2012 National Survey of Science and Mathematics Education

Compendium of Tables for High School Chemistry

September 2013

Horizon Research, Inc.
Chapel Hill, NC

Disclaimer

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INTRODUCTION

Background and Purpose of the Study

In 2012, the National Science Foundation supported the fifth in a series of surveys through a grant to Horizon Research, Inc. (HRI). The first survey was conducted in 1977 as part of a major assessment of science and mathematics education consisting of a comprehensive review of the literature; case studies of 11 districts throughout the United States; and a national survey of teachers, principals, and district and state personnel. A second survey of teachers and principals was conducted in 1985–86 to identify trends since 1977, a third survey was conducted in 1993, and a fourth in 2000.

The 2012 National Survey of Science and Mathematics Education (NSSME) was designed to provide up-to-date information and to identify trends in the areas of teacher background and experience, curriculum and instruction, and the availability and use of instructional resources. A total of 7,752 science and mathematics teachers in schools across the United States participated in this survey. The research questions addressed by the survey are:

1. To what extent do science and mathematics instruction and ongoing assessment mirror current understanding of learning?

2. What influences teachers' decisions about content and pedagogy?

3. What are the characteristics of the mathematics/science teaching force in terms of race, gender, age, content background, beliefs about teaching and learning, and perceptions of preparedness?

4. What are the most commonly used textbooks/programs, and how are they used?

5. What formal and informal opportunities do mathematics/science teachers have for ongoing development of their knowledge and skills?

6. How are resources for mathematics/science education, including well-prepared teachers and course offerings, distributed among schools in different types of communities and different socioeconomic levels?

The design and implementation of the 2012 National Survey involved developing a sampling strategy and selecting samples of schools and teachers; developing and piloting survey instruments; collecting data from sample members; and preparing data files and analyzing the data. These activities are described below, followed by an overview of the contents of the remainder of the report.

Sample Design and Sampling Error Considerations

The 2012 NSSME is based on a national probability sample of science and mathematics schools and teachers in grades K–12 in the 50 states and the District of Columbia. The sample was designed to allow national estimates of science and mathematics course offerings and enrollment; teacher background preparation; textbook usage; instructional techniques; and availability and use of science and mathematics facilities and equipment. Every eligible school and teacher in the target population had a known, positive probability of being drawn into the sample.

The sample design involved clustering and stratification prior to sample selection. The first stage units consisted of elementary and secondary schools. Science and mathematics teachers constituted the second stage units. The target sample sizes were designed to be large enough to allow sub-domain estimates such as for particular regions or types of community.

The sampling frame for the school sample was constructed from the Common Core of Data and Private School Survey databases—programs of the U.S. Department of Education's National Center for Education Statistics—which include school name and address and information about the school needed for stratification and sample selection. The sampling frame for the teacher sample was constructed from lists provided by sample schools, identifying current teachers and the specific science and mathematics subjects they were teaching.

Because biology is by far the most common science course at the high school level, selecting a random sample of science teachers would result in a much larger number of biology teachers than chemistry or physics teachers. Similarly, random selection of mathematics teachers might result in a smaller than desired sample of teachers of advanced mathematics courses. In order to ensure that the sample would include a sufficient number of advanced science and mathematics teachers for separate analysis, information on teaching assignments was used to create separate domains (e.g., for teachers of chemistry and physics), and sampling rates were adjusted by domain.

The study design included obtaining in-depth information from each teacher about curriculum and instruction in a single randomly selected class. Most elementary teachers were reported by their principals to teach in self-contained classrooms; i.e., they were responsible for teaching all academic subjects to a single group of students. Each such sample teacher was randomly assigned to one of two groups—science or mathematics—and received a questionnaire specific to that subject. Most secondary teachers in the sample taught several classes of a single subject; some taught both science and mathematics. For each such teacher, one class was randomly selected. For example, a teacher who taught two classes of science and three classes of mathematics each day might have been asked to answer questions about his first or second science class or his first, second, or third mathematics class of the day.

Whenever a sample is anything other than a simple random sample of a population, the results must be weighted to take the sample design into account. In the 2012 NSSME, the weight for each respondent was calculated as the inverse of the probability of selecting the individual into the sample multiplied by a non-response adjustment factor.[1] In the case of data about a randomly selected class, the teacher weight was adjusted to reflect the number of classes taught, and therefore, the probability of a particular class being selected. Detailed information about the sample design, weighting procedures, and non-response adjustments used in the 2012 NSSME can be found in Appendix A of the *Report of the 2012 National Survey of Science and Mathematics Education*.[2]

The results of any survey based on a sample of a population (rather than on the entire population) are subject to sampling variability. The sampling error (or standard error) provides a measure of the range within which a sample estimate can be expected to fall a certain proportion of the time. For example, it may be estimated that 7 percent of all elementary mathematics lessons involve the use of computers. If it is determined that the sampling error for this estimate was 1 percent, then according to the Central Limit Theorem, 95 percent of all possible samples of that same size selected in the same way would yield computer usage estimates between 5 percent and 9 percent (that is, 7 percent ± 2 standard error units).

In survey research, the decision to obtain information from a sample rather than from the entire population is made in the interest of reducing costs, in terms of both money and the burden on the population to be surveyed. The particular sample design chosen is the one that is expected to yield the most accurate information for the least cost. It is important to realize that, other things being equal, estimates based on small sample sizes are subject to larger standard errors than those based on large samples. Also, for the same sample design and sample size, the closer a percentage is to zero or 100, the smaller the standard error. The standard errors for the estimates presented in this report are included in parentheses in the tables. All population estimates presented in this report were computed using weighted data.

Instrument Development

As one purpose of the 2012 NSSME was to identify trends in science and mathematics education, the process of developing survey instruments began with the questionnaires that had been used in the earlier national surveys, in 1977, 1985–86, 1993, and 2000. The project Advisory Board, comprised of experienced researchers in science and mathematics education, reviewed these questionnaires and made recommendations about retaining or deleting particular items. Additional items needed to provide important information about the current status of science and mathematics education were also considered.

Preliminary drafts of the questionnaires were sent to a number of professional organizations for review; these included the National Science Teachers Association, the National Council of

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[1] The aim of non-response adjustments is to reduce possible bias by distributing the non-respondent weights among the respondents expected to be most similar to these non-respondents. In this study, adjustment was made by region, school metro status, grade level, type (public, catholic, other private), and percent minority enrollment.

[2] Banilower, E. R., Smith, P. S., Weiss, I. R., Malzahn, K. A., Campbell, K. M., & Weis, A. M. (2013). *Report of the 2012 national survey of science and mathematics education.* Chapel Hill, NC: Horizon Research, Inc. Available at http://www.horizon-research.com/2012nssme/research-products/reports/technical-report/

Teachers of Mathematics, the National Education Association, the American Federation of Teachers, and the National Catholic Education Association.

The survey instruments were revised based on feedback from the various reviewers, field tested, and revised again. The instrument development process was a lengthy one, constantly compromising between information needs and data collection constraints. There were several iterations, including rounds of cognitive interviews with teachers and revision to help ensure that individual items were clear and unambiguous and that the survey as a whole would provide the necessary information with the least possible burden on participants. Copies of the questionnaires are included in this compendium.

Data Collection

HRI secured permission for the study from education officials at various levels. First, notification letters were mailed to the Chief State School Officers. Similar letters were subsequently mailed to superintendents of districts including sampled public schools and diocesan offices of sampled Catholic schools, identifying the schools in the district/diocese that had been selected for the survey. (Information about this pre-survey mail-out is included in Appendix C of the *Report of the 2012 National Survey of Science and Mathematics Education*.) Copies of the survey instruments and additional information about the study were provided when requested.

Principals were asked to log onto the study website and designate a school contact person or "school coordinator." The school coordinator designation page was designed to confirm the principal's contact information, as well as to obtain the name, title, phone number, and email address of the coordinator. Of the 2,000 target slots, 1,504 schools were successfully recruited and 35 were ineligible (e.g., closed or merged with another school) for a response rate of 77 percent.

An incentive system was developed to encourage school and teacher participation in the survey. School coordinators were offered an honorarium of up to $200 ($100 for completing a teacher list and school questionnaire, $15 for completing each program questionnaire (optional), and $10 for each completed teacher questionnaire). Teachers were offered a $25 honorarium for completing the teacher questionnaire.

Survey invitation letters were mailed to teachers beginning in February 2012. In addition to the incentives described, phone calls and emails to school coordinators were used to encourage non-respondents to complete the questionnaires. In May 2012, a final questionnaire invitation mailing was sent to teachers who had not yet completed their questionnaires. The teacher response rate was 77 percent. The response rate for the school program questionnaires was 83 percent. A detailed description of the data collection procedures is included in Appendix D of the *Report of the 2012 National Survey of Science and Mathematics Education*.

Structure of the Compendium

This Compendium of Tables of the 2012 National Survey of Science and Mathematics Education: High School Chemistry contains the Science Teacher Questionnaire and corresponding tables. The analyses are based on 787 high school teachers whose teaching schedule includes at least one chemistry course. Furthermore, science teachers assigned to teach both chemistry and other science classes may have been asked about any of their classes so the number of chemistry classes included in the analyses involving class-level data is smaller (558) than the number of responding teachers of chemistry. Table numbers correspond to the questionnaire item numbers. Results are expressed in terms of percentages or means, with standard errors in parentheses.

HIGH SCHOOL CHEMISTRY TABLES

Table numbers correspond to the Science Teacher Questionnaire item numbers.

Table 1
Number of Years High School Chemistry
Teachers Spent Teaching Prior to This School Year

	Mean Number of Years
Any subject at the K–12 level	12.4 (0.5)
Science at the K–12 level	12.8 (0.5)
At this school, any subject	8.9 (0.3)

There is no Table 2.

There is no Table 3.

There is no Table 4.

There is no Table 5.

There is no Table 6.

Table 7
Number of Sections of Science and Engineering Classes Taught per Week by High School Chemistry Teachers

	Percent of Teachers	
	Science	Engineering
0 Sections	— —	96 (1.0)
1 Section	1 (0.6)	2 (0.7)
2 Sections	10 (2.2)	1 (0.7)
3 Sections	18 (2.4)	0 (0.2)
4 Sections	15 (1.7)	0 (0.1)
5 Sections	31 (2.5)	0 (0.1)
6 Sections	20 (2.2)	0 (0.2)
7 Sections	3 (0.6)	0 ---†
8 Sections	0 (0.3)	0 ---†
9 Sections	0 ---†	0 ---†
10 Sections	1 (0.4)	0 (0.2)

† No teachers in the sample selected this response option. Thus, it is not possible to calculate the standard error of this estimate.

There is no Table 8.

There is no Table 9.

There is no Table 10.

Table 11
Subjects of High School Chemistry Teachers' Degrees

	Percent of Teachers
Education, including Science Education	62 (2.6)
Natural Sciences and/or Engineering	69 (2.6)
Other Subject	27 (1.9)

Table 12
High School Chemistry Teachers with Education Degrees

	Percent of Teachers†
Elementary Education	1 (0.8)
Mathematics Education	4 (1.1)
Science Education	48 (2.5)
Other Education	17 (1.3)

† Teachers indicating in Q11 that they do not have an education degree are treated as not having a degree in these areas.

