APPENDIX E

Description of Reporting Variables

Region

Type of Community

Percent of Students in School Eligible for Free/Reduced-Price Lunch (FRL)

School Size

Grade Range

Percent of Non-Asian Minority Students in Class

Overview of Composites

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  - Quality of Professional Development
  - Extent to Which Professional Development/Coursework Focused on Student-Centered Instruction
  - Perceptions of Content Preparedness: Science
  - Perceptions of Content Preparedness: Mathematics
  - Perceptions of Preparedness to Teach Diverse Learners
  - Perceptions of Preparedness to Encourage Students
  - Perceptions of Preparedness to Implement Instruction in Particular Unit
- Decision-Making Autonomy
  - Curriculum Control
  - Pedagogical Control
- Instructional Objectives
  - Reform-Oriented Instructional Objectives
- Teaching Practices
  - Use of Reform-Oriented Teaching Practices: Science
  - Use of Reform-Oriented Teaching Practices: Mathematics
  - Use of Instructional Technology
- Influences on Instruction
  - Adequacy of Resources for Instruction: Science
  - Adequacy of Resources for Instruction: Mathematics
  - Extent to Which the Quality of Instructional Technology Is Problematic for Instruction
  - Extent to Which the Policy Environment Promotes Effective Instruction
  - Extent to Which Stakeholders Promote Effective Instruction
  - Extent to Which School Support Promotes Effective Instruction

Definitions of Program Composites
- State Standards for Science and Mathematics Education
  - Focus on State Science/Mathematics Standards
- Factors Affecting Instruction
  - Supportive Context for Science/Mathematics Instruction
  - Extent to Which a Lack of Materials and Supplies Is Problematic
  - Extent to Which Student Issues Are Problematic
  - Extent to Which Teacher Issues Are Problematic
  - Extent to Which a Lack of Time Is Problematic

Description of Reporting Variables

Region

Each sample school and teacher was classified as belonging to 1 of 4 census regions.

- Midwest: IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI
- Northeast: CT, MA, ME, NH, NJ, NY, PA, RI, VT
- South: AL, AR, DC, DE, FL, GA, KY, LA, MD, MS, NC, SC, TN, VA, WV
- West: AK, AZ, CA, CO, HI, ID, MT, NM, NV, OK, OR, TX, UT, WA, WY

Type of Community

Each sample school and teacher was classified as belonging to one of three types of communities.

- Urban: Central city
- Suburban: Area surrounding a central city, but still located within the counties constituting a Metropolitan Statistical Area (MSA)
- Rural: Area outside any MSA

Percent of Students in School Eligible for Free/Reduced-Price Lunch

Each school was classified into one of four categories based on the proportion of students eligible for free/reduced-price lunch (FRL). Defining common categories across grades K–12 would have been misleading, as students tend to select out of the FRL program as they advance in grade due to perceived social stigma. Therefore, the categories were defined as quartiles within groups of schools serving the same grades (e.g., schools with grades K–5, schools with grades 6–8).

School Size

Schools were classified into one of four categories based on the number of students served in the school. Defining common categories across grades K–12 would have been misleading, as

average school size tends to increase from elementary to middle to high school. Therefore, the categories were defined as quartiles within groups of schools serving the same grades (e.g., schools with grades K–5, schools with grades 6–8).

Grade Range

Teachers were classified by grade range according to the information they provided about their teaching schedule. Most of the analyses in this report used elementary, middle, and high with teachers and classes being categorized based on the grade range information provided by the teacher. Elementary was defined as grades K–5 plus 6th grade self-contained; middle was defined as 6th grade non-self-contained and grades 7–8; high was defined as grades 9–12.

Percent of Non-Asian Minority Students in Class

Each randomly selected class was classified into one of four categories based on the proportion of students in the class identified as non-Asian minorities. As this proportion is similar in schools regardless of grades served, the categories were defined as quartiles across all classes.

Overview of Composites

To facilitate the reporting of large amounts of survey data, and because individual questionnaire items are potentially unreliable, HRI used factor analysis to identify survey questions that could be combined into "composites." Each composite represents an important construct related to mathematics or science education. Composites were calculated for both the science and mathematics versions of the teacher questionnaire and for the program questionnaire completed by each responding school in the sample.

Each composite is calculated by summing the responses to the items associated with that composite and then dividing by the total points possible. In order for the composites to be on a 100-point scale, the lowest response option on each scale was set to 0 and the others were adjusted accordingly; so for example, an item with a scale ranging from 1 to 4 was re-coded to have a scale of 0 to 3. By doing this, someone who marks the lowest point on every item in a composite receives a composite score of 0 rather than some positive number. It also assures that 50 is the true mid-point. The denominator for each composite is determined by computing the maximum possible sum of responses for a series of items and dividing by 100; e.g., a 9-item composite where each item is on a scale of 0–3 would have a denominator of 0.27. Composites values were not computed for participants who respond to fewer than two-thirds of the items that form the composite.

The composites were derived through a multi-stage process. As a first step, to test whether the items intended to target the same underlying construct indeed showed similar response patterns, an exploratory factor analysis was conducted on a subset of the data. (The complete dataset was

split randomly into two subsets to allow for independent exploratory and confirmatory factor analyses.) Using Mplus version 6 and applying the appropriate weights (teacher, class, or school weights), several different factor solutions were produced and scree plots, eigenvalues, and factor patterns were examined. Based on item fit and conceptual coherence, preliminary composite definitions were created. Next, the preliminary composite definitions were applied to a different subset of the data and a confirmatory factor analysis was performed, again using Mplus. When analyzing data from a complex sample design, Mplus provides only two fit indices to evaluate the model: the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). The psychometric literature provides multiple criteria for judging acceptable model fit using these indices, ranging from 0.05–0.10 for both the RMSEA and SRMR.[1] The obtained values from final models[2] are presented in the tables, allowing the reader to apply his or her preferred criteria for evaluating fit. Lastly, to further aid in the assessment of the composites, Cronbach's coefficient alpha, a common measure of reliability, was calculated and is presented in the tables. An alpha of 0.6–0.8 is evidence of moderate reliability and a value over 0.8 is considered evidence of strong reliability.

Definitions of Teacher Composites

Composite definitions for the science and mathematics teacher questionnaire are presented below along with the item numbers from the respective questionnaires. Composites that are identical for the two subjects are presented in the same table; composites unique to a subject are presented in separate tables.

[1] Browne, M.W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods & Research, 21,* 230–258.

Hu, L., & Bentler, P.M. (1999). Cutoff criteria for fi t indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1–55.

Marsh, H.W., Wen, Z., & Hau, K-T. (2004). Structural equation models of latent interactions: Evaluation of alternative estimation strategies and indicator construction. *Psychological Methods, 9,* 275–300.

[2] Final models were occasionally adjusted to allow for correlated errors among individual items, typically when the items were worded similarly and the modification indices suggested that the proposed correlations would lead to substantially better fit. Multi-factor models were used in situations when a single-factor specification would result in an over-identified model.

Teacher Background and Opinions

These composites estimate the extent to which teachers feel prepared in both science and mathematics content and pedagogy.

Table E-1
Quality of Professional Development†

	Science	Mathematics
You had opportunities to engage in science investigations‡	Q32a	
You had opportunities to engage in mathematics investigations‡		Q20a
You had opportunities to examine classroom artifacts (e.g., student work samples)	Q32b	Q20b
You had opportunities to try out what you learned in your classroom *and* then talk about it as part of the professional development	Q32c	Q20c
You worked closely with other science teachers from your school‡	Q32d	
You worked closely with other mathematics teachers from your school‡		Q20d
You worked closely with other science teachers who taught the same grade and/or subject whether or not they were from your school‡	Q32e	
You worked closely with other mathematics teachers who taught the same grade and/or subject whether or not they were from your school‡		Q20e
The professional development was a waste of your time§	Q32f	Q20f
Number of Items in Composite	**6**	**6**
Reliability – Cronbach's Coefficient Alpha	**0.72**	**0.75**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.07**	**0.09**
Confirmatory Factor Analysis Fit Index – SRMR	**0.03**	**0.03**

† These items were presented only to teachers who participated in science/mathematics-related professional development in the last three years.

‡ The science and mathematics versions of this item are considered equivalent, worded appropriately for that discipline.

§ Responses were flipped when computing the composite to account for the negative polarity of the item.

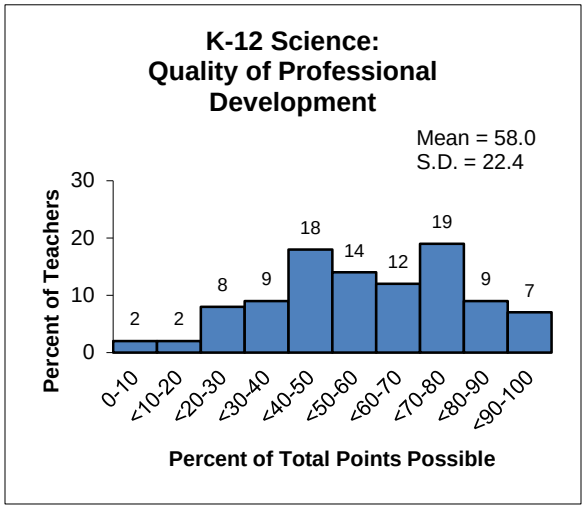


Figure E-1

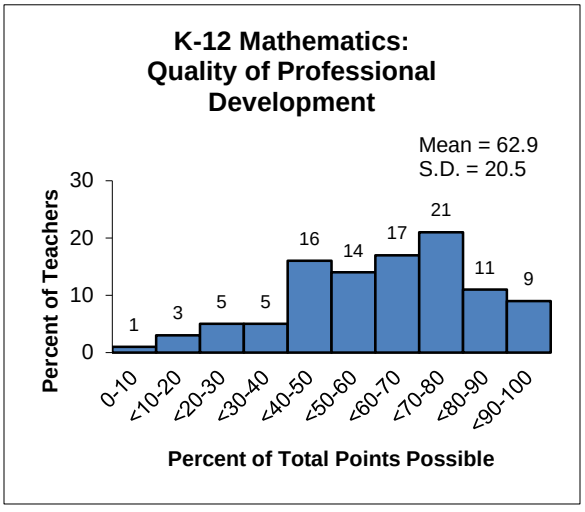


Figure E-2

Table E-2
Extent to Which Professional Development/Coursework Focused on Student-Centered Instruction[†]

	Science	Mathematics
Finding out what students think or already know about the key science ideas prior to instruction on those ideas[‡]	Q34c	
Finding out what students think or already know about the key mathematical ideas prior to instruction on those ideas[‡]		Q22d
Planning instruction so students at different levels of achievement can increase their understanding of the ideas targeted in each activity	Q34e	Q22f
Monitoring student understanding during science instruction[‡]	Q34f	
Monitoring student understanding during mathematics instruction[‡]		Q22g
Assessing student understanding at the conclusion of instruction on a topic	Q34j	Q22k
Number of Items in Composite	**4**	**4**
Reliability – Cronbach's Coefficient Alpha	**0.86**	**0.82**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.07**	**0.01**
Confirmatory Factor Analysis Fit Index – SRMR	**0.01**	**0.01**

[†] These items were presented only to teachers who participated in science/mathematics-related professional development or coursework within the last three years.

