

2018 Linking Study: Predicting Performance on the Massachusetts Comprehensive Assessment System (MCAS) based on MAP Growth Scores

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Executive Summary

This study produced a set of cut scores on MAP® Growth™ Reading and Mathematics for Grades K–8 that correspond to the Massachusetts Comprehensive Assessment System (MCAS) English Language Arts (ELA) and Mathematics achievement levels for each grade, as shown in Table 3.3 and Table 3.4 in Section 3.3. Equipercentile Linking Cut Scores. Bolded numbers indicate the cut scores considered to be at least proficient for accountability purposes. This study also used the 2015 NWEA norming study results to project a student’s probability to meet proficiency based on that student’s prior MAP Growth scores in fall and winter.

By using matched score data from a sample of MCAS students, the study demonstrates that MAP Growth scores can predict whether a student will reach proficiency on MCAS based on his or her MAP Growth scores, as shown by the classification accuracy results in Section 3.4. Classification Accuracy Summary Statistics. The overall classification accuracy rate ranges from 0.81 to 0.83 for ELA/Reading and 0.84 to 0.90 for Mathematics across all grades, suggesting that the MAP Growth cuts for each content area and grade are good predictors of students’ proficiency status on the MCAS test. For Grades K–2, the classification accuracy rate refers to how well the MAP Growth cuts can predict students’ proficiency status on the MCAS test in Grade 3. Consequently, the further back from Grade 3 that the cut scores were extrapolated, the lower the expected classification accuracy rate.

The results of this study can help educators predict student performance on the MCAS tests as early as possible and identify students at risk of failing to meet required standards so they can receive the necessary resources and assistance to meet their goals. However, some caution should be taken when using this information:

1. The tables provide information about scores on different tests that measure slightly different constructs. Therefore, the scores cannot be assumed to be interchangeable.
2. The sample data used in this study were collected from 73 schools in Massachusetts. Caution should be exercised when generalizing the results to students who differ significantly in characteristics from this sample.
3. Caution should be exercised if the linked scores are used for a subpopulation with sample sizes less than 1,000 within a grade and content area.

1. Introduction

1.1. Purpose of the Study

NWEA™ is committed to providing partners with useful tools to help make inferences about student learning from the MAP® Growth™ test scores. An important use of MAP Growth results is to predict a student's performance on the state summative assessment at different times throughout the year. This allows educators and parents to determine if a student is on track in their learning to meet state standards by the end of the year or, given a student's learning profile, is on track to obtain rigorous, realistic growth in their content knowledge and skills.

This document presents results from a linking study conducted by NWEA in May 2018 to statistically connect the scales of the Massachusetts Comprehensive Assessment System (MCAS) assessments with those of the MAP Growth assessments taken during the Spring 2017 term. Specifically, this report presents the following:

- Cut scores on the MAP Growth Reading and Mathematics scales for Grades 3–8 that correspond to the benchmarks on the MCAS ELA and Mathematics tests.
- Cut scores on the MAP Growth Reading and Mathematics scales for Grades K–2 that are extrapolated from the current Grade 3 cohort using the 2015 MAP Growth norms.
- Classification accuracy summary statistics based on estimated MAP Growth cut scores.
- The probability of meeting or exceeding grade-level proficiency on the MCAS assessments based on the observed MAP Growth scores taken during different terms in the same school year.

1.2. Assessment Overview

1.2.1. Massachusetts Comprehensive Assessment System (MCAS)

MCAS assessments include a series of achievement tests aligned to the Massachusetts Curriculum Framework administered to students in Grades 3–8 in ELA and Mathematics. In 2017, the MCAS ELA and Mathematics tests were administered in both computer-based and paper-based forms. For each grade and content area, there are three cut scores that distinguish between the following achievement levels. The Level 3 cut score demarks the minimum level of performance considered to be proficient for accountability purposes.

- Level 1: Not Meeting Expectations
- Level 2: Partially Meeting Expectations
- Level 3: Meeting Expectations
- Level 4: Exceeding Expectations

1.2.2. MAP Growth

MAP Growth Reading and Mathematics are computer adaptive interim assessments aligned to the Massachusetts Curriculum Framework. The MAP Growth Reading assessments are comparable to the Massachusetts Curriculum Framework in ELA. MAP Growth scores are reported on a vertical scale with a range of 100–350 in Rasch Unit (RIT). Each content area has its own scale. To aid interpretation of MAP Growth scores, NWEA periodically conducts norming studies of student and school performance on MAP Growth. The most recent MAP Growth norming study by Thum & Hauser (2015) employed multi-level growth models on nearly 500,000 longitudinal test scores from over 100,000 students that were weighted to create large, nationally representative norms.