Table 13
High School Chemistry Teachers with Natural Science and/or Engineering Degrees

	Percent of Teachers†
Biology/Life Science	37 (2.7)
Chemistry	26 (1.8)
Earth/Space Science	2 (0.5)
Engineering	5 (0.9)
Environmental Science/Ecology	2 (0.5)
Physics	4 (1.2)
Other natural science	8 (1.2)

† Teachers indicating in Q11 that they do not have a natural science and/or engineering degree are treated as not having a degree in these areas.

Table 14
Biology/Life Science College Courses Completed by High School Chemistry Teachers

	Percent of Teachers
General/introductory biology/life science courses (e.g., Biology I, Introduction to Biology)	92 (1.3)
Biology/life science courses beyond the general/introductory level	79 (2.3)
Biology/life science education courses	46 (2.5)

Table 15
Advanced Biology/Life Science College Courses Completed by High School Chemistry Teachers

	Percent of Teachers†
Anatomy/Physiology	49 (2.6)
Biochemistry	49 (2.6)
Botany	40 (2.4)
Cell Biology	45 (2.5)
Ecology	45 (2.4)
Evolution	22 (1.9)
Genetics	52 (2.5)
Microbiology	48 (2.4)
Zoology	36 (2.7)
Other biology/life science beyond the general/introductory level	45 (2.6)

† Teachers indicating in Q14 that they have not taken biology/life science courses beyond the general/introductory level are treated as not having taken any of these courses.

Table 16
Chemistry College Courses Completed by High School Chemistry Teachers

	Percent of Teachers
General/introductory chemistry courses (e.g., Chemistry I, Introduction to Chemistry)	96 (2.2)
Chemistry courses beyond the general/introductory level	89 (2.4)
Chemistry education courses	36 (2.2)

Table 17
Advanced Chemistry College Courses
Completed by High School Chemistry Teachers

	Percent of Teachers†
Analytical Chemistry	50 (2.8)
Biochemistry	52 (2.8)
Inorganic Chemistry	62 (3.0)
Organic Chemistry	83 (2.6)
Physical Chemistry	44 (2.7)
Quantum Chemistry	16 (1.6)
Other chemistry beyond the general/introductory level	32 (1.9)

† Teachers indicating in Q16 that they have not taken chemistry courses beyond the general/introductory level are treated as not having taken any of these courses.

Table 18
Physics College Courses
Completed by High School Chemistry Teachers

	Percent of Teachers
General/introductory physics courses (e.g., Physics I, Introduction to Physics)	92 (2.0)
Physics courses beyond the general/introductory level	39 (2.6)
Physics education courses	18 (1.9)

Table 19
Advanced Physics College Courses
Completed by High School Chemistry Teachers

	Percent of Teachers†
Electricity and Magnetism	20 (1.7)
Heat and Thermodynamics	21 (1.8)
Mechanics	22 (1.8)
Modern or Quantum Physics	16 (1.5)
Nuclear Physics	7 (1.3)
Optics	11 (1.4)
Other physics beyond the general/introductory level	19 (2.0)

† Teachers indicating in Q18 that they have not taken physics courses beyond the general/introductory level are treated as not having taken any of these courses.

Table 20
Earth/Space Science College Courses
Completed by High School Chemistry Teachers

	Percent of Teachers
General/introductory Earth/space science courses (e.g., Earth Science I, Introduction to Earth Science)	56 (2.7)
Earth/space science courses beyond the general/introductory level	25 (2.5)
Earth/space science education courses	11 (1.5)

Table 21
Advanced Earth/Space Science College Courses Completed by High School Chemistry Teachers

	Percent of Teachers†
Astronomy	15 (2.0)
Geology	19 (2.3)
Meteorology	8 (1.0)
Oceanography	6 (1.0)
Physical Geography	7 (1.2)
Other Earth/space science beyond the general/introductory level	10 (1.3)

† Teachers indicating in Q20 that they have not taken Earth/space science courses beyond the general/ introductory level are treated as not having taken any of these courses.

Table 22
Environmental Science College Courses Completed by High School Chemistry Teachers

	Percent of Teachers
General/introductory environmental science courses (e.g., Environmental Science I, Introduction to Environmental Science)	48 (2.4)
Environmental science courses beyond the general/introductory level	22 (2.5)
Environmental science education courses	12 (1.5)

Table 23
Advanced Environmental Science College Courses Completed by High School Chemistry Teachers

	Percent of Teachers†
Conservation Biology	8 (1.7)
Ecology	18 (2.4)
Forestry	4 (1.3)
Hydrology	4 (0.8)
Oceanography	6 (1.3)
Toxicology	2 (0.5)
Other environmental science beyond the general/introductory level	9 (1.1)

† Teachers indicating in Q22 that they have not taken environmental science courses beyond the general/introductory level are treated as not having taken any of these courses.

Table 24
High School Chemistry Teachers Having Completed One or More Engineering College Courses

	Percent of Teachers
High School Chemistry Teachers	14 (1.6)

Table 25
Engineering College Courses
Completed by High School Chemistry Teachers

	Percent of Teachers†
Aerospace Engineering	1 (0.5)
Bioengineering/Biomedical Engineering	1 (0.4)
Chemical Engineering	6 (1.0)
Civil Engineering	1 (0.5)
Computer Engineering	2 (0.6)
Electrical Engineering	2 (0.5)
Industrial/Manufacturing Engineering	1 (0.3)
Mechanical Engineering	4 (0.8)
Other types of engineering courses	5 (0.8)

† Teachers indicating in Q24 that they have not taken any engineering courses are treated as not having taken any of the specific engineering courses from Q25.

Table 26
College Courses†
Completed by High School Chemistry Teachers

	Percent of Teachers
Interdisciplinary science (a single course that addresses content across multiple science subjects, such as biology, chemistry, physics and/or Earth science)	47 (2.8)
Biology/Life science	92 (1.3)
Chemistry	96 (2.2)
Physics	92 (2.0)
Earth/Space science	56 (2.7)
Environmental science	48 (2.4)
Engineering	14 (1.6)
Mathematics	92 (2.8)

† A number of respondents to Q26 appear to have provided contact hours/credits rather than number of courses. Thus, it is not possible to report the number of courses taken with confidence and the percentage of teachers taking at least one course in each area is presented instead.

Table 27
Science College Courses† Completed by
High School Chemistry Teachers at Various Institutions

	Percent of Courses
Two-year college, community college, and/or technical school	7 (1.6)
Four-year college and/or university	93 (1.6)

† A number of respondents to Q27 appear to have provided contact hours/credits rather than number of courses. Thus, it is not possible to report the number of courses taken at various institutions with confidence. However, assuming respondents entered the same type of data for both two-year and four-year institutions, it is possible to calculate the percentage of courses taken at each.

Table 28
High School Chemistry Teachers' Paths to Certification

	Percent of Teachers
An undergraduate program leading to a bachelor's degree and a teaching credential	32 (2.9)
A post-baccalaureate credentialing program (no master's degree awarded)	31 (3.4)
A master's program that also awarded a teaching credential	27 (2.8)
You did not have any formal teacher preparation	11 (2.1)

Table 29
High School Chemistry Teachers' Most Recent Participation in Science-Focused† Professional Development

	Percent of Teachers
In the last 3 years	85 (1.9)
4–6 years ago	9 (1.6)
7–10 years ago	2 (0.6)
More than 10 years ago	1 (0.3)
Never	4 (1.1)

† Includes professional development focused on science or science teaching.

Table 30
High School Chemistry Teachers Participating in Various Professional Development Activities in the Last Three Years

	Percent of Teachers†
Attended a workshop on science or science teaching	89 (2.3)
Attended a national, state, or regional science teacher association meeting	44 (2.8)
Participated in a professional learning community/lesson study/teacher study group focused on science or science teaching	66 (3.1)

† Only teachers indicating in Q29 that they participated in professional development in the last three years are included in this analysis.

Table 31
Time Spent by High School Chemistry Teachers on Science-Focused† Professional Development in the Last Three Years

	Percent of Teachers
None‡	15 (1.9)
Less than 6 hours	8 (1.9)
6–15 hours	22 (2.2)
16–35 hours	19 (2.0)
More than 35 hours	36 (2.2)

† Includes professional development focused on science or science teaching.
‡ Includes those teachers indicating in Q29 that they had not participated in professional development in the last three years.

Table 32
High School Chemistry Teachers' Description of Science-Focused† Professional Development in the Last Three Years

	Percent of Teachers‡									
	Not at all				Somewhat				To a great extent	
	1		2		3		4		5	
You had opportunities to engage in science investigations	20	(5.1)	10	(1.7)	27	(3.7)	24	(4.2)	18	(2.5)
You had opportunities to examine classroom artifacts (e.g., student work samples)	19	(3.8)	20	(4.3)	30	(3.6)	18	(2.3)	14	(2.3)
You had opportunities to try out what you learned in your classroom *and* then talk about it as part of the professional development	15	(4.3)	17	(3.8)	28	(3.7)	24	(3.0)	15	(2.2)
You worked closely with other science teachers from your school	17	(4.2)	12	(4.2)	17	(2.3)	19	(2.4)	34	(3.3)
You worked closely with other science teachers who taught the same grade and/or subject whether or not they were from your school	14	(4.3)	14	(4.3)	20	(2.7)	25	(2.7)	28	(3.0)
The professional development was a waste of your time	47	(4.1)	22	(4.0)	25	(5.1)	5	(1.2)	2	(0.7)

† Includes professional development focused on science or science teaching.
‡ Only teachers indicating in Q29 that they participated in professional development in the last three years are included in this analysis.

Table 33
High School Chemistry Teachers' Most Recent Participation in a Formal Course for College Credit in Various Areas

	Percent of Teachers									
	In the last 3 years		4–6 years ago		7–10 years ago		More than 10 years ago		Never	
Science	22	(1.9)	21	(2.1)	15	(1.9)	42	(2.2)	0	(0.4)
How to teach science	23	(2.1)	16	(1.8)	13	(2.0)	30	(2.2)	17	(2.5)
Student teaching in science	9	(2.0)	9	(1.4)	9	(1.2)	45	(2.7)	27	(2.6)
Student teaching in other subjects	5	(1.1)	4	(1.1)	5	(1.0)	25	(2.2)	61	(2.6)

Table 34
High School Chemistry Teachers' Perceptions of Topics Emphasized During Professional Development/Coursework in the Last Three Years

	Percent of Teachers†									
	Not at All				Somewhat				To a Great Extent	
	1		2		3		4		5	
Deepening your own science content knowledge	12	(1.8)	14	(1.8)	24	(2.5)	28	(2.5)	23	(2.9)
Learning how to use hands-on activities/ manipulatives for science instruction	5	(1.3)	12	(2.1)	35	(3.6)	29	(2.8)	18	(3.2)
Finding out what students think or already know about the key science ideas prior to instruction on those ideas	6	(1.4)	17	(2.3)	37	(3.7)	23	(2.1)	16	(3.5)
Implementing the science textbook/module to be used in your classroom	23	(2.3)	20	(2.7)	28	(3.4)	17	(3.2)	12	(2.5)
Planning instruction so students at different levels of achievement can increase their understanding of the ideas targeted in each activity	4	(1.0)	16	(3.5)	25	(2.6)	30	(3.4)	25	(3.3)
Monitoring student understanding during science instruction	7	(1.5)	11	(2.1)	29	(2.6)	30	(3.7)	22	(3.2)
Providing enrichment experiences for gifted students	19	(2.3)	24	(3.8)	25	(2.4)	22	(3.0)	10	(2.2)
Providing alternative science learning experiences for students with special needs	25	(3.4)	25	(2.9)	26	(2.7)	16	(2.9)	9	(1.7)
Teaching science to English-language learners	47	(4.2)	25	(3.3)	16	(2.1)	7	(1.4)	6	(1.1)
Assessing student understanding at the conclusion of instruction on a topic	5	(1.2)	8	(1.3)	27	(2.9)	32	(2.6)	28	(3.5)

† Only teachers indicating in Q29 that they participated in professional development or indicating in Q33 that they took a college course in "Science" or "How to teach science" in the last three years are included in this analysis.

