

August 2019 Progress Update

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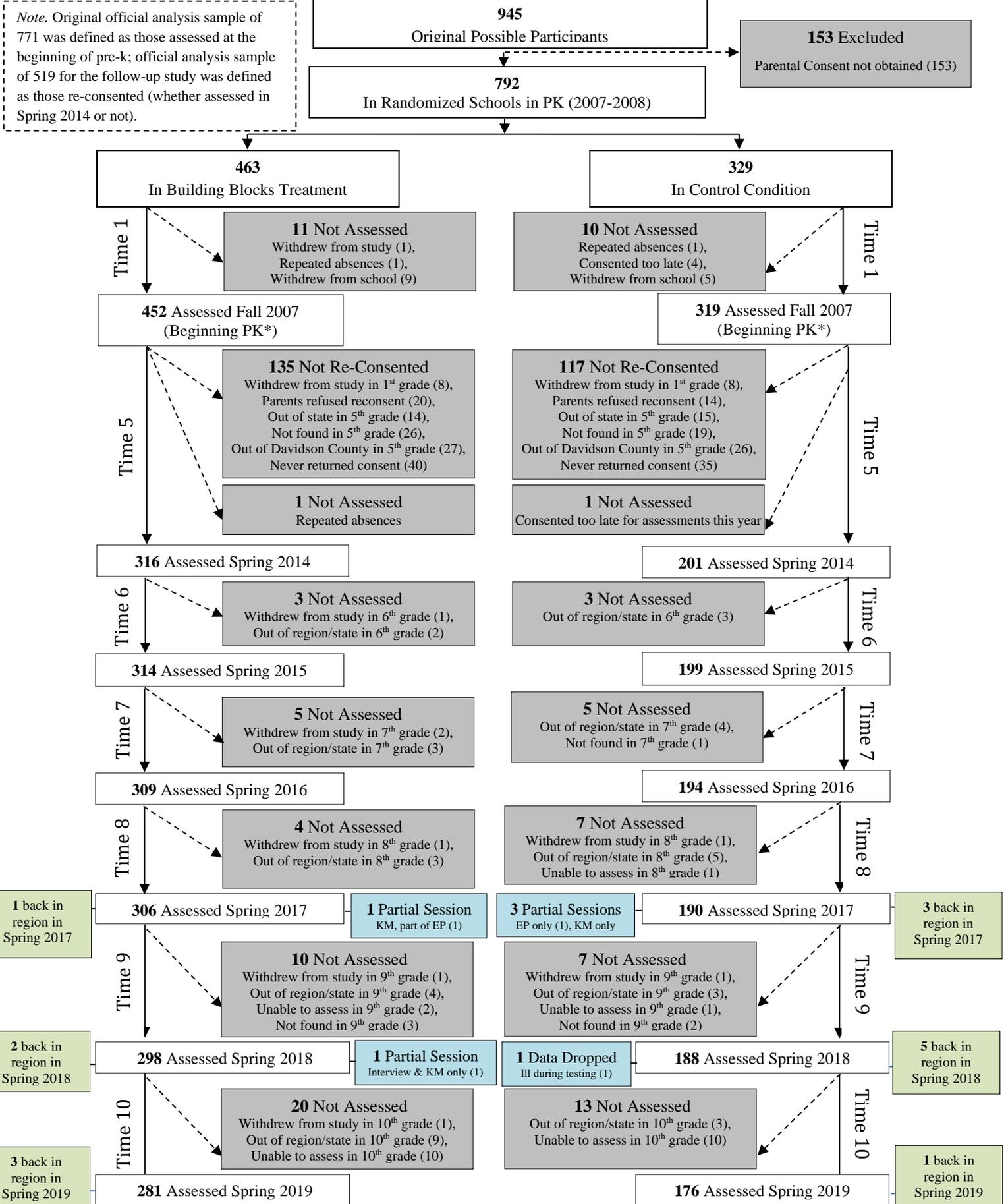
Official Analysis Sample

- There were 771 students in our database from the Pre-K study, and the goal for the newly re-consented sample in 2013 was 500 students.
- **THE FOLLOW-UP ANALYSIS SAMPLE CONSISTS OF 519 STUDENTS.**
 - **Middle School Follow-Up Study Time Points (IES and Heising Simons Foundation):**
 - Year 1 (5th grade): 517 students assessed
 - Year 2 (6th grade): 513 students assessed
 - Year 3 (7th grade): 503 students assessed
 - Year 4 (8th grade): 496 students assessed
 - Year 5 (9th grade): 486 students assessed
 - **High School Follow-Up Study Time Points (NSF):**
 - Year 1 (10th grade): 457 students assessed

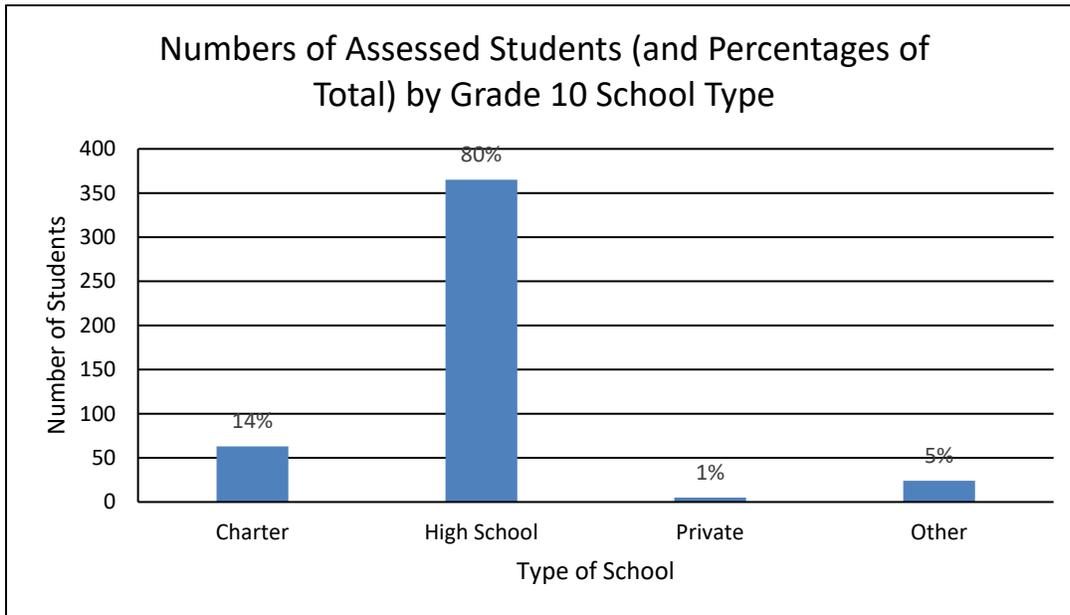
OVERVIEW OF STUDENT DIRECT ASSESMENT DATA COLLECTION			
Project Title	School Year	Grade Level*	Assessment Timepoints
Building Blocks	2007-2008	Pre-K	T1 = Fall Pre-K T2 = Spring Pre-K
	2008-2009	Kindergarten	T3 = Spring K*
	2009-2010	1 st	T4 = Spring 1 st Grade*
"Between Study Years"	2010-2011	2 nd	N/A
	2011-2012	3 rd	N/A
	2012-2013	4 th	N/A
Middle School Follow-Up Study	2013-2014	5 th	T5 = Spring 5 th Grade*
	2014-2015	6 th	T6 = Spring 6 th Grade*
	2015-2016	7 th	T7 = Spring 7 th Grade*
	2016-2017	8 th	T8 = Spring 8 th Grade*
	2017-2018	9 th	T9 = Spring 9 th Grade*
High School Follow-Up Study	2018-2019	10 th	T10 = Spring 10 th Grade*
	2019-2020	11 th	T11 = Spring 11 th Grade*
	2020-2021	12 th	T12 = Spring 12 th Grade*

*Grade level if not retained.

Consort Chart: From the Original Study through the Follow-Up Studies



Assessed Students in Grade 10



Note. "Other" schools include 1 that only serves students with IEPs, 1 K-12 school, 2 alternative schools, 1 school serving grades 7-12, and 4 students who were homeschooled.

Note. This year, 77 students (17% of the assessed sample) were retained and were in 9th grade.

Mobility of Students between Schools in Grade 10

	Frequency	Percent
Attended 1 School	414	90.6
Attended 2 Schools	33	7.2
Attended 3 Schools	10	2.2

Note. 15 of the students assessed this year (3.3% of the assessed sample) attended an alternative school at some point during the year.

School Enrollment across Years

Year	N	Attended MNPS School		Did Not Attend MNPS School	
		Freq	Pct	Freq	Pct
Year 1	519	519	100.0	0	0.0
Year 2	513	508	99.0	5	1.0
Year 3	503	483	96.0	20	4.0
Year 4	496	460	92.7	36	7.3
Year 5	485	432	89.1	53	10.9
Year 6	457	396	86.7	67	13.3

DCS Custody across Years

Year	# Students in DCS Custody
5 th Grade	0
6 th Grade	0
7 th Grade	0
8 th Grade	6
9 th Grade	7
10 th Grade	12

Note. We have documentation that the students listed in the above table were in DCS (TN Department of Children’s Services) custody at some point during the respective school year.

Demographic Information (Assessed Sample for Grade 10)

	N	Min	Max	Mean	SD
Age at Time of Testing (in years)	457	15.33	17.42	15.96	.333
PK Building Blocks Treatment	281	15.33	17.42	15.93	.328
PK Control Condition	176	15.42	17.17	16.01	.318

	Overall		PK Building Blocks		PK Control	
	Freq	Pct	Freq	Pct	Freq	Pct
Ethnicity						
Black	362	79.2	229	81.5	133	75.6
White	34	7.4	17	6.0	17	9.7
Hispanic	41	9.0	20	7.1	21	11.9
Other	20	4.4	15	5.3	5	2.8
Gender						
Male	197	43.1	124	44.1	73	41.5
Female	260	56.9	157	55.9	103	58.5
Number of Current Schools	58	-	42	-	44	-
Pre-K School System						
Head Start (MAC)	183	40.0	131	46.6	52	29.5
MNPS Pre-K	274	60.0	150	53.4	124	70.5

Note. Most students were located in Davidson County, but we also assessed any student who had moved to a contiguous county (2 in Cheatham, 15 in Clarksville-Montgomery, 4 in Robertson, 16 in Rutherford, 7 in Sumner, 2 in Williamson, and 6 in Wilson). In addition, 5 students attended a private school, and 4 were homeschooled.

Socioeconomic Information

In the fall of 2018, when most students were in 10th grade, 411 parents (79.2%) were re-interviewed by phone to determine current education and income. Responses to questions regarding attitudes toward math and science are presented in the Appendix, parent section.

Highest Education of Caregiver				
	Female Caregiver		Male Caregiver	
	Frequency	Percent	Frequency	Percent
Less than high school	67	16.3	35	8.5
High school diploma/GED	220	53.5	153	37.2
Associates degree	66	16.1	22	5.4
Bachelor's degree	26	6.3	29	7.1
Graduate degree	24	5.8	1	0.2
Not applicable	6	1.5	135	32.8
Don't know	2	0.5	36	8.8

Number of Adults and Children in the Student's Home				
	N adults¹		N children²	
	Frequency	Percent	Frequency	Percent
1	174	42.5	104	25.4
2	158	38.6	131	32.0
3	56	13.7	75	18.3
4	18	4.4	54	13.2
5 or more	3	0.7	46	11.2

Note¹. 2 parents refused to answer question #3 (# of adults in student's household).

Note². 1 parent chose not to answer question #4 (# of children in student's household).

Approximate Total Household Income for the Past Year		
	Frequency	Percent
Less than \$20,000	128	31.1
\$20,000 - \$34,000	104	25.3
\$35,000 - \$49,000	75	18.2
\$50,000 - \$64,000	33	8.0
\$65,000 - \$79,000	16	3.9
Over \$80,000	25	6.1
Don't know	18	4.4
Prefer not to answer	12	2.9

Student Outcomes: CMAT

From 5th through 9th grades, the project used KeyMath to assess students. During the 2018-2019 school year, after extensive piloting, we chose to switch to CMAT. The subscale scores in CMAT are somewhat different, but it does include both an Algebra and Geometry subtest. Instead of the KeyMath Numeration, CMAT has a Problem Solving subtest. We continued to give the Woodcock Johnson Quantitative Concepts subtest.

CMAT	N	Min	Max	Mean	Median	SD	Actual - Expected Mean
CMAT: Problem Solving							
Age-Based Standard Score	457	1.0	15.0	7.7	8.0	3.0	-2.3
Age Equivalent Score	457	6.3	18.0	13.0	11.6	3.3	-2.9
Grade Equivalent Score	457	1.2	12.7	7.8	6.4	3.2	-2.9
CMAT: Algebra							
Age-Based Standard Score	457	1.0	17.0	7.0	7.0	3.2	-3.0
Age Equivalent Score	457	8.3	18.3	13.1	13.0	3.1	-2.8
Grade Equivalent Score	457	3.2	12.7	7.9	8.0	3.1	-2.8
CMAT: Geometry							
Age-Based Standard Score	457	1.0	16.0	7.0	6.0	2.9	-3.0
Age Equivalent Score	457	8.3	18.3	12.9	12.6	2.6	-3.0
Grade Equivalent Score	457	3.2	12.7	7.7	7.4	2.5	-3.0

Note. The average age of the students at testing was 15.9 years. The average current grade level of the students was 10.7.

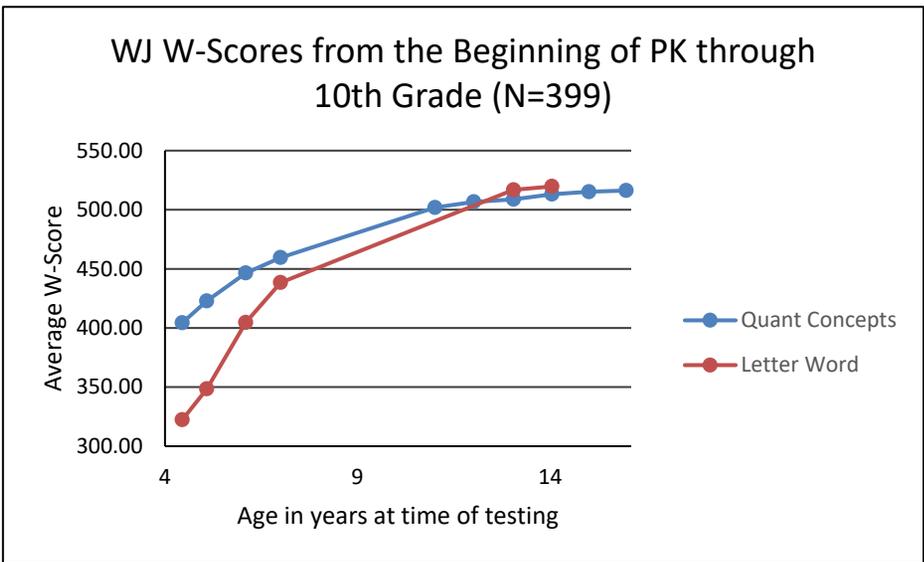
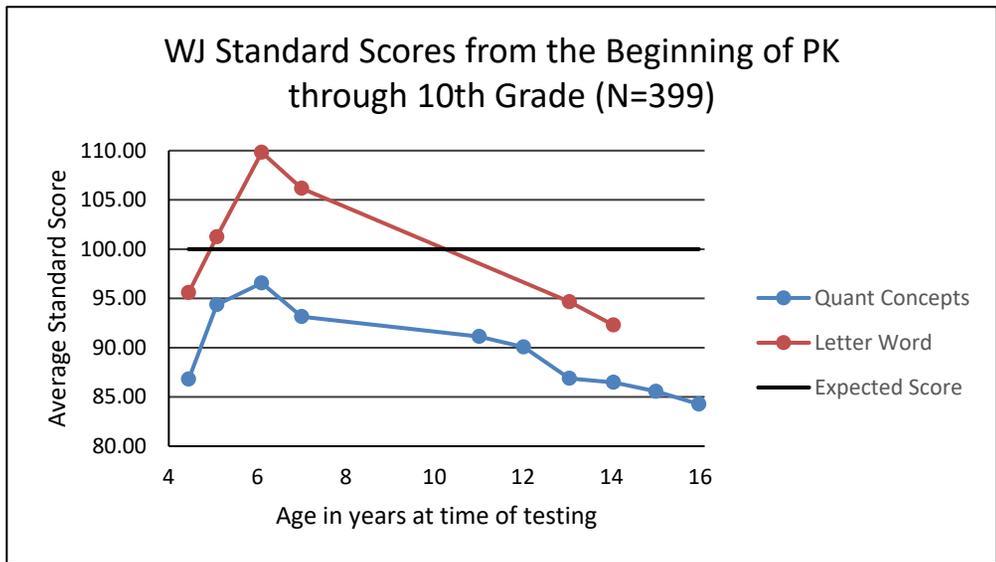
Student Outcomes: Woodcock-Johnson Subtests

Quantitative Concepts	N	Min	Max	Mean	Median	SD
W-Score	456	458.00	560.00	516.23	515.00	15.17
Standard Score	456	32.00	121.00	84.27	83.00	13.44

Note. We dropped Woodcock-Johnson data for 1 student this year due to assessor error.

Woodcock-Johnson Scores across Years

- From the original Building Blocks study through this year, there were 10 testing time points. They were: fall of PK, spring of PK, spring of K, spring of 1st grade, and spring of 5th, 6th, 7th, 8th, 9th, and 10th grades.
- Letter-Word Identification was only given in fall of PK, spring of PK, spring of K, spring of 1st grade, and spring of 7th and 8th grades.
- The graphs below show the scores over time for those 399 students who were tested at all possible time points.