[‡] The science and mathematics versions of this item are considered equivalent, worded appropriately for that discipline.

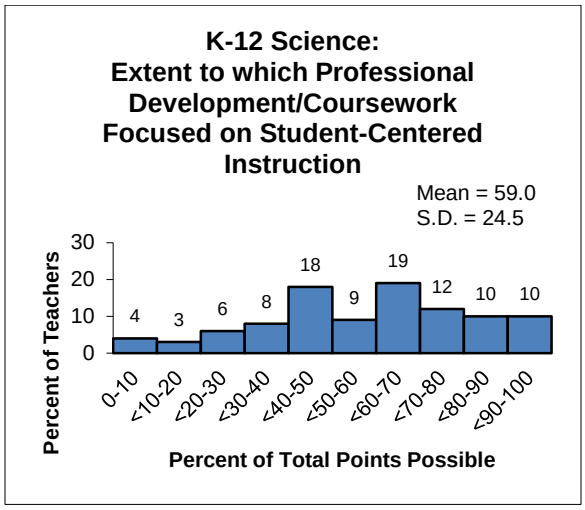


Figure E-3

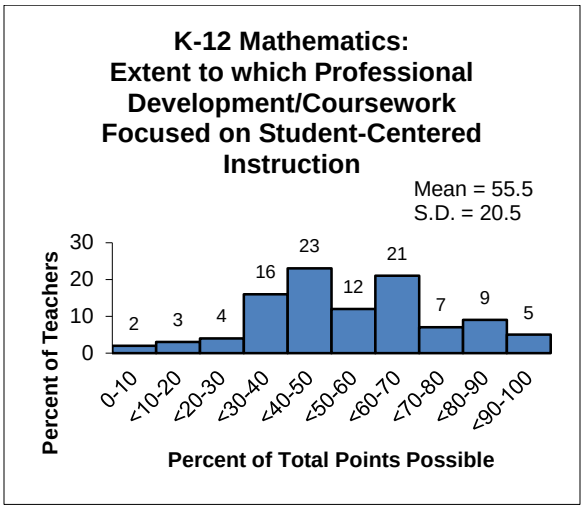


Figure E-4

Table E-3S
Perceptions of Content Preparedness: Science†

	Biology/ Life Science	Chemistry	Earth Science	Integrated/ General Science	Physical Science	Physics
Earth's features and physical processes			Q37ai	Q37ai		
The solar system and the universe			Q37aii	Q37aii		
Climate and weather			Q37aiii	Q37aiii		
Cell biology	Q37bi			Q37bi		
Structures and functions of organisms	Q37bii			Q37bii		
Ecology/ecosystems	Q37biii			Q37biii		
Genetics	Q37biv			Q37biv		
Evolution	Q37bv			Q37bv		
Atomic structure		Q37ci		Q37ci	Q37ci	
Chemical bonding, equations, nomenclature, and reactions		Q37cii		Q37cii	Q37cii	
Elements, compounds, and mixtures		Q37ciii		Q37ciii	Q37ciii	
The Periodic Table		Q37civ		Q37civ	Q37civ	
Properties of solutions		Q37cv		Q37cv	Q37cv	
States, classes, and properties of matter		Q37cvi		Q37cvi	Q37cvi	
Forces and motion				Q37di	Q37di	Q37di
Energy transfers, transformations, and conservation				Q37dii	Q37dii	Q37dii
Properties and behaviors of waves				Q37diii	Q37diii	Q37diii
Electricity and magnetism				Q37div	Q37div	Q37div
Modern physics (e.g., special relativity)				Q37dv	Q37dv	Q37dv
Environmental and resource issues (e.g., land and water use, energy resources and consumption, sources and impacts of pollution)				Q37f		
Number of Items in Composite	**5**	**6**	**3**	**20**	**11**	**5**
Reliability – Cronbach's Coefficient Alpha	**0.89**	**0.95**	**0.83**	**0.90**	**0.92**	**0.88**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.08**	**0.08**	**0.08**	**0.16**	**0.15**	**0.08**
Confirmatory Factor Analysis Fit Index – SRMR	**0.06**	**0.06**	**0.06**	**0.13**	**0.10**	**0.06**

† Items in these composites were presented only to non-self-contained teachers.

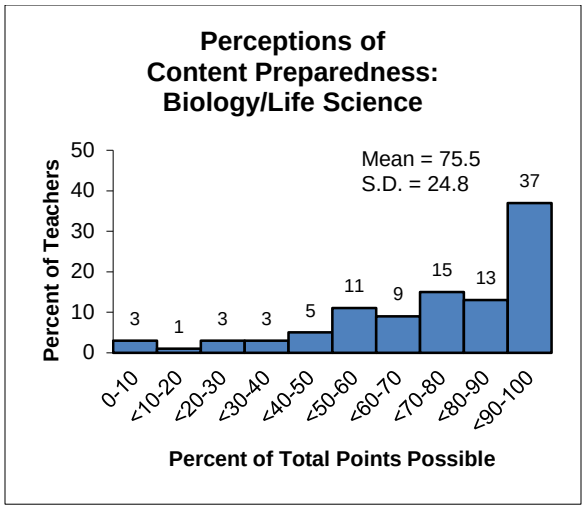
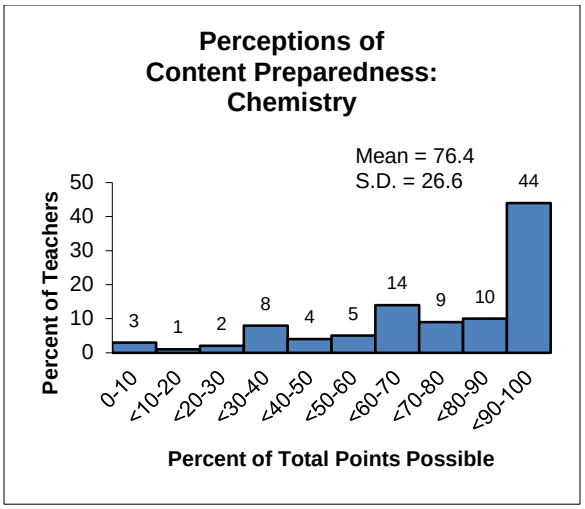


Figure E-5



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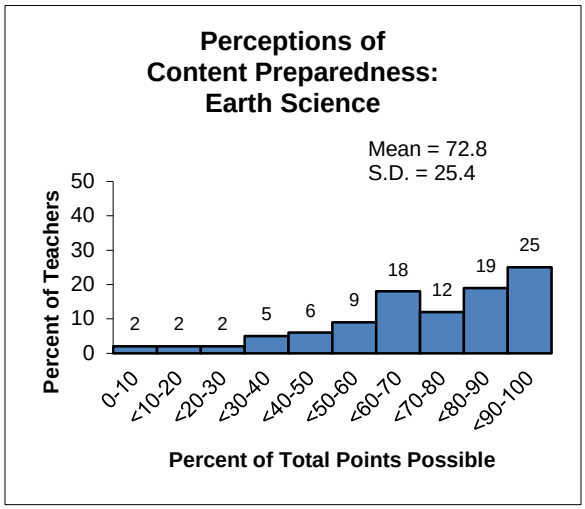
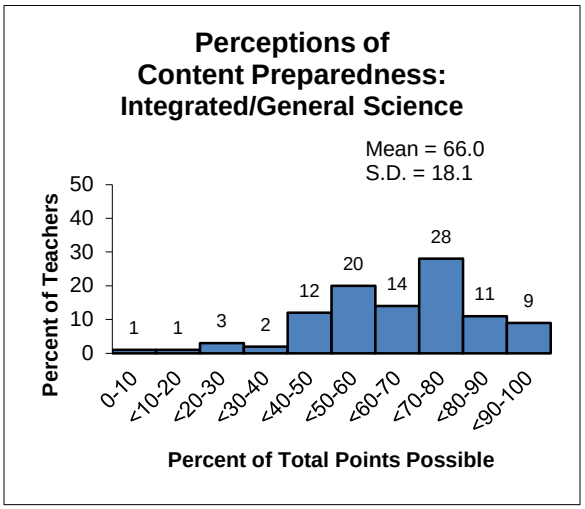


