; a certificate that requires some additional coursework, student teaching, or passage of a test before regular certification can be obtained; and a certificate issued to persons who must complete a certification program in order to continue teaching.

For this report, a certificate is limited to two of the five SASS options. To be precise, a certificate in this report is a regular or standard state certification, advanced professional certificate, or a certificate issued after satisfying all requirements except the completion of a probationary period. Certifications must apply to any of grades 6–8, except for the subjects of art/arts and crafts, music, and dance/drama or theater, for which an ungraded certification is accepted.

Common Core of Data (CCD): The CCD is a group of surveys that acquires and maintains public elementary and secondary education data from the 50 states, the District of Columbia, U.S. Department of Defense schools, and the outlying areas through state-level (or equivalent) education agencies. Information about staff and students in public schools is collected annually at the school, local education agency (i.e., school district), and state levels. Information about revenues and expenditures is also collected at the state level. The CCD is the basis for the SASS sampling frame for traditional public or public charter schools.

Course subject area taught: This term is not defined in the SASS questionnaires. A general definition is any subject taught by a teacher, including both main assignment and other assignments. Teachers may report multiple subject areas taught.

Departmentalized teacher: The SASS Teacher Questionnaire defines departmentalized teachers as those who instruct several classes of different students most or all of the day in one or more subjects (such as algebra, history, or biology).

In-field teacher: This term is not defined by the SASS. In education research literature, an in-field teacher is usually one whose postsecondary degree (major) and/or certification (type, content area covered and grade level) match the subject(s) that he or she has been assigned to teach.

Main assignment field: The SASS Teacher Questionnaire defines main assignment as the field in which the teacher teaches the most classes, though this may not necessarily sum to more than 50 percent of the teacher's classes. Teachers may report only one main assignment.

Major: This term is not defined by SASS, but is meant as a field of study in which an individual has taken substantial academic coursework, implying that the individual has substantial knowledge of the academic discipline or subject area.

Nondepartmentalized teacher: The SASS Teacher Questionnaire defines nondepartmentalized teachers as one of the following: teachers who instruct the same group of students all or most of the day in multiple subjects (self-contained classroom); one of two or more teachers, in the same class at the same time, that are jointly responsible for teaching the same group of students all or most of the day (team teaching); or teachers who instruct a small number of selected students released from or in their regular classes in specific skills (pull-out or push-in instruction).

Public charter school: A public charter school is a public school that, in accordance with an enabling state statute, has been granted a charter exempting it from selected state or local rules and regulations. A public charter school may be a newly created school or it may previously have been a public or private school.

Public school: A public school is an institution or part of an institution that provides classroom instruction to students, has one or more teachers to provide instruction, serves students in one or more of grades 1–12 or the ungraded equivalent, and is located in one or more buildings. It is possible for two or more schools to share the same building; in this case, they were treated as different schools if they had different administrators (i.e., principals). Public schools include regular, special education, vocational/technical, alternative, and public charter schools. Schools in juvenile detention centers and schools that are located on domestic military bases and operated by the U.S. Department of Defense are included. See also entries for Public charter school and Traditional public school.

Teacher: A teacher is defined as a full-time or part-time teacher who teaches any regularly scheduled classes in any of grades K–12. This includes administrators, librarians, and other professional or support staff members who teach regularly scheduled classes on a part-time basis. Itinerant teachers are included, as well as long-term substitutes who are filling the role of a regular teacher on a long-term basis. An itinerant teacher is defined as a teacher whose assignment requires teaching at more than one school (e.g., a music teacher who teaches 3 days per week at one school and 2 days per week at another). Itinerant teachers who teach full time in any district but teach part time in a particular school are considered part-time teachers at that particular school. A regular full-time teacher is any teacher whose primary position in a school is not as an itinerant teacher, a long-term substitute, a short-term substitute, a student

teacher, a teacher aide, an administrator, a library media specialist or librarian, another type of professional staff (e.g., counselor, curriculum coordinator, social worker), support staff (e.g., secretary), or a part-time teacher. Short-term substitute teachers and student teachers are not included.

Teacher level: This is based on the grade level of students taught by teachers. Teachers are grouped into four categories based on the grade levels of the students taught and the teachers' main assignments. Teacher level does not necessarily reflect the level of the school in which teachers teach. Primary-level teachers include teachers who taught grades Pre-K–4, but no grades higher than 6. Middle grades teachers taught grades 5–8, but no grades lower than 5 and no grades higher than 9. High school-level teachers include all teachers who taught any of grades 9–12, but no grades lower than 9. This definition of high school varies from the definition used for high school teachers in past SASS reports. All other teachers are categorized as combined.

Traditional public school: Traditional public schools are the subset of all public schools that are not public charter schools. They include regular education, special education, vocational/technical, and alternative schools. They also include schools in juvenile detention centers and schools located on domestic military bases and operated by the U.S. Department of Defense. See also the definitions in this glossary for public school and public charter school.