Table 35
High School Chemistry Teachers Participating in Various Professional Activities in the Last Three Years

	Percent of Teachers	
Received feedback about your science teaching from a mentor/coach formally assigned by the school or district/diocese	49	(3.9)
Served as a formally assigned mentor/coach for science teaching, not including supervision of student teachers	24	(3.3)
Supervised a student teacher in your classroom	18	(2.7)
Taught in-service workshops on science or science teaching	18	(2.4)
Led a professional learning community/lesson study/teacher study group focused on science or science teaching	23	(2.6)

There is no Table 36.

Table 37
High School Chemistry Teachers' Perceptions of their Preparedness to Teach Various Subjects

	Percent of Teachers							
	Not Adequately Prepared		Somewhat Prepared		Fairly Well Prepared		Very Well Prepared	
Atomic structure	0	(0.4)	2	(2.5)	13	(2.0)	84	(2.9)
Chemical bonding, equations, nomenclature, and reactions	0	(0.4)	4	(2.7)	11	(2.0)	85	(3.1)
Elements, compounds, and mixtures	0	(0.4)	3	(2.5)	8	(1.8)	89	(2.9)
The Periodic Table	0	---[†]	3	(2.5)	9	(1.8)	88	(2.9)
Properties of solutions	0	(0.4)	7	(2.8)	19	(2.1)	73	(3.0)
States, classes, and properties of matter	0	(0.4)	3	(2.5)	12	(2.0)	84	(2.9)

† No teachers in the sample selected this response option. Thus, it is not possible to calculate the standard error of this estimate.

Table 38
High School Chemistry Teachers' Perceptions of their Preparedness for Each of a Number of Tasks

	Percent of Teachers							
	Not Adequately Prepared		Somewhat Prepared		Fairly Well Prepared		Very Well Prepared	
Plan instruction so students at different levels of achievement can increase their understanding of the ideas targeted in each activity	1	(0.4)	16	(3.4)	44	(3.3)	38	(3.0)
Teach science to students who have learning disabilities	12	(3.2)	34	(3.3)	38	(3.0)	17	(2.2)
Teach science to students who have physical disabilities	12	(1.4)	34	(3.3)	37	(2.8)	17	(2.1)
Teach science to English-language learners	28	(3.5)	32	(3.0)	27	(2.5)	13	(2.1)
Provide enrichment experiences for gifted students	8	(2.2)	21	(2.6)	39	(3.1)	32	(2.9)
Encourage students' interest in science and/or engineering	1	(0.9)	10	(2.0)	36	(2.9)	53	(3.0)
Encourage participation of females in science and/or engineering	3	(1.1)	9	(2.0)	31	(2.2)	57	(2.6)
Encourage participation of racial or ethnic minorities in science and/or engineering	4	(1.3)	13	(2.3)	38	(2.9)	45	(2.9)
Encourage participation of students from low socioeconomic backgrounds in science and/or engineering	4	(1.3)	13	(2.0)	37	(2.8)	46	(2.9)
Manage classroom discipline	0	(0.2)	7	(2.0)	34	(2.9)	59	(3.1)

Table 39
High School Chemistry Teachers' Opinions about Teaching and Learning

	Percent of Teachers									
	Strongly Disagree		Disagree		No Opinion		Agree		Strongly Agree	
Students learn science best in classes with students of similar abilities	1	(0.3)	22	(2.1)	12	(2.0)	47	(2.7)	18	(1.6)
Inadequacies in students' science background can be overcome by effective teaching	1	(0.3)	6	(0.7)	7	(1.9)	67	(2.3)	19	(1.6)
It is better for science instruction to focus on ideas in depth, even if that means covering fewer topics	0	(0.3)	11	(1.0)	16	(2.1)	47	(2.6)	26	(2.0)
Students should be provided with the purpose for a lesson as it begins	1	(0.2)	3	(0.6)	11	(2.0)	51	(2.9)	35	(2.6)
At the beginning of instruction on a science idea, students should be provided with definitions for new scientific vocabulary that will be used	1	(0.3)	18	(2.1)	15	(1.3)	45	(2.7)	21	(2.2)
Teachers should explain an idea to students before having them consider evidence that relates to the idea	4	(0.6)	37	(2.7)	23	(2.3)	27	(2.1)	8	(1.6)
Most class periods should include some review of previously covered ideas and skills	0	(0.2)	4	(0.8)	7	(1.9)	60	(2.9)	28	(2.7)
Most class periods should provide opportunities for students to share their thinking and reasoning	0	---†	2	(0.5)	9	(2.1)	49	(2.2)	40	(2.1)
Hands-on/laboratory activities should be used primarily to reinforce a science idea that the students have already learned	5	(1.3)	26	(1.9)	11	(1.9)	36	(2.3)	22	(2.2)
Students should be assigned homework most days	3	(0.7)	20	(1.7)	19	(1.7)	47	(2.4)	11	(1.6)
Most class periods should conclude with a summary of the key ideas addressed	0	(0.2)	2	(0.5)	11	(2.0)	57	(2.6)	29	(2.3)

† No teachers in the sample selected this response option. Thus, it is not possible to calculate the standard error of this estimate.

Table 40
Average Minutes per Week High School Chemistry Classes Meet

	Average Number of Minutes
High School Chemistry Classes	253.9 (3.3)

Table 41
Average Number of Students in High School Chemistry Classes

	Average Number of Students
High School Chemistry Classes	21.5 (0.5)

Table 42
Race/Ethnicity of Students in High School Chemistry Classes

	Percent of Students	
American Indian or Alaskan Native	1	(0.3)
Asian	6	(0.7)
Black or African American	13	(1.6)
Hispanic/Latino	14	(1.3)
Native Hawaiian or Other Pacific Islander	1	(0.1)
White	63	(2.1)
Two or more races	2	(0.5)

Table 43
Prior Science Achievement Level of Students in High School Chemistry Classes

	Percent of Classes	
Mostly low achievers	7	(1.1)
Mostly average achievers	32	(2.9)
Mostly high achievers	33	(2.6)
A mixture of levels	28	(2.6)

Table 44
High School Chemistry Classes Where Teachers Report Having Control Over Various Curriculum and Instruction Decisions

	Percent of Classes									
	No Control				Moderate Control				Strong Control	
	1		2		3		4		5	
Determining course goals and objectives	16	(2.6)	11	(2.1)	26	(3.3)	16	(2.8)	32	(3.7)
Selecting textbooks/modules	24	(3.5)	13	(2.3)	22	(3.3)	11	(1.9)	29	(3.5)
Selecting content, topics, and skills to be taught	12	(2.4)	14	(2.1)	30	(3.8)	12	(2.1)	32	(3.7)
Selecting teaching techniques	0	---†	0	---†	10	(2.9)	19	(2.3)	71	(3.4)
Determining the amount of homework to be assigned	1	(0.4)	1	(0.5)	7	(2.9)	18	(2.2)	74	(3.5)
Choosing criteria for grading student performance	1	(0.6)	2	(0.8)	15	(3.1)	22	(2.9)	59	(4.2)

† No teachers in the sample selected this response option. Thus, it is not possible to calculate the standard error of this estimate.

Table 45
Emphasis Given in High School Chemistry Classes to Various Instructional Objectives

	Percent of Classes							
	None		Minimal Emphasis		Moderate Emphasis		Heavy Emphasis	
Memorizing science vocabulary and/or facts	2	(1.0)	40	(2.6)	51	(3.0)	7	(1.3)
Understanding science concepts	0	---†	0	(0.2)	18	(2.3)	82	(2.3)
Learning science process skills (e.g., observing, measuring)	0	---†	4	(0.8)	44	(2.7)	53	(2.8)
Learning about real-life applications of science	0	(0.3)	14	(2.0)	59	(2.3)	26	(2.0)
Increasing students' interest in science	1	(0.5)	9	(1.5)	49	(2.5)	41	(2.5)
Preparing for further study in science	0	(0.0)	7	(1.3)	44	(3.1)	49	(3.0)
Learning test taking skills/strategies	1	(0.5)	26	(2.3)	49	(2.2)	24	(2.3)

† No teachers in the sample selected this response option. Thus, it is not possible to calculate the standard error of this estimate.

Table 46
High School Chemistry Classes in which Teachers Report Various Activities in their Classrooms

	Percent of Classes									
	Never		Rarely (e.g., A few times a year)		Sometimes (e.g., Once or twice a month)		Often (e.g., Once or twice a week)		All or almost all science lessons	
Explain science ideas to the whole class	0	---†	0	(0.2)	3	(0.7)	42	(2.5)	55	(2.6)
Engage the whole class in discussions	0	(0.2)	4	(0.8)	18	(1.9)	42	(2.8)	36	(2.8)
Have students work in small groups	0	---†	1	(0.4)	16	(2.5)	60	(2.8)	24	(2.4)
Do hands-on/laboratory activities	0	(0.2)	4	(2.0)	26	(1.9)	66	(2.7)	4	(0.7)
Engage the class in project-based learning (PBL) activities	16	(2.0)	41	(2.3)	34	(2.4)	8	(1.3)	1	(0.4)
Have students read from a science textbook, module, or other science-related material in class, either aloud or to themselves	17	(1.9)	33	(2.6)	27	(2.0)	21	(2.2)	2	(0.6)
Have students represent and/or analyze data using tables, charts, or graphs	1	(0.4)	6	(2.1)	40	(2.7)	47	(2.6)	6	(1.0)
Require students to supply evidence in support of their claims	1	(0.3)	9	(1.5)	27	(2.4)	47	(2.8)	16	(1.8)
Have students make formal presentations to the rest of the class (e.g., on individual or group projects)	15	(1.7)	56	(2.4)	26	(2.5)	3	(0.7)	1	(0.2)
Have students write their reflections (e.g., in their journals) in class or for homework	31	(2.6)	31	(2.5)	23	(2.2)	11	(1.7)	4	(0.8)
Give tests and/or quizzes that are predominantly short-answer (e.g., multiple choice, true/ false, fill in the blank)	2	(0.7)	15	(2.2)	46	(2.6)	30	(2.6)	7	(1.1)
Give tests and/or quizzes that include constructed-response/open-ended items	2	(0.7)	8	(1.3)	49	(2.8)	33	(2.5)	8	(1.4)
Focus on literacy skills (e.g., informational reading or writing strategies)	14	(1.9)	35	(2.5)	35	(2.4)	14	(2.0)	2	(0.6)
Have students practice for standardized tests	20	(2.6)	32	(2.9)	29	(2.5)	12	(1.5)	6	(1.3)
Have students attend presentations by guest speakers focused on science and/or engineering in the workplace	58	(3.0)	36	(2.7)	5	(1.1)	1	(0.3)	0	(0.2)

† No teachers in the sample selected this response option. Thus, it is not possible to calculate the standard error of this estimate.