Student Direct Assessment Outcomes by School Type

	CHARTER		HIGH		OTHER		PRIVATE	
	N	Mean	N	Mean	N	Mean	N	Mean
WJ QC (standard score)	63	88.22	364	83.15	24	89.87	5	89.60
CMAT PS (age-based standard score)	63	8.79	365	7.37	24	8.67	5	8.20
CMAT Alg (age-based standard score)	63	8.06	365	6.67	24	8.71	5	9.00
CMAT Geo (age-based standard score)	63	7.70	365	6.81	24	8.25	5	7.20

Note. The “high school” category includes both MNPS high schools and out-of-county high schools.

Connecting KeyMath and CMAT

KeyMath tops out at 10th grade. Consequently, we changed assessment instruments in the 2018-2019 school year to CMAT. Because we changed assessment instruments, we assessed a sample of children to receive CMAT and one of the KeyMath subtests. To choose the students, we divided them into quartiles based on their past KeyMath performance. Within each quartile, we randomly assigned students to one of the KeyMath subtests. We lost students from some of the KeyMath assessments because of time issues or not being assessed this year. The following table presents results from children who were assessed with both KeyMath and CMAT in 2019. They served as a validation sample for our change of outcome measures; each child in the table below just completed one KeyMath subtest this year.

KeyMath Subtest	N	Min	Max	Mean	Median	SD	Actual - Expected Mean
KeyMath: Numeration							
Age-Scaled Score	110	1.0	14.0	7.0	7.0	2.47	-3.0
Grade Equivalent	110	1.2	10.0	6.2	6.0	2.40	-4.5
KeyMath: Algebra							
Age-Scaled Score	115	1.0	13.0	7.4	7.0	3.06	-2.6
Grade Equivalent	115	0.8	10.0	6.4	6.0	2.71	-4.3
KeyMath: Geometry							
Age-Scaled Score	123	3.0	14.0	7.6	8.0	2.36	-2.4
Grade Equivalent	123	1.5	10.0	6.6	7.0	2.46	-4.1

Note. The average age of the students at testing was 16.0 years. The average current grade level of the students was 10.7.

KeyMath Scores across Years

The following tables show students' KeyMath scores over time, from 5th to 10th grade and correlations with CMAT. Because each student only completed one KeyMath subtest this year, we restricted the sample for each subtest to students who had data for that subtest at all six assessment timepoints.

KeyMath Age-Scaled Scores across Years

Year	Test	N	Mean	SD	Actual - Expected Mean
5 th Grade	Numeration	107	7.42	2.48	-2.58
	Algebra	111	8.04	2.85	-1.96
	Geometry	118	8.03	2.41	-1.97
6 th Grade	Numeration	107	7.60	2.48	-2.40
	Algebra	111	8.10	2.91	-1.90
	Geometry	118	7.80	2.39	-2.20
7 th Grade	Numeration	107	7.74	2.79	-2.26
	Algebra	111	8.20	2.98	-1.80
	Geometry	118	7.80	2.32	-2.20
8 th Grade	Numeration	107	7.27	2.62	-2.73
	Algebra	111	7.96	3.16	-2.04
	Geometry	118	8.01	2.64	-1.99
9 th Grade	Numeration	107	7.21	2.33	-2.79
	Algebra	111	7.88	3.07	-2.12
	Geometry	118	7.70	2.66	-2.30
10 th Grade	Numeration	107	7.07	2.50	-2.93
	Algebra	111	7.44	3.05	-2.56
	Geometry	118	7.64	2.39	-2.36

Correlations Between 10th Grade KeyMath and CMAT Scores

	I. KM NUM	II. KM ALG	III. KM Geo	IV. CMAT PS	V. CMAT ALG	VI. CMAT GEO
I. KeyMath Number (Age-Scaled)						
II. KeyMath Algebra (Age-Scaled)	N/A					
III. KeyMath Geometry (Age-Scaled)	N/A	N/A				
IV. CMAT Problem Solving (Std. Score)	0.76	0.82	0.68			
V. CMAT Algebra (Std. Score)	0.59	0.85	0.62	0.66		
VI. CMAT Geometry (Std. Score)	0.63	0.67	0.61	0.57	0.60	

Correlations between 9th Grade KeyMath Assessments and TCAP/TNReady Scores

Each year, the project receives the state end of grade tests in the late fall of the year following spring testing. Consequently, for this report we can only examine the relations between the 9th grade KeyMath assessments and the 9th grade state tests. Tennessee switched its state test from the TCAP to TNReady in 2016.

Correlations Among Student Direct Assessment Scores & TCAP/TNReady Scores across Years

	KeyMath Raw Scores												WJ Quant Concepts W Scores			
	NUM G5	NUM G6	NUM G8	NUM G9	ALG G5	ALG G6	ALG G8	ALG G9	Geo G5	Geo G6	Geo G8	Geo G9	WJQC Y5	WJQC Y6	WJQC Y8	WJQC G9
TCAP Math Scale Score 2013-2014 (5 th Grade)	0.63	0.69	0.69	0.67	0.62	0.66	0.69	0.67	0.45	0.56	0.56	0.56	0.57	0.60	0.64	0.64
TCAP Math Scale Score 2014-2015 (6 th Grade)	0.61	0.66	0.68	0.65	0.60	0.67	0.70	0.68	0.49	0.57	0.58	0.58	0.55	0.60	0.66	0.66
TNReady Math Scale Score 2016-2017 (8 th Grade)	0.60	0.65	0.69	0.69	0.60	0.63	0.70	0.69	0.50	0.58	0.60	0.62	0.51	0.56	0.66	0.66
TNReady Math Scale Score 2017-2018 (9 th Grade)	0.53	0.57	0.62	0.60	0.49	0.55	0.66	0.64	0.43	0.49	0.51	0.54	0.53	0.50	0.56	0.64

Note. All correlations are significant at the 0.01 level (2-tailed). Correlations between measures from the same year are bolded.

Students' 9th Grade Direct Assessment Scores within TCAP/TNReady Levels

In addition to a total score, the TNReady state test scores are divided into bands that characterize students as being below expected performance, approaching expectations, on-track, or mastering the content area. We provide the mean scores for each band.

		KeyMath: Numeration Age Scaled Score			
Perf. Level	N	Min	Max	Mean	SD
Below	305	2.00	15.00	7.01	2.19
Approaching	60	4.00	15.00	9.27	2.07
On-Track	20	5.00	16.00	11.55	2.35
Mastered	6	10.00	19.00	13.67	3.20

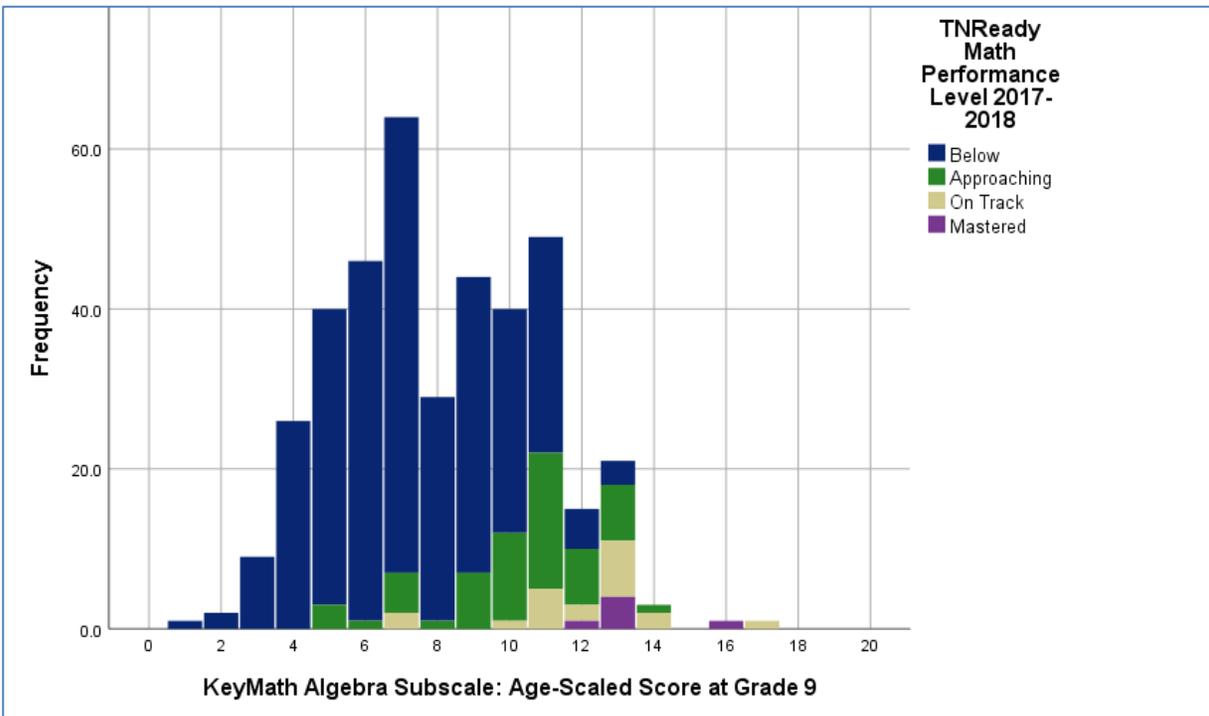
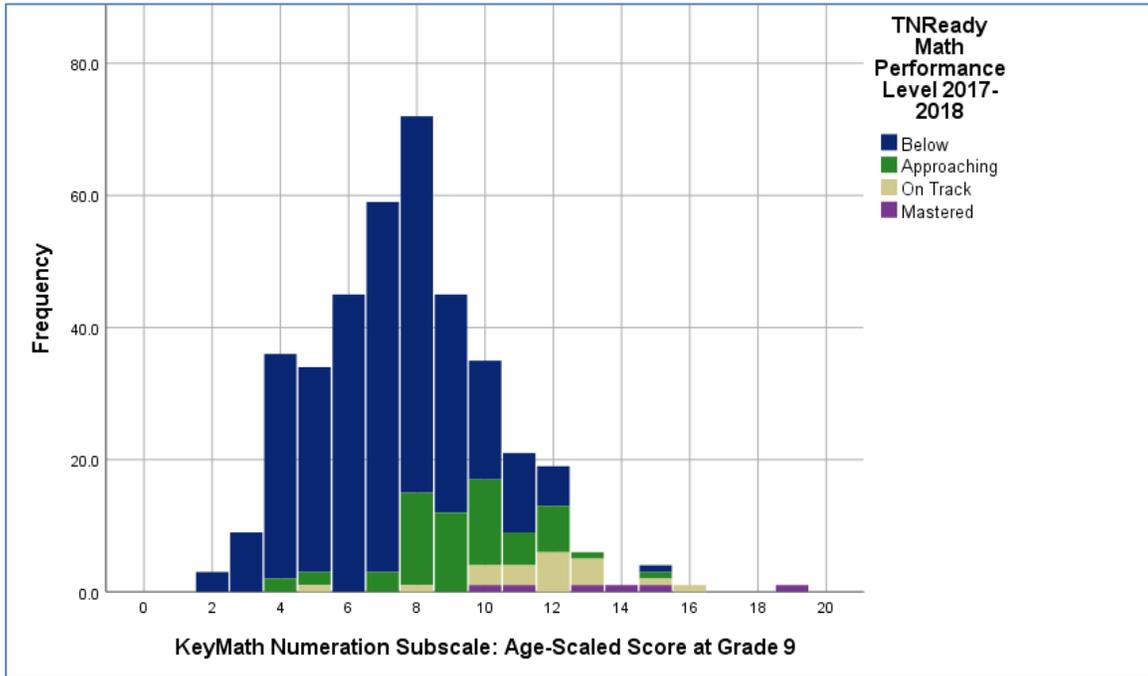
		KeyMath: Algebra Age Scaled Score			
Perf. Level	N	Min	Max	Mean	SD
Below	305	1.00	13.00	7.29	2.38
Approaching	60	5.00	14.00	10.22	2.13
On-Track	20	7.00	17.00	11.95	2.28
Mastered	6	12.00	16.00	13.33	1.37

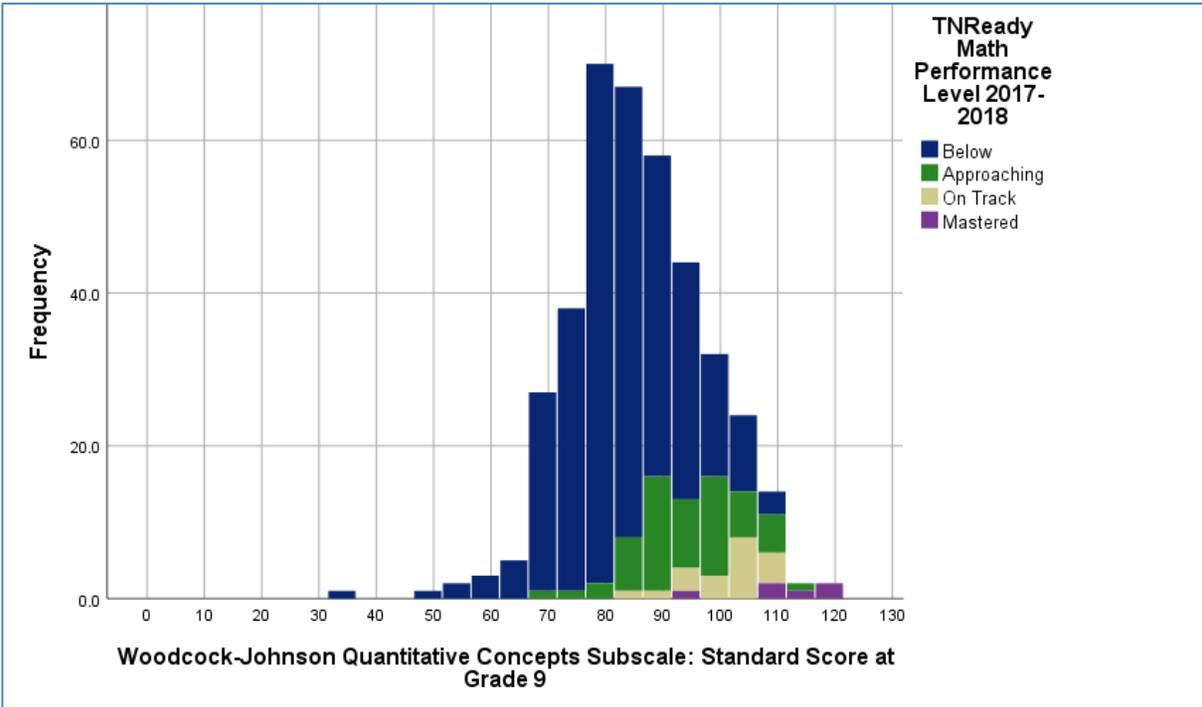
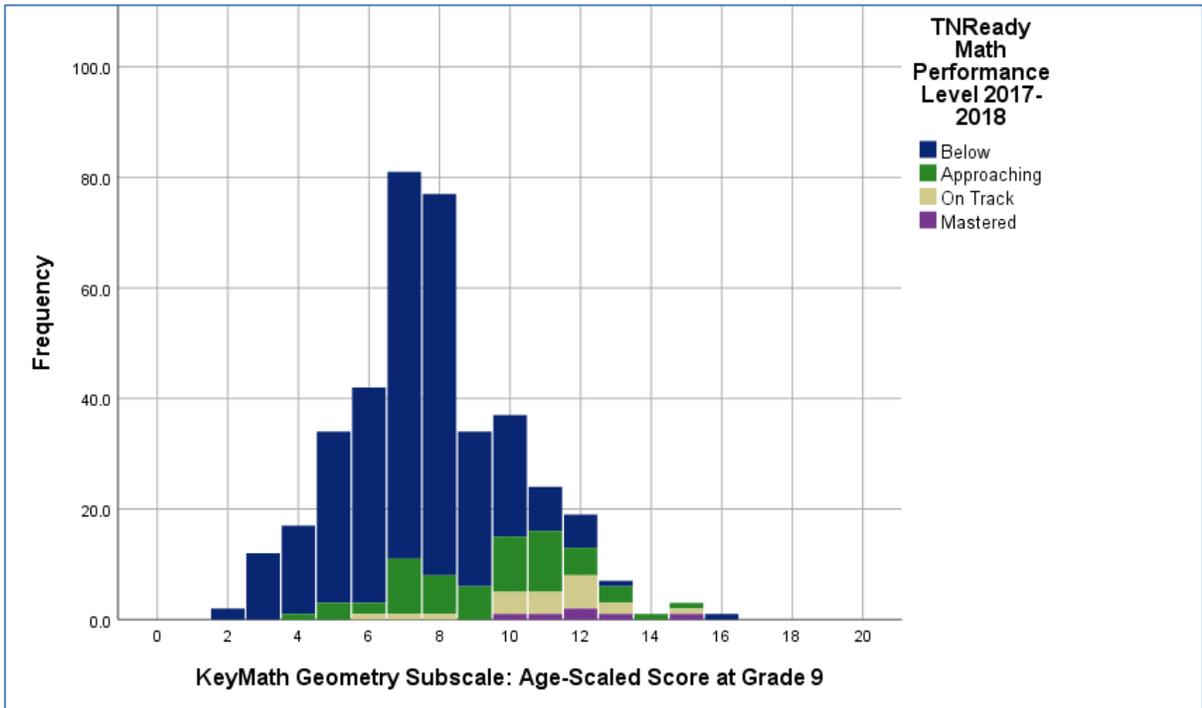
		KeyMath: Geometry Age Scaled Score			
Perf. Level	N	Min	Max	Mean	SD
Below	305	2.00	16.00	7.20	2.08
Approaching	60	4.00	15.00	9.33	2.40
On-Track	20	6.00	15.00	10.90	2.10
Mastered	6	10.00	15.00	12.17	1.72

		Woodcock-Johnson: Quantitative Concepts Standard Score			
Perf. Level	N	Min	Max	Mean	SD
Below	304	34.00	111.00	82.77	10.55
Approaching	60	69.00	112.00	93.92	9.13
On-Track	20	86.00	111.00	101.20	7.22
Mastered	6	96.00	121.00	110.83	8.91

Note. We dropped Quantitative Concepts data in the 9th grade year for 1 student who was ill and had to leave school on the day she was tested.

