



Psychometric Research Brief

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Linking Measures of Academic Progress in Mathematics and Maryland School Assessment in Mathematics

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This brief analyzes data collected from a pilot administration of the Measures of Academic Progress in Mathematics (MAP-M) in Montgomery County Public Schools (MCPS) during 2010–2011. The brief examines validity evidence of MAP-M in predicting success on the Maryland School Assessment (MSA) Math. The information in the brief may be used for monitoring student growth toward meeting Maryland state performance standards before the next generation of state assessment is in place in 2013–2014. In addition to monitoring student growth over time, MAP-M provides benchmark assessments for learning and may be used to help guide instruction.

Background

MAP-M is a computerized adaptive test developed by the Northwest Evaluation Association (NWEA) to measure academic achievement and growth in mathematics. It is designed to provide data for educators to develop targeted instruction for students. MAP-M measures five major goals including number process, statistics/probability, algebra, geometry, and measurement.

MAP-M is administered in a group setting and adjusted to each individual student's performance level (NWEA, 2009). The difficulty of each question is based on the accuracy of a student's responses on prior questions. If the student answers correctly, questions become more difficult (NWEA, 2009). Although the tests are not timed, it usually takes students about one hour to complete the MAP-M test. RIT (Rasch Unit) scores, content goal scores, and percentile ranks are reported for MAP-M.

In 2010–2011, the MAP-M was piloted on students in Grades 3–8 from 29 elementary schools and 14 middle schools of MCPS. Schools used their own criteria to select students for MAP-M participation. The pilot administration was intended to explore the use of MAP-M in relation to classroom instruction and MSA Math.

MSA Math is a mathematics achievement test in Maryland that meets the testing requirements of the

No Child Left Behind Act of 2001. MSA Math measures five major objectives: algebra, geometry/measurement, statistics/probability, process, and numbers/computation. The test is administered each spring for students in Grades 3–8. Student performance on the MSA Math is classified as basic, proficient, or advanced.

The brief examines predictive validity of winter MAP-M as related to spring MSA Math and concurrent validity of spring MAP-M as related to spring MSA Math, and establishes minimum (or threshold) scores of MAP-M to be successful on MSA Math.

Validity. One purpose of administering MAP-M in MCPS is to provide information about student progress toward meeting the state performance standards. Therefore it is important to examine validity evidence of the intended use of MAP-M.

Predictive validity exists when a measure can be used to predict scores on another measure in the future (Messick, 1993). The relationship between winter MAP-M and spring MSA Math can provide predictive validity evidence.

Concurrent validity exists when a measure yields scores that are closely related to scores on another test administered at the same time (Messick, 1993). The testing windows of spring MAP-M and MSA Math are very close. Therefore, concurrent validity may be studied for spring MAP-M as related to MSA Math.

Differential validity exists when there are differences in the magnitude of the relationship for different groups (Linn, 1978). Differential validity is important because it has relevance for the issues of test bias and fair test use.

Score Linking. Even though MAP-M and MSA Math measure similar mathematics skills, they are not developed according to the same test specifications. However, the MAP-M RIT scores and MSA Math

scores can be linked through statistical procedures as is done for SAT and ACT scores (College Board, 2009).

Methodology

Research Questions

This study addresses the following four research questions:

- Who were the participants in the 2010–2011 pilot and what was their performance on the MAP-M and MSA Math?
- Did winter and spring MAP-M RIT scores provide predictive and concurrent validity evidence as related to MSA Math scores?
- Did the relationship between MAP-M and MSA Math differ by gender and racial/ethnic groups?
- What were the winter and spring MAP-M threshold scores linked to proficient and advanced levels on MSA Math?

Sample

The analytical sample included MCPS students in Grades 3–8 who took the MAP-M in the fall, winter, and spring of 2010–2011 as well as the 2011 MSA Math. Analyses were conducted with individual student data. Most of the test takers in the pilot took the MAP-M in winter and spring of 2010–2011. Therefore, the analyses were done based on winter and spring examinees. Students who took the Alternate MSA were excluded because the test scores were on a different scale.

Analytical Procedures

First, correlation analyses were conducted. A correlation indicates how variables are linearly related. Correlation coefficients greater than an absolute value of 0.5 are regarded as large (Cohen, 1988). Pearson correlation coefficients for the winter MAP-M RIT scores and MSA Math scale scores were calculated to examine predictive validity, while correlation coefficients for the spring MAP-M RIT scores and MSA Math scale scores were computed to examine concurrent validity. Correlation by subgroup was calculated to examine differential validity by student groups.