Table 47
Availability of Instructional Technology in High School Chemistry Classrooms

	Percent of Classes		
	Do not have one per group available	At least one per group available upon request or in another room	At least one per group located in your classroom
Personal computers, including laptops	22 (3.1)	43 (3.7)	35 (4.1)
Hand-held computers (e.g., PDAs, tablets, smartphones, iPads)	78 (2.6)	11 (1.7)	11 (2.0)
Internet access	15 (2.4)	36 (3.9)	49 (4.2)
Graphing calculators	45 (3.8)	22 (3.6)	33 (3.7)
Other calculators	15 (2.6)	17 (2.8)	69 (3.4)
Probes for collecting data (e.g., motion sensors, temperature probes)	26 (3.6)	39 (3.4)	35 (3.5)
Microscopes	28 (3.7)	50 (3.9)	22 (3.6)
Classroom response system or "Clickers" (handheld devices used to respond electronically to questions in class)	54 (3.4)	29 (2.9)	16 (2.8)

Table 48
Expectations that Students Will Provide their Own Instructional Technologies in High School Chemistry Classes

	Percent of Classes
Laptop computers	9 (1.8)
Hand-held computers	7 (1.6)
Graphing calculators	29 (3.2)
Other calculators	61 (3.9)

Table 49
Frequency of Instructional Technology Use in High School Chemistry Classes

	Percent of Classes				
	Never	Rarely (e.g., A few times a year)	Sometimes (e.g., Once or twice a month)	Often (e.g., Once or twice a week)	All or almost all science lessons
Personal computers, including laptops	16 (2.9)	21 (2.8)	33 (3.2)	23 (4.2)	6 (1.7)
Hand-held computers	64 (3.8)	16 (2.7)	7 (1.7)	10 (3.5)	3 (1.2)
Internet	5 (1.4)	25 (2.9)	38 (3.2)	25 (3.7)	6 (1.6)
Graphing calculators	41 (3.8)	15 (2.5)	11 (2.6)	17 (2.6)	16 (2.8)
Probes for collecting data	29 (3.8)	26 (3.4)	35 (3.7)	10 (2.3)	0 (0.1)
Classroom response system or "Clickers"	70 (3.2)	15 (2.6)	8 (1.8)	6 (1.4)	1 (0.4)

Table 50
Availability of Resources in High School Chemistry Classes

	Percent of Classes		
	Not available	Available in another room	Located in your classroom
Lab tables	3 (2.5)	14 (2.9)	83 (3.6)
Electric outlets	3 (2.5)	7 (2.0)	91 (3.1)
Faucets and sinks	3 (2.6)	10 (2.7)	86 (3.6)
Gas for burners	10 (3.1)	13 (2.6)	76 (3.7)
Fume hoods	9 (3.0)	26 (3.3)	65 (3.9)

Table 51
Frequency of Required External Science Testing in High School Chemistry Classes

	Percent of Classes
Never	34 (2.8)
Once a year	30 (2.3)
Twice a year	13 (1.5)
Three or four times a year	11 (1.4)
Five or more times a year	11 (2.0)

Table 52
Amount of Homework Assigned in High School Chemistry Classes per Week

	Percent of Classes
Fewer than 15 minutes per week	3 (0.9)
15–30 minutes per week	16 (2.9)
31–60 minutes per week	32 (3.9)
61–90 minutes per week	27 (2.9)
91–120 minutes per week	7 (1.8)
2–3 hours per week	9 (1.8)
3–4 hours per week	4 (1.2)
More than 4 hours per week	3 (1.4)

Table 53
Instructional Materials Used in High School Chemistry Classes

	Percent of Classes
One commercially-published textbook most of the time	50 (2.8)
Multiple commercially-published textbooks most of the time	5 (0.9)
Modules from a single publisher most of the time	2 (0.5)
Modules from multiple publisher most of the time	1 (0.4)
A roughly equal mix of commercially-published textbooks and commercially-published modules most of the time	13 (1.9)
Non-commercially-published instructional materials most of the time	29 (2.3)

Table 54a
Most Recent Copyright Year of
Instructional Materials Used in High School Chemistry Classes

	Percent of Classes†	
2012	6	(1.2)
2011	1	(0.6)
2010	2	(0.8)
2009	5	(1.9)
2008	9	(2.1)
2007	11	(2.1)
2006 or earlier	66	(3.0)

† Only classes of teachers indicating in Q53 that they use commercially-published textbooks/modules are included in this analysis.

Table 54b
Market Share of Commercial Textbook/
Module Publishers Used in High School Chemistry Classes

	Percent of Classes†	
Pearson	38	(3.2)
Houghton Mifflin Harcourt	32	(3.1)
McGraw-Hill	16	(2.1)
Cengage Learning	8	(1.6)
W. H. Freeman	3	(1.0)
Apologia Educational Ministries Inc.	1	(0.7)
Kendall Hunt	1	(0.7)
John Wiley & Sons	1	(0.6)
It’s About Time	0	(0.4)
Bob Jones University Press	0	(0.2)
Lab-Aids	0	(0.2)
Saunders College Publishers	0	(0.2)

† Only classes of teachers indicating in Q53 that they use commercially-published textbooks/modules are included in this analysis.

Table 55
Perceived Quality of Instructional Materials
Used Most Often in High School Chemistry Classes

	Percent of Classes†	
Very poor	0	(0.3)
Poor	2	(1.1)
Fair	15	(3.2)
Good	39	(4.1)
Very good	31	(3.9)
Excellent	12	(2.9)

† Only classes of teachers indicating in Q53 that they use one or multiple commercially-published textbooks/modules are included in this analysis.

Table 56
Percentage of Instructional Time Spent Using Instructional Materials during the High School Chemistry Course

	Percent of Classes†
Less than 25 %	56 (4.9)
25–49 %	22 (4.5)
50–74 %	13 (3.7)
75–90 %	8 (2.6)
More than 90 %	1 (1.0)

† Only classes of teachers indicating in Q53 that they use one commercially-published textbook or modules from a single publisher are included in this analysis.

Table 57
Percentage of Textbook/Modules Covered during the High School Chemistry Course

	Percent of Classes†
Less than 25 %	3 (1.5)
25–49 %	16 (4.2)
50–74 %	45 (4.9)
75–90 %	34 (5.2)
More than 90 %	2 (1.1)

† Only classes of teachers indicating in Q53 that they use one commercially-published textbook or modules from a single publisher are included in this analysis.

Table 58, 59, 60, 61
Adequacy of Classroom Resources for Chemistry Instruction in High Schools

	Percent of Classes				
	Not Adequate		Somewhat Adequate		Adequate
	1	2	3	4	5
Equipment (e.g., microscopes, beakers, photogate timers, Bunsen burners)	4 (1.7)	3 (0.8)	22 (2.3)	28 (2.3)	42 (2.2)
Instructional technology (e.g., calculators, computers, probes/sensors)	5 (1.0)	11 (1.4)	32 (2.6)	24 (2.3)	29 (2.4)
Consumable supplies (e.g., chemicals, living organisms, batteries)	6 (2.1)	5 (1.1)	17 (1.7)	29 (2.2)	43 (2.3)
Facilities (e.g., lab tables, electric outlets, faucets and sinks)	7 (2.2)	4 (0.9)	13 (1.8)	23 (2.1)	53 (2.7)

Table 62
High School Chemistry Classes for which Teachers Report Technology Problems

	Percent of Classes		
	Not a significant problem	Somewhat of a problem	Serious problem
Lack of access to computers	64 (3.8)	30 (3.6)	6 (1.3)
Old age of computers	63 (3.8)	27 (3.5)	10 (2.0)
Lack of access to the Internet	80 (2.9)	18 (2.7)	3 (1.2)
Unreliability of the Internet connection	74 (3.1)	22 (2.9)	4 (1.4)
Slow speed of the Internet connection	69 (3.7)	26 (3.6)	5 (1.4)
Lack of availability of appropriate computer software	60 (3.6)	36 (3.5)	4 (1.2)
Lack of availability of technology support	66 (3.6)	27 (3.3)	7 (1.8)

Table 63
High School Chemistry Classes for which Teachers Report the Effect of Various Factors on Science Instruction

	Percent of Classes					
	Inhibits Effective Instruction 1	2	Neutral or Mixed 3	4	Promotes Effective Instruction 5	N/A or Don't Know
Current state standards	4 (1.4)	5 (1.3)	38 (3.8)	18 (2.9)	28 (3.6)	6 (1.5)
District/Diocese curriculum frameworks†	5 (1.3)	4 (1.1)	29 (2.9)	18 (2.2)	32 (3.1)	13 (2.4)
District/Diocese and/or school pacing guides	6 (1.6)	5 (1.4)	30 (3.8)	17 (3.3)	20 (2.6)	23 (3.5)
State testing/accountability policies†	6 (1.7)	16 (2.5)	34 (3.9)	16 (2.8)	11 (2.1)	18 (2.7)
District/Diocese testing/accountability policies†	4 (1.3)	9 (2.0)	33 (3.6)	17 (2.7)	12 (1.9)	25 (3.0)
Textbook/module selection policies	4 (1.5)	10 (1.9)	28 (3.0)	24 (3.6)	18 (2.7)	16 (2.9)
Teacher evaluation policies	2 (0.9)	8 (1.6)	36 (4.0)	19 (2.7)	23 (3.4)	11 (2.8)
College entrance requirements	0 (0.3)	3 (1.3)	28 (3.4)	25 (3.3)	34 (3.2)	10 (2.4)
Students' motivation, interest, and effort in science	8 (1.8)	10 (1.9)	22 (3.5)	23 (3.0)	36 (3.2)	2 (1.0)
Students' reading abilities	8 (1.7)	13 (2.1)	25 (3.1)	28 (3.6)	24 (3.4)	2 (1.0)
Community views on science instruction	2 (1.0)	8 (1.7)	38 (3.7)	21 (2.6)	17 (2.6)	14 (2.3)
Parent expectations and involvement	5 (1.5)	12 (2.1)	29 (3.9)	23 (2.9)	28 (3.0)	4 (1.2)
Principal support	2 (0.9)	4 (1.5)	21 (3.0)	24 (3.2)	45 (3.9)	4 (1.2)
Time for you to plan, individually and with colleagues	10 (2.3)	10 (2.2)	23 (3.7)	27 (3.4)	28 (3.4)	2 (0.8)
Time available for your professional development	6 (1.5)	10 (1.7)	35 (4.2)	28 (3.6)	20 (2.8)	2 (0.9)

† Item presented only to public and Catholic schools.