9th Grade Direct Assessment Outcomes Within TNReady Levels





Correlations among 10th Grade Measures

	I. WJ QC	II. CMAT PS	III. CMAT ALG
I. WJ Quant Concepts (Std. Score)	--	--	--
II. CMAT Problem Solving (Std. Score)	0.73	--	--
III. CMAT Algebra (Std. Score)	0.73	0.66	--
IV. CMAT Geometry (Std. Score)	0.66	0.57	0.60

Note. All correlations are significant at the 0.01 level (2-tailed).

Correlations among 9th & 10th Grade Measures

		9th Grade Outcomes			
		KM NUM (AGE-SCALED)	KM ALG (AGE-SCALED)	KM GEO (AGE-SCALED)	QCS
10 th Grade Outcomes	QCS	0.82	0.83	0.68	0.86
	CMAT PS (STD SCORE)	0.77	0.76	0.66	0.73
	CMAT ALG (STD SCORE)	0.73	0.76	0.62	0.71
	CMAT GEO (STD SCORE)	0.64	0.65	0.61	0.62

Student Survey Outcomes: TIMSS (Trends in International Mathematics and Science Study) Math

Each year since 5th grade, we have administered the TIMSS survey on math attitudes. This year we added the Science Survey. Students answered privately on paper.

	N	Min	Max	Mean	SD
Confidence Scale Average	457	1.25	4.00	2.92	0.67
I know what my math teacher expects	457	1.00	4.00	3.62	0.62
My math teacher is easy to understand	457	1.00	4.00	2.86	0.95
I usually do well in math	457	1.00	4.00	3.13	0.86
Math is more difficult for me than my classmates (reverse coded)	457	1.00	4.00	2.71	1.03
Math is not one of my strengths (reverse coded)	457	1.00	4.00	2.55	1.15
I learn quickly in math	457	1.00	4.00	2.76	0.96
Math makes me confused and nervous (reverse coded)	457	1.00	4.00	2.76	1.00
I am good at working out hard math problems	457	1.00	4.00	2.64	0.94
My teacher thinks I am good at working out hard math problems	457	1.00	4.00	3.08	0.88
My teacher tells me I am good at math	457	1.00	4.00	3.08	0.94
Math is harder for me than other subjects (reverse coded)	457	1.00	4.00	2.65	1.19
My family thinks I am good at math	457	1.00	4.00	3.25	0.88
Value Scale Average	457	1.33	4.00	3.28	0.54
It is important to do well in math	457	2.00	4.00	3.84	0.40
Learning math will help me in daily life	457	1.00	4.00	3.40	0.80
I need math to learn other subjects	457	1.00	4.00	3.26	0.79
I need to do well in math to get into college	457	1.00	4.00	3.54	0.75
I need to do well in math to get the job I want	457	1.00	4.00	3.29	0.89
I would like a job that uses math	457	1.00	4.00	2.34	1.07
Like Learning Scale Average	457	1.00	4.00	2.89	0.67
I enjoy learning math	457	1.00	4.00	3.10	0.84
I wish I did not have to study math (reverse coded)	457	1.00	4.00	2.84	1.01
Math is boring (reverse coded)	457	1.00	4.00	2.68	0.96
I learn interesting things in math	457	1.00	4.00	3.34	0.83
I like math	456	1.00	4.00	2.94	1.02
I think of things not related to the lesson (reverse coded)	457	1.00	4.00	2.21	0.84
I am interested in what my math teacher says	457	1.00	4.00	3.06	0.85
My math teacher gives me interesting things to do	457	1.00	4.00	2.92	0.97

Note. All negative items above were reverse coded (e.g., Math is boring) so that on all items higher scores mean more positive student ratings. Also, 1 student did not feel he could answer "I like math".

Student Ratings for Math Subscales by Year

	6 th Grade		7 th Grade		8 th Grade		9 th Grade		10 th Grade	
	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
Students' Confidence in Mathematics Avg	3.22	0.58	3.07	0.62	3.01	0.65	2.94	0.69	2.92	0.67
Students Value Mathematics Avg	3.55	0.40	3.52	0.42	3.47	0.43	3.39	0.50	3.28	0.54
Students Like Learning Mathematics Avg	3.37	0.53	3.21	0.60	3.06	0.62	2.98	0.67	2.89	0.67

Student Survey Outcomes: TIMSS Science

	N	Min	Max	Mean	SD
Confidence Scale Average	457	1.25	4.00	2.99	0.63
I know what my science teacher expects	457	1.00	4.00	3.46	0.73
My science teacher is easy to understand	457	1.00	4.00	2.93	0.98
I usually do well in science	457	1.00	4.00	3.21	0.79
Science is more difficult for me than my classmates (reverse coded)	457	1.00	4.00	3.00	0.94
Science is not one of my strengths (reverse coded)	457	1.00	4.00	2.72	1.03
I learn quickly in science	457	1.00	4.00	2.82	0.95
Science makes me confused and nervous (reverse coded)	457	1.00	4.00	2.95	0.96
I am good at working out hard science problems	457	1.00	4.00	2.54	0.96
My teacher thinks I can do well in science class with difficult materials	457	1.00	4.00	3.17	0.83
My teacher tells me I am good at science	456	1.00	4.00	2.99	0.94
Science is harder for me than other subjects (reverse coded)	457	1.00	4.00	3.07	0.98
My family thinks I am good at science	457	1.00	4.00	3.05	0.91
Value Scale Average	457	1.00	4.00	2.76	0.73
It is important to do well in science	457	1.00	4.00	3.37	0.73
Learning science will help me in daily life	457	1.00	4.00	2.82	0.97
I need science to learn other subjects	457	1.00	4.00	2.47	0.98
I need to do well in science to get into college	457	1.00	4.00	3.05	1.02
I need to do well in science to get the job I want	457	1.00	4.00	2.60	1.13
I would like a job that uses science	457	1.00	4.00	2.25	1.13
Like Learning Scale Average	457	1.00	4.00	2.83	0.67
I enjoy learning science	457	1.00	4.00	3.00	0.95
I wish I did not have to study science (reverse coded)	457	1.00	4.00	2.86	1.02
I read about science in my spare time	457	1.00	4.00	1.69	0.87
Science is boring (reverse coded)	457	1.00	4.00	2.88	0.97
I learn interesting things in science	457	1.00	4.00	3.48	0.78
I like science	457	1.00	4.00	3.00	0.99
I think of things not related to the lesson (reverse coded)	457	1.00	4.00	2.34	0.95
I am interested in what my science teacher says	457	1.00	4.00	3.06	0.88
My science teacher gives me interesting things to do	457	1.00	4.00	3.11	0.90

Note. All negative items above were reverse coded so that higher scores mean more positive ratings. Also, 1 student did not feel she could answer "My teacher tells me I am good at science".

Student TIMSS Ratings by School Type

	CHARTER		HIGH		OTHER		PRIVATE	
	N	Mean	N	Mean	N	Mean	N	Mean
TIMSS Math: Confidence	63	3.01	365	2.90	24	3.05	5	2.90
TIMSS Math: Value	63	3.27	365	3.28	24	3.26	5	3.23
TIMSS Math: Liking	63	2.93	365	2.87	24	3.02	5	2.88
TIMSS Math: Total	63	79.17	365	77.45	24	80.29	5	77.20
TIMSS Science: Confidence	63	2.93	365	3.00	24	2.92	5	3.18
TIMSS Science: Value	63	2.77	365	2.73	24	3.03	5	3.27
TIMSS Science: Liking	63	2.85	365	2.82	24	2.85	5	3.04
TIMSS Science: Total	63	77.44	365	77.80	24	78.83	5	85.20

Teacher Survey

- The online teacher survey was changed in 2018-19. Teachers no longer reported on each individual child. Instead the focus of the instrument was on teacher practices. This year's survey was taken from the Surveys of Enacted Curriculum (Grades K-12 Mathematics) and C-SAIL Teacher Survey (K-12 Mathematics).
- This year's teacher survey included 3 major sections:
 - Teacher background questions (demographics, education, experience)
 - Class description questions (characteristics of target math class)
 - Math content questions (math concepts covered in target math class and cognitive demand emphasis for each)
- We sent out 159 teacher surveys to teachers who had at least 1 participating student enrolled in their math class.
- For Grade 10, we have survey data on **127** teachers: **119** teachers (74.8% of the teacher sample) fully completed their surveys, and **8** teachers (5.0%) completed part of the survey. We included all possible collected data in our analyses except for the following:
 - We dropped all survey data for 1 teacher because he misunderstood the survey directions, and his data were unusable. Thus, the highest possible responses for any item will be **126**.
 - We also dropped items related to student gender, student race/ethnicity, and student EL status data for 5 teachers who misunderstood how we wanted them to report these data. The rest of these teachers' survey data are included in the analyses.

Section 1: Teacher Background

- Gender
 - Female: 76 (60.3%)
 - Male: 50 (39.7%)
- Ethnicity
 - Asian or Pacific Islander: 3 (2.4%)
 - Black: 26 (20.6%)
 - Hispanic: 2 (1.6%)
 - White: 88 (69.8%)
 - American Indian or Alaska Native: 1 (0.8%)
 - Other: 3 (2.4%)
 - Prefer not to answer: 3 (2.4%)
- Experience
 - Years as a teacher
 - This is 1st year: 7 (5.6%)
 - 2-4 years: 32 (25.4%)
 - 5-10 years: 41 (32.5%)
 - More than 10 years: 46 (36.5%)
 - Years at current school
 - This is 1st year: 29 (23.0%)
 - 2-4 years: 56 (44.4%)
 - 5-10 years: 32 (25.4%)
 - More than 10 years: 9 (7.1%)
- Licensure (categories add up to more than 100%)
 - Elementary license (at least): 8 (6.3%)
 - Middle Grades license (at least): 6 (4.8%)
 - Mathematics license (at least):
 - Mathematics (6 – 12): 35 (27.8%)
 - Mathematics (7 – 12): 93 (73.8%)
 - Middle Grades Math (6 – 8): 18 (14.3%)
 - Special Education license (at least): 14 (11.1%)
 - Other license (at least): 11 (8.7%)
- Education
 - Highest degree earned
 - Bachelor's degree: 46 (36.5%)
 - Master's degree: 55 (43.7%)
 - Master's degree + 30: 21 (16.7%)
 - Doctoral degree: 4 (3.2%)
 - Majored in math in undergraduate program
 - Yes: 73 (57.9%)
 - No: 53 (42.1%)
 - Minored in math in undergraduate program
 - Yes: 10 (7.9%)
 - No: 89 (70.6%)
 - No minor (N/A): 27 (21.4%)

- Majored in math in graduate school
 - Yes: 23 (18.3%)
 - No: 72 (57.1%)
 - No grad school (N/A): 31 (24.6%)
- Ever majored or minored in math
 - Yes: 88 (69.8%)
 - No: 38 (30.2%)

Section 2: Description of Target Math Class

In this section, teachers were shown a list of all of the participating students enrolled in their math classes. Then, they were asked to select a target math class by choosing the math period/block they taught which contained the largest number of our study participants.

The target math class was used as a reference for filling out the remaining portions of the survey, which included questions about the composition of the target math class (section 2), and questions about the math content covered in the target math class (section 3).

- **Name of Target Math Period/Block**
 - Integrated Math I: 24 (19.0%)
 - Integrated Math II: 48 (38.1%)
 - Integrated Math III: 17 (13.5%)
 - Algebra: 11 (8.7%)
 - Geometry: 20 (15.9%)
 - Trigonometry: 1 (0.8%)
 - Advanced Math: 3 (2.4%)
 - Other: 2 (1.6%)

Name of Target Math Class by School Type

	School Type			
Name of Target Math Class	High School	Charter	Private	Other
Advanced Math	3	0	0	0
Algebra	5	3	3	0
Geometry	18	2	0	0
Integrated Math I	19	2	0	3
Integrated Math II	39	5	0	4
Integrated Math III	13	1	0	3
Other	2	0	0	0
Trigonometry	1	0	0	0
TOTAL	100	13	3	10

- **Grade Level of Most Students in Target Class**

- 9th: 29 (23.0%)
- 10th: 86 (68.3%)
- 11th: 9 (7.1%)
- 12th: 2 (1.6%)

- **Total # of Students in Target Class**

N	Min	Max	Mean	SD
121	10	37	24	5.98

Note. We dropped data for five teachers on this item, as well as the ethnicity, gender, and EL items following. These teachers misunderstood the question and either only reported data for the study participants enrolled in their math classes (N = 4) or reported data for all 94 students enrolled in their Integrated Math II courses (N=1).

- **Proportion of Students in Target Math Class by Ethnicity**

	N	Min	Max	Mean	SD
Proportion of Students in Class who are Asian or Pacific Islander	121	0.00	0.29	0.03	0.56
Proportion of Students in Class who are Hispanic	121	0.00	0.88	0.17	0.18
Proportion of Students in Class who are Black	121	0.00	1.00	0.43	0.27
Proportion of Students in Class who are White	121	0.00	1.00	0.33	0.28
Proportion of American Indian or Alaska Native Students in Class	121	0.00	0.05	0.00	0.01
Proportion of Students in Class who are of Other Race	121	0.00	0.37	0.03	0.07

Note. Mean class size is 24 students. We dropped data for 5 teachers because they misunderstood the question about reporting ethnicity of students in the target math class.

Racial/Ethnic Majority of Students in Target Math Class

	All Study Schools		Public Schools in Davidson County	
	Freq	Pct	Freq	Pct
Majority White	30	24.8	7	8.5
Majority Black	42	34.7	38	46.3
Majority Hispanic	8	6.6	8	9.8
No Racial/Ethnic Majority	41	33.9	29	35.4

Note. A class was defined as majority white if at least 51% of students were white, majority black if at least 51% of students were black, etc. We dropped data for 5 teachers because they misunderstood how we wanted them to report ethnicity data on their students.

Classes of Each Type by Racial Composition of Students in Target Math Class

Name of Target Math Class	Majority Race/Ethnic Group				TOTAL
	Majority White	Majority Black	Majority Hispanic	No Majority	
Integrated Math I	3	9	2	9	23
Integrated Math II	5	19	4	18	46
Integrated Math III	3	6	0	7	16
Algebra	4	3	1	2	10
Geometry	12	4	1	3	20
Advanced Math	2	0	0	1	3
Trigonometry	1	0	0	0	1
Other	0	1	0	1	2
TOTAL	30	42	8	41	

Note. We dropped data for 5 teachers because they misunderstood how we wanted them to report ethnicity data on their students.

• **Gender of Students in Target Class**

Student Gender	Min. # Students in Class	Max. # Students in Class	Avg. # Students in Class
Male	3	27	12
Female	1	24	12

Note. We dropped data for 5 teachers because they misunderstood how we wanted them to report gender data on their students.

• **English Learner (EL) Status of Students in Target Class**

EL Status	Min. # Students in Class	Max. # Students in Class	Avg. # Students in Class
English Learner	0	30	2
Not English Learner	0	36	22

Note. We dropped data for 5 teachers because they misunderstood how we wanted them to report EL data on their students.

• **Number of Instructional Hours Target Class Spends in Math Instruction Per Week**

- 2 hours: 1 (0.8%)
- 3 hours: 34 (27.0%)
- 4 hours: 34 (27.0%)
- 5 hours: 27 (21.4%)
- 6 hours: 5 (4.0%)
- 7 hours: 19 (15.1%)
- 8 hours: 3 (2.4%)
- 9 hours: 1 (0.8%)

Note. Two teachers (1.6% of completed surveys) accidentally left this item blank.

- Average Length of Each Class Period for Target Math Class
 - 41 to 50 minutes: 21 (16.7%)
 - 51 to 60 minutes: 15 (11.9%)
 - 61 to 90 minutes: 83 (65.9%)
 - 91 to 120 minutes: 3 (2.4%)
 - Varies Due to Block Scheduling: 4 (3.2%)
- Total # of Weeks the Target Math Class Will Meet This Year
 - 1 to 12: 2 (1.6%)
 - 13 to 24: 12 (9.5%)
 - 25 or More: 112 (88.9%)
- Achievement Level of Most Students in Target Class Compared to National Norms
 - High Achievement Levels: 15 (11.9%)
 - Average Achievement Levels: 21 (16.7%)
 - Low Achievement Levels: 48 (38.1%)
 - Mixed Achievement Levels: 42 (33.3%)

Teachers' Ratings of Math Achievement Level in Target Math Class by Course Name

Name of Target Math Class	Math Achievement Level			
	High	Average	Low	Mixed
Integrated Math I	1	1	15	7
Integrated Math II	6	7	16	19
Integrated Math III	6	4	3	4
Algebra	1	2	5	3
Geometry	1	7	8	4
Advanced Math	0	0	0	3
Trigonometry	0	0	0	1
Other	0	0	1	1
TOTAL	15	21	48	42

- What is Considered Most When Scheduling Students into Target Class
 - Ability or Prior Achievement: 45 (35.7%)
 - Limited English Proficiency: 4 (3.2%)
 - Teacher Recommendation: 1 (0.8%)
 - IEP Recommendation: 11 (8.7%)
 - Parent Request: 2 (1.6%)
 - Student Decision: 6 (4.8%)
 - No One Factor More Than Another: 57 (45.2%)

Section 3: Content Covered in Target Math Class

Level of Coverage:

- 0 = none
- 1 = less than 1 class lesson
- 2 = 1 to 5 class lessons
- 3 = more than 5 lessons

Cognitive Demand Emphasis

- 0 = no focus
- 1 = minor focus
- 2 = moderate focus
- 3 = major focus

Note. For each topic, only one value of 3 (major focus) may be selected.