Second, an equipercentile method was used to link spring MAP-M and MSA Math. The linking is based on student scores of equivalent percentile ranks on the two tests (Holland & Dorans, 2006). The method has been used to link the SAT and ACT scores (College Board, 2009). The method also has been

used by NWEA to link the MAP-M to some state assessments (NWEA, 2010).

Results

Pilot Participants

As shown in Table 1, 306 students in Grades 6–8 took the fall MAP-M. In Grades 3–8, 14,723 students took the winter MAP-M, and 15,089 students took the spring MAP-M in 2010–2011, respectively. More than 2,000 students in each grade took the MAP-M in winter and spring of 2010–2011. Information about winter and spring examinees by subgroups is provided in Table A1 (Appendix).

Table 1
Test Takers of MAP-M by Test Administration in 2010–2011

	Fall	Winter	Spring
	<i>N</i>	<i>N</i>	<i>N</i>
Total	306	14,723	15,089
Grade 3	0	2,402	2,415
Grade 4	0	2,261	2,280
Grade 5	0	2,272	2,271
Grade 6	107	2,503	2,703
Grade 7	98	2,594	2,765
Grade 8	101	2,691	2,655

Performance on MAP-M

Table 2 presents median MAP-M RIT scores for the MCPS winter and spring examinees in the pilot. Table 2 also includes the national median¹ on MAP-M for comparison purposes (NWEA, 2011).

The pilot students in Grades 3–5 had higher median scores than students nationally in winter and spring of 2010–2011. The pilot students in Grades 6–8 had median scores at the same level as the national ones in winter, but their scores were lower than the national ones in spring.

¹ National medians were based on NWEA’s 2011 norm group including Grades K–11 samples of at least 20,000 students per grade. These samples were randomly drawn from a test records pool of 5.1 million students from 13,000 schools of more than 2,700 school districts in 50 states.

Table 2
MAP-M Median RIT Scores by
Test Administration in 2010–2011

	Pilot	National	Pilot	National
	winter	winter	spring	spring
	Median	Median	Median	Median
Grade 3	203	199	207	203
Grade 4	213	209	217	213
Grade 5	223	218	227	221
Grade 6	222	223	224	226
Grade 7	227	228	228	231
Grade 8	233	233	234	235

Note. National averages (median is the score at 50th percentile rank) are obtained from MAP-M 2011 norm data.

Student performance on MAP-M by grade and subgroup is provided in Table A2 (Appendix). Across all grades, Asian and White students had the highest performance on winter MAP-M, followed by students of two or more races. Hispanic/Latino and Black or African American students performed at the lowest levels among ethnic groups (Table A2). The same pattern existed for spring MAP-M (Table A3, in the Appendix).

Performance on MSA Math

Students in the pilot performed lower on 2010–2011 MSA Math than all MCPS students in that grade level (Table 3). For example, 11.1% of all MCPS Grade 3 students scored basic on 2010–2011 MSA Math, compared to 14.3% of Grade 3 students in the pilot. The same pattern was observed for all other grades. The achievement gaps between all MCPS students and pilot students were larger in middle school than in elementary school. Please note that pilot students also were included in all MPCS students.

Table 3
Student Performance on MSA Math by Grade in
2010–2011

		MSA Math		
		% Basic	% Proficient	% Advanced
Grade 3	MCPS	11.1	47.1	41.8
	Pilot	14.3	51.2	34.5
Grade 4	MCPS	8.9	38.9	52.2
	Pilot	10.9	45.4	43.7
Grade 5	MCPS	13.8	53.1	33.1
	Pilot	17.1	55.5	27.4
Grade 6	MCPS	16.3	45.6	38.0
	Pilot	24.3	53.0	22.7
Grade 7	MCPS	19.3	46.2	34.5
	Pilot	30.8	50.0	19.2
Grade 8	MCPS	25.3	32.0	42.7
	Pilot	38.6	36.4	24.9

Percentage proficient on 2010–2011 MSA Math for students in the MAP-M pilot is provided by subgroup in Table A4 for Grades 3–5 and Table A5 for Grades 6–8 (Appendix). Across all grades, White and Asian students had the highest performance on MSA Math, followed by students of two or more races.