2. Methods

2.1. Data Collection

This linking study was based on data from the MCAS and the MAP Growth assessments taken during Spring 2017. Massachusetts school districts were recruited by NWEA's Research Data Services team to participate in the study by sharing their student and score data for the target term. Districts also gave NWEA permission to access students' associated MAP Growth scores from NWEA's in-house database. NWEA made every effort to maximize district participation so that results could be robust and representative of all students taking the MCAS assessment.

Once Massachusetts state score information was received by participating districts, each student's state testing record was matched to their MAP Growth score. Matching was performed using the student's first and last names, date of birth, student ID, and other available identifying information. The final study sample included students for whom both MCAS and MAP Growth scores were available.

2.2. Equipercentile Linking Procedure

The equipercentile procedure (e.g., Kolen & Brennan, 2004) was used to link MCAS scores and MAP Growth scores. This procedure matches scores on the two scales that have the same percetile rank (i.e., the proportion of tests at or below each score).

Consider the linked scores between two tests. Let x represent a score on Test X (e.g., MCAS). Its equipercentile equivalent score on Test Y (e.g., MAP Growth), $e_y(x)$, can be obtained through a cumulative-distribution-based linking function defined in Equation 1:

$$e_y(x) = G^{-1}[P(x)] \quad (1)$$

where $e_y(x)$ is the equipercentile equivalent of score x on MCAS on the scale of MAP Growth, $P(x)$ is the percetile rank of a given score on Test X , and G^{-1} is the inverse of the percetile rank function for Test Y that indicates the score on Test Y corresponding to a given percetile. Polynomial loglinear pre-smoothing was applied to reduce irregularities of the score distributions and equipercentile linking curve.

Spring cuts for Grades K–2 were extrapolated from the current Grade 3 student cohort. Using NWEA's 2015 MAP Growth norms data, the previous grade's spring scores were determined by obtaining the score that corresponds to the same percetile rank as the current Grade 3 cuts.

2.3. Classification Accuracy Summary Statistics

The degree to which MAP Growth tests predict student proficiency status on MCAS tests can be described using classification accuracy statistics, which are important indicators for evaluating reliability and validity of classification results. Table 2.1 describes the classification accuracy statistics for MAP Growth as it relates to the MCAS tests.

Table 2.1. Classification Accuracy Data Associated with MAP Growth and MCAS

Classification Accuracy Statistic	Description*	Interpretation
Overall Classification Accuracy Rate	$(TP + TN) / (\text{total sample size})$	The proportion of students in the study sample whose proficiency classification on the state test was correctly predicted by MAP Growth cut scores (Pommerich, Hanson, Harris, & Scoring, 2004).
Sensitivity	$TP / (TP + FN)$	The proportion of proficient students who were correctly identified on the MAP Growth test as such.
Specificity	$TN / (TN + FP)$	The proportion of below-proficient students who were correctly identified on the MAP Growth test as such.
False Negative Rate	$FN / (FN + TP)$	The proportion of proficient students who were incorrectly predicted by MAP Growth test to be below proficiency.
False Positive Rate	$FP / (FP + TN)$	The proportion of below-proficient students who were incorrectly predicted by MAP Growth test to be proficient.
Area Under the Curve (AUC)	Area under the ROC curve	How well MAP Growth cut scores separate the study sample into proficiency categories that match those from the state test cut scores. An AUC at or above 0.80 is considered "good" accuracy.

*TN = true negatives. FP = false positives. FN = false negatives. TP = true positives. ROC = receiver operating characteristics.

2.4. Proficiency Projection

MAP Growth conditional growth norms provide students' expected score gains across testing seasons (Thum & Hauser, 2015). This information was used to estimate the previous fall and winter terms' MAP Growth scores that would meet the spring cut, considering the growth that is expected of the previous term's RIT value. Additionally, the growth norms data were used to calculate the probability of reaching proficiency on the MCAS test based on the student's MAP Growth scores from prior terms.

Equation 2 was used to determine the fall or winter MAP Growth score needed to reach the spring cut score, considering the expected growth associated with the previous RIT score:

$$RIT_{SpringCut} = RIT_{previous} + g \quad (2)$$

where:

- $RIT_{SpringCut}$ is the MAP Growth spring cuts
- $RIT_{previous}$ is the unknown fall or winter RIT score
- g is the expected growth from fall or winter to spring corresponding to $RIT_{previous}$.