Figure E-7



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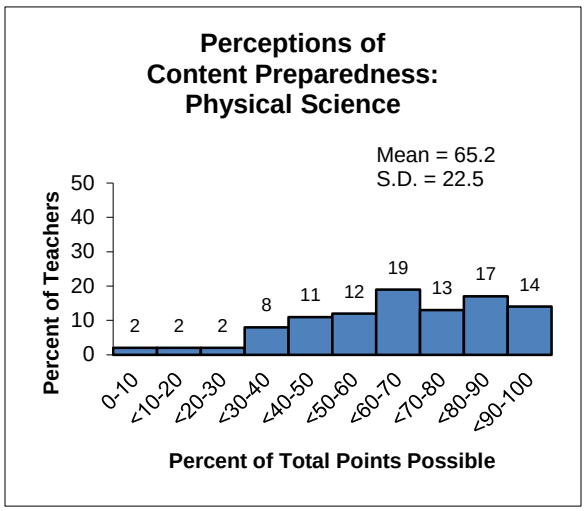

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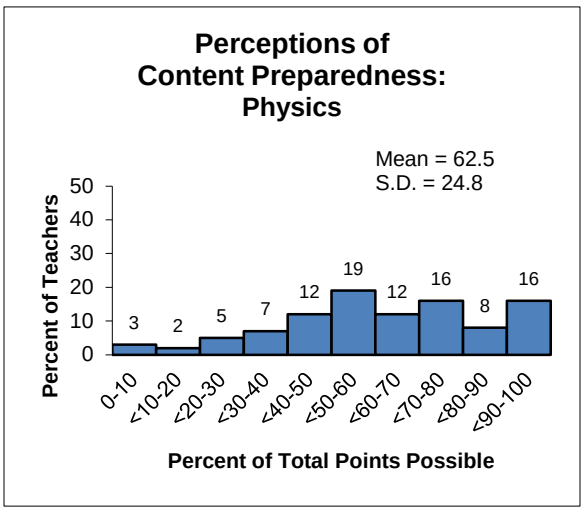


Figure E-10

Table E-3M
Perceptions of Content Preparedness: Mathematics†

	Mathematics
The number system and operations	Q25a
Algebraic thinking	Q25b
Functions	Q25c
Modeling	Q25d
Measurement	Q25e
Geometry	Q25f
Statistics and probability	Q25g
Discrete mathematics	Q25h
Number of Items in Composite	**8**
Reliability – Cronbach's Coefficient Alpha	**0.79**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.09**
Confirmatory Factor Analysis Fit Index – SRMR	**0.04**

† These items were presented only to non-self-contained teachers.

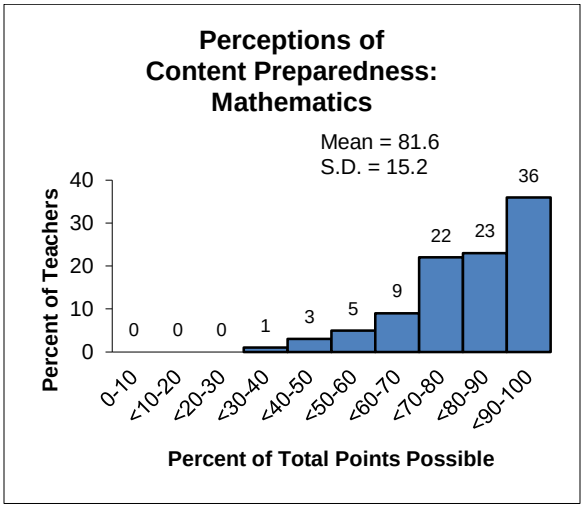


Figure E-11

Table E-4
Perceptions of Preparedness to Teach Diverse Learners

	Science	Mathematics
Plan instruction so students at different levels of achievement can increase their understanding of the ideas targeted in each activity	Q38a	Q26a
Teach science to students who have learning disabilities‡	Q38b	
Teach mathematics to students who have learning disabilities‡		Q26b
Teach science to students who have physical disabilities‡	Q38c	
Teach mathematics to students who have physical disabilities‡		Q26c
Teach science to English-language learners‡	Q38d	
Teach mathematics to English-language learners‡		Q26d
Provide enrichment experiences for gifted students	Q38e	Q26e
Number of Items in Composite	**5**	**5**
Reliability – Cronbach's Coefficient Alpha	**0.80**	**0.76**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.05**	**0.12**
Confirmatory Factor Analysis Fit Index – SRMR	**0.02**	**0.03**

‡ The science and mathematics versions of this item are considered equivalent, worded appropriately for that discipline.

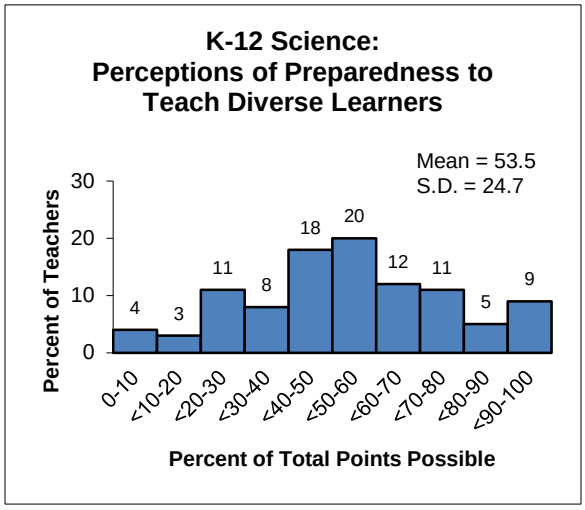


Figure E-12

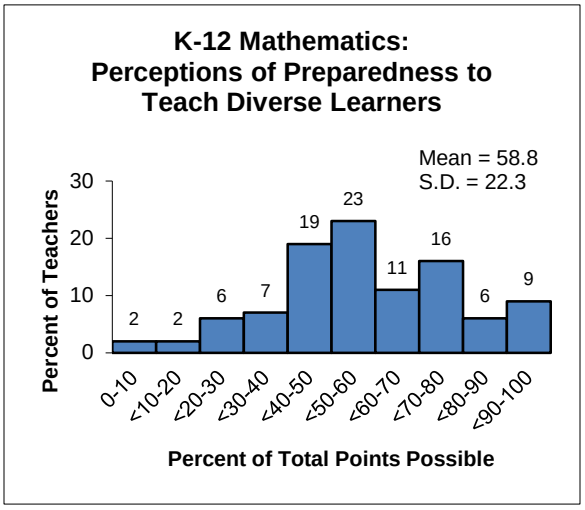
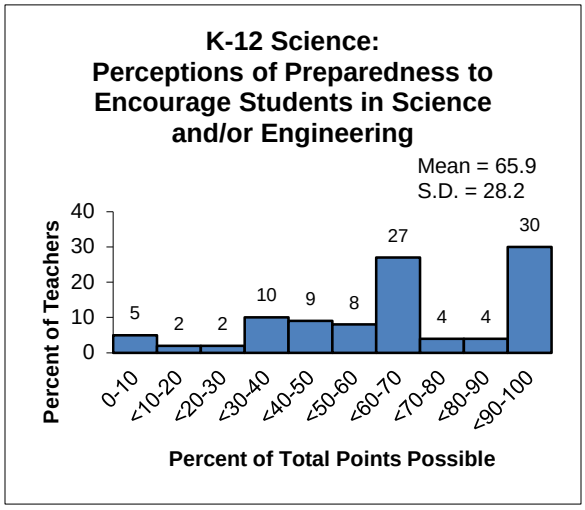


Figure E-13

Table E-5
Perceptions of Preparedness to Encourage Students‡

	Science	Mathematics
Encourage students' interest in science and/or engineering	Q38f	
Encourage students' interest in mathematics		Q26f
Encourage participation of females in science and/or engineering	Q38g	
Encourage participation of females in mathematics		Q26g
Encourage participation of racial or ethnic minorities in science and/or engineering	Q38h	
Encourage participation of racial or ethnic minorities in mathematics		Q26h
Encourage participation of students from low socioeconomic backgrounds in science and/or engineering	Q38i	
Encourage participation of students from low socioeconomic backgrounds in mathematics		Q26i
Number of Items in Composite	**4**	**4**
Reliability – Cronbach's Coefficient Alpha	**0.92**	**0.89**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.12**	**0.24**
Confirmatory Factor Analysis Fit Index – SRMR	**0.01**	**0.03**

‡ The science and mathematics versions of these items are considered equivalent, worded appropriately for that discipline.



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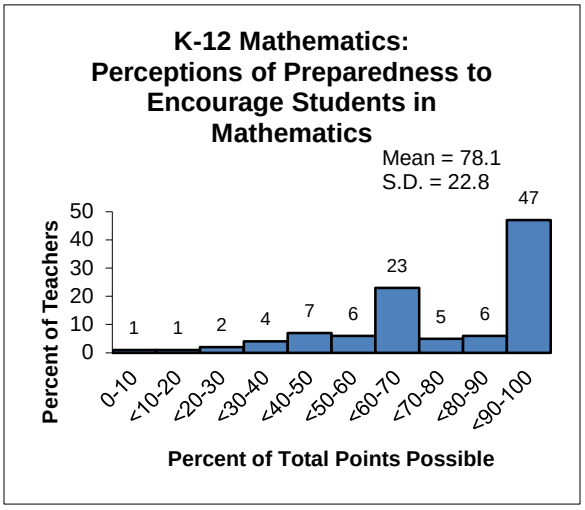


Figure E-15

Table E-6
Perceptions of Preparedness to Implement Instruction in Particular Unit

	Science	Mathematics
Anticipate difficulties that students will have with particular science ideas and procedures in this unit‡	Q73a	
Anticipate difficulties that students will have with particular mathematical ideas and procedures in this unit‡		Q58a
Find out what students thought or already knew about the key science ideas‡	Q73b	
Find out what students thought or already knew about the key mathematical ideas‡		Q58b
Implement the science textbook/ module to be used during this unit‡	Q73c	
Implement the mathematics textbook/ program to be used during this unit‡		Q58c
Monitor student understanding during this unit	Q73d	Q58d
Assess student understanding at the conclusion of this unit	Q73e	Q58e
Number of Items in Composite	**5**	**5**
Reliability – Cronbach's Coefficient Alpha	**0.88**	**0.84**
Confirmatory Factor Analysis Fit Index – RMSEA	**<0.01**	**0.04**
Confirmatory Factor Analysis Fit Index – SRMR	**<0.01**	**0.01**

‡ The science and mathematics versions of this item are considered equivalent, worded appropriately for that discipline.