Average Level of Coverage & Cognitive Demand Emphasis by Math Domain for All Teachers who Completed a Survey

Math Domain	Level of Coverage					Cognitive Demand Emphasis														
						Recall/Perform Procedures					Demonstrate/Communicate Understanding					Generalize				
	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD
Number Properties & Operations	123	0.0	3.0	1.78	0.76	122	0.5	3.0	1.82	0.54	122	0.5	3.0	1.72	0.52	122	0.0	3.0	1.48	0.71
Basic Algebra	123	0.0	3.0	1.85	0.63	121	1.0	3.0	1.95	0.44	121	0.57	3.0	1.90	0.47	121	0.0	3.0	1.62	0.62
Advanced Algebra	122	0.0	3.0	0.95	0.55	115	0.50	3.0	1.97	0.52	115	0.63	2.75	1.79	0.50	115	0.0	3.0	1.39	0.72
Functions	122	0.0	2.92	1.19	0.64	116	0.57	3.0	1.90	0.53	116	0.25	3.0	1.89	0.53	116	0.0	3.0	1.53	0.67
Geometric Concepts	122	0.0	2.78	0.94	0.62	118	1.0	3.0	1.92	0.52	118	0.0	3.0	1.87	0.54	118	0.0	3.0	1.36	0.68
Trigonometry	121	0.0	3.0	0.89	0.74	94	1.0	3.0	2.04	0.63	94	0.0	3.0	1.90	0.61	94	0.0	3.0	1.49	0.75

Average Level of Coverage by Type of Target Math Class

Math Domain	Integrated Math I (N = 23)	Integrated Math II (N = 48)	Integrated Math III (N = 17)	Algebra (N = 11)	Geometry (N = 19)
Number Properties & Operations	2.04	1.78	1.75	1.94	1.46
Basic Algebra	1.85	2.03	1.89	2.15	1.37
Advanced Algebra	0.81	1.21	1.11	1.14	0.36
Functions	1.08	1.30	1.76	1.46	0.46
Geometric Concepts	0.81	0.91	0.84	0.15	1.89
Trigonometry	0.24	1.13	0.86	0.26	1.58

Note. 1 IM II teacher only completed the “Number Properties & Operations” and “Basic Algebra” sections of the survey, and 1 Geometry teacher accidentally skipped the Trigonometry section.

Average Cognitive Demand Emphasis by Type of Target Math Class

Math Domain	Integrated Math I			Integrated Math II			Integrated Math III			Algebra			Geometry		
	Recall Avg.	Dem. Avg.	Gen. Avg.	Recall Avg.	Dem. Avg.	Gen. Avg.	Recall Avg.	Dem. Avg.	Gen. Avg.	Recall Avg.	Dem. Avg.	Gen. Avg.	Recall Avg.	Dem. Avg.	Gen. Avg.
Number Properties & Operations	1.86	1.70	1.68	1.81	1.75	1.53	1.96	1.81	1.44	1.68	1.62	1.26	1.80	1.63	1.16
Basic Algebra	2.03	1.94	1.84	1.89	1.93	1.64	1.88	1.96	1.58	2.00	2.20	1.64	2.08	1.61	1.30
Advanced Algebra	1.94	1.70	1.57	2.07	1.91	1.47	1.84	1.90	1.46	1.95	1.76	1.19	1.90	1.47	0.92
Functions	1.92	1.76	1.66	1.82	1.90	1.56	2.01	2.08	1.56	1.76	2.04	1.49	2.21	1.52	1.15
Geometric Concepts	1.92	1.70	1.29	1.84	1.90	1.38	1.94	2.07	1.44	1.79	1.49	1.14	2.29	1.98	1.35
Trigonometry	1.88	1.50	1.75	2.11	1.92	1.56	1.86	2.15	1.38	1.88	1.63	1.13	2.21	1.86	1.34

Average Level of Coverage in Integrated Math II Classes by Achievement Level of Target Math Class

Math Domain	Achievement Level of Target Math Class							
	High (N = 6)		Average (N = 7)		Low (N = 16)		Mixed (N=19)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Number Properties & Operations	1.81	1.05	1.75	0.86	1.85	0.59	1.72	0.60
Basic Algebra	2.18	0.51	2.25	0.42	2.05	0.43	1.89	0.48
Advanced Algebra	1.40	0.33	1.20	0.49	1.20	0.53	1.17	0.33
Functions	1.63	0.56	1.12	0.49	1.38	0.46	1.20	0.54
Geometric Concepts	1.30	0.47	0.78	0.42	0.90	0.49	0.83	0.37
Trigonometry	1.36	0.59	0.81	0.37	1.22	0.40	1.10	0.53

Note. 1 teacher in the “Mixed” category only completed the “Number Properties & Operations” and “Basic Algebra” sections of the survey.

Average Cognitive Demand Emphasis in Integrated Math II Classes by Achievement Level of Target Math Class

Math Domain	Achievement Level of Target Math Class				Math Domain	Achievement Level of Target Math Class			
	High	Average	Low	Mixed		High	Average	Low	Mixed
Number Properties & Operations	Mean	Mean	Mean	Mean	Functions	Mean	Mean	Mean	Mean
Recall/Perform Procedures	2.25	1.78	1.65	1.82	Recall/Perform Procedures	1.99	1.60	1.86	1.81
Demonstrate/Communicate Understanding	1.75	1.97	1.65	1.76	Demonstrate/Communicate Understanding	2.13	1.90	1.81	1.91
Generalize	1.58	1.96	1.44	1.43	Generalize	1.72	1.99	1.49	1.42
Basic Algebra	Mean	Mean	Mean	Mean	Geometric Concepts	Mean	Mean	Mean	Mean
Recall/Perform Procedures	2.14	1.74	1.92	1.85	Recall/Perform Procedures	2.18	1.40	1.88	1.85
Demonstrate/Communicate Understanding	2.22	1.99	1.85	1.87	Demonstrate/Communicate Understanding	2.22	1.99	1.79	1.85
Generalize	1.67	2.11	1.63	1.46	Generalize	1.42	1.84	1.38	1.20
Advanced Algebra	Mean	Mean	Mean	Mean	Trigonometry	Mean	Mean	Mean	Mean
Recall/Perform Procedures	2.35	1.94	1.96	2.12	Recall/Perform Procedures	2.24	1.69	2.18	2.16
Demonstrate/Communicate Understanding	2.02	1.96	1.84	1.93	Demonstrate/Communicate Understanding	2.17	2.00	1.78	1.92
Generalize	1.68	2.09	1.41	1.22	Generalize	1.78	2.19	1.38	1.39

Average Level of Coverage by Racial/Ethnic Composition of Target Math Class

	Racial/Ethnic Majority in Target Math Class					
	Majority White (N = 28)		Majority Black (N = 41)		No Majority (N=41)	
Math Domain	Mean	SD	Mean	SD	Mean	SD
Number Properties & Operations	1.55	0.84	1.93	0.67	1.80	0.80
Basic Algebra	1.77	0.74	1.91	0.56	1.85	0.63
Advanced Algebra	0.89	0.62	0.99	0.54	1.04	0.55
Functions	0.98	0.77	1.25	0.53	1.27	0.68
Geometric Concepts	1.12	0.83	0.93	0.59	0.93	0.50
Trigonometry	1.09	0.84	0.87	0.72	0.89	0.73

Note. 3 teachers indicated the racial composition of their target math class but did not complete the math content items (2 in the majority white category, and 1 in the majority black category). Majority Hispanic classrooms are not included in this table because there were so few (n=8).

Average Cognitive Demand Emphasis by Racial/Ethnic Composition of Target Math Class

Math Domain	Racial/Ethnic Composition of Target Math Class			Math Domain	Racial/Ethnic Composition of Target Math Class		
	Majority White	Majority Black	No Majority		Majority White	Majority Black	No Majority
Number Properties & Operations	Mean	Mean	Mean	Functions	Mean	Mean	Mean
Recall/Perform Procedures	1.83	1.79	1.92	Recall/Perform Procedures	1.73	1.89	1.96
Demonstrate/Communicate Understanding	1.66	1.67	1.87	Demonstrate/Communicate Understanding	1.73	1.86	1.95
Generalize	1.17	1.50	1.67	Generalize	1.19	1.59	1.68
Basic Algebra	Mean	Mean	Mean	Geometric Concepts	Mean	Mean	Mean
Recall/Perform Procedures	2.06	1.89	1.95	Recall/Perform Procedures	2.08	1.89	1.84
Demonstrate/Communicate Understanding	1.77	1.87	2.03	Demonstrate/Communicate Understanding	1.74	1.81	1.99
Generalize	1.39	1.62	1.77	Generalize	1.11	1.43	1.50
Advanced Algebra	Mean	Mean	Mean	Trigonometry	Mean	Mean	Mean
Recall/Perform Procedures	1.86	1.95	2.00	Recall/Perform Procedures	2.05	2.04	2.01
Demonstrate/Communicate Understanding	1.63	1.82	1.90	Demonstrate/Communicate Understanding	1.75	1.83	2.05
Generalize	1.10	1.39	1.59	Generalize	1.16	1.46	1.80

Teacher Interviews 2018-2019

In addition to the teacher surveys (which teachers filled out online during the spring semester), we completed individual, in-person teacher interviews during the fall of 2018.

We restricted our teacher interview sample for this year to only include teachers who worked at regular public schools in Davidson County. (NOTE: This is different than the teacher survey sample. We asked all teachers who had at least one participating student enrolled in their math class this year to complete a teacher survey.)

Among 112 teachers who were asked for an interview, 93 (83.4%) interviews were completed.

Copies of the teacher interview and the coding scheme can be found in the Measures section of the binder.

- This year, we interviewed teachers from different types of in-county schools.

School Type	Freq	Pct
Charter	13	14.0
Regular Public	71	76.3
Other (magnet or alternative)	9	9.7

- Teachers were asked which math course(s) they taught.

Code	Freq	Pct
Integrated Math I	33	35.5
Integrated Math II	45	48.4
Integrated Math III	24	25.8
Algebra I or II	4	4.3
Geometry	3	3.2
Advanced Math	17	18.3

Note. Codes are not mutually exclusive.

Prompted Codes about High Quality Math Classrooms

- Teachers were asked questions about the role of a high quality math teacher and what class discussion would look like in a high quality math class.

Code	Freq	Pct
Role of Teacher		
4 More Knowledgeable Other	2	2.2
3 Facilitator	44	47.3
2 Monitor	21	22.6
1 Deliverer of Knowledge	25	26.9
0 Motivator	1	1.1
Patterns/Structure of Classroom Talk		
4 Whole Class Conversation Not Dependent on Teacher	2	2.2
3 Whole Class Conversation Dependent on Teacher	28	30.1
2 Student-Student Discourse Only in Small Groups	56	60.2
1 Traditional Lecturing	6	6.5
Dropped for interviewer error	1	1.1
Nature of Classroom Talk		
4 Talk Should Be Conceptually Oriented	10	10.8
3 Talk Is Calculation Oriented or Generally Involves Questions/Explanations	43	46.2
2 Talk is about Math but no Content Specifics	26	28.0
Did not discuss or discussed only talks between student and teacher	13	14.0
Data Dropped for Interviewer Error	1	1.1

Teachers were asked what they find are the typical reasons students sometimes don't learn math as expected.

Code	Freq	Pct
General Productivity of Response		
Productive (within teacher's control)	2	2.2
Unproductive (outside of teacher's control)	73	78.5
Mixed (productive and unproductive)	18	19.4
Reasons for Student Difficulties		
Gaps in Student Knowledge	52	55.9
Teachers Need to Use Different Strategies	21	22.6
Student Laziness or Lack of Motivation	45	48.4
Home Life Issues	6	6.5
School System Issues	3	3.2
Students Lack Confidence	29	31.2
Bad Behavior	5	5.4
Poor Curriculum	4	4.3
Students Move Frequently	0	0.0
Class Sizes Too Large	2	2.2

Note. The specific reasons for student difficulties are not mutually exclusive codes.

- **Teachers were asked how they address the reasons their students don't learn math as expected.**

Code	Freq	Pct
General Productivity of Response		
Productive (maintains high cognitive demand)	6	6.5
Unproductive (lowers the cognitive demand)	75	80.6
Mixed (productive and unproductive)	11	11.8
Dropped for interviewer error	1	1.1
Productive Teacher Strategies to Support Struggling Students		
Focus on how task was launched	5	5.4
Use differentiated instruction or tasks with multiple entry points	8	8.6
Focus on "mastery" norms of participation	2	2.2
Assign competence to students' mathematical contributions	2	2.2
Group students in ways to maximize participation	3	3.2
Unproductive Teacher Strategies to Support Struggling Students		
Shorten problems/remove prompts to explain thinking	8	8.6
Walk students through the steps of solving a problem	17	18.3
Study hall, tutoring, etc. as extra practice opportunities for struggling students	35	37.6
Teacher does not assign a math-specific strategy	54	58.1

Note. The specific strategy codes are not mutually exclusive.

- **We asked teachers with which academy they aligned their math courses.**
Depending on the type of response, we coded them into the following categories:

Code	Freq	Pct
Teacher able to provide career academy name(s) with which they align their math courses	31	33.3
Teacher able to provide career academy name(s) with which they align their math courses, but admit they only partially implement alignment	2	2.2
Teacher able to provide career academy name(s) with which they align their math courses, but admit they do not implement alignment	7	7.5
Teacher aligns math courses with the school's Freshman Academy (not career academy)	14	15.1
Teacher aligns math courses with the school's Exceptional Education program (not career academy)	1	1.1
School does not use academy model	38	40.9

- We asked the 40 Career Academy teachers about the advantages and disadvantages of career academies.

Code	Freq	Pct
Do students benefit from academies?		
Yes	24	60.0
No	3	7.5
Mixed (teacher mentions both pros and cons)	13	32.5
Subcodes for advantages of the career academy experience		
Gain real-world experiences and expertise	16	40.0
Allow collaboration between stakeholders to connect course content to related fields	9	22.5
Opportunity to reflect on future career choices and education	21	52.5
Able to explore different interests/opportunities	10	25.0
Allow students to feel a sense of community	9	22.5
Other	2	5
Subcodes for disadvantages of the career academy experience		
Focus is on assessments, standard tests, grades	1	2.5
Limited choices within career academy pathways	8	20.0
Student would benefit if they were in the same academy within a course	1	2.5
Students treated differently based on different prestige of academies	1	2.5
Inability to determine career choices at this age	3	7.5
Lack of planning and training for teachers	1	2.5

Note. Specific subcodes for this section are not mutually exclusive.

- We asked the 40 Career Academy teachers about professional development or training for career academies.

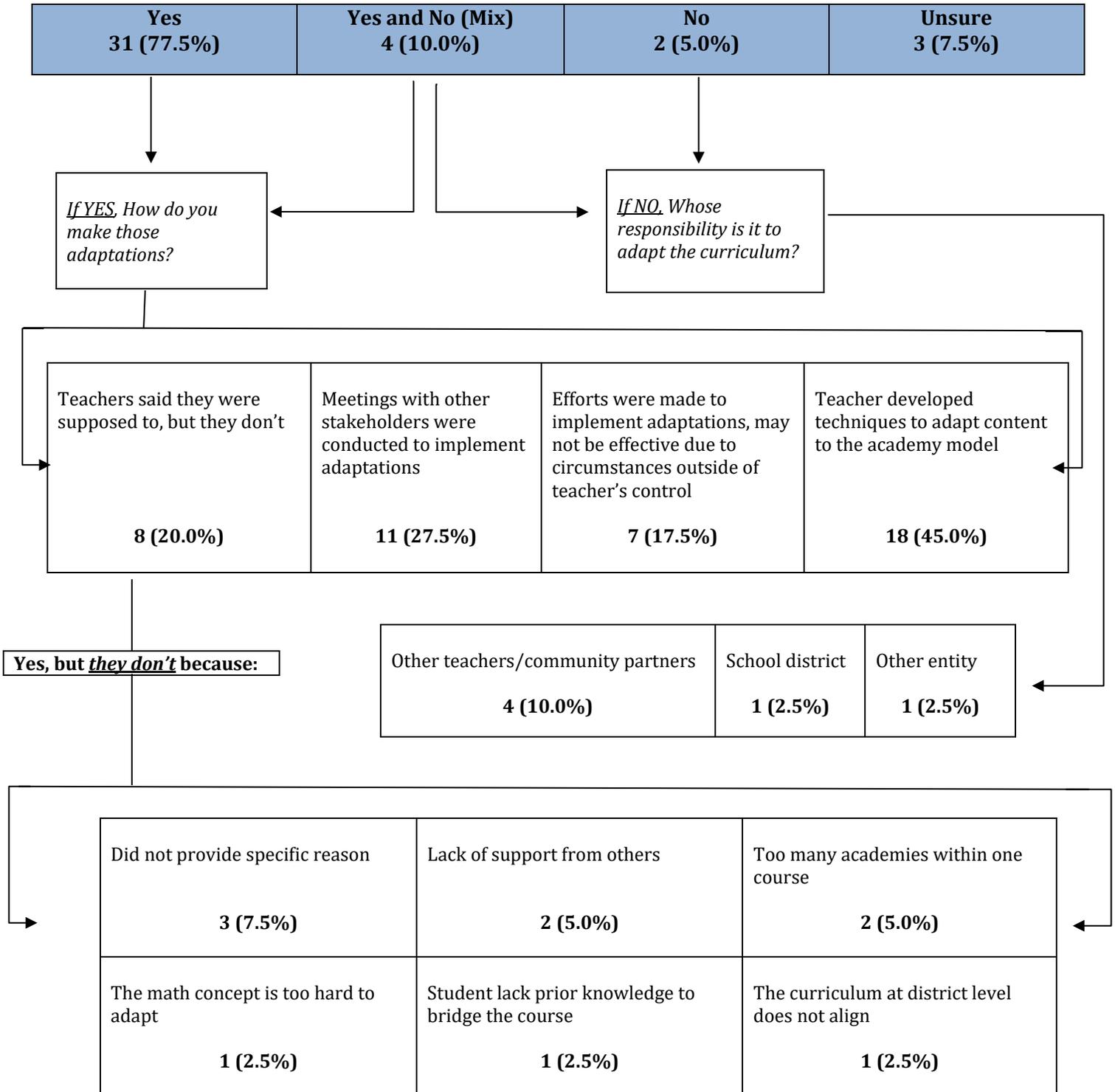
Code	Freq	Pct
Has the teacher had professional development/training to help adapt their math instruction to fit the career academy model?		
Yes	15	37.5
No	20	50.0
Teacher received other relevant training (not specific to the career academy model)	5	12.5
We asked how satisfied teachers felt about the amount of training received.		
Teacher talked only about positive attributes of the training	7	17.5
Teacher talked only about negative attributes of the training	2	5.0
Teacher talked about both positive and negative attributes of the training	6	15.0
Teacher received no direct career academy training	25	62.5
For the teachers who were <u>not satisfied</u> with the training they have received, we asked the reason(s).		
Trainings need to be more content specific	2	5.0
Trainings do not provide enough information, need more training	3	7.5
Lack of alignment between the training and math standards/curriculum	1	2.5
Other reasons unsatisfied	2	5.0
N/A (Teacher was satisfied about the training/received no direct academy training)	32	80.0

Note. Specific subcodes for this section are not mutually exclusive.