Equation 3 was used to calculate the probability of a student achieving Level 3 (i.e., the proficient benchmark) on the MCAS test based on his or her fall or winter MAP Growth score:

$$Pr(\text{Achieving Level 3 in spring} | \text{starting RIT}) = \Phi \left(\frac{RIT_{previous} + g - RIT_{SpringCut}}{SD} \right) \quad (3)$$

where:

- Φ is a standardized normal cumulative distribution.
- $RIT_{previous}$ is the student's RIT score in fall or winter.
- g is the expected growth from fall or winter to spring corresponding to that previous RIT.
- $RIT_{SpringCut}$ is the MAP Growth Level 3 cut score for spring.
- SD is the conditional standard deviation of growth from fall or winter to spring.

Equation 4 was used to estimate the probability of a student achieving Level 3 on the MCAS test based on his or her spring score RIT_{Spring} :

$$Pr(\text{Achieving Level 3 in spring} \mid \text{spring RIT}) = \Phi \left(\frac{RIT_{Spring} - RIT_{SpringCut}}{SE} \right) \quad (4)$$

where SE is the standard error of measurement for MAP Growth.

3. Results and Discussion

3.1. Study Sample

A total of 73 schools across 8 districts in Massachusetts participated in this linking study. Table 3.1 provides the demographics of the study sample. For all content areas, there are 37.0% to 48.3% of students with not specified or other ethnicity information. There are 31.9% to 41.5% of white, followed by Black/African-American, Hispanic, Asian/Pacific Islander (PI), Other/Multi-Racial (Other/MR), and American Indian/Alaska Native (AI/AN). There are about 50% of students who are females or males. The high percent of not specified ethnicity is likely due to the fact that ethnicity is not the required information for schools to provide. To better evaluate the study sample in the future, students' demographic information needs to be provided or collected. As a result, caution should be exercised when generalizing the results to students from non-participating schools.

Table 3.1. Demographics of the Study Sample

Content Area	Grade	N	Race/Ethnicity*							Gender	
			White	Black	Hispanic	Asian/PI	AI/AN	Other/MR	Not Spec.	Female	Male
ELA/ Reading	3	2,389	35.2%	8.5%	4.3%	2.4%	0.1%	1.2%	48.3%	49.4%	50.4%
	4	2,650	41.5%	7.7%	2.9%	3.9%	0.2%	0.7%	43.1%	50.2%	49.7%
	5	2,516	40.4%	8.5%	2.0%	4.0%	0.2%	0.9%	44.0%	51.4%	48.5%
	6	2,045	35.0%	8.8%	7.1%	2.5%	0.1%	1.2%	45.2%	49.7%	50.0%
	7	1,414	31.9%	5.0%	18.7%	1.1%	0.1%	2.6%	40.5%	50.1%	49.6%
	8	1,218	32.5%	6.9%	20.2%	1.1%	0.0%	1.6%	37.8%	49.7%	50.0%
Mathematics	3	2,649	35.1%	9.2%	3.9%	2.9%	0.1%	1.1%	47.6%	49.2%	50.6%
	4	2,858	40.8%	8.3%	2.7%	4.5%	0.1%	0.7%	43.0%	50.1%	49.9%
	5	2,835	39.4%	9.2%	1.7%	4.4%	0.2%	0.8%	44.3%	50.9%	49.0%
	6	2,436	34.2%	9.6%	6.1%	3.2%	0.2%	1.0%	45.7%	50.4%	49.4%
	7	1,381	32.7%	4.8%	19.8%	1.0%	0.1%	2.8%	38.7%	50.0%	49.7%
	8	1,172	32.3%	6.4%	21.0%	0.9%	0.0%	1.5%	38.0%	48.6%	51.0%

*Asian/PI = Asian/Pacific Islander. AI/AN = American Indian/Alaska Native. Other/MR = Other/Multi-Race (a combination of "Native Hawaiian or other Pacific Islander" and "Multi-Ethnic"). Not Spec. = Not Specified or Other

3.2. Descriptive Statistics

Table 3.2 provides descriptive statistics of the MCAS and MAP Growth scores for Spring 2017, including the correlation coefficient (r) between the two scales. As shown in the table, the correlation coefficients between MAP Growth and MCAS scores range from 0.77 to 0.79 for ELA/Reading and 0.82 to 0.86 for Mathematics. In general, these correlations can be considered criterion-related validity evidence between MAP Growth and MCAS assessments by content area. These results indicate that the relationship between MAP Growth and MCAS scores is strong.