Table 64
Average Number of Class Periods
Devoted to the Most Recently Completed High School Chemistry Unit

	Average Number of Periods
High School Chemistry Units	10.7 (0.3)

There is no Table 65.

There is no Table 66.

Table 67
Most Recent High School Chemistry Unit Based Primarily on
Previously Indicated Commercially-Published Textbook/Module

	Percent of Classes†
High School Chemistry Classes	63 (3.2)

† Only classes of teachers indicating in Q53 that they use commercially-published textbooks/modules are included in this analysis.

Table 68
Most Recent High School Chemistry Unit Based
Primarily on Any Commercially-Published Textbook/Module

	Percent of Classes
High School Chemistry Classes	55 (2.7)

There is no Table 69.

Table 70
Ways Textbooks/Modules Were Used in the Most Recently Completed Unit in High School Chemistry Classes

	Percent of Classes†									
	Not at all				Somewhat				To a great extent	
	1		2		3		4		5	
You used the textbook/module to guide the overall structure and content emphasis of the unit	3	(1.5)	7	(2.3)	34	(3.5)	31	(3.4)	25	(4.0)
You followed the textbook/module to guide the detailed structure and content emphasis of the unit	8	(2.5)	13	(2.3)	39	(3.7)	24	(2.9)	15	(3.0)
You picked what is important from the textbook/module and skipped the rest	8	(2.3)	12	(1.9)	24	(2.9)	30	(3.4)	26	(3.5)
You incorporated activities (e.g., problems, investigations, readings) from other sources to supplement what the textbook/module was lacking	2	(1.2)	4	(1.3)	16	(2.9)	38	(3.5)	39	(3.4)

† Only classes of teachers indicating in Q67/68 that they used commercially-published textbooks/modules in their most recent unit are included in this analysis.

Table 71
Reasons Parts of the Textbook/Module Were Skipped in High School Chemistry Classes

	Percent of Classes†					
	Not a Factor		A Minor Factor		A Major Factor	
The science ideas addressed in the activities you skipped are not included in your pacing guide and/or current state standards	45	(5.6)	30	(5.1)	25	(4.7)
You did not have the materials needed to implement the activities you skipped	56	(5.2)	27	(5.2)	16	(4.1)
The activities you skipped were too difficult for your students	50	(5.8)	34	(5.4)	16	(5.0)
Your students already knew the science ideas or were able to learn them without the activities you skipped	44	(5.5)	39	(5.4)	17	(4.6)
You have different activities for those science ideas that work better than the ones you skipped	19	(4.2)	38	(5.0)	43	(4.7)

† Only classes of teachers indicating in Q67/68 that they used commercially-published textbooks/modules in their most recent unit and indicating in Q70 that they "picked what was important from the textbook/module and skipped the rest" at all are included in this analysis.

Table 72
Reasons Why the Textbook/Module Was Supplemented in High School Chemistry Classes

	Percent of Classes[†]					
	Not a Factor		A Minor Factor		A Major Factor	
Your pacing guide indicated that you should use supplemental activities	67	(5.2)	24	(4.8)	9	(2.6)
Supplemental activities were needed to prepare students for standardized tests	55	(6.3)	28	(5.0)	17	(3.8)
Supplemental activities were needed to provide students with additional practice	5	(2.3)	27	(5.7)	67	(5.5)
Supplemental activities were needed so students at different levels of achievement could increase their understanding of the ideas targeted in each activity	9	(2.6)	39	(5.6)	52	(5.1)

† Only classes of teachers indicating in Q67/68 that they used commercially-published textbooks/modules in their most recent unit and indicating in Q70 that they "incorporated activities (e.g., problems, investigations, readings) from other sources to supplement what the textbook/module was lacking" at all are included in this analysis.

Table 73
High School Chemistry Classes Taught by Teachers Feeling Prepared for Each of a Number of Tasks in the Most Recent Unit

	Percent of Teachers							
	Not Adequately Prepared		Somewhat Prepared		Fairly Well Prepared		Very Well Prepared	
Anticipate difficulties that students will have with particular science ideas and procedures in this unit	0	(0.2)	7	(1.6)	36	(2.2)	56	(2.3)
Find out what students thought or already knew about the key science ideas	1	(0.5)	13	(2.1)	44	(2.5)	42	(2.6)
Implement the science textbook/module to be used during this unit[†]	1	(1.0)	5	(1.4)	37	(3.5)	56	(3.5)
Monitor student understanding during this unit	0	---[‡]	7	(1.7)	35	(2.3)	58	(2.4)
Assess student understanding at the conclusion of this unit	0	---[‡]	3	(1.7)	30	(2.3)	67	(2.4)

† Item presented only to teachers indicating in Q67/68 that they used commercially-published textbooks/modules in their most recent unit.

‡ No teachers in the sample selected this response option. Thus, it is not possible to calculate the standard error of this estimate.

Table 74
High School Chemistry Classes in which Teachers Used Various Assessment Methods in the Most Recent Unit

	Percent of Classes
Administered an assessment, task, or probe at the beginning of the unit to find out what students thought or already knew about the key science ideas	46 (2.3)
Questioned individual students during class activities to see if they were "getting it"	98 (0.8)
Used information from informal assessments of the entire class (e.g., asking for a show of hands, thumbs up/thumbs down, clickers, exit tickets) to see if students were "getting it"	81 (2.0)
Reviewed student work (e.g., homework, notebooks, journals, portfolios, projects) to see if they were "getting it"	96 (1.0)
Administered one or more quizzes and/or tests to see if students were "getting it"	87 (1.9)
Had students use rubrics to examine their own or their classmates' work	13 (1.6)
Assigned grades to student work (e.g., homework, notebooks, journals, portfolios, projects)	89 (1.6)
Administered one or more quizzes and/or tests to assign grades	93 (1.5)
Went over the correct answers to assignments, quizzes, and/or tests with the class as a whole	92 (1.4)

Table 75
Duration of the Most Recent High School Chemistry Lesson

	Average Number of Minutes
High School Chemistry Lessons	61.0 (1.3)

Table 76
Time Spent on Different Activities in the Most Recent High School Chemistry Lesson

	Average Percent of Class Time
Non-instructional activities (e.g., attendance taking, interruptions)	8 (0.3)
Whole class activities (e.g., lectures, explanations, discussions)	44 (1.2)
Small group work	30 (1.5)
Students working individually (e.g., reading textbooks, completing worksheets, taking a test or quiz)	18 (1.1)

Table 77
High School Chemistry Classes Participating in Various Activities in the Most Recent Lesson

	Percent of Classes
Teacher explaining a science idea to the whole class	90 (1.7)
Whole class discussion	59 (2.7)
Students completing textbook/worksheet problems	71 (2.5)
Teacher conducting a demonstration while students watched	34 (2.7)
Students doing hands-on/manipulative activities	32 (2.4)
Students reading about science	22 (2.3)
Students using instructional technology	22 (2.3)
Practicing for standardized tests	12 (1.8)
Test or quiz	14 (1.7)
None of the above	0 (0.2)

Table 78
Sex of High School Chemistry Teachers

	Percent of Teachers
Male	46 (2.6)
Female	54 (2.6)

Table 79
High School Chemistry Teachers of Hispanic or Latino Origin

	Percent of Teachers
Hispanic/Latino	3 (0.8)
Non-Hispanic/Latino	97 (0.8)

Table 80
Race of High School Chemistry Teachers

	Percent of Teachers
American Indian or Alaska Native	1 (0.5)
Asian	4 (0.7)
Black or African American	3 (0.7)
Native Hawaiian or Other Pacific Islander	0 (0.3)
White	93 (0.9)

Table 81
Age of High School Chemistry Teachers

	Percent of Teachers
Less than 31 years old	15 (2.2)
31–40 years old	31 (2.6)
41–50 years old	23 (1.9)
51–60 years old	22 (1.9)
More than 60 years old	9 (1.3)

SCIENCE TEACHER QUESTIONNAIRE

2012 National Survey of Science and Mathematics Education
Science Teacher Questionnaire

Section A. Teacher Background and Opinions

1. How many years have you taught prior to this school year: [Enter each response as a whole number (for example: 15).]

a. any subject at the K-12 level? _____
b. science at the K-12 level? _____
c. at this school, any subject? _____

2. At what grade levels do you currently teach science? [Select all that apply.]

□	K-5
□	6-8
□	9-12
□	You do not currently teach science

3. ***[Presented to self-contained teachers only]***
Which best describes the science instruction provided to the entire class?

- Do not consider pull-out instruction that some students may receive for remediation or enrichment.
- Do not consider instruction provided to individual or small groups of students, for example by an English-language specialist, special educator, or teacher assistant.

○	This class receives science instruction ***only*** from you. ***[Presented only to teachers who answered in Q2 that they teach science]***
○	This class receives science instruction from you and another teacher (for example: a science specialist or a teacher you team with). ***[Presented only to teachers who answered in Q2 that they teach science]***

4. ***[Presented to self-contained teachers only]***
Which best describes your science teaching?

○	I teach science all or most days, every week of the year.
○	I teach science every week, but typically three or fewer days each week.
○	I teach science some weeks, but typically not every week. ***[Skip to Q6]***

5. ***[Presented to self-contained teachers only]***
In a typical week, how many days do you teach lessons on each of the following subjects and how many minutes per week are spent on each subject? [Enter each response as a whole number (for example: 5, 150).]

	Number of days per week	**Total number of minutes per week**
a. Mathematics		
b. Science		
c. Social Studies		
d. Reading/Language Arts		

6. ***[Presented to self-contained teachers only]***

In a typical year, how many weeks do you teach lessons on each of the following subjects and how many minutes per week are spent on each subject? [Enter each response as a whole number (for example: 36, 150).]

	Number of weeks per year	Average number of minutes per week when taught
a. Mathematics		
b. Science		
c. Social Studies		
d. Reading/Language Arts		

7. ***[Presented to non-self-contained teachers only]***

In a typical week, how many different classes of each of the following do you teach?

- If you meet with the *same class of students* multiple times per week, count that class only once.
- If you teach the *same science or engineering course* to multiple classes of students, count each class separately.
- Select one on each row.

	0	1	2	3	4	5	6	7	8	9	10
Science (may include some engineering content)	○	○	○	○	○	○	○	○	○	○	○
Engineering (may include some science content)	○	○	○	○	○	○	○	○	○	○	○

8. ***[Presented to non-self-contained teachers only]***

For each science class you teach, select the course type and enter the number of students enrolled. Enter the classes in the order that you teach them. For teachers on an alternating day block schedule, please order your classes starting with the first class you teach this week. [Select one course type on each row and enter the number of students as a whole number (for example: 25).]

Class	Course Type	Number of Students
Your 1st science class:		
Your 2nd science class:		
…		
Your Nth science class:		

Course Type List	
1	Science (Grades K - 5)
2	Life Science (Grades 6 - 8)
3	Earth Science (Grades 6 - 8)
4	Physical Science (Grades 6 - 8)
5	General or Integrated Science (Grades 6 - 8)
6	Coordinated or Integrated Science including General Science and Physical Science (Grades 9 - 12)
7	Earth/Space Science (Grades 9 - 12)
8	Life Science/Biology (Grades 9 - 12)
9	Environmental Science/Ecology (Grades 9 - 12)
10	Chemistry (Grades 9 - 12)
11	Physics (Grades 9 - 12)

9. ***[Presented to non-self-contained grades 9–12 teachers only]***
For each grades 9-12 science class you teach, select the level that best describes the content addressed in that class.