Code	Freq	Pct
If teachers did not receive any training, we asked what kind of training they thought would help them to adapt their math instruction to fit the career academy model.		
Training not needed	7	17.5
Uncertain	3	7.5
No interest	3	7.5
Other	7	17.5
N/A (Teacher received PD/training)	20	50.0

- We asked teachers about adapting their math courses to align with the career academies.

Is it your responsibility to make adaptations between your math curriculum and the academies?



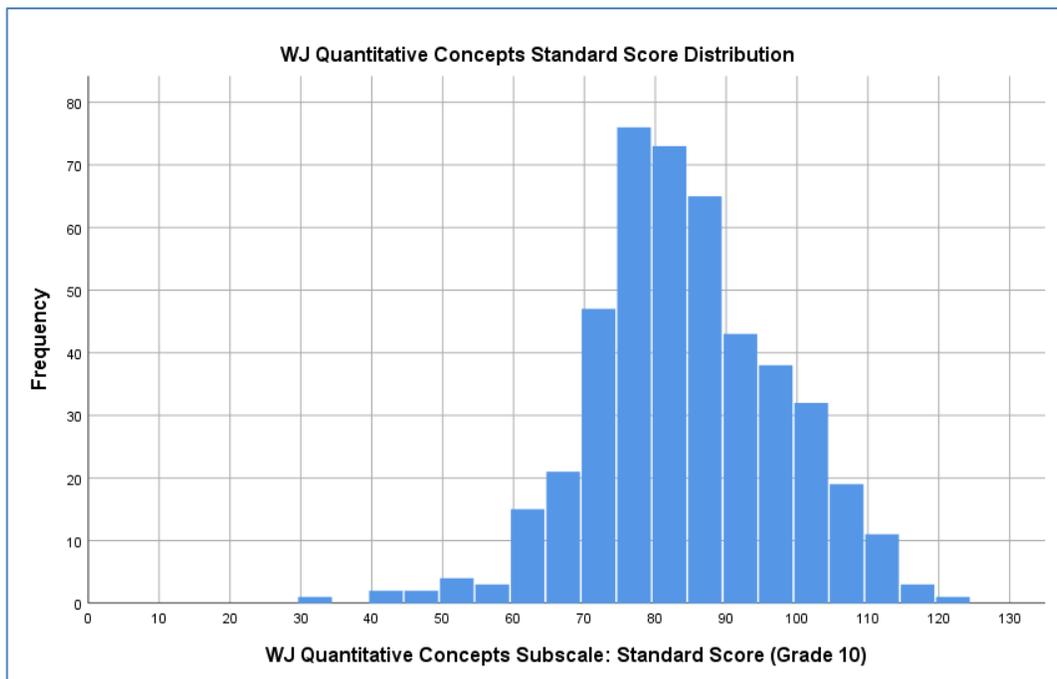
Note. Specific subcodes for this section are not mutually exclusive. Percent indicates percent of all teachers.

Appendix

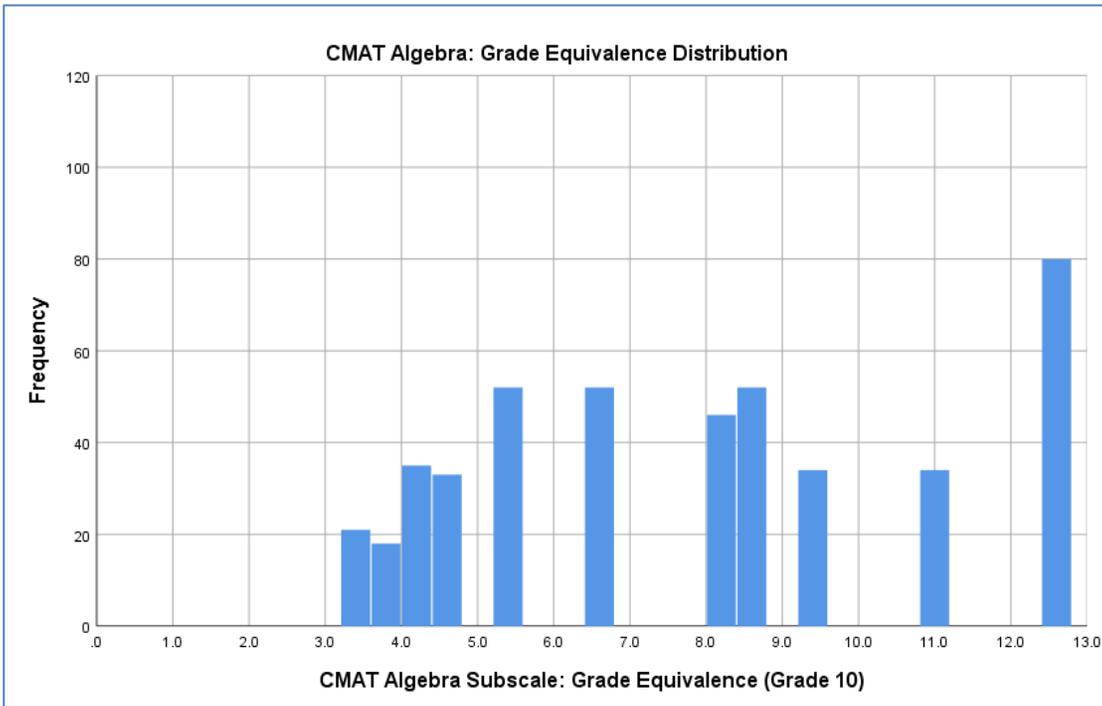
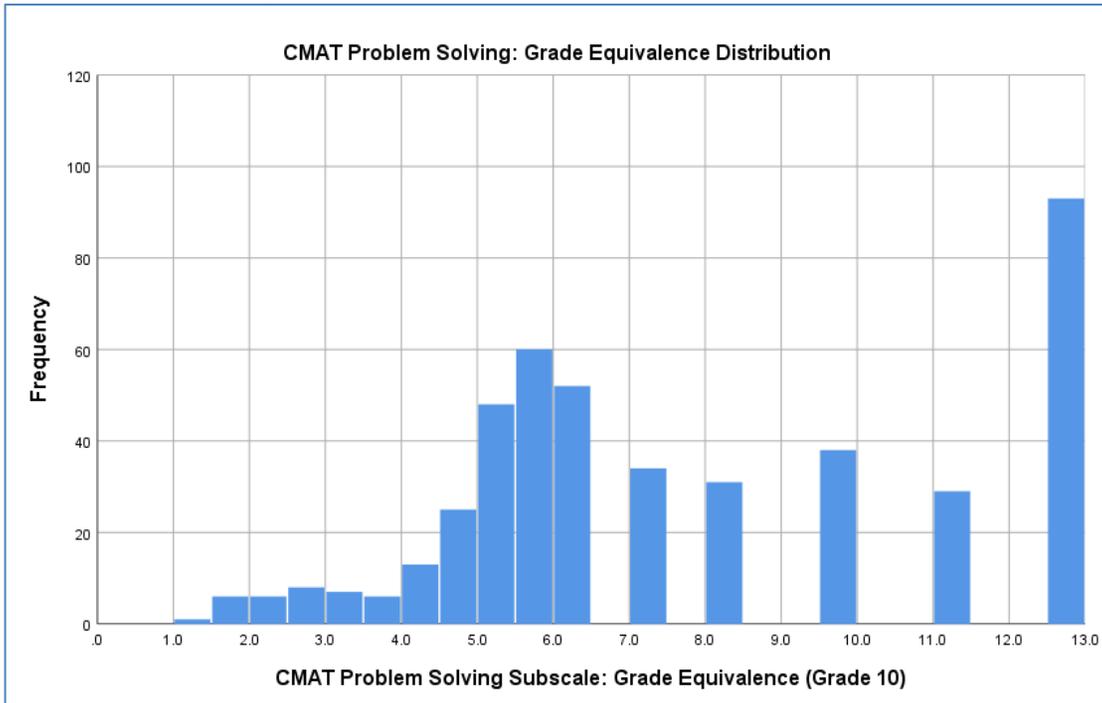
Additional Information about Student Outcomes

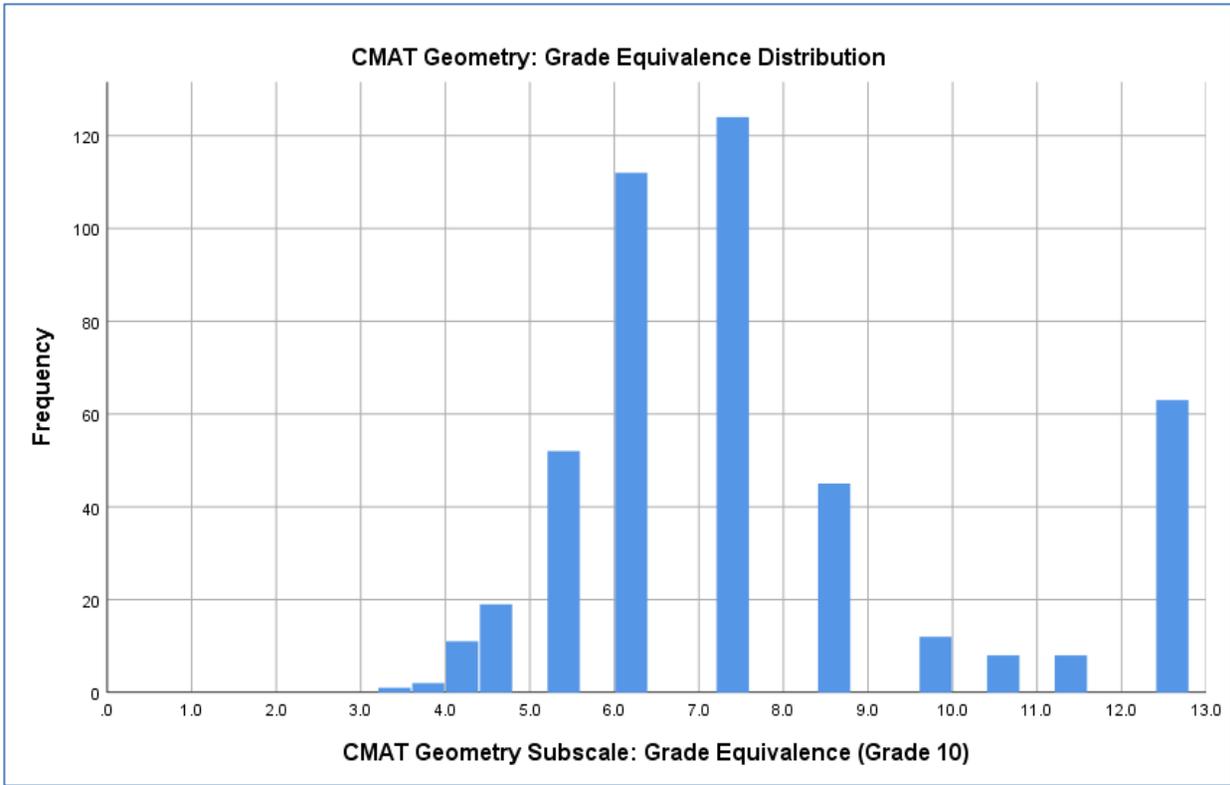
Distributions of Scores Across Direct Child Assessments

Woodcock-Johnson: Quantitative Concepts Subscale Distributions

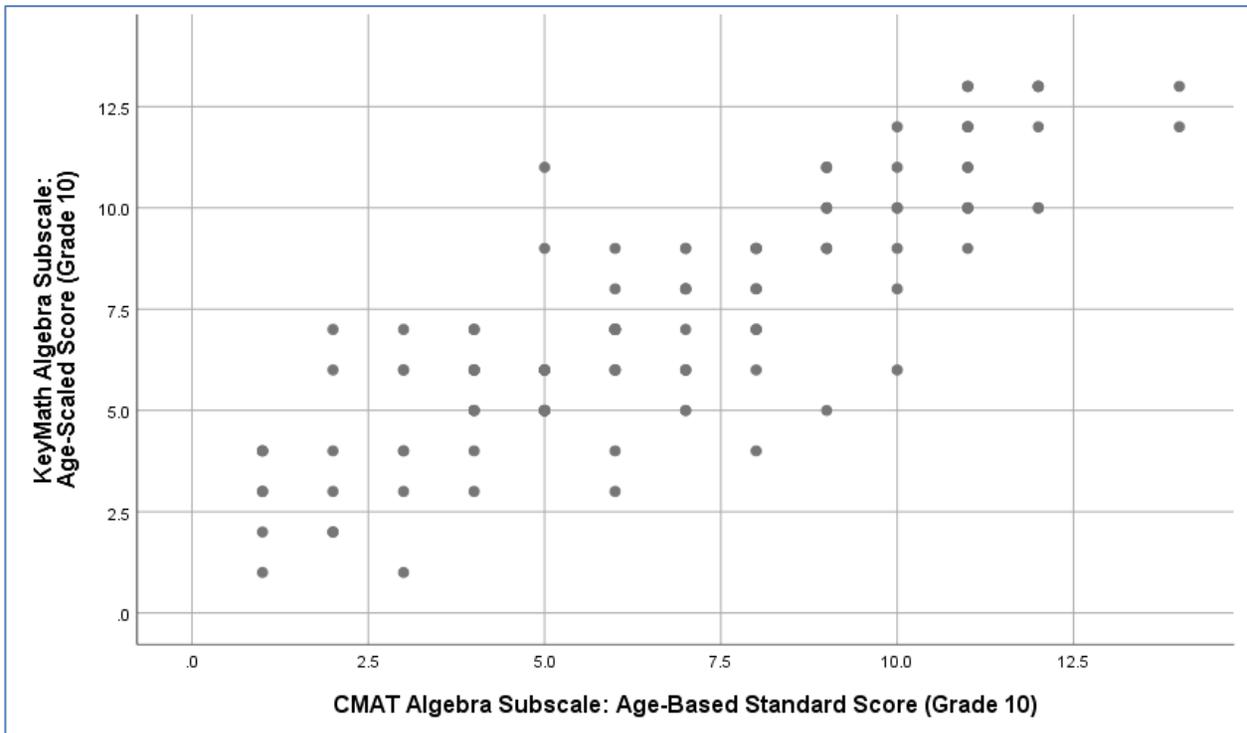
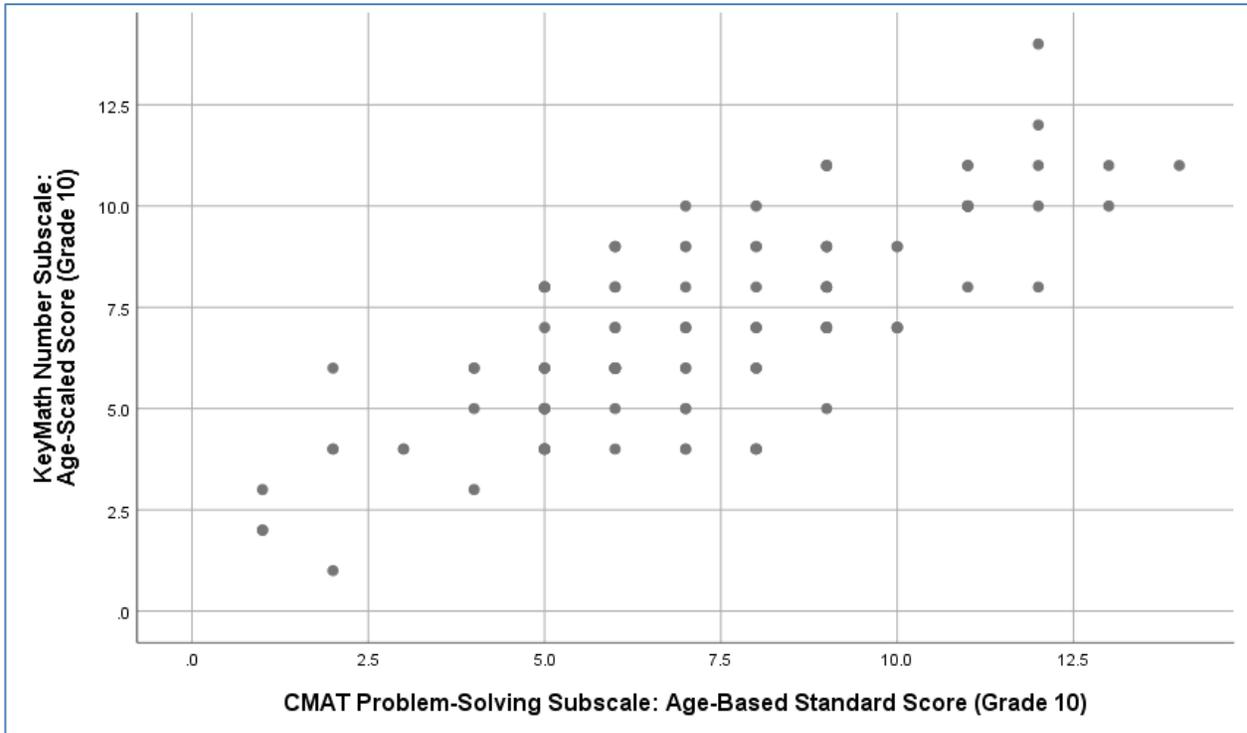