Hispanic/Latino and Black or African American students performed at the lowest levels among ethnic groups. For example, in Grade 8 in the pilot study, 49.2% of Hispanic/Latino and 47% of Black or African American students scored at the basic level on MSA Math, compared to 17% White and 17.8% Asian students who scored basic (Table A5).

Predictive and Concurrent Validity of MAP-M

If the MAP-M can predict MSA Math, then a high correlation should exist between the two tests. Correlation coefficients range from -1 to +1. If a positive correlation exists between the MAP-M and MSA Math, it means that students who score higher on one test will also score higher on the other. The closer the correlation is to 1, the stronger the relationship is.

As shown in Table 4, correlations between winter MAP-M and spring MSA Math in 2010–2011 were high, ranging from .82 to .87. The high correlation makes it possible to predict spring MSA Math scores based on winter MAP-M RIT scores.

Table 4
Correlation Between MAP-M RIT Scores and MSA
Math Scale Scores by Grade in 2010–2011

	Winter MAP-M & MSA Math	Spring MAP-M & MSA Math
Grade 3	.82	.83
Grade 4	.87	.87
Grade 5	.86	.85
Grade 6	.85	.83
Grade 7	.87	.86
Grade 8	.87	.87

Correlations between spring MAP-M and spring MSA Math are also high, ranging from .83 to .87 (Table 4). The strong correlations provide concurrent validity evidence for spring MAP-M as related to MSA Math.

Presented in Tables A6–A7 (Appendix) were correlations between five MAP-M goal scores (number process, statistics/probability, algebra, geometry, and measurement) and five MSA Math objective scores (algebra, geometry/measurement, statistics/probability, numbers/computation, and process). The correlation coefficients range from .48 to .74 among MSA objective scores and MAP-M goal scores.

Because objective and goal scores have fewer test items compared to the entire tests, the correlation among MSA objective and MAP-M goal scores are lower compared with the correlations between MSA total scale scores and MAP-M RIT scores. However, the relationships among objective and goal scores were still very strong.

The strong correlation between winter MAP-M and MSA Math provides predictive validity evidence to support the use of MAP-M for monitoring student progress towards meeting Maryland state performance. The strong correlation between spring MAP-M and MSA Math provides concurrent validity evidence to support the use of spring MAP-M as another criterion measuring MSA Math performance.

Differential Validity

Table 5 shows a strong correlation between winter MAP-M and MSA Math by gender and race/ethnicity. No obvious gender differences were observed. This means that winter MAP-M scores predict MSA Math performance equally well for male and female students, and there is no evidence of differential validity. The correlation was high across all ethnic groups in Grades 3–8 (Table 5). For example, coefficients in Grade 3 range from .75 for Hispanic/Latino students to .84 for Black or African American students. This means that the prediction is slightly better for Black or African American students compared to Hispanic/ Latino students.

Table 5
Correlation Between Winter MAP-M RIT Scores and MSA Math Scale Scores by Grade and Subgroup in 2010–2011

	Grade					
	3	4	5	6	7	8
Gender						
Female	.83	.88	.86	.85	.87	.87
Male	.83	.86	.86	.85	.86	.87
Race						
AS	.76	.81	.85	.84	.87	.89
BL	.84	.84	.83	.80	.82	.83
HI	.75	.85	.84	.83	.82	.84
WH	.76	.81	.82	.81	.85	.87

Note. AS = Asian; BL = Black or African American; HI = Hispanic/Latino; WH = White.

Table 6 shows the correlations between spring MAP-M and MSA Math scores. The pattern is the same as observed in Table 5. Despite small coefficient fluctuation, there is no strong evidence of differential validity for different ethnic groups. This means that the MAP-M and MSA Math are strongly related for each racial/ethnic group.

Table 6
Correlation Between Spring MAP-M RIT Scores and MSA Math Scale Scores by Grade and Subgroup in 2010–2011

	Grade					
	3	4	5	6	7	8
Gender						
Female	.84	.89	.85	.84	.87	.87
Male	.84	.87	.86	.82	.86	.88
Race						
AS	.77	.84	.80	.85	.83	.87
BL	.84	.85	.83	.80	.83	.85
HI	.76	.86	.82	.80	.83	.84
WH	.79	.82	.83	.79	.86	.87

Note. AS = Asian; BL = Black or African American; HI = Hispanic/Latino; WH = White.