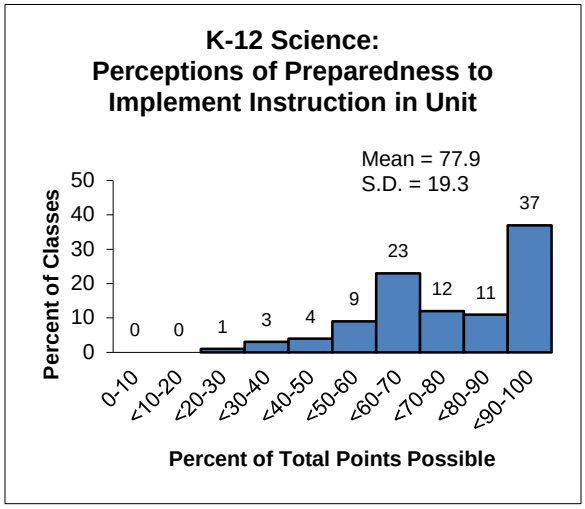


Figure E-16

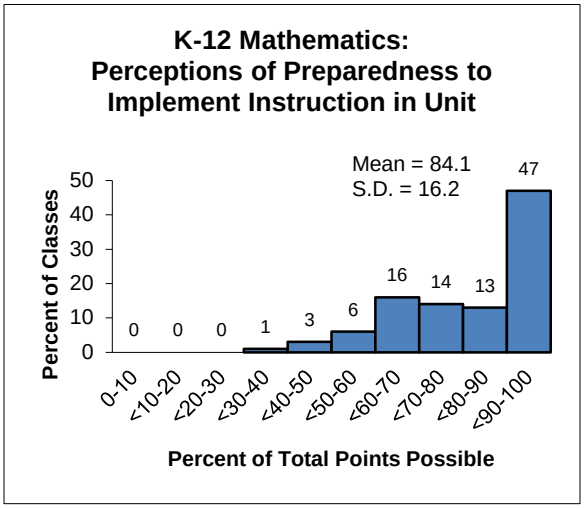


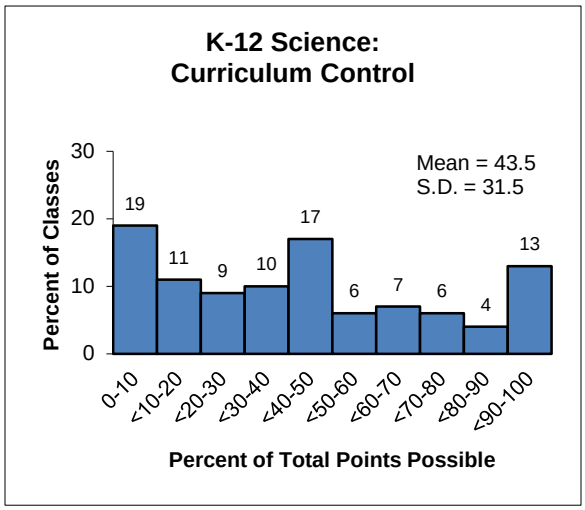
Figure E-17

Decision-Making Autonomy

These composites estimate the level of control teachers perceive having over curriculum and pedagogy decisions for their classrooms.

Table E-7
Curriculum Control

	Science	Mathematics
Determining course goals and objectives	Q44a	Q32a
Selecting textbooks/modules	Q44b	Q32b
Selecting content, topics, and skills to be taught	Q44c	Q32c
Number of Items in Composite	**3**	**3**
Reliability – Cronbach's Coefficient Alpha	**0.80**	**0.84**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.09**	**0.08**
Confirmatory Factor Analysis Fit Index – SRMR	**0.04**	**0.04**



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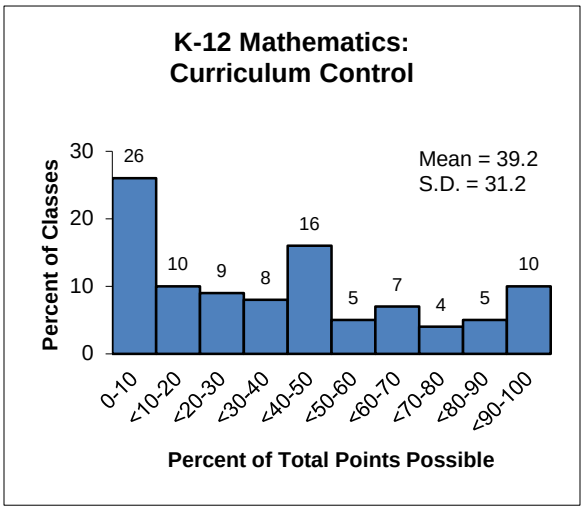


Figure E-19

Table E-8
Pedagogical Control

	Science	Mathematics
Selecting teaching techniques	Q44d	Q32d
Determining the amount of homework to be assigned	Q44e	Q32e
Choosing criteria for grading student performance	Q44f	Q32f
Number of Items in Composite	**3**	**3**
Reliability – Cronbach's Coefficient Alpha	**0.73**	**0.71**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.09**	**0.08**
Confirmatory Factor Analysis Fit Index – SRMR	**0.04**	**0.04**

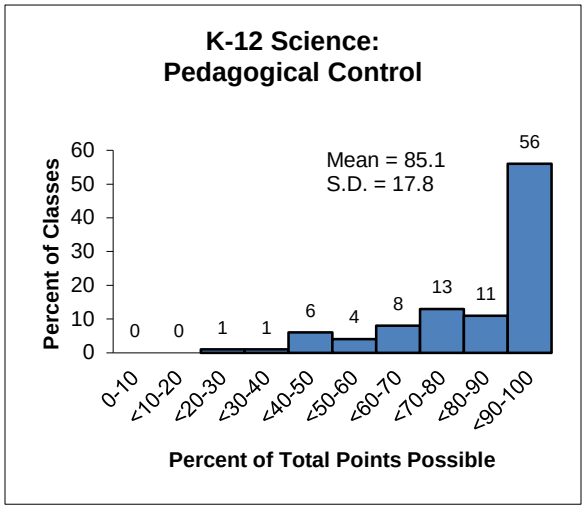


Figure E-20

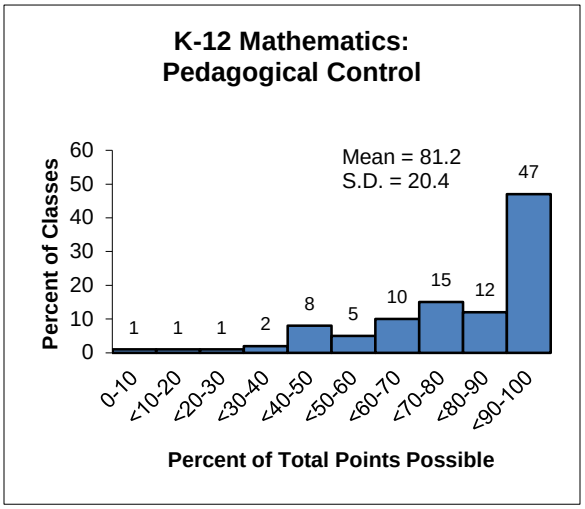


Figure E-21

Instructional Objectives

These composites estimate the amount of emphasis teachers place on reform-oriented instructional objectives.

Table E-9
Reform-Oriented Instructional Objectives

	Science	Mathematics
Understanding science concepts‡	Q45b	
Understanding mathematical ideas‡		Q33c
Learning science process skills (e.g., observing, measuring) ‡	Q45c	
Learning mathematical practices (e.g., considering how to approach a problem, justifying solutions) ‡		Q33d
Learning about real-life applications of science‡	Q45d	
Learning about real-life applications of mathematics‡		Q33e
Increasing students' interest in science‡	Q45e	
Increasing students' interest in mathematics‡		Q33f
Preparing for further study in science‡	Q45f	
Preparing for further study in mathematics‡		Q33g
Number of Items in Composite	**5**	**5**
Reliability – Cronbach's Coefficient Alpha	**0.72**	**0.71**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.07**	**0.11**
Confirmatory Factor Analysis Fit Index – SRMR	**0.02**	**0.03**

‡ The science and mathematics versions of this item are considered equivalent, worded appropriately for that discipline.

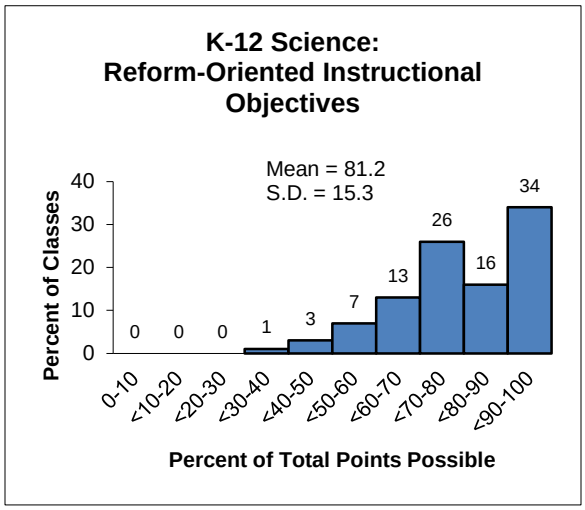


Figure E-22

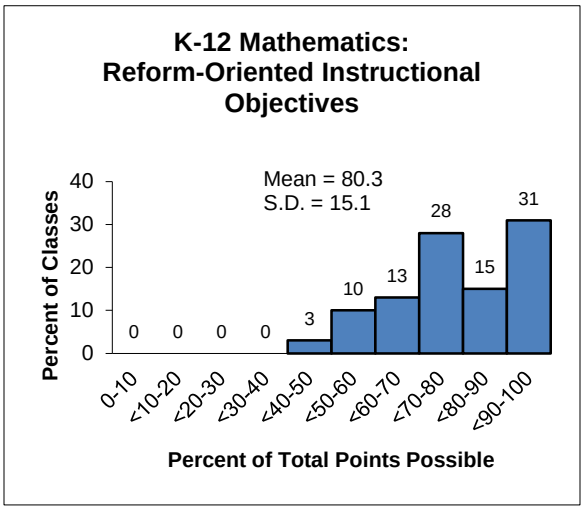


Figure E-23

Teaching Practices

These composites estimate the extent to which teachers use reform-oriented teaching practices and instructional technology.