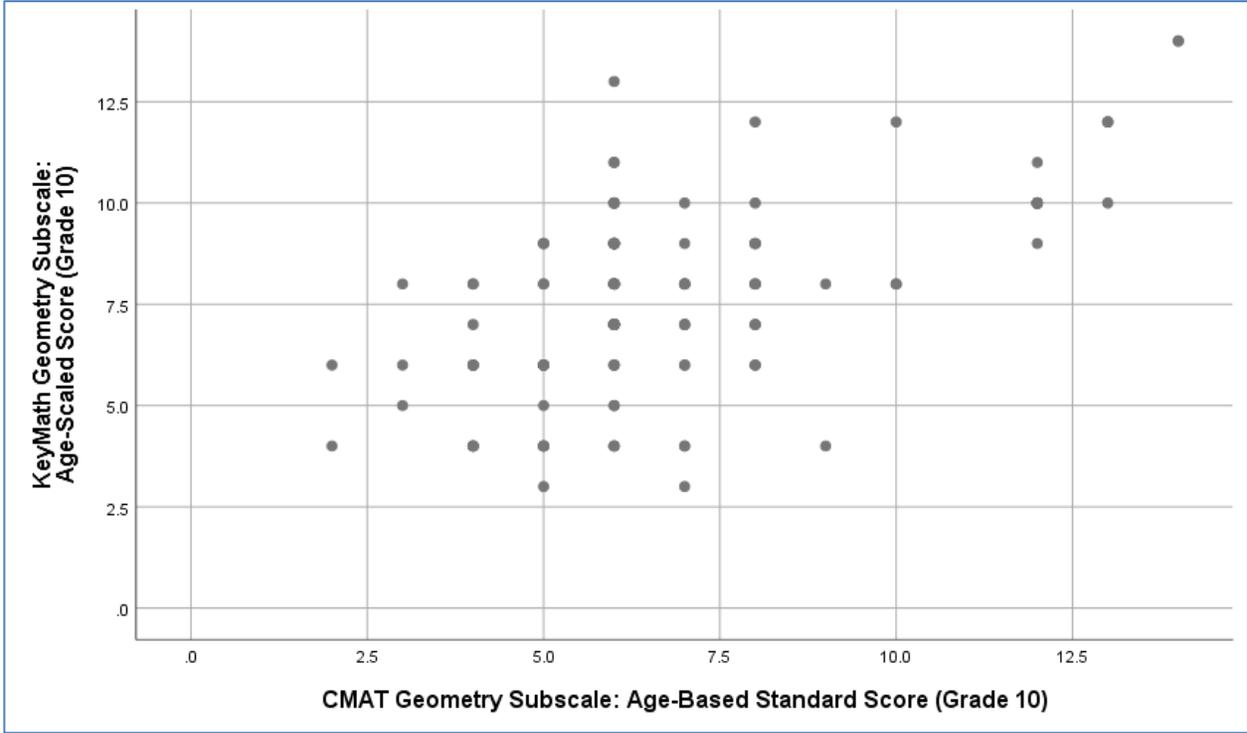
CMAT Grade Equivalent Distributions





Relationship between KeyMath and CMAT





Student Outcomes by Retention Status

Student Outcomes on Woodcock-Johnson Subtests by Retention Status

	N	Min	Max	Mean	Median	SD
Not Retained						
Average Age = 15.98 years, Average Grade = 10.75						
Quantitative Concepts						
W-Score	379	458.00	560.00	518.43	518.00	14.81
Standard Score	379	32.00	121.00	86.18	85.00	13.13

	N	Min	Max	Mean	Median	SD
Retained						
Average Age = 15.87 years, Average Grade = 9.75						
Quantitative Concepts						
W-Score	77	477.00	538.00	505.43	505.00	11.97
Standard Score	77	49.00	105.00	74.87	75.00	10.78

Student Outcomes on CMAT by Retention Status

	N	Min	Max	Mean	Median	SD
Not Retained						
Average Age = 15.95 years, Average Grade = 10.75						
CMAT: Problem Solving						
Age-Based Standard Score	380	1.0	15.0	8.0	8.0	2.9
Age Equivalent	380	6.9	18.0	13.5	12.6	3.3
Grade Equivalent	380	1.7	12.7	8.3	7.4	3.2
CMAT: Algebra						
Age-Based Standard Score	380	1.0	17.0	7.5	7.5	3.2
Age Equivalent	380	8.3	18.3	13.5	13.9	3.1
Grade Equivalent	380	3.2	12.7	8.3	8.7	3.0
CMAT: Geometry						
Age-Based Standard Score	380	1.0	16.0	7.3	6.0	3.0
Age Equivalent	380	8.9	18.3	13.2	12.6	2.7
Grade Equivalent	380	3.7	12.7	8.0	7.4	2.5

	N	Min	Max	Mean	Median	SD
Retained						
Average Age = 15.82 years, Average Grade = 9.75						
CMAT: Problem Solving						
Age-Based Standard Score	77	1.0	12.0	5.7	5.0	2.6
Age Equivalent	77	6.3	18.0	10.9	10.3	2.4
Grade Equivalent	77	1.2	12.7	5.7	5.2	2.4
CMAT: Algebra						
Age-Based Standard Score	77	1.0	10.0	4.6	4.0	2.2
Age Equivalent	77	8.3	16.0	10.7	9.9	1.9
Grade Equivalent	77	3.2	11.0	5.6	4.7	1.9
CMAT: Geometry						
Age-Based Standard Score	77	1.0	10.0	5.4	6.0	1.6
Age Equivalent	77	8.3	14.9	11.2	11.3	1.2
Grade Equivalent	77	3.2	9.7	6.1	6.2	1.2

Low Performing Students

- Students were selected who were **below an eighth-grade level** this past year on all 3 CMAT subscales.
- This group ended up including 167 students, which is about 32% of the current sample.

Comparison of Low and Not Low Scoring Students on 10th Grade Assessments

Descriptive Statistics										
	Low-Scoring					Not Low-Scoring				
	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD
CMAT PS (Std. Score)	167	1.00	9.00	5.26	2.12	290	1.00	15.00	9.02	2.53
CMAT Alg. (Std. Score)	167	1.00	6.00	3.90	1.61	290	1.00	17.00	8.77	2.54
CMAT Geo. (Std. Score)	167	1.00	8.00	5.27	1.41	290	2.00	16.00	8.02	3.03
WJ Quant. Cpts. (Std. Score)	167	40.00	105.00	73.98	9.69	289	32.00	121.00	90.22	11.59
TIMSS Math (Total)	167	35.00	103.00	73.37	13.99	290	36.00	104.00	80.40	13.69
TIMSS Science (Total)	167	39.00	106.00	77.81	14.83	290	33.00	107.00	77.93	14.97

Note. Due to assessor error, we dropped WJ Quant Concepts scores for 1 student.

Characteristics of Low-Scoring Students

	Low-Scoring		Not Low-Scoring	
	Freq	Pct	Freq	Pct
Ethnicity				
Black	148	40.9	214	59.1
White	9	26.5	25	73.5
Hispanic	9	22.0	32	78.0
Other	1	5.0	19	95.0
Gender				
Male	71	36.0	126	64.0
Female	96	36.9	164	63.1
ELL in Pre-K Year				
ELL	157	81.8	35	18.2
Not ELL	10	3.8	254	96.2
Pre-K Curriculum Condition				
Building Blocks	96	34.2	185	65.8
Control	71	40.3	105	59.7
Pre-K School System				
Head Start	70	38.3	113	61.7
MNPS Pre-K	97	35.4	177	64.6

	Low-Scoring		Not Low-Scoring	
	Freq	Pct	Freq	Pct
Grade 5 School Type				
Charter	21	22.1	74	77.9
Izone	31	45.6	37	54.4
Middle	71	30.5	162	69.5
Other	1	100.0	0	0.0
Elementary	43	71.7	17	28.3
Grade 6 School Type				
Charter	29	26.4	81	73.6
Izone	29	46.0	34	54.0
Middle	107	38.2	173	61.8
Other	2	66.7	1	33.3
Grade 7 School Type				
Charter	27	26.7	74	73.3
Izone	26	46.4	30	53.6
Middle	111	38.0	181	62.0
Other	1	50.0	1	50.0
Private	0	0.0	1	100.0
Grade 8 School Type				
Charter	24	26.1	68	73.9
Izone	18	48.6	19	51.4
Middle	115	37.5	192	62.5
Other	7	43.8	9	56.3
Private	1	50.0	1	50.0
Grade 9 School Type				
Charter	16	22.9	54	77.1
Izone	7	87.5	1	12.5
Middle	33	68.8	15	31.3
High	103	34.3	197	65.7
Other	6	24.0	19	76.0
Private	0	0.0	4	100.0
Grade 10 School Type				
Charter	13	20.6	50	79.4
High School	146	40.0	219	60.0
Private	0	0.0	5	100.0
Other	8	33.3	16	66.7

Note. 1 student was out-of-region in Grade 6, 5 were out-of-region in Grade 7, 3 were out-of-region in Grade 8, and in Grade 9, 1 student was out-of-region and 1 student could not be located. Also, 1 student is missing a pre-k year ELL designation.

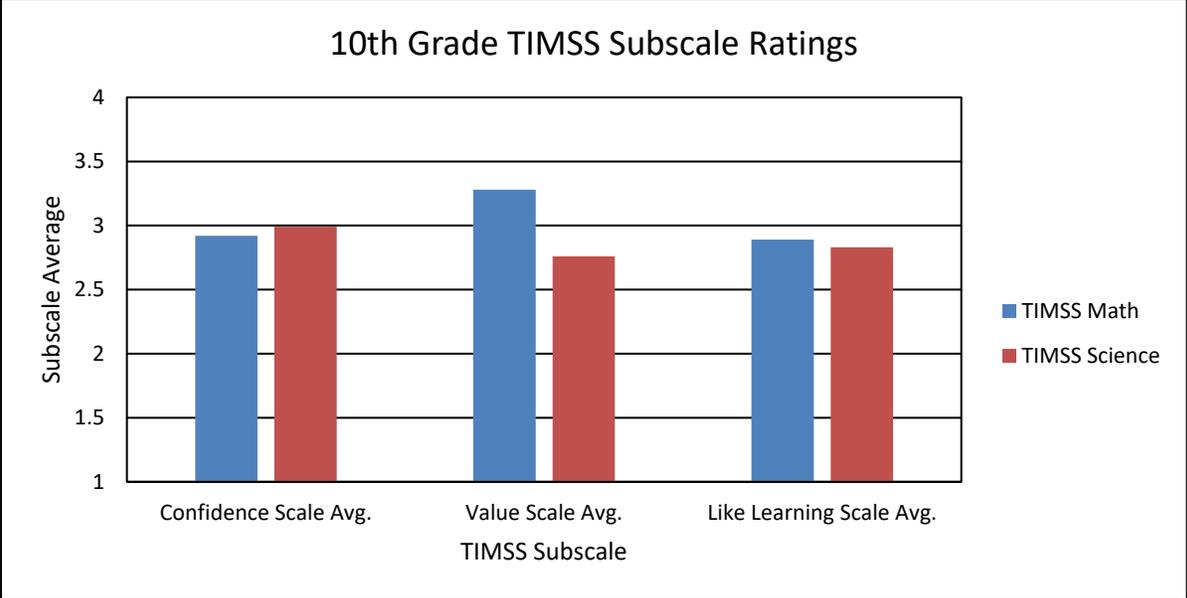
Early Correlates of Later Skills

Zero-Order Correlations: All Students																	
		Fall PK QC (Std Score)	Spring PK QC (Std Score)	Spring K QC (Std Score)	Spring G1 QC (Std Score)	Fall PK AP (Std Score)	Spring PK AP (Std Score)	Spring K AP (Std Score)	Spring G1 AP (Std Score)	Fall PK REMA NUM	Spring PK REMA NUM	Spring K REMA NUM	Spring G1 REMA NUM	Fall PK REMA GEO	Spring PK REMA GEO	Spring K REMA GEO	Spring G1 REMA GEO
10 th Grade Outcomes	WJ Quant. Cpts. (Std Score)	0.41	0.52	0.53	0.56	0.32	0.46	0.51	0.55	0.36	0.48	0.57	0.59	0.28	0.42	0.42	0.37
	TIMSS Math (Total)	0.06	0.06	0.11	0.19	-0.01	0.03	0.16	0.15	0.07	0.09	0.12	0.14	0.06	0.06	0.14	0.08
	TIMSS Science (Total)	0.00	-0.02	0.04	0.06	0.00	0.06	0.01	0.04	-0.02	-0.01	-0.02	-0.02	0.00	-0.02	0.01	-0.04
	CMAT Problem Solving (Std Score)	0.38	0.45	0.48	0.53	0.31	0.44	0.51	0.57	0.33	0.45	0.53	0.56	0.31	0.43	0.42	0.45
	CMAT Algebra (Std Score)	0.36	0.42	0.43	0.46	0.24	0.38	0.42	0.48	0.33	0.45	0.48	0.50	0.27	0.37	0.40	0.35
	CMAT Geometry (Std Score)	0.40	0.46	0.45	0.47	0.24	0.38	0.45	0.44	0.32	0.37	0.41	0.40	0.27	0.33	0.31	0.33

Note. Red cells indicate correlations > .20.

Student Survey Outcomes: TIMSS Math and TIMSS Science

Comparing Student Survey Subscales in Grade 10

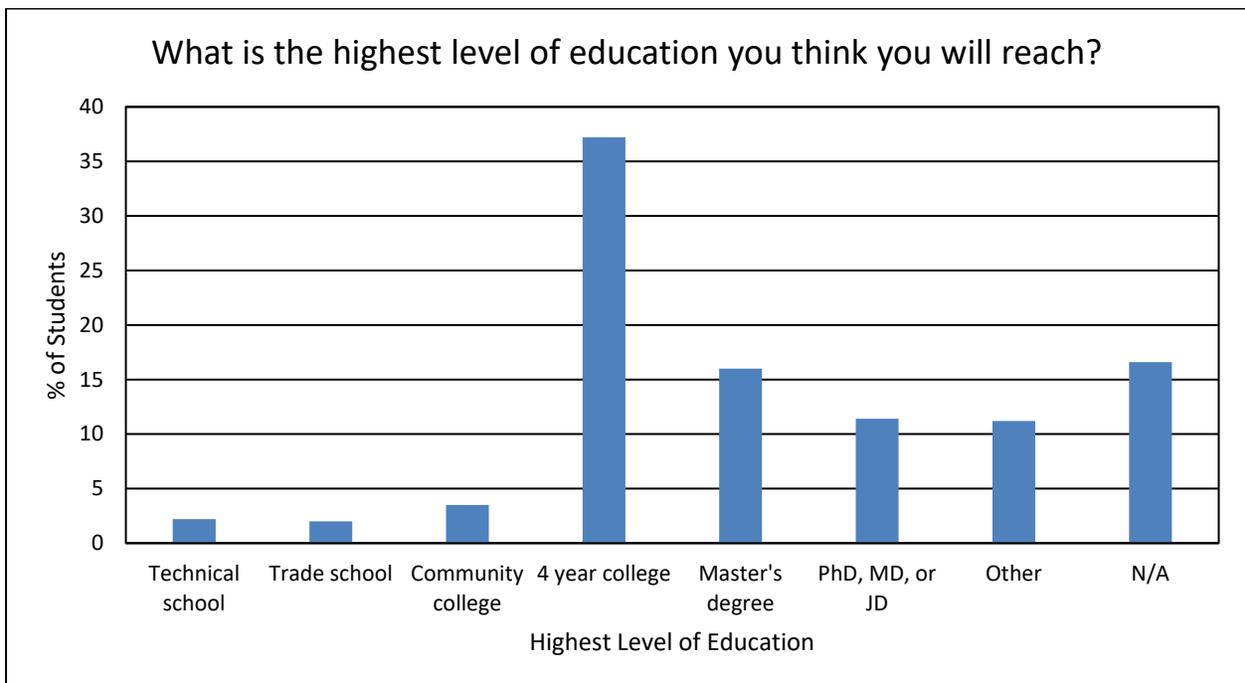


Student Interviews

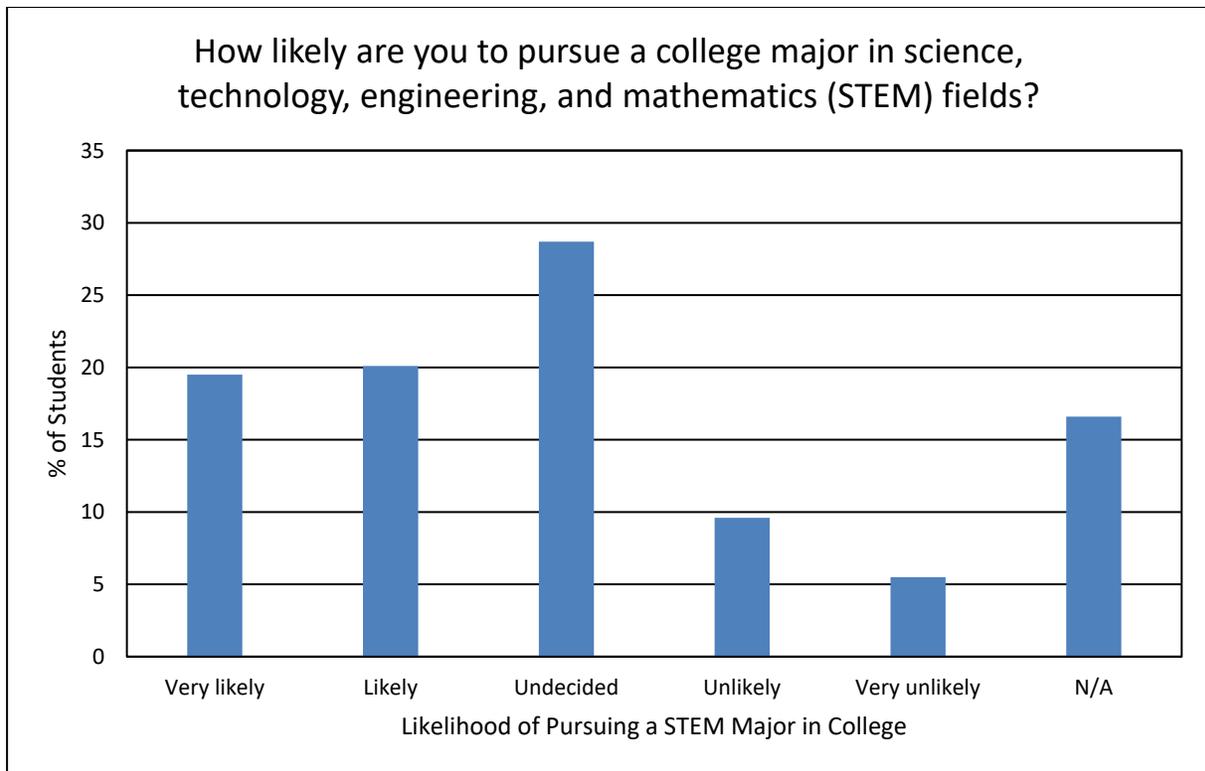
Students were individually interviewed during spring assessments about their plans for the future and how likely they thought they were to major in or pursue a career in math or science.