The consistent magnitude of the correlation coefficients across gender subgroups and across racial/ethnic subgroups for predictive validity and for concurrent validity indicates there is no evidence of differential validity.

Linking MAP-M and MSA Math

Because of a strong correlation between MAP-M and MSA Math, scores on MAP-M may be linked to MSA Math with the equipercentile linking method. After linking, threshold RIT scores associated with MSA Math proficient or advanced levels were identified (Table 7). These threshold scores are associated with a high likelihood of success on the MSA.

For example, Grade 3 students with a winter MAP-M RIT score of 189 were likely to be proficient on MSA Math. The RIT score of 189 in winter is equivalent to the minimum score for predicting success at the proficient level on MSA Math in spring. A Grade 3 student who scored proficient on MSA Math also was very likely to score 192 RIT on spring MAP-M.

Table 7
 MAP-M Winter and Spring Threshold RIT Scores
 Associated With Proficient or Advanced Levels on
 MSA Math in 2010–2011

	Winter MAP-M threshold RIT score		Spring MAP-M threshold RIT score	
	Prof.	Advanced	Prof.	Advanced
Grade 3	189	209	192	212
Grade 4	195	216	198	219
Grade 5	208	233	210	237
Grade 6	211	235	212	235
Grade 7	218	242	219	242
Grade 8	228	244	228	244

Note. Prof. = proficient.

It is important to keep in mind that threshold scores are estimated based on group performance. There are error terms when applied to individual students. For example, the Grade 3 winter threshold is 189. The standard error for 189 is 3. This means that a Grade 3 student can actually score between 186 and 192 in winter.

In addition, reports associated with MAP-M are useful in interpreting RIT scores and determining how these data may be used to guide instruction. These data and the associated reports provide information about student performance on grade level content as defined by MSA assessment limits.

Conclusion

The results of the pilot MAP-M administration have shown high correlation between MAP-M and MSA Math scores in 2010–2011. The high correlation makes it possible to predict student performance on the MSA Math based on winter MAP-M RIT scores.

At the same time, the high correlation between spring MAP-M and spring MSA Math provides evidence of concurrent validity to support the use of MAP-M for monitoring student progress toward meeting Maryland performance standards.

The reasonably high correlation between MSA objective scores and MAP-M goal scores can help teachers to identify student's strength and weakness in mathematics and provide targeted support for instruction purposes.

The analyses indicate students who fail to score higher than the threshold scores on MAP-M (Table 7) in winter are at higher risk for not scoring proficient or advanced on MSA Math. The earlier a student reaches spring threshold scores during a school year, the more likely he/she will be to score proficient or

advanced on the MSA Math. The threshold scores should be used as one measure along with others in predicting MSA success.

Despite small fluctuations across ethnic groups, the strong relationship between students' MAP-M and MSA Math exists regardless of gender and race/ethnicity. Lack of differential validity provides evidence for use of MAP-M.

It should be noted that due to the adaptive nature of MAP-M, a student's response to each test item determines the difficulty of the next test item. Low level of effort by students will yield inaccurate RIT scores and misguide instructional decisions for these students (Hauser & Kingsbury, 2009). Therefore, students should be encouraged to demonstrate their highest level of effort during any MAP-M testing administration.

Readers need to be aware of the following limitations of the study. First, the results are based on a pilot MAP-M administration with 20% of MCPS students participating in each grade. Verification of the results with more data is necessary. Second, student motivation may impact their RIT scores because their scores in the MAP-M pilot were not reported at the individual student level. It is also possible that middle schools were more likely to administer MAP-M to low-performing students, given the gaps between all MCPS students and pilot students on the MSA.

Recommendations

Based on the pilot study results, the following recommendations are suggested:

- Administer MAP-M to all students in Grades 3–8, if feasible.
- Encourage students to demonstrate their best effort from the beginning of each MAP-M test administration.
- Analyze NWEA and *myMCPS* MAP-M reports to provide meaning to RIT scores to assist in guiding instruction of the MCPS curriculum.
- Use MAP-M goal scores in addition to the MCPS curriculum resources (e.g., formative assessments, checks for understanding, diagnostic tools) to determine student's strengths and weaknesses in mathematics for instructional purposes.
- Provide support to students who score below the winter MAP-M threshold RIT scores associated with the proficient level on the MSA Math.
- Verify the identified relationships between MAP-M and MSA Math when more data are available.