Table X-10S
Use of Reform-Oriented Teaching Practices: Science

	Science
Have students work in small groups	Q46c
Do hands-on/laboratory activities	Q46d
Engage the class in project-based learning (PBL) activities	Q46e
Have students represent and/or analyze data using tables, charts, or graphs	Q46g
Require students to supply evidence in support of their claims	Q46h
Have students write their reflections (e.g., in their journals) in class or for homework	Q46j
Number of Items in Composite	**6**
Reliability – Cronbach's Coefficient Alpha	**0.72**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.06**
Confirmatory Factor Analysis Fit Index – SRMR	**0.03**

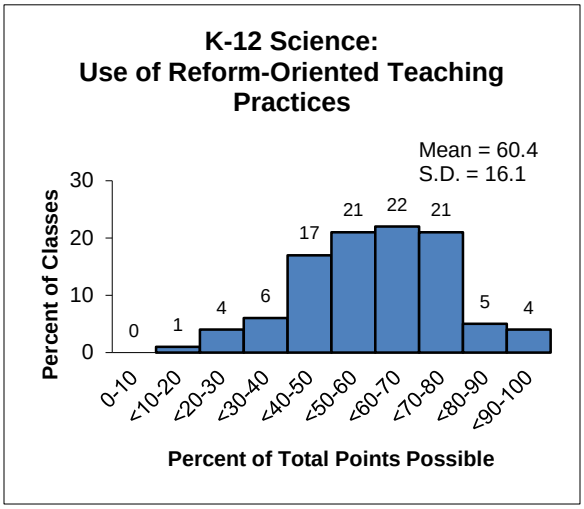


Figure E-24

Table E-10M
Use of Reform-Oriented Teaching Practices: Mathematics

	Mathematics
Have students consider multiple representations in solving a problem (e.g., numbers, tables, graphs, pictures)	Q34f
Have students explain and justify their method for solving a problem	Q34g
Have students compare and contrast different methods for solving a problem	Q34h
Have students present their solution strategies to the rest of the class	Q34j
Number of Items in Composite	**4**
Reliability – Cronbach's Coefficient Alpha	**0.77**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.04**
Confirmatory Factor Analysis Fit Index – SRMR	**0.01**

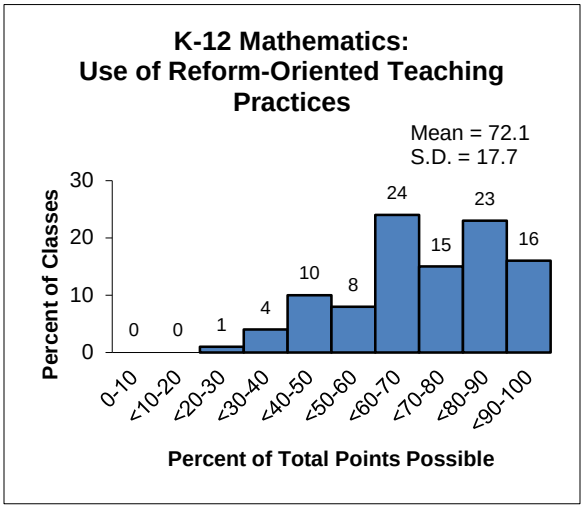


Figure E-25

Table E-11
Use of Instructional Technology

	Science	Mathematics
Personal computers, including laptops	Q49a	Q37a
Hand-held computers	Q49b	Q37b
Internet	Q49c	Q37c
Calculators/Graphing Calculators†	Q49d/e	—
Probes for collecting data	Q49f	—
Number of Items in Composite	**5**	**3**
Reliability – Cronbach's Coefficient Alpha	**0.70**	**0.70**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.04**	**0.07**
Confirmatory Factor Analysis Fit Index – SRMR	**0.05**	**0.05**

† Elementary teachers were asked about their use of "calculators," middle and high school teachers were asked about their use of "graphing calculators."

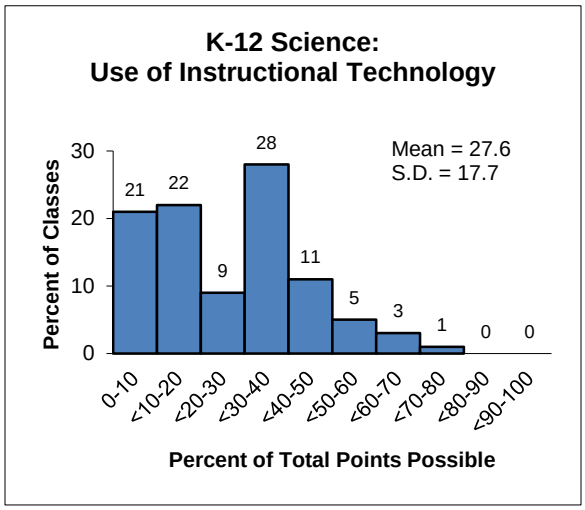


Figure E-26

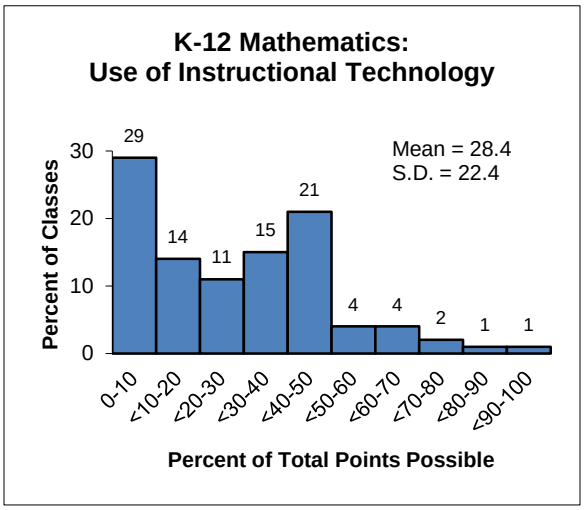


Figure E-27

Influences on Instruction

These composites estimate the extent to which teachers perceive various factors as promoting/ inhibiting effective instruction.

Table E-12S
Adequacy of Resources for Instruction: Science

	Science
Science courses may benefit from the availability of particular kinds of equipment (e.g., microscopes, beakers, photogate timers, Bunsen burners). How adequate is the equipment you have available for teaching this science class?	Q58
Science courses may benefit from the availability of particular kinds of instructional technology (e.g., calculators, computers, probes/sensors). How adequate is the instructional technology you have available for teaching this science class?	Q59
Science courses may benefit from the availability of particular kinds of consumable supplies (e.g., chemicals, living organisms, batteries). How adequate are the consumable supplies you have available for teaching this science class?	Q60
Science courses may benefit from the availability of particular kinds of facilities (e.g., lab tables, electric outlets, faucets and sinks). How adequate are the facilities you have available for teaching this science class?	Q61
Number of Items in Composite	**4**
Reliability – Cronbach's Coefficient Alpha	**0.84**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.03**
Confirmatory Factor Analysis Fit Index – SRMR	**0.01**

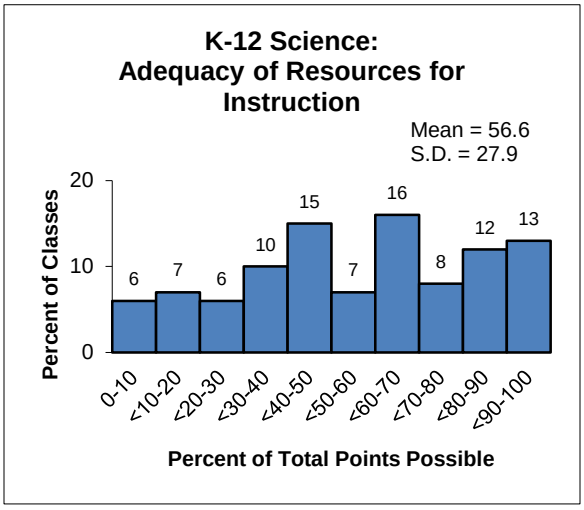


Figure E-28

Table E-12M
Adequacy of Resources for Instruction: Mathematics

	Mathematics
Instructional technology (e.g., calculators, computers, probes/sensors)	Q46a
Measurement tools (e.g., protractors, rulers)	Q46b
Manipulatives (e.g., pattern blocks, algebra tiles)	Q46c
Consumable supplies (e.g., graphing paper, batteries)	Q46d
Number of Items in Composite	**4**
Reliability – Cronbach's Coefficient Alpha	**0.74**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.14**
Confirmatory Factor Analysis Fit Index – SRMR	**0.03**