Information from the 457 completed student interviews

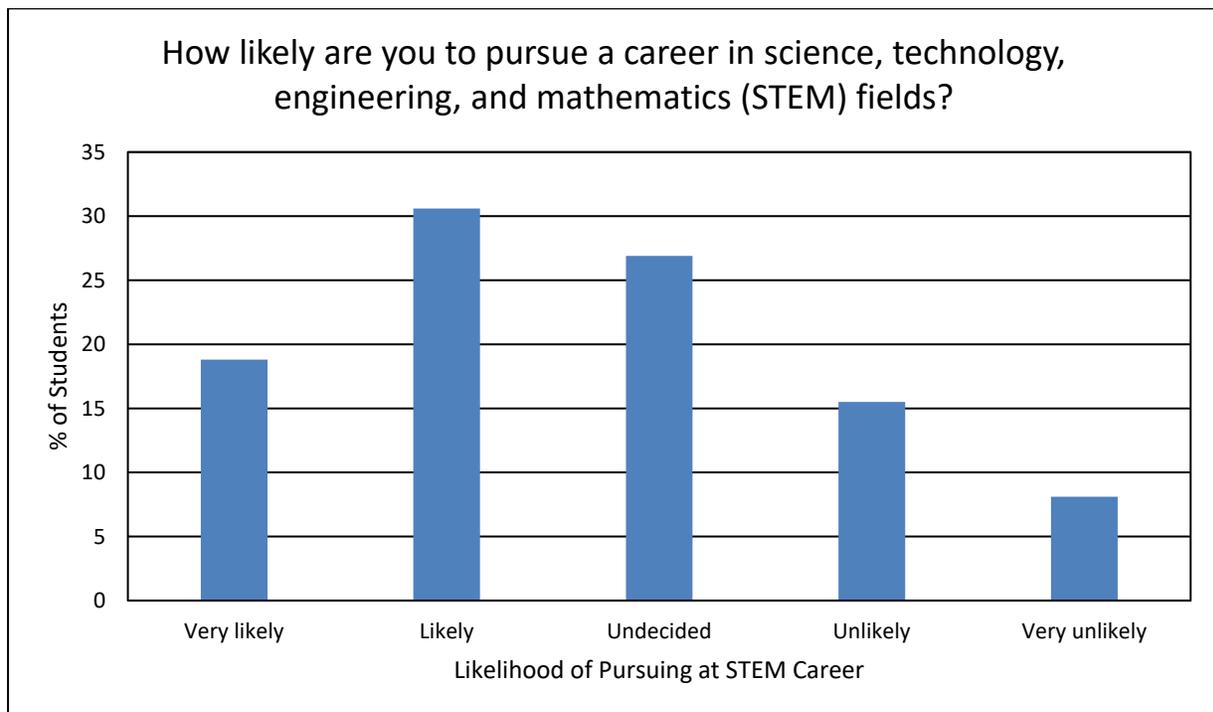
- **After high school, what are you most likely to do?**
(NOTE: These codes were not mutually exclusive.)
 - Continue in school: 381 (83.4%)
 - Get a job: 59 (12.9%)
 - Volunteer: 0 (0.0%)
 - Join the military: 19 (4.2%)
 - Not sure: 25 (5.5%)
 - Other: 24 (5.3%)



Note. Students who do not plan to pursue post-secondary education were coded as N/A for this question.



Note. Students who do not plan to pursue post-secondary education were coded as N/A for this question.



Parent Interview

- Out of the 519 students in the official original sample, we were able to conduct parent interviews with 79.2% (N=411). These are the responses to additional questions not summarized in the main report.

Helping with students' math homework

Who helps student most often with math homework		
	Frequency	Percent
Female guardian	158	38.5
Male guardian	20	4.9
Grandparent	7	1.7
Older sibling	26	6.3
Partner of parent	1	0.2
Adult relative	3	0.7
Adult nonrelative	1	0.2
Teacher/Tutor	1	0.2
Multiple responses	2	0.5
No one	191	46.6

Note. 1 parent did not answer this interview question.

How often respondent or other adult helps student with math homework in a typical week		
	Frequency	Percent
Never	193	47.1
Less than once a week	62	15.1
1 to 2 times a week	91	22.2
3 to 4 times a week	47	11.5
5 or more times a week	17	4.1

Note. 1 parent did not answer this interview question.

Where outside the home the student receives additional help with math homework after school		
	Frequency	Percent
After school program at school	46	11.2
After school program outside of school	8	2.0
Teacher/aide at school	40	9.8
Paid private tutor program	2	0.5
Neighbor/adult non relative home	2	0.5
Grandparent/adult relative home	0	0.0
Other	10	2.4
Multiple responses	5	1.2
Not applicable	297	72.4

Note. Not applicable means that the student did not receive additional help with math homework after school in some place other than the home. 1 parent did not answer this interview question.

How informed respondent is about student's math instruction

	Frequency	Percent
Not informed	51	12.4
Slightly informed	81	19.8
Somewhat informed	123	30.0
Very informed	125	30.5
Extremely informed	30	7.3

Note. 1 parent did not answer this interview question.

Parents' evaluation of students' interest and performance (math)

Student's interest in math

	Frequency	Percent
Not interested	20	4.9
Slightly interested	71	17.3
Somewhat interested	161	39.3
Very interested	116	28.3
Extremely interested	42	10.2

Note. 1 parent did not answer this interview question.

Student's performance in math

	Frequency	Percent
Very much below average	4	1.0
Below average	65	15.9
Average	219	53.4
Above average	93	22.7
Very much above average	29	7.1

Note. 1 parent did not answer this interview question.

Respondent's beliefs and expectations (math)

Respondent's beliefs about own math skills

	Was good at math in high school		Good at math now		Knows enough about math to help student	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Not true	93	22.7	74	18.0	88	21.5
Slightly true	72	17.6	91	22.2	94	22.9
True half the time	49	12.0	68	16.6	80	19.5
Mostly true	86	21.0	103	25.1	78	19.0
Completely true	108	26.3	74	18.0	70	17.1
Don't know	2	0.5	0	0.0	0	0.0

Note. 1 parent did not answer these interview questions.

Respondent's expectations of child						
	Expects child to get good grades in math		Believes child will perform well in math in future grades		Believes math plays an important role in child's future	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Not true	1	0.2	4	1.0	1	0.2
Slightly true	17	4.1	30	7.3	15	3.7
True half the time	22	5.4	31	7.6	16	3.9
Mostly true	98	23.9	117	28.5	73	17.8
Completely true	271	66.1	227	55.4	304	74.1
Don't know	1	0.2	1	0.2	1	0.2

Note. 1 parent did not answer these interview questions.

Helping with students' science homework

Who helps student most often with science homework		
	Frequency	Percent
Female guardian	125	30.6
Male guardian	10	2.4
Grandparent	2	0.5
Older sibling	18	4.4
Partner of parent	0	0.0
Adult relative	2	0.5
Adult nonrelative	0	0.0
Teacher/Tutor	0	0.0
Multiple responses	2	0.5
No one	250	61.1

Note. 2 parents did not answer this question.

How often respondent or other adult helps student with science homework in a typical week		
	Frequency	Percent
Never	253	61.9
Less than once a week	60	14.7
1 to 2 times a week	74	18.1
3 to 4 times a week	17	4.2
5 or more times a week	5	1.2

Note. 2 parents did not answer this question.

Where outside the home the student receives additional help with science homework after school

	Frequency	Percent
After school program at school	25	6.1
After school program outside of school	7	1.7
Teacher/aide at school	23	5.6
Paid private tutor program	0	0.0
Neighbor/adult non relative home	0	0.0
Grandparent/adult relative home	2	0.5
Other	8	2.0
Multiple responses	0	0.0
Not applicable	344	84.1

Note. Not applicable means that the student does not receive additional help with science homework after school in some place other than the home. 2 parents did not answer this question.

How informed respondent is about student's science instruction

	Frequency	Percent
Not informed	65	15.9
Slightly informed	101	24.7
Somewhat informed	107	26.2
Very informed	103	25.2
Extremely informed	33	8.1

Note. 2 parents did not answer this question.

Parents' evaluation of students' interest and performance (science)

Student's interest in science

	Frequency	Percent
Not interested	33	8.1
Slightly interested	98	24.0
Somewhat interested	134	32.8
Very interested	92	22.5
Extremely interested	52	12.7

Note. 2 parents did not answer this question.

Student's performance in science

	Frequency	Percent
Very much below average	2	0.5
Below average	33	8.1
Average	227	55.5
Above average	117	28.6
Very much above average	30	7.3

Note. 2 parents did not answer this question.

Respondent's beliefs and expectations (science)

Respondent's beliefs about own science skills						
	Was good at science in high school		Good at science now		Knows enough about science to help student	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Not true	43	10.5	85	20.7	64	15.6
Slightly true	88	21.5	105	25.6	112	27.3
True half the time	65	15.9	74	18.0	55	13.4
Mostly true	117	28.5	81	19.8	96	23.4
Completely true	95	23.2	64	15.6	83	20.2
Don't know	2	0.5	1	0.2	0	0.0

Note. 1 parent did not answer this question.

Respondent's expectations of child						
	Expects child to get good grades in science		Believes child will perform well in science in future grades		Believes science plays an important role in child's future	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Not true	2	0.5	2	0.5	5	1.2
Slightly true	15	3.7	27	6.6	45	11.0
True half the time	34	8.3	22	5.4	35	8.5
Mostly true	102	24.9	123	30.0	112	27.3
Completely true	257	62.7	236	57.6	212	51.7
Don't know	0	0.0	0	0.0	1	0.2

Note. 1 parent did not answer this question.

Teacher Survey

This section includes supplemental information about the teacher survey. The table below shows the average level of coverage and cognitive demand emphasis that teachers reported for every item on the math content portion of the survey. Information and data from the rest of the teacher survey can be found in the main report, beginning on page 25.

Level of Coverage & Cognitive Demand Emphasis by Individual Math Item

	<u>Level of Coverage</u>					<u>Cognitive Demand Emphasis</u>														
						Recall/Perform Procedures					Demonstrate/Communicate Understanding					Generalize				
Number Properties & Operations																				
	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD
OVERALL	123	0.0	3.0	1.78	0.76	122	0.5	3.0	1.82	0.54	122	0.5	3.0	1.72	0.52	122	0.0	3.0	1.48	0.71
Integers	123	0.0	3.0	1.67	1.12	99	0.0	3.0	1.80	0.77	98	0.0	3.0	1.81	0.65	99	0.0	3.0	1.57	0.87
Fractions, decimals, and percents	123	0.0	3.0	1.63	1.03	104	0.0	3.0	1.80	0.73	104	0.0	3.0	1.71	0.75	104	0.0	3.0	1.46	0.86
Real and/or rational numbers	123	0.0	3.0	1.72	1.11	98	0.0	3.0	1.84	0.74	98	0.0	3.0	1.67	0.72	98	0.0	3.0	1.52	0.88
Exponents and scientific notation	123	0.0	3.0	1.86	0.92	109	0.0	3.0	1.78	0.71	109	0.0	3.0	1.80	0.74	109	0.0	3.0	1.53	0.85
Factors, multiples, and divisibility	123	0.0	3.0	1.95	1.00	108	0.0	3.0	1.87	0.79	108	0.0	3.0	1.77	0.65	108	0.0	3.0	1.47	0.86
Opposites, reciprocals, and identities	123	0.0	3.0	1.62	1.07	100	0.0	3.0	1.75	0.73	100	0.0	3.0	1.71	0.76	100	0.0	3.0	1.40	0.87
Mathematical properties	123	0.0	3.0	2.10	1.00	111	0.0	3.0	2.02	0.75	111	0.0	3.0	1.81	0.73	111	0.0	3.0	1.50	0.85
Operations on fractions and decimals	123	0.0	3.0	1.64	1.03	102	0.0	3.0	1.79	0.74	102	0.0	3.0	1.61	0.75	102	0.0	3.0	1.54	0.89

	<u>Level of Coverage</u>					<u>Cognitive Demand Emphasis</u>														
						Recall/Perform Procedures					Demonstrate/Communicate Understanding					Generalize				
Ratio and proportion	123	0.0	3.0	1.80	1.00	107	0.0	3.0	1.74	0.71	107	0.0	3.0	1.81	0.66	107	0.0	3.0	1.64	0.82
Basic Algebra																				
	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD
OVERALL	123	0.0	3.0	1.85	0.63	121	1.0	3.0	1.95	0.44	121	0.57	3.0	1.90	0.47	121	0.0	3.0	1.62	0.62
Use of variables	123	0.0	3.0	2.34	0.99	110	0.0	3.0	1.95	0.72	110	1.0	3.0	2.07	0.52	110	0.0	3.0	2.01	0.72
Formulas, expressions, and equations	123	0.0	3.0	2.62	0.75	116	1.0	3.0	2.09	0.63	116	1.0	3.0	2.15	0.53	116	0.0	3.0	1.86	0.77
One-step equations	123	0.0	3.0	1.68	1.09	102	0.0	3.0	1.95	0.84	102	0.0	3.0	1.77	0.74	102	0.0	3.0	1.61	0.89
Coordinate planes	123	0.0	3.0	2.14	1.00	111	0.0	3.0	1.90	0.73	110	0.0	3.0	2.00	0.70	110	0.0	3.0	1.71	0.85
Arithmetic or geometric patterns	123	0.0	3.0	1.56	1.20	86	1.0	3.0	1.78	0.66	86	0.0	3.0	1.92	0.77	86	0.0	3.0	1.70	0.87
Multi-step equations	123	0.0	3.0	2.28	0.91	114	0.0	3.0	2.08	0.71	114	1.0	3.0	2.04	0.61	114	0.0	3.0	1.67	0.83
Inequalities	123	0.0	3.0	1.50	1.15	87	0.0	3.0	1.80	0.68	87	0.0	3.0	1.87	0.73	88	0.0	3.0	1.73	0.85
Linear and non-linear relations	123	0.0	3.0	2.15	1.05	107	0.0	3.0	1.83	0.68	107	0.0	3.0	1.99	0.75	108	0.0	3.0	1.77	0.84
Functions	123	0.0	3.0	2.20	1.03	106	0.0	3.0	1.86	0.65	106	0.0	3.0	2.04	0.65	107	0.0	3.0	1.82	0.80
Operations on functions	123	0.0	3.0	1.89	1.17	97	1.0	3.0	1.94	0.69	97	0.0	3.0	1.89	0.66	97	0.0	3.0	1.64	0.86
Rate of change/slope	123	0.0	3.0	2.07	0.95	111	0.0	3.0	1.90	0.67	111	0.0	3.0	1.96	0.67	111	0.0	3.0	1.80	0.88
Polynomials	123	0.0	3.0	1.91	1.19	96	0.0	3.0	2.01	0.72	96	0.0	3.0	1.98	0.73	96	0.0	3.0	1.58	0.85
Operations on polynomials	123	0.0	3.0	1.97	1.12	101	0.0	3.0	2.08	0.77	101	0.0	3.0	1.83	0.76	101	0.0	3.0	1.43	0.88
Factoring polynomials	123	0.0	3.0	1.93	1.25	94	0.0	3.0	2.13	0.74	94	0.0	3.0	1.94	0.73	94	0.0	3.0	1.51	0.85
Operations on radicals	123	0.0	3.0	1.44	1.17	83	0.0	3.0	1.94	0.76	83	0.0	3.0	1.64	0.82	83	0.0	3.0	1.14	0.86