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Appendix

Table A1
MCPS Grades 3–8 Test Takers of MAP-M in 2010–2011 Pilot

	Fall		Winter		Spring	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Total	306		14723		15089	
Female	153	50.0	7342	49.9	7511	49.8
Male	153	50.0	7381	50.1	7578	50.2
American Indian	1	0.3	25	0.2	22	0.1
Asian	16	5.2	1746	11.9	1762	11.7
Black or African American	80	26.1	4039	27.4	4376	29.0
Hispanic/Latino	190	62.1	5035	34.2	5153	34.2
Two or More Races	3	1.0	670	4.6	663	4.4
Pacific Islanders	0	0.0	7	0.0	7	0.0
White	16	5.2	3201	21.7	3106	20.6
Non-FARMS	96	31.4	7886	53.6	7957	52.7
FARMS	210	68.6	6837	46.4	7132	47.3
Non-ESOL	263	85.9	12960	88.0	13205	87.5
ESOL	43	14.1	1763	12.0	1884	12.5
Non-SE	257	84.0	13468	91.5	13779	91.3
SE	49	16.0	1255	8.5	1310	8.7

Note. FARMS refers to receipt of Free and Reduced-price Meals System services. ESOL refers to receipt of English for Speakers of Other Languages services. SE refers to receipt of special education services.

Table A2
Mean and Standard Deviation of Winter MAP-M RIT Scores by Grade and Subgroup
in 2010–2011 Pilot

	Winter MAP-M RIT Scores in 2010–2011																	
	Grade 3			Grade 4			Grade 5			Grade 6			Grade 7			Grade 8		
	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD
All	2402	204.1	14.4	2261	214.1	15.3	2272	223.1	15.8	2503	222.3	15.9	2594	227.3	16.9	2691	232.0	17.7
Female	1185	204.1	13.6	1103	213.5	14.5	1163	222.5	15.1	1272	222.6	15.6	1279	227.2	16.4	1340	231.3	17.5
Male	1217	204.0	15.2	1158	214.7	15.9	1109	223.8	16.6	1231	222.0	16.3	1315	227.5	17.3	1351	232.8	18.0
AS	311	213.1	14.2	308	221.6	14.0	293	230.1	14.9	275	232.5	14.9	260	238.7	15.7	299	241.8	17.0
BL	577	197.9	12.1	546	207.7	13.2	548	217.4	14.3	764	218.2	14.4	780	222.8	15.5	824	227.8	15.7
HI	771	198.2	12.0	698	207.3	13.1	683	216.5	14.1	933	217.4	14.1	968	222.0	14.6	982	226.8	17.0
MU	130	208.5	14.0	127	221.6	14.1	126	227.5	14.5	96	226.1	17.3	101	233.8	17.3	90	237.9	16.2
WH	611	211.9	13.0	577	222.6	13.5	619	231.2	14.2	431	232.7	14.4	474	238.0	15.4	489	242.9	15.6
FARMS	1059	197.2	12.2	939	206.3	13.2	936	215.6	14.1	1279	216.5	13.8	1284	221.3	14.9	1340	225.7	16.4
ESOL	558	195.2	10.9	385	201.9	12.2	265	208.2	14.2	215	207.3	12.6	166	209.0	17.0	174	211.0	18.4
SE	184	193.9	15.2	182	206.6	16.4	180	213.4	15.6	223	211.9	15.5	239	214.9	16.0	247	219.0	15.9

Note. AS = Asian; BL = Black or African American; HI = Hispanic/Latino; MU = Two or More Races; WH = White. FARMS refers to receipt of Free and Reduced-price Meals System services. ESOL refers to receipt of English for Speakers of Other Languages services. SE refers to receipt of special education services. Data are not shown for groups with less than five students.