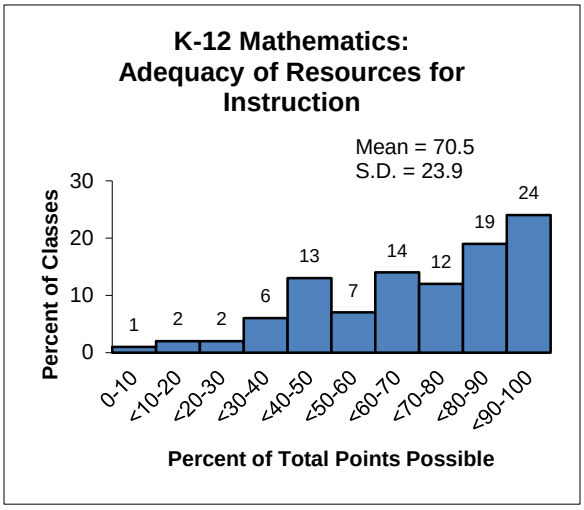


Figure E-29

Table E-13
Extent to Which the Quality of Instructional Technology Is Problematic for Instruction

	Science	Mathematics
Lack of access to computers	Q62a	Q47a
Old age of computers	Q62b	Q47b
Lack of access to the Internet	Q62c	Q47c
Unreliability of the Internet connection	Q62d	Q47d
Slow speed of the Internet connection	Q62e	Q47e
Lack of availability of appropriate computer software	Q62f	Q47f
Lack of availability of technology support	Q62g	Q47g
Number of Items in Composite	**7**	**7**
Reliability – Cronbach's Coefficient Alpha	**0.86**	**0.87**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.10**	**0.11**
Confirmatory Factor Analysis Fit Index – SRMR	**0.03**	**0.03**

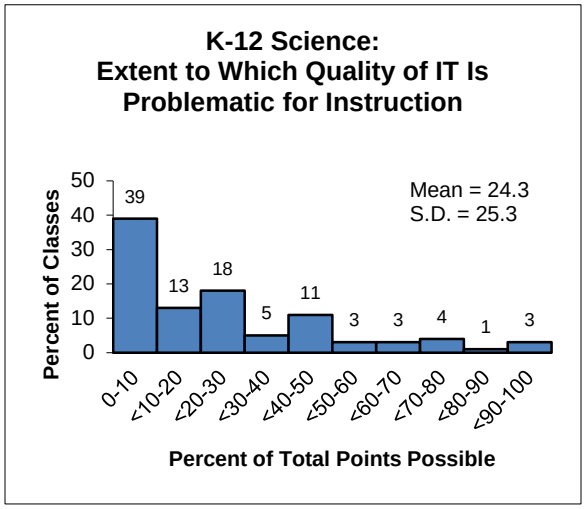


Figure E-30

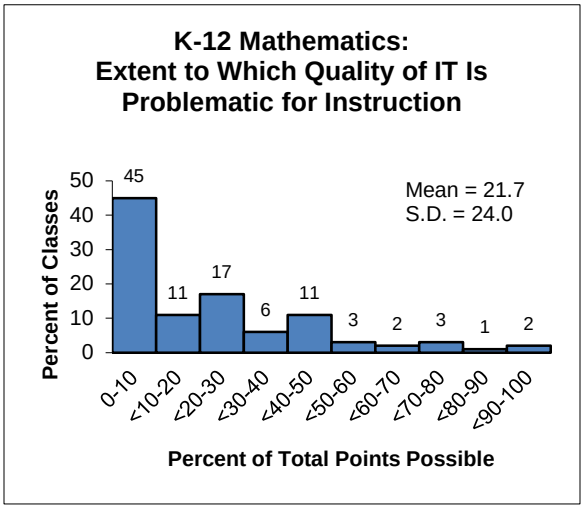


Figure E-31

Table E-14
Extent to Which the Policy Environment Promotes Effective Instruction

	Science	Mathematics
Current state standards	Q63a	Q48a
District/Diocese curriculum frameworks†	Q63b	Q48b
School/District/Diocese pacing guides	Q63c	Q48c
State testing/accountability policies†	Q63d	Q48d
District/Diocese testing/accountability policies†	Q63e	Q48e
Textbook/module selection policies‡	Q63f	
Textbook/program selection policies‡		Q48f
Teacher evaluation policies	Q63g	Q48g
Number of Items in Composite	**7**	**7**
Reliability – Cronbach's Coefficient Alpha	**0.88**	**0.89**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.08**	**0.08**
Confirmatory Factor Analysis Fit Index – SRMR	**0.05**	**0.04**

† This item was presented only to teachers in public and Catholic schools.
‡ The science and mathematics versions of this item are considered equivalent, worded appropriately for that discipline.

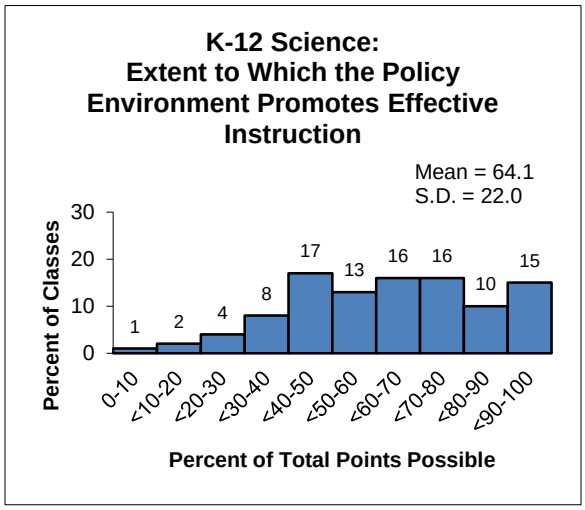


Figure E-32

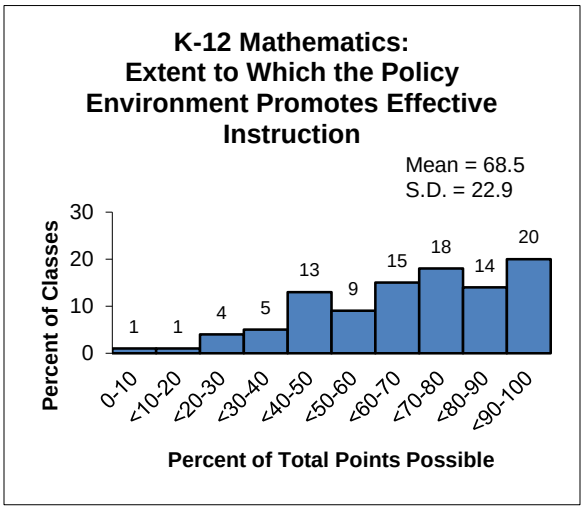


Figure E-33

Table E-15
Extent to Which Stakeholders Promote Effective Instruction

	Science	Mathematics
Students' motivation, interest, and effort in science‡	Q63i	
Students' motivation, interest, and effort in mathematics‡		Q48i
Students' reading abilities	Q63j	Q48j
Community views on science instruction‡	Q63k	
Community views on mathematics instruction‡		Q48k
Parent expectations and involvement	Q63l	Q48l
Number of Items in Composite	**4**	**4**
Reliability – Cronbach's Coefficient Alpha	**0.84**	**0.87**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.08**	**0.08**
Confirmatory Factor Analysis Fit Index – SRMR	**0.05**	**0.04**

‡ The science and mathematics versions of this item are considered equivalent, worded appropriately for that discipline.

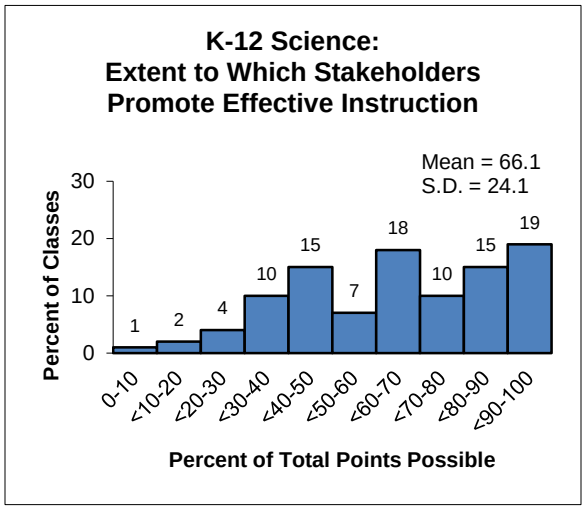


Figure E-34

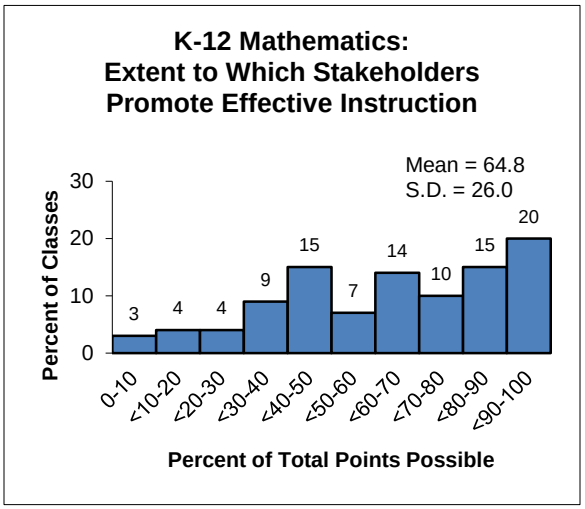


Figure E-35

Table E-16
Extent to Which School Support Promotes Effective Instruction

	Science	Mathematics
Time for you to plan, individually and with colleagues	Q63n	Q48n
Time available for your professional development	Q63o	Q48o
Number of Items in Composite	**2**	**2**
Reliability – Cronbach's Coefficient Alpha	**0.85**	**0.86**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.08**	**0.08**
Confirmatory Factor Analysis Fit Index – SRMR	**0.05**	**0.04**