	<u>Level of Coverage</u>					<u>Cognitive Demand Emphasis</u>														
						Recall/Perform Procedures					Demonstrate/Communicate Understanding					Generalize				
Rational expressions	123	0.0	3.0	1.39	1.25	75	1.0	3.0	1.92	0.67	75	0.0	3.0	1.84	0.74	75	0.0	3.0	1.37	0.91
Completing the square	123	0.0	3.0	0.98	1.16	59	0.0	3.0	1.97	0.83	59	0.0	3.0	1.63	0.83	58	0.0	3.0	1.16	0.89
Quadratic formula	123	0.0	3.0	1.46	1.21	81	0.0	3.0	2.12	0.83	81	0.0	3.0	1.74	0.82	81	0.0	3.0	1.33	0.82
Functions to model data	123	0.0	3.0	1.55	1.14	89	1.0	3.0	1.58	0.56	89	0.0	3.0	1.93	0.69	89	0.0	3.0	2.03	0.82
Advanced Algebra																				
	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD
OVERALL	122	0.0	3.0	0.95	0.55	115	0.50	3.0	1.97	0.52	115	0.63	2.75	1.79	0.50	115	0.0	3.0	1.39	0.72
Computational algebra	122	0.0	3.0	1.38	1.24	76	0.0	3.0	2.12	0.71	76	0.0	3.0	1.84	0.69	76	0.0	3.0	1.51	0.86
Quadratic equations	122	0.0	3.0	1.76	1.30	85	0.0	3.0	2.02	0.77	85	0.0	3.0	2.01	0.76	85	0.0	3.0	1.65	0.83
Systems of equations	122	0.0	3.0	1.48	1.13	87	0.0	3.0	1.86	0.77	87	0.0	3.0	1.72	0.79	87	0.0	3.0	1.60	0.97
Systems of inequalities	122	0.0	3.0	0.95	1.04	63	0.0	3.0	1.67	0.76	63	0.0	3.0	1.70	0.78	63	0.0	3.0	1.52	0.97
Compound inequalities	122	0.0	3.0	0.54	0.86	39	0.0	3.0	1.69	0.69	39	0.0	3.0	1.67	0.66	39	0.0	3.0	1.51	0.89
Matrices and determinants	122	0.0	3.0	0.20	0.62	14	1.0	3.0	1.93	0.83	14	1.0	2.0	1.64	0.50	14	0.0	3.0	1.43	1.02
Conic sections	122	0.0	3.0	0.24	0.66	17	1.0	3.0	1.71	0.77	17	1.0	3.0	1.71	0.59	17	0.0	3.0	1.24	0.75
Rational, negative exponents, or radicals	122	0.0	3.0	1.49	1.19	82	1.0	3.0	2.18	0.67	82	0.0	3.0	1.82	0.72	82	0.0	3.0	1.17	0.93
Rules for exponents	122	0.0	3.0	1.67	1.05	97	0.0	3.0	2.26	0.73	97	0.0	3.0	1.85	0.74	97	0.0	3.0	1.19	0.92
Complex numbers	122	0.0	3.0	1.03	1.16	59	1.0	3.0	2.10	0.74	59	0.0	3.0	1.86	0.71	59	0.0	3.0	1.14	0.94
Binomial theorem	122	0.0	3.0	0.21	0.71	11	1.0	3.0	1.73	0.79	11	1.0	3.0	1.91	0.70	11	0.0	3.0	1.91	0.94
Factor/remainder theorem	122	0.0	3.0	0.61	1.06	35	1.0	3.0	1.97	0.75	35	0.0	3.0	1.83	0.89	35	0.0	3.0	1.31	0.90

	<u>Level of Coverage</u>					<u>Cognitive Demand Emphasis</u>														
						Recall/Perform Procedures					Demonstrate/Communicate Understanding					Generalize				
Field properties of real number system	122	0.0	3.0	0.31	0.74	21	0.0	3.0	1.57	0.75	21	0.0	3.0	1.57	0.93	21	0.0	3.0	1.38	1.12
Multiple representations	122	0.0	3.0	1.47	1.27	77	0.0	3.0	1.68	0.62	77	0.0	3.0	2.06	0.71	77	0.0	3.0	1.95	0.86
Functions																				
	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD
OVERALL	122	0.0	2.92	1.19	0.64	116	0.57	3.0	1.90	0.53	116	0.25	3.0	1.89	0.53	116	0.0	3.0	1.53	0.67
Notation	122	0.0	3.0	1.40	1.13	84	0.0	3.0	1.90	0.75	84	0.0	3.0	1.89	0.78	84	0.0	3.0	1.40	0.92
Relations	122	0.0	3.0	1.17	1.10	75	0.0	3.0	1.63	0.67	75	0.0	3.0	1.88	0.81	75	0.0	3.0	1.52	0.89
Linear	122	0.0	3.0	1.76	1.11	98	1.0	3.0	1.89	0.67	98	0.0	3.0	1.88	0.68	98	0.0	3.0	1.79	0.90
Quadratic	122	0.0	3.0	1.75	1.28	88	1.0	3.0	1.99	0.69	88	0.0	3.0	2.05	0.73	88	0.0	3.0	1.66	0.86
Polynomial	122	0.0	3.0	1.48	1.31	76	0.0	3.0	1.92	0.71	76	0.0	3.0	1.93	0.72	76	0.0	3.0	1.46	0.87
Rational	122	0.0	3.0	0.95	1.23	51	1.0	3.0	1.88	0.62	51	0.0	3.0	1.90	0.73	51	0.0	3.0	1.51	0.86
Logarithmic	122	0.0	3.0	0.48	0.98	27	0.0	3.0	1.93	0.78	27	0.0	3.0	1.93	0.83	27	0.0	3.0	1.22	0.85
Exponential	122	0.0	3.0	1.74	1.17	92	0.0	3.0	1.82	0.65	92	0.0	3.0	1.91	0.66	92	0.0	3.0	1.86	0.91
Trigonometric and circular	122	0.0	3.0	0.89	1.19	50	1.0	3.0	2.08	0.75	50	0.0	3.0	1.78	0.71	50	0.0	3.0	1.46	0.86
Inverse	122	0.0	3.0	0.75	1.08	45	1.0	3.0	1.93	0.69	45	0.0	3.0	1.93	0.75	45	0.0	3.0	1.44	0.87
Composition	122	0.0	3.0	0.29	0.72	19	0.0	3.0	1.79	0.79	19	0.0	3.0	1.68	0.67	19	0.0	3.0	1.26	0.87
Domain and range functions	122	0.0	3.0	1.57	1.15	89	0.0	3.0	1.87	0.69	89	0.0	3.0	2.01	0.75	89	0.0	3.0	1.64	0.84
Geometric Concepts																				
	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD
OVERALL	122	0.0	2.78	0.94	0.62	118	1.0	3.0	1.92	0.52	118	0.0	3.0	1.87	0.54	118	0.0	3.0	1.36	0.68
Basic terminology	122	0.0	3.0	1.89	1.02	105	0.0	3.0	2.08	0.78	105	0.0	3.0	1.87	0.79	105	0.0	3.0	1.38	0.86
Precise definitions of geometric objects and properties	122	0.0	3.0	1.43	1.08	91	0.0	3.0	1.91	0.69	91	0.0	3.0	1.86	0.81	91	0.0	3.0	1.24	0.90
Logic, reasoning, and proof	122	0.0	3.0	1.28	1.22	71	0.0	3.0	1.76	0.67	71	0.0	3.0	2.08	0.79	71	0.0	3.0	1.41	0.94

	<u>Level of Coverage</u>					<u>Cognitive Demand Emphasis</u>														
						Recall/Perform Procedures					Demonstrate/Communicate Understanding					Generalize				
Points, lines, rays, segments, and planes	122	0.0	3.0	1.01	1.09	64	1.0	3.0	2.05	0.74	64	0.0	3.0	1.80	0.65	64	0.0	3.0	1.41	0.92
Angles	122	0.0	3.0	1.63	1.12	95	1.0	3.0	1.87	0.72	95	0.0	3.0	1.94	0.71	95	0.0	3.0	1.46	0.90
Vectors	122	0.0	2.0	0.25	0.57	22	0.0	3.0	1.82	0.96	22	0.0	3.0	1.45	0.91	22	0.0	3.0	0.95	0.90
Rigid transformations	122	0.0	3.0	1.57	1.25	82	0.0	3.0	1.95	0.77	82	0.0	3.0	1.99	0.76	82	0.0	3.0	1.44	0.94
Dilations	122	0.0	3.0	1.43	1.17	80	1.0	3.0	2.08	0.61	80	0.0	3.0	2.11	0.80	80	0.0	3.0	1.55	0.83
Defining congruence in terms of transformations	122	0.0	3.0	1.23	1.20	69	0.0	3.0	1.94	0.66	69	0.0	3.0	1.96	0.74	69	0.0	3.0	1.36	0.95
Congruence of triangles	121	0.0	3.0	1.31	1.27	69	0.0	3.0	1.93	0.73	69	0.0	3.0	2.03	0.80	69	0.0	3.0	1.39	0.93
Congruence of other figures	121	0.0	3.0	0.85	1.09	52	0.0	3.0	1.83	0.73	52	0.0	3.0	1.90	0.72	52	0.0	3.0	1.25	0.91
Defining similarity in terms of transformations	121	0.0	3.0	1.26	1.21	69	0.0	3.0	2.03	0.64	69	0.0	3.0	2.09	0.74	69	0.0	3.0	1.32	0.90
Similarity of triangles	121	0.0	3.0	1.52	1.28	76	1.0	3.0	2.03	0.69	76	0.0	3.0	2.09	0.72	76	0.0	3.0	1.49	0.90
Similarity of other figures	121	0.0	3.0	1.02	1.14	61	1.0	3.0	1.92	0.69	61	0.0	3.0	1.89	0.71	61	0.0	3.0	1.43	0.94
Parallel lines	121	0.0	3.0	1.31	1.12	79	1.0	3.0	1.94	0.74	79	0.0	3.0	1.78	0.80	79	0.0	3.0	1.37	0.96
Classifying polygons	121	0.0	3.0	0.92	1.12	56	1.0	3.0	2.09	0.70	56	0.0	3.0	2.00	0.79	56	0.0	3.0	1.34	0.90
Triangles	121	0.0	3.0	1.74	1.18	92	1.0	3.0	2.09	0.64	92	0.0	3.0	2.09	0.67	92	0.0	3.0	1.54	0.84
Quadrilaterals	121	0.0	3.0	1.18	1.20	67	1.0	3.0	2.04	0.66	67	0.0	3.0	2.09	0.67	67	0.0	3.0	1.54	0.77
Other polygons	121	0.0	3.0	0.64	0.92	47	0.0	3.0	1.77	0.79	47	0.0	3.0	1.74	0.71	47	0.0	3.0	1.34	0.87

	<u>Level of Coverage</u>					<u>Cognitive Demand Emphasis</u>														
						Recall/Perform Procedures					Demonstrate/Communicate Understanding					Generalize				
Pythagorean theorem	121	0.0	3.0	1.36	1.05	85	1.0	3.0	2.21	0.71	85	0.0	3.0	1.86	0.73	85	0.0	3.0	1.67	0.86
Right triangles	122	0.0	3.0	1.83	1.14	97	1.0	3.0	2.05	0.62	97	0.0	3.0	2.00	0.75	97	0.0	3.0	1.73	0.82
Circles (arc length and area)	122	0.0	3.0	0.89	1.23	45	0.0	3.0	2.00	0.67	45	0.0	3.0	2.13	0.76	46	0.0	3.0	1.50	0.72
Circles (chords, tangents, and secants)	122	0.0	3.0	0.75	1.17	39	1.0	3.0	2.23	0.63	39	1.0	3.0	2.13	0.57	39	0.0	3.0	1.46	0.72
3-D relationships	122	0.0	3.0	0.48	0.93	31	0.0	3.0	1.90	0.87	31	0.0	3.0	1.55	0.77	31	0.0	2.0	1.23	0.81
Classifying and describing 3-D figures	122	0.0	3.0	0.54	0.90	38	1.0	3.0	2.05	0.80	38	0.0	3.0	1.66	0.71	38	0.0	3.0	1.26	0.86
Structure of 3-D figures	122	0.0	3.0	0.36	0.75	26	0.0	3.0	1.81	0.85	26	0.0	3.0	1.38	0.80	27	0.0	3.0	1.19	0.79
Polyhedra	122	0.0	3.0	0.17	0.59	11	1.0	3.0	1.73	0.79	11	0.0	3.0	1.64	0.81	11	0.0	3.0	1.55	1.04
Cylinders, cones, and spheres	122	0.0	3.0	0.93	1.13	57	1.0	3.0	2.05	0.74	57	0.0	3.0	1.86	0.79	57	0.0	3.0	1.53	0.85
Geometric constructions	122	0.0	3.0	0.49	0.87	34	1.0	3.0	2.03	0.72	34	0.0	3.0	1.76	0.82	34	0.0	3.0	1.18	0.83
Loci	122	0.0	2.0	0.06	0.27	6	0.0	2.0	1.17	0.75	6	0.0	2.0	0.83	0.75	6	0.0	2.0	1.00	0.63
Analytic or coordinate geometry	122	0.0	3.0	0.78	1.09	45	1.0	3.0	1.96	0.56	45	0.0	3.0	2.04	0.82	45	0.0	3.0	1.60	0.78
Symmetry	122	0.0	3.0	0.85	0.98	61	1.0	3.0	1.79	0.73	61	0.0	3.0	1.75	0.81	62	0.0	3.0	1.31	0.97
Geometric modeling	122	0.0	3.0	0.60	0.99	37	1.0	3.0	1.70	0.66	37	0.0	3.0	1.84	0.73	37	0.0	3.0	1.84	0.90
Geometric patterns	122	0.0	3.0	0.22	0.62	17	1.0	3.0	1.76	0.83	17	0.0	3.0	1.71	0.77	17	0.0	3.0	1.47	1.01
Non-Euclidian geometry	122	0.0	3.0	0.09	0.43	6	1.0	2.0	1.67	0.52	6	1.0	3.0	1.83	0.75	6	1.0	3.0	1.83	0.75
Topology	122	0.0	3.0	0.04	0.33	2	2.0	2.0	2.00	0.00	2	2.0	2.0	2.00	0.00	2	2.0	2.0	2.00	0.00

	<u>Level of Coverage</u>					<u>Cognitive Demand Emphasis</u>														
						Recall/Perform Procedures					Demonstrate/Communicate Understanding					Generalize				
<u>Trigonometry</u>																				
	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD
OVERALL	121	0.0	3.0	0.89	0.74	94	1.0	3.0	2.04	0.63	94	0.0	3.0	1.90	0.61	94	0.0	3.0	1.49	0.75
Basic ratios	121	0.0	3.0	1.58	1.15	88	1.0	3.0	2.10	0.71	88	0.0	3.0	1.98	0.68	88	0.0	3.0	1.49	0.86
Radian measure	121	0.0	3.0	0.58	0.94	38	0.0	3.0	2.00	0.90	38	0.0	3.0	1.68	0.78	38	0.0	3.0	1.08	0.85
Right-triangle trigonometry	121	0.0	3.0	1.60	1.31	78	1.0	3.0	2.18	0.70	78	0.0	3.0	2.04	0.61	78	0.0	3.0	1.77	0.87
Law of Sines and Cosines	121	0.0	3.0	0.75	1.10	43	1.0	3.0	2.26	0.69	43	0.0	3.0	1.88	0.73	43	0.0	3.0	1.56	0.88
Identities	121	0.0	3.0	0.38	0.76	29	1.0	3.0	1.83	0.71	29	0.0	3.0	1.72	0.75	29	0.0	3.0	1.28	0.88
Trigonometric equations	121	0.0	3.0	0.48	0.97	27	1.0	3.0	1.96	0.81	27	0.0	3.0	1.78	0.70	27	0.0	3.0	1.52	0.85

The following tables show the average level of coverage and cognitive demand emphasis for teachers who identified Integrated Math II as their target math class. The first table presents these data for all IM II teachers, while the second table shows IM II teachers' average level of coverage by the achievement level of students in their target math class.

Average Level of Coverage & Cognitive Demand Emphasis by Math Domain for Integrated Math II Teachers Only

Math Domain	Level of Coverage					Cognitive Demand Emphasis														
						Recall/Perform Procedures					Demonstrate/Communicate Understanding					Generalize				
	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD
Number Properties & Operations	48	0.1	3.0	1.78	0.68	48	0.5	3.0	1.81	0.50	48	0.5	3.0	1.75	0.56	48	0.0	3.0	1.53	0.62
Basic Algebra	48	0.7	2.8	2.03	0.47	48	1.0	2.9	1.89	0.46	48	1.0	2.8	1.93	0.44	48	0.4	3.0	1.63	0.60
Advanced Algebra	47	0.5	2.5	1.21	0.42	47	1.0	3.0	2.07	0.44	47	0.63	2.67	1.91	0.44	47	0.0	3.0	1.47	0.76
Functions	47	0.3	2.5	1.30	0.52	47	1.0	2.6	1.82	0.43	47	0.8	3.0	1.90	0.50	47	0.0	3.0	1.57	0.71
Geometric Concepts	47	0.0	2.1	0.91	0.45	46	1.0	2.8	1.84	0.49	46	0.1	3.0	1.90	0.53	46	0.0	3.0	1.4	0.72
Trigonometry	47	0.3	2.5	1.13	0.49	47	1.0	3.0	2.11	0.61	47	0.0	3.0	1.92	0.55	47	0.0	3.0	1.56	0.77

Note. 1 teacher only completed the “Number Properties & Operations” and “Basic Algebra” sections. Another teacher chose “0” for level of coverage on all Geometry items.

Average Level of Coverage in Integrated Math II Classes by Achievement Level of Target Math Class

Math Domain	Achievement Level of Target Math Class															
	High (N = 6)				Average (N = 7)				Low (N = 16)				Mixed (N=19)			
	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD
Number Properties & Operations	0.1	3.0	1.81	1.05	0.3	2.9	1.75	0.86	0.6	3.0	1.85	0.59	0.6	2.8	1.72	0.60
Basic Algebra	1.5	2.7	2.18	0.51	1.7	2.8	2.25	0.42	1.3	2.8	2.05	0.43	0.7	2.7	1.89	0.48
Advanced Algebra	1.1	2.0	1.40	0.33	0.6	1.9	1.20	0.49	0.5	2.5	1.20	0.53	0.7	1.9	1.17	0.33
Functions	1.0	2.5	1.63	0.56	0.4	1.8	1.12	0.49	0.8	2.4	1.38	0.46	0.3	2.1	1.20	0.54
Geometric Concepts	0.7	2.1	1.30	0.47	0.0	1.1	0.78	0.42	0.1	1.7	0.90	0.49	0.4	1.8	0.83	0.37
Trigonometry	0.8	2.3	1.36	0.59	0.3	1.3	0.81	0.37	0.5	1.7	1.22	0.40	0.5	2.5	1.10	0.53

Note. 1 teacher in the “Mixed” category only completed the “Number Properties & Operations” and “Basic Algebra” sections of the survey.