- Use the descriptions below to help identify the level.
- Select one on each row.

Level	**Description**
Non-college Prep	A course that does not count towards the entrance requirements of a 4-year college. For example: Life Science.
1st Year College Prep, Including Honors	The first course in a discipline that counts towards the entrance requirements of a 4-year college. For example: Biology, Chemistry I.
2nd Year Advanced	A course typically taken after a 1st year college prep course. For example: Anatomy and Physiology, Advanced Chemistry, Physics II. Include Advanced Placement, International Baccalaureate, and concurrent college and high school credit/dual enrollment.

Class	**Course Type**	**Non-college Prep**	**1st Year College Prep, Including Honors**	**2nd Year Advanced**
Your 1st science class:	[*course type(s) teacher selected in Q8*]	○	○	○
Your 2nd science class:		○	○	○
…				
Your Nth science class:		○	○	○

10. ***[Presented to non-self-contained teachers only]***
Later in this questionnaire, we will ask you questions about your randomly selected science class, which you indicated was [*level and course type teacher selected in Q8/9*]. What is your school's title for this course? ________________________________

11. Have you been awarded one or more bachelor's and/or graduate degrees in the following fields? (With regard to bachelor's degrees, count only areas in which you majored.) [Select one on each row.]

	Yes	**No**
a. Education, including science education	○	○
b. Natural Sciences and/or Engineering	○	○
c. Other, please specify ____________________	○	○

12. ***[Presented only to teachers that answered "Yes" to Q11a]***
What type of education degree do you have? (With regard to bachelor's degrees, count only areas in which you majored.) [Select all that apply.]

□	Elementary Education
□	Mathematics Education
□	Science Education
□	Other Education, please specify. ___________

13. ***[Presented only to teachers that answered "Yes" to Q11b]***
What type of natural science and/or engineering degree do you have? (With regard to bachelor's degrees, count only areas in which you majored.) [Select all that apply.]

□	Biology/Life Science
□	Chemistry
□	Earth/Space Science
□	Engineering
□	Environmental Science/Ecology
□	Physics
□	Other natural science, please specify ________________

14. Did you complete any of the following types of biology/life science courses at the undergraduate or graduate level? [Select one on each row.]

	Yes	No
a. General/introductory biology/life science courses (for example: Biology I, Introduction to Biology)	○	○
b. Biology/life science courses beyond the general/introductory level	○	○
c. Biology/life science education courses	○	○

15. ***[Presented only to teachers that answered "Yes" to Q14b]***
Please indicate which of the following biology/life science courses you completed (beyond a general/introductory course) at the undergraduate or graduate level. [Select all that apply.]

□	Anatomy/Physiology
□	Biochemistry
□	Botany
□	Cell Biology
□	Ecology
□	Evolution
□	Genetics
□	Microbiology
□	Zoology
□	Other biology/life science beyond the general/introductory level

16. Did you complete any of the following types of chemistry courses at the undergraduate or graduate level? [Select one on each row.]

	Yes	No
a. General/introductory chemistry courses (for example: Chemistry I, Introduction to Chemistry)	○	○
b. Chemistry courses beyond the general/introductory level	○	○
c. Chemistry education courses	○	○

17. ***[Presented only to teachers that answered "Yes" to Q16b]***
Please indicate which of the following chemistry courses you completed (beyond a general/introductory course) at the undergraduate or graduate level. [Select all that apply.]

□	Analytical Chemistry
□	Biochemistry
□	Inorganic Chemistry
□	Organic Chemistry
□	Physical Chemistry
□	Quantum Chemistry
□	Other chemistry beyond the general/introductory level

18. Did you complete any of the following types of physics courses at the undergraduate or graduate level? [Select one on each row.]

	Yes	**No**
a. General/introductory physics courses (for example: Physics I, Introduction to Physics)	○	○
b. Physics courses beyond the general/introductory level	○	○
c. Physics education courses	○	○

19. ***[Presented only to teachers that answered "Yes" to Q18b]***
Please indicate which of the following physics courses you completed (beyond a general/introductory course) at the undergraduate or graduate level. [Select all that apply.]

□	Electricity and Magnetism
□	Heat and Thermodynamics
□	Mechanics
□	Modern or Quantum Physics
□	Nuclear Physics
□	Optics
□	Other physics beyond the general/introductory level

20. Did you complete any of the following types of Earth/space science courses at the undergraduate or graduate level? [Select one on each row.]

	Yes	**No**
a. General/introductory Earth/space science courses (for example: Earth Science I, Introduction to Earth Science)	○	○
b. Earth/space science courses beyond the general/introductory level	○	○
c. Earth/space science education courses	○	○

21. ***[Presented only to teachers that answered "Yes" to Q20b]***
Please indicate which of the following Earth/space science courses you completed (beyond a general/introductory course) at the undergraduate or graduate level. [Select all that apply.]

□	Astronomy
□	Geology
□	Meteorology
□	Oceanography
□	Physical Geography
□	Other Earth/space science beyond the general/introductory level

22. Did you complete any of the following types of environmental science courses at the undergraduate or graduate level? [Select one on each row.]

	Yes	No
a. General/introductory environmental science courses (for example: Environmental Science I, Introduction to Environmental Science)	○	○
b. Environmental science courses beyond the general/introductory level	○	○
c. Environmental science education courses	○	○

23. ***[Presented only to teachers that answered "Yes" to Q22b]***
Please indicate which of the following environmental science courses you completed (beyond a general/introductory course) at the undergraduate or graduate level. [Select all that apply.]

□	Conservation Biology
□	Ecology
□	Forestry
□	Hydrology
□	Oceanography
□	Toxicology
□	Other environmental science beyond the general/introductory level

24. Did you complete one or more engineering courses at the undergraduate or graduate level?

○	Yes
○	No

25. ***[Presented only to teachers that answered "Yes" to Q24b]***
Please indicate which of the following types of engineering courses you completed at the undergraduate or graduate level. [Select all that apply.]

□	Aerospace Engineering
□	Bioengineering/Biomedical Engineering
□	Chemical Engineering
□	Civil Engineering
□	Computer Engineering
□	Electrical Engineering
□	Industrial/Manufacturing Engineering
□	Mechanical Engineering
□	Other types of engineering courses

26. For each of the following areas, indicate the number of semester and/or quarter courses you completed.

- Count *courses* **not** credit hours.
- Include courses taken at the graduate or undergraduate level, as well as courses for which you received college credit while you were in high school.
- Count each course taken in high school for college credit as a one semester college course.
- Count courses that lasted multiple semesters or quarters as multiple courses.
- If your transcripts are not available, provide your best estimates.
- Enter your responses as whole numbers (for example: 3). You may either enter 0 (zero) or leave the box empty wherever applicable.

	Number of SEMESTER college courses	**Number of QUARTER college courses**
a. Interdisciplinary science (a single course that addresses content across ***multiple*** science subjects, such as biology, chemistry, physics and/or Earth science)		
b. Biology/Life science		
c. Chemistry		
d. Physics		
e. Earth/Space science		
f. Environmental science		
g. Engineering		
h. Mathematics		

27. How many of the undergraduate and graduate level science courses you completed were taken at each of the following types of institutions? (Please do not include science education courses.) [Enter each response as a whole number (for example: 15).]

a. Two-year college, community college, and/or technical school _______
b. Four-year college and/or university _______

28. Which of the following best describes your teacher certification program?

○	An undergraduate program leading to a bachelor's degree and a teaching credential
○	A post-baccalaureate credentialing program (no master's degree awarded)
○	A master's program that also awarded a teaching credential
○	You did not have any formal teacher preparation

29. When did you **last participate** in professional development (sometimes called in-service education) focused on science or science teaching? (Include attendance at professional meetings, workshops, and conferences, as well as professional learning communities/lesson studies/teacher study groups. **Do not** include formal courses for which you received college credit or time you spent **providing** professional development for other teachers.)

○	In the last 3 years	
○	4–6 years ago	*Skip to 33*
○	7–10 years ago	*Skip to 33*
○	More than 10 years ago	*Skip to 33*
○	Never	*Skip to 33*

30. In the last 3 years have you… [Select one on each row.]

		Yes	No
a.	attended a workshop on science or science teaching?	○	○
b.	attended a national, state, or regional science teacher association meeting?	○	○
c.	participated in a professional learning community/lesson study/teacher study group focused on science or science teaching?	○	○

31. What is the **total** amount of time you have spent on professional development in science or science teaching **in the last 3 years**? (Include attendance at professional meetings, workshops, and conferences, as well as professional learning communities/lesson studies/teacher study groups. **Do not** include formal courses for which you received college credit or time you spent **providing** professional development for other teachers.)

○	Less than 6 hours
○	6-15 hours
○	16-35 hours
○	More than 35 hours

32. Thinking about all of your science-related professional development **in the last 3 years**, to what extent does each of the following describe your experiences? [Select one on each row.]

		Not at all		Somewhat		To a great extent
a.	You had opportunities to engage in science investigations.	①	②	③	④	⑤
b.	You had opportunities to examine classroom artifacts (for example: student work samples).	①	②	③	④	⑤
c.	You had opportunities to try out what you learned in your classroom ***and*** then talk about it as part of the professional development.	①	②	③	④	⑤
d.	You worked closely with other science teachers from your school.	①	②	③	④	⑤
e.	You worked closely with other science teachers who taught the same grade and/or subject whether or not they were from your school.	①	②	③	④	⑤
f.	The professional development was a waste of your time.	①	②	③	④	⑤

33. When did you last take a formal course for **college credit** in each of the following areas? Do not count courses for which you received only Continuing Education Units. [Select one on each row.]

		In the last 3 years	4 – 6 years ago	7 – 10 years ago	More than 10 years ago	Never
a.	Science	○	○	○	○	○
b.	How to teach science	○	○	○	○	○
c.	Student teaching in science	○	○	○	○	○
d.	Student teaching in other subjects	○	○	○	○	○

34. ***[Presented only to teachers that have participated in professional development in the last three years as indicated in Q29, OR took a course in "Science" or "How to teach science" in the last three years as indicated in q33a/b]***
Considering all the opportunities to learn about science or the teaching of science (professional development and coursework) **in the last 3 years**, how much was each of the following emphasized? [Select one on each row.]