Table A3
Mean and Standard Deviation of Spring MAP-M RIT Scores by Grade and Subgroup
in 2010–2011 Pilot

	Spring MAP-M RIT Scores in 2010–2011																	
	Grade 3			Grade 4			Grade 5			Grade 6			Grade 7			Grade 8		
	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD
All	2415	207.8	14.5	2280	217.7	16.1	2271	227.2	16.4	2703	223.7	15.8	2765	228.0	16.7	2655	232.7	18.3
Female	1204	207.8	13.7	1115	217.0	15.3	1164	226.6	15.8	1365	223.6	15.0	1358	227.6	16.3	1305	231.8	17.8
Male	1211	207.8	15.3	1165	218.3	16.9	1107	227.8	17.0	1338	223.9	16.6	1407	228.3	17.2	1350	233.5	18.8
AS	314	216.8	13.6	312	225.2	14.7	292	235.3	15.4	272	233.8	14.5	275	237.6	13.8	297	241.7	17.6
BL	574	201.4	12.5	545	210.9	14.5	549	221.2	15.2	879	221.0	14.4	924	224.9	15.1	905	229.2	16.7
HI	784	201.7	11.8	709	210.8	14.1	686	220.2	14.5	1031	218.9	14.4	1016	222.6	15.8	927	227.3	17.3
MU	130	212.3	14.0	129	224.8	14.4	125	231.6	14.8	100	226.6	17.9	95	234.3	16.4	84	240.7	16.7
WH	611	216.2	13.0	580	226.6	13.9	615	235.5	14.5	417	234.1	14.4	445	239.2	15.4	438	243.7	16.8
FARMS	1065	200.9	12.2	950	209.6	14.2	936	219.4	14.5	1432	218.5	14.2	1402	222.5	15.6	1347	227.0	17.0
ESOL	569	199.2	11.4	388	205.2	12.7	271	212.4	15.0	261	210.3	13.7	200	209.6	18.2	195	210.7	19.4
SE	179	198.0	14.8	190	208.9	18.0	180	216.7	16.9	261	212.5	15.4	264	216.6	15.6	236	219.5	15.8

Note. AS = Asian; BL = Black or African American; HI = Hispanic/Latino; MU = Two or More Races; WH = White. FARMS refers to receipt of Free and Reduced-price Meals System services. ESOL refers to receipt of English for Speakers of Other Languages services. SE refers to receipt of special education services. Data are not shown for groups with less than five students.

Table A4
Percentages of Students Scoring Basic, Proficient, and Advanced on 2011 MSA Math in Grades 3–5
by Subgroup in 2010–2011 Pilot

	2011 MSA Math											
	Grade 3				Grade 4				Grade 5			
	<i>N</i>	% Basic	% Prof.	% Adv.	<i>N</i>	% Basic	% Prof.	% Adv.	<i>N</i>	% Basic	% Prof.	% Adv.
All	2441	14.3	51.2	34.5	2309	10.9	45.4	43.7	2294	17.1	55.5	27.4
Female	1211	13.0	49.8	37.2	1131	10.0	45.3	44.7	1176	16.6	56.3	27.1
Male	1230	15.6	52.5	31.9	1178	11.8	45.6	42.6	1118	17.6	54.7	27.6
AS	315	5.4	34.6	60.0	315	3.5	31.7	64.8	294	7.5	46.3	46.3
BL	585	23.9	57.6	18.5	555	18.2	57.3	24.5	555	25.2	60.0	14.8
HI	792	19.4	64.4	16.2	722	17.0	55.4	27.6	692	26.6	60.4	13.0
MU	130	11.5	36.2	52.3	130	2.3	34.6	63.1	127	8.7	58.3	33.1
WH	617	3.7	39.7	56.6	582	2.4	32.0	65.6	622	5.6	49.8	44.5
FARMS	1083	23.4	60.4	16.3	968	18.0	58.6	23.5	950	28.3	59.8	11.9
ESOL	578	26.1	63.1	10.7	395	29.4	57.5	13.2	274	42.3	52.2	5.5
SE	185	37.8	46.5	15.7	191	27.2	48.2	24.6	183	30.1	60.1	9.8

Note. AS = Asian; BL = Black or African American; HI = Hispanic/Latino; MU = Two or More Races; WH = White. FARMS refers to receipt of Free and Reduced-price Meals System services. ESOL refers to receipt of English for Speakers of Other Languages services. SE refers to receipt of special education services. Data are not shown for groups with less than five students.