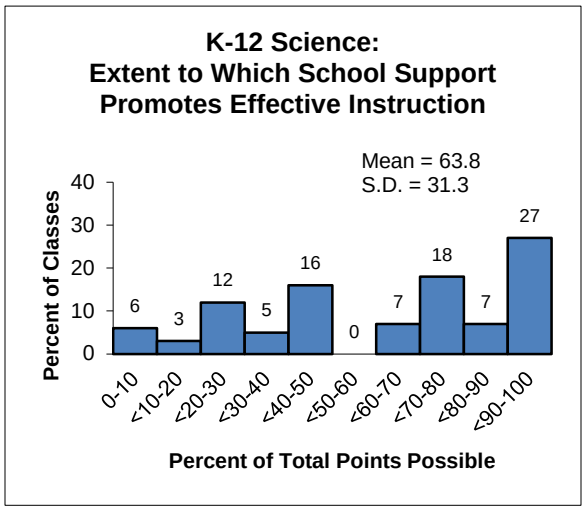


Figure E-36

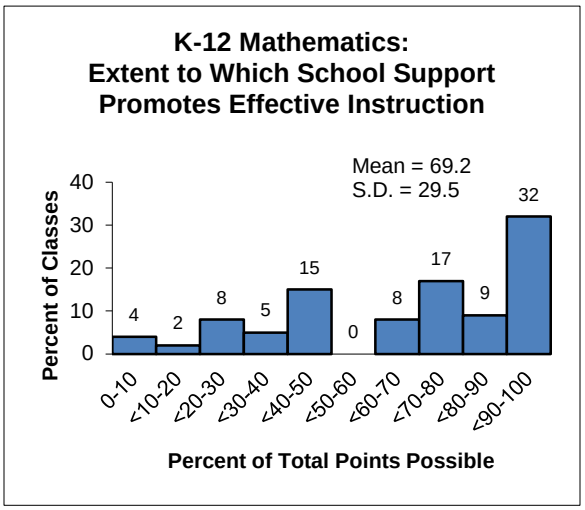


Figure E-37

Definitions of Program Composites

Composite definitions for the science and mathematics program questionnaire are presented below along with the item numbers from the respective questionnaires. Composites that are identical for the two subjects are presented in the same table; composites unique to a subject are presented in separate tables.

State Standards for Science and Mathematics Education

These composites estimate the level of attention to state standards given by teachers and other stakeholders.

Table E-17
Focus on State Science/Mathematics Standards

	Science	Mathematics
State science standards have been thoroughly discussed by science teachers in this school‡	Q6a	
State mathematics standards have been thoroughly discussed by mathematics teachers in this school‡		Q6a
There is a school-wide effort to align science instruction with the state science standards‡	Q6b	
There is a school-wide effort to align mathematics instruction with the state mathematics standards‡		Q6b
Most science teachers in this school teach to the state standards‡	Q6c	
Most mathematics teachers in this school teach to the state standards‡		Q6c
Your district/diocese organizes science professional development based on state standards†, ‡	Q6d	
Your district/diocese organizes mathematics professional development based on state standards†, ‡		Q6d
Number of Items in Composite	**4**	**4**
Reliability – Cronbach's Coefficient Alpha	**0.81**	**0.84**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.08**	**0.06**
Confirmatory Factor Analysis Fit Index – SRMR	**0.02**	**0.01**

† This item was presented only to teachers in public and Catholic schools.
‡ The science and mathematics versions of this item are considered equivalent, worded appropriately for that discipline.

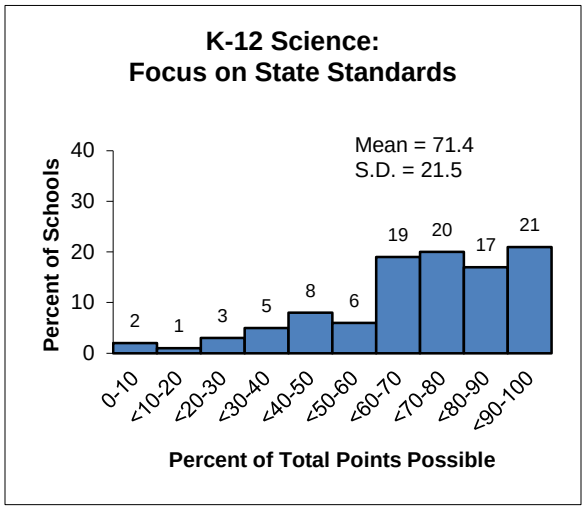


Figure E-38

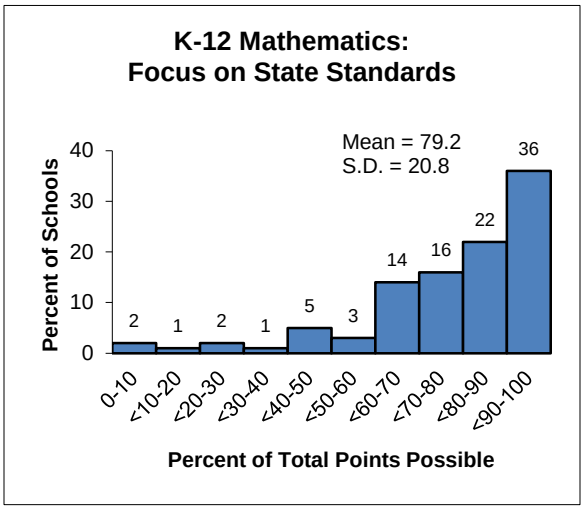


Figure E-39

Factors Affecting Instruction

These composites estimate the extent to which various factors impact science/mathematics instruction in schools.

Table E-18
Supportive Context for Science/Mathematics Instruction

	Science	Mathematics
District/Diocese science professional development policies and practices†, ‡	Q32a	
District/Diocese mathematics professional development policies and practices†, ‡		Q20a
Time provided for teacher professional development in science‡	Q32b	
Time provided for teacher professional development in mathematics‡		Q20b
Importance that the school places on science‡	Q32c	
Importance that the school places on mathematics‡		Q20c
Public attitudes toward science instruction‡	Q32d	
Public attitudes toward mathematics instruction‡		Q20d
Conflict between efforts to improve science instruction and other school and/or district/diocese initiatives‡	Q32e	
Conflict between efforts to improve mathematics instruction and other school and/or district/diocese initiatives‡		Q20e
How science instructional resources are managed (e.g., distributing and refurbishing materials)	Q32f	
Equipment and supplies and/or manipulatives for teaching mathematics (e.g., materials for students to draw, cut and build in order to make sense of problems)		Q20f
Number of Items in Composite	**6**	**6**
Reliability – Cronbach's Coefficient Alpha	**0.78**	**0.75**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.10**	**0.06**
Confirmatory Factor Analysis Fit Index – SRMR	**0.03**	**0.02**

† This item was presented only to teachers in public and Catholic schools.
‡ The science and mathematics versions of this item are considered equivalent, worded appropriately for that discipline.

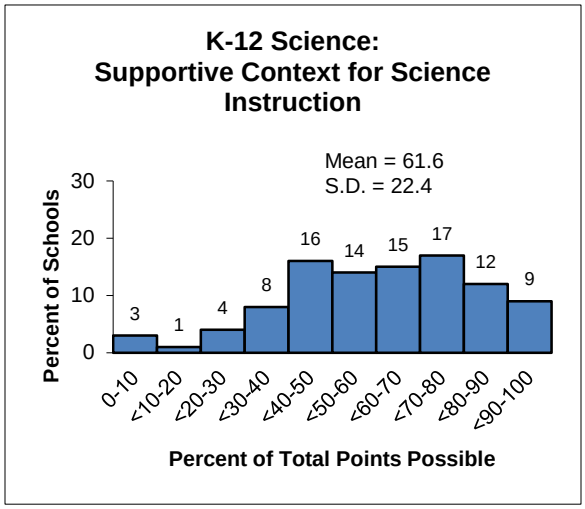


Figure E-40

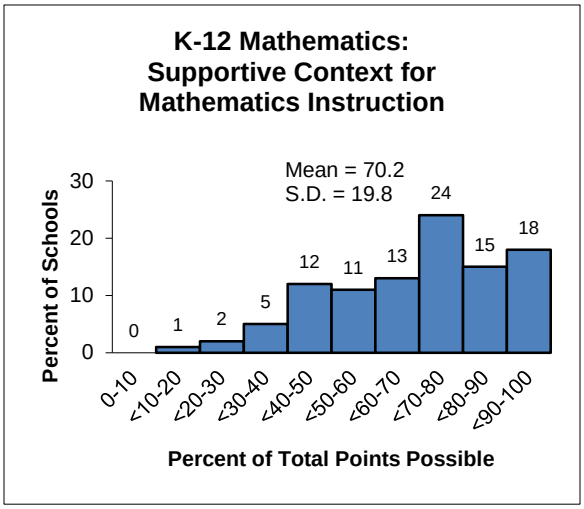
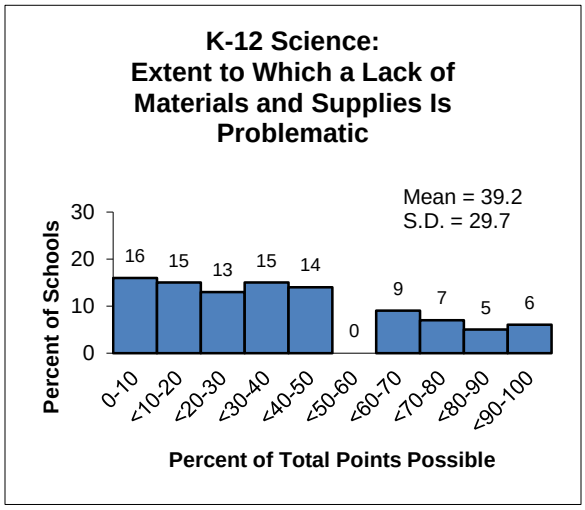


Figure E-41

Table E-19
Extent to Which a Lack of Materials and Supplies Is Problematic

	Science	Mathematics
Lack of science facilities (e.g., lab tables, electric outlets, faucets and sinks in classrooms)	Q33a	—
Inadequate funds for purchasing science equipment and supplies‡	Q33b	
Inadequate funds for purchasing mathematics equipment and supplies‡		Q21a
Inadequate supply of science textbooks/modules‡	Q33c	
Inadequate supply of mathematics textbooks/programs‡		Q21b
Inadequate materials for individualizing science instruction‡	Q33d	
Inadequate materials for individualizing mathematics instruction‡		Q21c
Number of Items in Composite	**4**	**3**
Reliability – Cronbach's Coefficient Alpha	**0.76**	**0.75**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.07**	**0.06**
Confirmatory Factor Analysis Fit Index – SRMR	**0.04**	**0.05**

‡ The science and mathematics versions of this item are considered equivalent, worded appropriately for that discipline.