	Not at all		**Somewhat**		**To a great extent**
a. Deepening your own science content knowledge	①	②	③	④	⑤
b. Learning about difficulties that students may have with particular science ideas and procedures	①	②	③	④	⑤
c. Finding out what students think or already know about the key science ideas prior to instruction on those ideas	①	②	③	④	⑤
d. Implementing the science textbook/module to be used in your classroom	①	②	③	④	⑤
e. Planning instruction so students at different levels of achievement can increase their understanding of the ideas targeted in each activity	①	②	③	④	⑤
f. Monitoring student understanding during science instruction	①	②	③	④	⑤
g. Providing enrichment experiences for gifted students	①	②	③	④	⑤
h. Providing alternative science learning experiences for students with special needs	①	②	③	④	⑤
i. Teaching science to English-language learners	①	②	③	④	⑤
j. Assessing student understanding at the conclusion of instruction on a topic	①	②	③	④	⑤

35. In the last 3 years have you… [Select one on each row.]

	Yes	**No**
a. received feedback about your science teaching from a mentor/coach **formally assigned** by the school or district/diocese?	○	○
b. served as a **formally-assigned** mentor/coach for science teaching? (Please do not include supervision of student teachers.)	○	○
c. supervised a student teacher in your classroom?	○	○
d. taught in-service workshops on science or science teaching?	○	○
e. led a professional learning community/lesson study/teacher study group focused on science or science teaching?	○	○

36. ***[Presented only to grades K–5 teachers; sub-items e, f, and g for self-contained teachers only]***
Many teachers feel better prepared to teach some subject areas than others. How well prepared do you feel to teach each of the following subjects **at the grade level(s) you teach**, whether or not they are currently included in your teaching responsibilities? [Select one on each row.]

	Not adequately prepared	**Somewhat prepared**	**Fairly well prepared**	**Very well prepared**
a. Life Science	①	②	③	④
b. Earth Science	①	②	③	④
c. Physical Science	①	②	③	④
d. Engineering	①	②	③	④
e. Mathematics	①	②	③	④
f. Reading/Language Arts	①	②	③	④
g. Social Studies	①	②	③	④

37. ***[Presented only to grades 6–12 teachers; non-self-contained teachers shown only topics related to their randomly selected class and engineering; self-contained teachers shown all topics]***
Within science many teachers feel better prepared to teach some topics than others. How well prepared do you feel to teach each of the following topics **at the grade level(s) you teach**, whether or not they are currently included in your teaching responsibilities? [Select one on each row.]

	Not adequately prepared	Somewhat prepared	Fairly well prepared	Very well prepared
a. Earth/Space Science				
i. Earth's features and physical processes	①	②	③	④
ii. The solar system and the universe	①	②	③	④
iii. Climate and weather	①	②	③	④
b. Biology/Life Science				
i. Cell biology	①	②	③	④
ii. Structures and functions of organisms	①	②	③	④
iii. Ecology/ecosystems	①	②	③	④
iv. Genetics	①	②	③	④
v. Evolution	①	②	③	④
c. Chemistry				
i. Atomic structure	①	②	③	④
ii. Chemical bonding, equations, nomenclature, and reactions	①	②	③	④
iii. Elements, compounds, and mixtures	①	②	③	④
iv. The Periodic Table	①	②	③	④
v. Properties of solutions	①	②	③	④
vi. States, classes, and properties of matter	①	②	③	④
d. Physics				
i. Forces and motion	①	②	③	④
ii. Energy transfers, transformations, and conservation	①	②	③	④
iii. Properties and behaviors of waves	①	②	③	④
iv. Electricity and magnetism	①	②	③	④
v. Modern physics (for example: special relativity)	①	②	③	④
e. Engineering (for example: nature of engineering and technology, design processes, analyzing and improving technological systems, interactions between technology and society)	①	②	③	④
f. Environmental and resource issues (for example: land and water use, energy resources and consumption, sources and impacts of pollution)	①	②	③	④

38. How well prepared do you feel to do each of the following in your science instruction? [Select one on each row.]

	Not adequately prepared	Somewhat prepared	Fairly well prepared	Very well prepared
a. Plan instruction so students at different levels of achievement can increase their understanding of the ideas targeted in each activity	①	②	③	④
b. Teach science to students who have learning disabilities	①	②	③	④
c. Teach science to students who have physical disabilities	①	②	③	④
d. Teach science to English-language learners	①	②	③	④
e. Provide enrichment experiences for gifted students	①	②	③	④
f. Encourage students' interest in science and/or engineering	①	②	③	④
g. Encourage participation of females in science and/or engineering	①	②	③	④
h. Encourage participation of racial or ethnic minorities in science and/or engineering	①	②	③	④
i. Encourage participation of students from low socioeconomic backgrounds in science and/or engineering	①	②	③	④
j. Manage classroom discipline	①	②	③	④

39. Please provide your opinion about each of the following statements. [Select one on each row.]

	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
a. Students learn science best in classes with students of similar abilities.	①	②	③	④	⑤
b. Inadequacies in students' science background can be overcome by effective teaching.	①	②	③	④	⑤
c. It is better for science instruction to focus on ideas in depth, even if that means covering fewer topics.	①	②	③	④	⑤
d. Students should be provided with the purpose for a lesson as it begins.	①	②	③	④	⑤
e. At the beginning of instruction on a science idea, students should be provided with definitions for new scientific vocabulary that will be used.	①	②	③	④	⑤
f. Teachers should explain an idea to students before having them consider evidence that relates to the idea.	①	②	③	④	⑤
g. Most class periods should include some review of previously covered ideas and skills.	①	②	③	④	⑤
h. Most class periods should provide opportunities for students to share their thinking and reasoning.	①	②	③	④	⑤
i. Hands-on/laboratory activities should be used primarily to reinforce a science idea that the students have already learned.	①	②	③	④	⑤
j. Students should be assigned homework most days.	①	②	③	④	⑤
k. Most class periods should conclude with a summary of the key ideas addressed.	①	②	③	④	⑤

Section B. Your Science Instruction

The rest of this questionnaire is about your science instruction in this class.

40. ***[Presented to non-self-contained teachers only]***
On average, how many minutes per week does this class meet? [Enter your response as a whole number (for example: 300).] _________

41. Enter the number of students for each grade represented in this class. [Enter each response as a whole number (for example: 15).]

Kindergarten	
1st grade	
2nd grade	
3rd grade	
4th grade	
5th grade	
6th grade	
7th grade	
8th grade	
9th grade	
10th grade	
11th grade	
12th grade	

42. For the students in this class, indicate the number of males and females in this class in each of the following categories of race/ethnicity. [Enter each response as a whole number (for example: 15).]

	Males	**Females**
a. American Indian or Alaska Native		
b. Asian		
c. Black or African American		
d. Hispanic/Latino		
e. Native Hawaiian or Other Pacific Islander		
f. White		
g. Two or more races		

43. Which of the following best describes the prior science achievement levels of the students in this class relative to other students in this school?

○	Mostly low achievers
○	Mostly average achievers
○	Mostly high achievers
○	A mixture of levels

44. How much control do you have over each of the following aspects of science instruction in this class? [Select one on each row.]

	No Control		Moderate Control		Strong Control
a. Determining course goals and objectives	①	②	③	④	⑤
b. Selecting textbooks/modules	①	②	③	④	⑤
c. Selecting content, topics, and skills to be taught	①	②	③	④	⑤
d. Selecting teaching techniques	①	②	③	④	⑤
e. Determining the amount of homework to be assigned	①	②	③	④	⑤
f. Choosing criteria for grading student performance	①	②	③	④	⑤

45. Think about your plans for this class for the entire course/year. By the end of the course/year, how much emphasis will each of the following student objectives receive? [Select one on each row.]

	None	Minimal emphasis	Moderate emphasis	Heavy emphasis
a. Memorizing science vocabulary and/or facts	①	②	③	④
b. Understanding science concepts	①	②	③	④
c. Learning science process skills (for example: observing, measuring)	①	②	③	④
d. Learning about real-life applications of science	①	②	③	④
e. Increasing students' interest in science	①	②	③	④
f. Preparing for further study in science	①	②	③	④
g. Learning test taking skills/strategies	①	②	③	④

46. How often do you do each of the following in your science instruction in this class? [Select one on each row.]

	Never	Rarely (for example: A few times a year)	Sometimes (for example: Once or twice a month)	Often (for example: Once or twice a week)	All or almost all science lessons
a. Explain science ideas to the whole class	①	②	③	④	⑤
b. Engage the whole class in discussions	①	②	③	④	⑤
c. Have students work in small groups	①	②	③	④	⑤
d. Do hands-on/laboratory activities	①	②	③	④	⑤
e. Engage the class in project-based learning (PBL) activities	①	②	③	④	⑤
f. Have students read from a science textbook, module, or other science-related material in class, either aloud or to themselves	①	②	③	④	⑤
g. Have students represent and/or analyze data using tables, charts, or graphs	①	②	③	④	⑤
h. Require students to supply evidence in support of their claims	①	②	③	④	⑤
i. Have students make formal presentations to the rest of the class (for example: on individual or group projects)	①	②	③	④	⑤
j. Have students write their reflections (for example: in their journals) in class or for homework	①	②	③	④	⑤
k. Give tests and/or quizzes that are predominantly short-answer (for example: multiple choice, true /false, fill in the blank)	①	②	③	④	⑤
l. Give tests and/or quizzes that include constructed-response/open-ended items	①	②	③	④	⑤
m. Focus on literacy skills (for example: informational reading or writing strategies)	①	②	③	④	⑤
n. Have students practice for standardized tests	①	②	③	④	⑤
o. Have students attend presentations by guest speakers focused on science and/or engineering in the workplace	①	②	③	④	⑤

47. Which best describes the availability of each of the following for small group (4-5 students) work in this class? [Select one on each row.]

	Do not have one per group available	At least one per group available upon request or in another room	At least one per group located in your classroom
a. Personal computers, including laptops	○	○	○
b. Hand-held computers (for example: PDAs, tablets, smartphones, iPads)	○	○	○
c. Internet access	○	○	○
d. Graphing calculators	○	○	○
e. Other calculators	○	○	○
f. Probes for collecting data (for example: motion sensors, temperature probes)	○	○	○
g. Microscopes	○	○	○
h. Classroom response system or "Clickers" (handheld devices used to respond electronically to questions in class)	○	○	○

48. For each of the following, are students expected to provide their own for use in this science class? [Select one on each row.]

	Yes	No
a. Laptop computers	○	○
b. Hand-held computers	○	○
c. Graphing calculators	○	○
d. Other calculators	○	○

49. How often do students use each of the following instructional technologies in this science class? [Select one on each row.]

	Never	Rarely (for example: A few times a year)	Sometimes (for example: Once or twice a month)	Often (for example: Once or twice a week)	All or almost all science lessons
a. Personal computers, including laptops	①	②	③	④	⑤
b. Hand-held computers	①	②	③	④	⑤
c. Internet	①	②	③	④	⑤
d. Calculators ***[Presented to grades K–5 teachers only]***	①	②	③	④	⑤
e. Graphing calculators ***[Presented to grades 6–12 teachers only]***	①	②	③	④	⑤
f. Probes for collecting data	①	②	③	④	⑤
g. Classroom response system or "Clickers"	①	②	③	④	⑤

50. Please indicate the availability of each of the following for your science instruction in this class. [Select one on each row.]

	Not available	Available in another room	Located in your classroom
a. Lab tables	○	○	○
b. Electric outlets	○	○	○
c. Faucets and sinks	○	○	○
d. Gas for burners ***[Presented to grades 9–12 teachers only]***	○	○	○
e. Fume hoods ***[Presented to grades 9–12 teachers only]***	○	○	○

51. How often are students in this class required to take science tests that you did not develop yourself, for example state assessments or district benchmarks? (Do not include Advanced Placement or International Baccalaureate exams or students retaking a test because of failure.)