Table A5
Percentages of Students Scoring Basic, Proficient, and Advanced on 2011 MSA Math in Grades 6–8
by Subgroup in 2010–2011 Pilot

	2011 MSA Math											
	Grade 6				Grade 7				Grade 8			
	<i>N</i>	% Basic	% Prof.	% Adv.	<i>N</i>	% Basic	% Prof.	% Adv.	<i>N</i>	% Basic	% Prof.	% Adv.
All	2937	24.3	53.0	22.7	3023	30.8	50.0	19.2	3039	38.6	36.4	24.9
Female	1494	23.4	54.0	22.6	1487	29.6	50.6	19.8	1511	38.6	37.4	24.0
Male	1443	25.3	52.0	22.7	1536	32.0	49.5	18.5	1528	38.7	35.5	25.9
AS	316	7.3	43.7	49.1	316	10.4	50.0	39.6	348	17.8	35.1	47.1
BL	953	31.2	55.9	12.9	993	38.5	51.1	10.5	1014	47.0	36.7	16.3
HI	1079	30.4	57.4	12.2	1079	39.7	52.4	8.0	1056	49.2	37.5	13.3
MU	113	22.1	49.6	28.3	114	22.8	45.6	31.6	96	24.0	36.5	39.6
WH	471	8.5	43.9	47.6	510	12.0	43.7	44.3	517	17.0	35.0	48.0
FARMS	1520	33.8	55.1	11.1	1495	42.5	49.7	7.8	1523	51.1	36.3	12.6
ESOL	265	50.2	45.7	4.2	206	68.9	28.2	2.9	215	72.1	22.8	5.1
SE	276	40.9	51.8	7.2	279	49.1	44.1	6.8	268	70.1	24.6	5.2

Note. AS = Asian; BL = Black or African American; HI = Hispanic/Latino; MU = Two or More Races; WH = White. FARMS refers to receipt of Free and Reduced-price Meals System services. ESOL refers to receipt of English for Speakers of Other Languages services. SE refers to receipt of special education services. Data are not shown for groups with less than five students.

Table A6
Correlation between Spring MAP-M and MSA Math Subscores for Grade 3–5 in 2010–2011 Pilot
Spring MAP-M Goal Scores

MSA Math Objective Scores	Number Process Goal 1	Statistics/Probability Goal 2	Algebra Goal 3	Geometry Goal 4	Measurement Goal 5
Grade 3					
Algebra	.65	.60	.67	.63	.65
Geometry/Measurement	.48	.49	.51	.48	.49
Statistics/Probability	.63	.61	.66	.64	.62
Numbers/Computation	.60	.58	.62	.60	.61
Process	.58	.56	.59	.57	.58
Grade 4					
Algebra	.60	.59	.61	.61	.60
Geometry/Measurement	.64	.67	.67	.66	.65
Statistics/Probability	.59	.59	.61	.62	.60
Numbers/Computation	.62	.61	.63	.63	.64
Process	.65	.65	.65	.65	.64
Grade 5					
Algebra	.61	.57	.61	.62	.62
Geometry/Measurement	.58	.60	.60	.60	.61
Statistics/Probability	.52	.53	.52	.53	.52
Numbers/Computation	.62	.62	.64	.64	.66
Process	.71	.69	.69	.71	.71

Table A7
Correlation between Spring MAP-M and MSA Math Subscores for Grade 6–8 in
2010–2011 Pilot

MSA Math Objective Scores	Spring MAP-M Goal Scores				
	Number Process Goal 1	Statistics/Probability Goal 2	Algebra Goal 3	Geometry Goal 4	Measurement Goal 5
Grade 6					
Algebra	.62	.59	.63	.64	.64
Geometry/Measurement	.57	.56	.60	.60	.60
Statistics/Probability	.58	.55	.60	.61	.62
Numbers/Computation	.57	.55	.60	.59	.62
Process	.66	.64	.67	.68	.68
Grade 7					
Algebra	.67	.60	.63	.64	.65
Geometry/Measurement	.63	.63	.65	.63	.64
Statistics/Probability	.65	.61	.65	.66	.64
Numbers/Computation	.61	.57	.61	.61	.62
Process	.69	.67	.67	.68	.68
Grade 8					
Algebra	.64	.63	.65	.63	.66
Geometry/Measurement	.61	.69	.68	.64	.65
Statistics/Probability	.69	.69	.70	.71	.70
Numbers/Computation	.60	.60	.63	.61	.62
Process	.73	.73	.74	.74	.73