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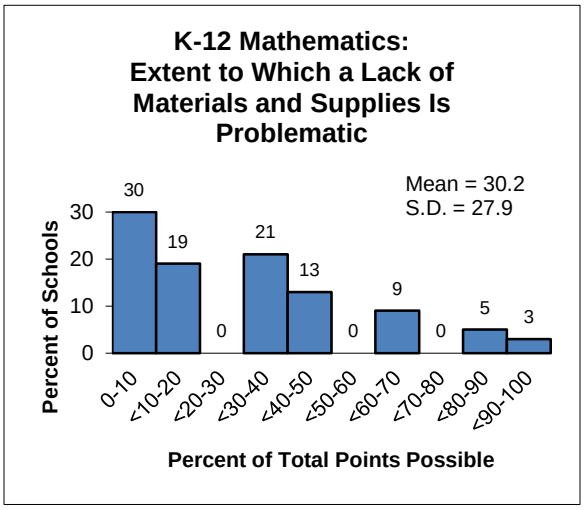
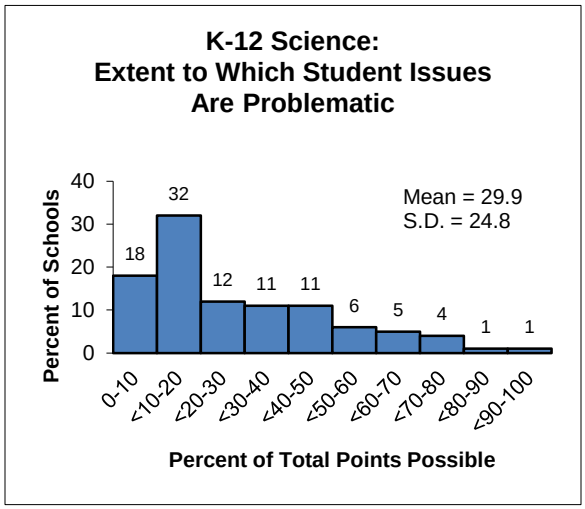


Figure E-43

Table E-20
Extent to Which Student Issues Are Problematic

	Science	Mathematics
Low student interest in science‡	Q33e	
Low student interest in mathematics‡		Q21d
Low student reading abilities	Q33f	Q21e
Large class sizes	Q33m	Q21l
High student absenteeism	Q33n	Q21m
Inappropriate student behavior	Q33o	Q21n
Number of Items in Composite	**5**	**5**
Reliability – Cronbach's Coefficient Alpha	**0.76**	**0.78**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.07**	**0.06**
Confirmatory Factor Analysis Fit Index – SRMR	**0.04**	**0.05**

‡ The science and mathematics versions of this item are considered equivalent, worded appropriately for that discipline.



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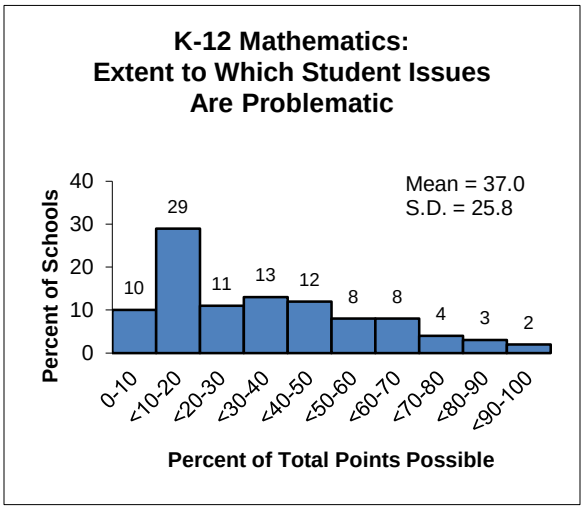
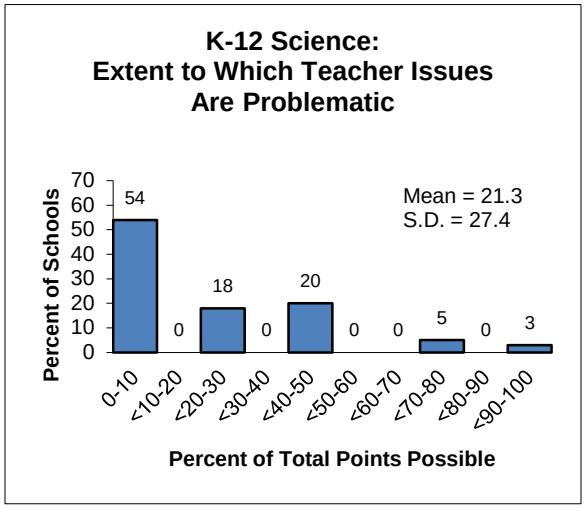


Figure E-45

Table E-21
Extent to Which Teacher Issues Are Problematic

	Science	Mathematics
Lack of teacher interest in science‡	Q33g	
Lack of teacher interest in mathematics‡		Q21f
Inadequate teacher preparation to teach science‡	Q33h	
Inadequate teacher preparation to teach mathematics‡		Q21g
Number of Items in Composite	**2**	**2**
Reliability – Cronbach's Coefficient Alpha	**0.75**	**0.70**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.07**	**0.06**
Confirmatory Factor Analysis Fit Index – SRMR	**0.04**	**0.05**

‡ The science and mathematics versions of this item are considered equivalent, worded appropriately for that discipline.



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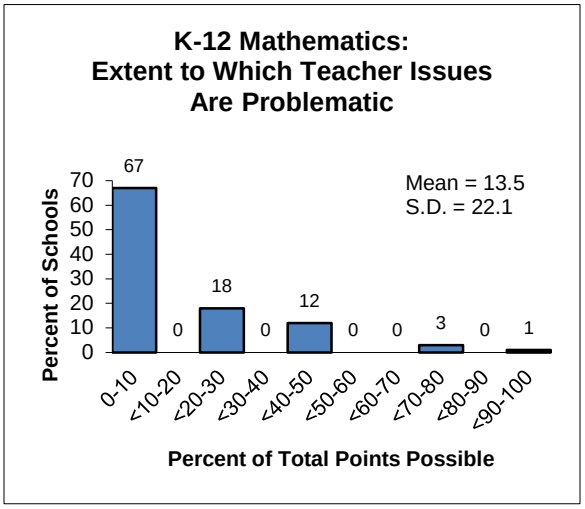
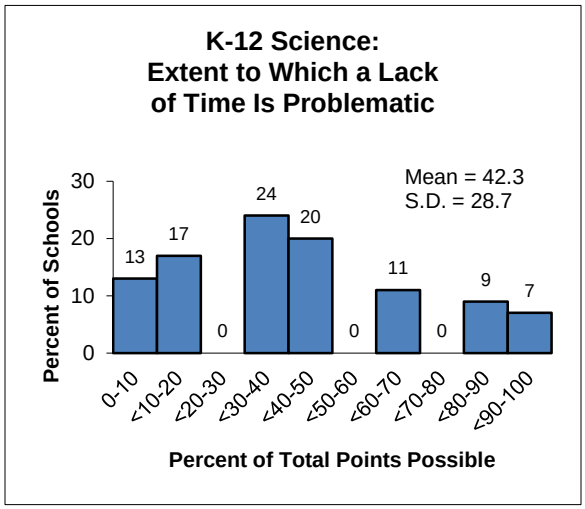


Figure E-47

Table E-22
Extent to Which a Lack of Time Is Problematic

	Science	Mathematics
Insufficient time to teach science‡	Q33i	
Insufficient time to teach mathematics‡		Q21h
Lack of opportunities for science teachers to share ideas‡	Q33j	
Lack of opportunities for mathematics teachers to share ideas‡		Q21i
Inadequate science-related professional development opportunities‡	Q33k	
Inadequate mathematics-related professional development opportunities‡		Q21j
Number of Items in Composite	**3**	**3**
Reliability – Cronbach's Coefficient Alpha	**0.65**	**0.61**
Confirmatory Factor Analysis Fit Index – RMSEA	**0.07**	**0.06**
Confirmatory Factor Analysis Fit Index – SRMR	**0.04**	**0.05**

‡ The science and mathematics versions of this item are considered equivalent, worded appropriately for that discipline.



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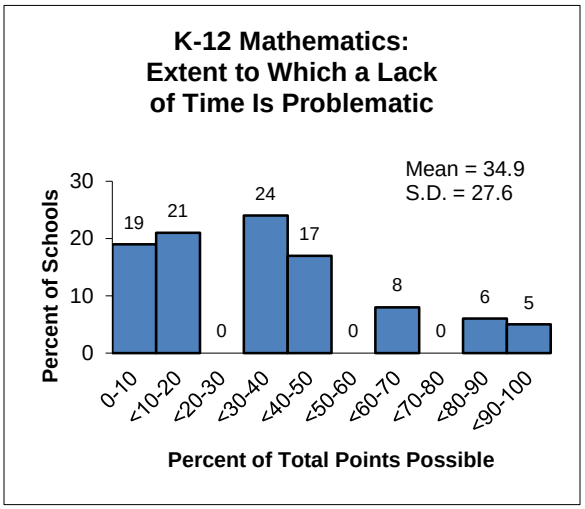

Figure E-49