○	Never
○	Once a year
○	Twice a year
○	Three or four times a year
○	Five or more times a year

52. How much science homework do you assign to this class in a typical **week**? (Do not include time that the class spends getting started on homework during class.)

○	Fewer than 15 minutes per week
○	15-30 minutes per week
○	31-60 minutes per week
○	61-90 minutes per week
○	91-120 minutes per week
○	2 to 3 hours per week
○	3-4 hours per week
○	More than 4 hours per week

53. Which best describes the instructional materials students **most frequently** use in this class?

Mainly commercially-published textbook(s)	
○	One textbook
○	Multiple textbooks
Mainly commercially-published modules	
○	Modules from a single publisher
○	Modules from multiple publishers
Other	
○	A roughly equal mix of commercially-published textbooks and commercially-published modules most of the time
○	Non-commercially-published materials most of the time ***[Skip to Q58]***

54. Please indicate the title, author, most recent copyright year, and ISBN code of the textbook/module used by the students in this class.

- The 10- or 13-character ISBN code can be found on the copyright page and/or the back cover of the textbook/module.
- Do not include the dashes when entering the ISBN.
- An example of the location of the ISBN is shown to the right.

Title:
First Author:
Year:
ISBN:

55. How would you rate the overall quality of this textbook/the modules used from this publisher?

○	Very poor
○	Poor
○	Fair
○	Good
○	Very good
○	Excellent

56. ***[Presented only to teachers who indicated using one commercially-published textbook or modules from a single publisher in Q53]***
Over the course of the school year, approximately what percentage of the science **instructional time** will students in this class spend using this textbook/these modules?

○	Less than 25%
○	25-49%
○	50-74%
○	75-90%
○	More than 90%

57. ***[Presented only to teachers who indicated using one commercially-published textbook in Q53]***
Approximately what percentage of the chapters in this textbook will students in this class engage with during the school year?

○	Less than 25%
○	25-49%
○	50-74%
○	75-90%
○	More than 90%

58. Science courses may benefit from the availability of particular kinds of ***equipment*** (for example: microscopes, beakers, photogate timers, Bunsen burners). How adequate is the ***equipment*** you have available for teaching this science class?

○	Not adequate
○	
○	Somewhat adequate
○	
○	Adequate

59. Science courses may benefit from the availability of particular kinds of ***instructional technology*** (for example: calculators, computers, probes/sensors). How adequate is the ***instructional technology*** you have available for teaching this science class?

○	Not adequate
○	
○	Somewhat adequate
○	
○	Adequate

60. Science courses may benefit from the availability of particular kinds of ***consumable supplies*** (for example: chemicals, living organisms, batteries). How adequate are the ***consumable supplies*** you have available for teaching this science class?

○	Not adequate
○	
○	Somewhat adequate
○	
○	Adequate

61. Science courses may benefit from the availability of particular kinds of ***facilities*** (for example: lab tables, electric outlets, faucets and sinks). How adequate are the ***facilities*** you have available for teaching this science class?

○	Not adequate
○	
○	Somewhat adequate
○	
○	Adequate

62. In your opinion, how great a problem is each of the following for your science instruction in this class? [Select one on each row.]

	Not a significant problem	**Somewhat of a problem**	**Serious problem**
a. Lack of access to computers	○	○	○
b. Old age of computers	○	○	○
c. Lack of access to the Internet	○	○	○
d. Unreliability of the Internet connection	○	○	○
e. Slow speed of the Internet connection	○	○	○
f. Lack of availability of appropriate computer software	○	○	○
g. Lack of availability of technology support	○	○	○

63. Please rate the effect of each of the following on your science instruction in this class. [Select one on each row.]

	Inhibits effective instruction		**Neutral or Mixed**		**Promotes effective instruction**	**N/A or Don't Know**
a. Current state standards	①	②	③	④	⑤	○
b. District/Diocese curriculum frameworks ***[Not presented to non-Catholic private schools]***	①	②	③	④	⑤	○
c. District/Diocese and/or school pacing guides	①	②	③	④	⑤	○
d. State testing/accountability policies ***[Not presented to non-Catholic private schools]***	①	②	③	④	⑤	○
e. District/Diocese testing/accountability policies ***[Not presented to non-Catholic private schools]***	①	②	③	④	⑤	○
f. Textbook/module selection policies	①	②	③	④	⑤	○
g. Teacher evaluation policies	①	②	③	④	⑤	○
h. College entrance requirements ***[Presented to grades 9–12 teachers only]***	①	②	③	④	⑤	○
i. Students' motivation, interest, and effort in science	①	②	③	④	⑤	○
j. Students' reading abilities	①	②	③	④	⑤	○
k. Community views on science instruction	①	②	③	④	⑤	○
l. Parent expectations and involvement	①	②	③	④	⑤	○
m. Principal support	①	②	③	④	⑤	○
n. Time for you to plan, individually and with colleagues	①	②	③	④	⑤	○
o. Time available for your professional development	①	②	③	④	⑤	○

Section C. Your Most Recently Completed Science Unit in this Class

The questions in this section are about the most recently completed science unit in this class.

- Depending on the structure of your class and the instructional materials you use, a unit may range from a few to many class periods.
- Do not be concerned if this unit was not typical of your instruction.

64. How many class periods were devoted to instruction on the **most recently completed science unit**? [Enter your response as a whole number (for example: 15).] ___________________

65. Which of the following best describes the content of this unit?

○	Earth/Space Science
○	Life Science/Biology
○	Environmental Science/Ecology
○	Chemistry
○	Physics
○	Engineering

66. What science ideas and/or skills were addressed in this unit? ________________________________

67. ***[Presented only to teachers who indicated using commercially-published textbooks/modules in Q53]*** Was this unit based primarily on the commercially-published textbook/modules you described earlier as the one used most often in this class?

○	Yes ***[Skip to Q70]***
○	No

68. Was this unit based on a commercially-published textbook/module?

○	Yes
○	No ***[Skip to Q73]***

69. Please indicate the title, author, most recent copyright year, and ISBN code of that textbook/module.

- The 10- or 13-character ISBN code can be found on the copyright page and/or the back cover of the textbook/module.
- Do not include the dashes when entering the ISBN.
- An example of the location of the ISBN is shown to the right.

Title:
First Author:
Year:
ISBN:

70. Please indicate the extent to which you did each of the following while teaching this unit. [Select one on each row.]

	Not at all		Somewhat		To a great extent
a. You used the textbook/module to guide the overall structure and content emphasis of the unit.	①	②	③	④	⑤
b. You followed the textbook/module to guide the detailed structure and content emphasis of the unit.	①	②	③	④	⑤
c. You picked what is important from the textbook/module and skipped the rest.	①	②	③	④	⑤
d. You incorporated activities (for example: problems, investigations, readings) from other sources to supplement what the textbook/module was lacking.	①	②	③	④	⑤

71. *[Presented only to teachers who answered "2–5" in Q70c]*
During this unit, when you skipped activities (for example: problems, investigations, readings) in your textbook/module, how much was each of the following a factor in your decisions? [Select one on each row.]

	Not a factor	A minor factor	A major factor
a. The science ideas addressed in the activities you skipped are not included in your pacing guide and/or current state standards.	①	②	③
b. You did not have the materials needed to implement the activities you skipped.	①	②	③
c. The activities you skipped were too difficult for your students.	①	②	③
d. Your students already knew the science ideas or were able to learn them without the activities you skipped.	①	②	③
e. You have different activities for those science ideas that work better than the ones you skipped.	①	②	③

72. *[Presented only to teachers who answered "2–5" in Q70d]*
During this unit, when you supplemented the textbook/module with additional activities, how much was each of the following a factor in your decisions? [Select one on each row.]

	Not a factor	A minor factor	A major factor
a. Your pacing guide indicated that you should use supplemental activities.	①	②	③
b. Supplemental activities were needed to prepare students for standardized tests.	①	②	③
c. Supplemental activities were needed to provide students with additional practice.	①	②	③
d. Supplemental activities were needed so students at different levels of achievement could increase their understanding of the ideas targeted in each activity.	①	②	③

73. How well prepared did you feel to do each of the following as part of your instruction on this particular unit? [Select one on each row.]

	Not adequately prepared	Somewhat prepared	Fairly well prepared	Very well prepared
a. Anticipate difficulties that students may have with particular science ideas and procedures in this unit	①	②	③	④
b. Find out what students thought or already knew about the key science ideas	①	②	③	④
c. Implement the science textbook/module to be used during this unit ***[Presented only to teachers who indicated using commercially-published textbooks/modules in Q67/68]***	①	②	③	④
d. Monitor student understanding during this unit	①	②	③	④
e. Assess student understanding at the conclusion of this unit	①	②	③	④

74. Which of the following did you do during this unit? [Select all that apply.]

□	Administered an assessment, task, or probe at the beginning of the unit to find out what students thought or already knew about the key science ideas
□	Questioned individual students during class activities to see if they were “getting it”
□	Used information from informal assessments of the entire class (for example: asking for a show of hands, thumbs up/thumbs down, clickers, exit tickets) to see if students were “getting it”
□	Reviewed student work (for example: homework, notebooks, journals, portfolios, projects) to see if they were “getting it”
□	Administered one or more quizzes and/or tests to see if students were “getting it”
□	Had students use rubrics to examine their own or their classmates’ work
□	Assigned grades to student work (for example: homework, notebooks, journals, portfolios, projects)
□	Administered one or more quizzes and/or tests to assign grades
□	Went over the correct answers to assignments, quizzes, and/or tests with the class as a whole

Section D. Your Most Recent Science Lesson in this Class

The next three questions refer to the most recent science lesson in this class, whether or not that instruction was part of the unit you’ve just been describing. Do not be concerned if this lesson included activities and/or interruptions that are not typical (for example: a test, students working on projects, a fire drill).

75. How many minutes was that lesson? [Enter your response as a non-zero whole number (for example: 50).] __________

76. Of these minutes, how many were spent on the following: [Enter each response as a whole number (for example: 15).]

a. Non-instructional activities (for example: attendance taking, interruptions) ____
b. Whole class activities (for example: lectures, explanations, discussions)____
c. Small group work ___
d. Students working individually (for example: reading textbooks, completing worksheets, taking a test or quiz) ___

77. Which of the following activities took place during that science lesson? [Select all that apply.]

□	Teacher explaining a science idea to the whole class
□	Whole class discussion
□	Students completing textbook/worksheet problems
□	Teacher conducting a demonstration while students watched
□	Students doing hands-on/laboratory activities
□	Students reading about science
□	Students using instructional technology
□	Practicing for standardized tests
□	Test or quiz
□	None of the above

Section E. Demographic Information

78. Indicate your sex:

○	Male
○	Female

79. Are you of Hispanic or Latino origin?

○	Yes
○	No

80. What is your race? [Select all that apply.]

□	American Indian or Alaska Native
□	Asian
□	Black or African American
□	Native Hawaiian or Other Pacific Islander
□	White

81. In what year were you born? [Enter your response as a whole number (for example: 1969). Do not use commas.] __________

Thank you!