Table 3.2. Descriptive Statistics of MCAS and MAP Growth Scores from the Study Sample

Content Area	Grade	N	r	MCAS*				MAP Growth*			
				Mean	SD	Min.	Max.	Mean	SD	Min.	Max.
ELA/ Reading	3	2,389	0.78	491.4	20.9	441	560	195.5	16.3	146	241
	4	2,650	0.79	494.2	20.9	441	560	205.1	15.7	146	244
	5	2,516	0.78	493.7	19.7	442	560	209.9	16.4	146	247
	6	2,045	0.77	491.1	20.0	442	560	212.4	16.2	147	254
	7	1,414	0.78	491.2	21.0	441	560	214.8	17.4	151	256
	8	1,218	0.77	488.9	21.8	441	554	215.6	19.3	148	258
Mathematics	3	2,649	0.82	491.4	21.8	441	560	200.0	13.5	138	265
	4	2,858	0.85	493.1	21.3	440	557	211.9	14.6	146	258
	5	2,835	0.86	492.5	19.4	443	560	219.4	17.0	156	268
	6	2,436	0.86	490.6	20.4	441	550	220.4	17.2	146	262
	7	1,381	0.85	490.1	20.8	440	560	225.1	19.3	149	276
	8	1,172	0.83	489.1	20.7	441	560	226.3	21.5	142	277

*SD = standard deviation. Min. = minimum. Max. = maximum.

3.3. Equipercentile Linking Cut Scores

Table 3.3 – Table 3.4 present the MCAS scale scores for each achievement level and the corresponding MAP Growth scores (obtained from equipercentile linking) and percentile ranges for ELA/Reading and Mathematics. These tables can be used to predict a student's likely achievement level on the MCAS assessment when MAP Growth is taken in the spring. For example, a Grade 6 student who obtained a MAP Growth Reading score of 222 in the spring is likely to be at Level 3 (Meeting Expectations) on the MCAS taken during that same testing season (see Table 3.3).

Table 3.3. MAP Growth Cut Scores Corresponding to MCAS Scores when MAP Growth is taken in Spring—ELA/Reading

MCAS ELA								
Grade	Level 1: Not Meeting Expectations		Level 2: Partially Meeting Expectations		Level 3: Meeting Expectations*		Level 4: Exceeding Expectations	
3	440–469		470–499		500–529		530–560	
4	440–469		470–499		500–529		530–560	
5	440–469		470–499		500–529		530–560	
6	440–469		470–499		500–529		530–560	
7	440–469		470–499		500–529		530–560	
8	440–469		470–499		500–529		530–560	

MAP Growth Reading								
Grade	Level 1: Not Meeting Expectations		Level 2: Partially Meeting Expectations		Level 3: Meeting Expectations*		Level 4: Exceeding Expectations	
	RIT	Percentile	RIT	Percentile	RIT*	Percentile	RIT	Percentile
K**	100–141	1–9	142–161	10–60	162–177	61–93	178–350	94–99
1**	100–159	1–10	160–181	11–60	182–199	61–93	200–350	94–99
2**	100–169	1–10	170–192	11–59	193–211	60–93	212–350	94–99
3	100–179	1–10	180–202	11–60	203–221	61–93	222–350	94–99
4	100–187	1–10	188–210	11–62	211–227	63–92	228–350	93–99
5	100–190	1–7	191–215	8–59	216–235	60–94	236–350	95–99
6	100–196	1–9	197–220	10–62	221–237	63–92	238–350	93–99
7	100–199	1–10	200–222	11–61	223–242	62–94	243–350	95–99
8	100–202	1–13	203–225	14–63	226–244	64–93	245–350	94–99

*Bolded numbers indicate the cut scores considered to be at least proficient for accountability purposes.

**Spring cut scores were extrapolated from the Grade 3 cohort using the 2015 MAP Growth norms.

Table 3.4. MAP Growth Cut Scores Corresponding to MCAS Scores when MAP Growth is taken in Spring—Mathematics

MCAS Mathematics								
Grade	Level 1: Not Meeting Expectations		Level 2: Partially Meeting Expectations		Level 3: Meeting Expectations*		Level 4: Exceeding Expectations	
3	440–469		470–499		500–529		530–560	
4	440–469		470–499		500–529		530–560	
5	440–469		470–499		500–529		530–560	
6	440–469		470–499		500–529		530–560	
7	440–469		470–499		500–529		530–560	
8	440–469		470–499		500–529		530–560	

MAP Growth Mathematics								
Grade	Level 1: Not Meeting Expectations		Level 2: Partially Meeting Expectations		Level 3: Meeting Expectations*		Level 4: Exceeding Expectations	
	RIT	Percentile	RIT	Percentile	RIT*	Percentile	RIT	Percentile
K**	100–143	1–12	144–160	13–53	161–177	54–91	178–350	92–99
1**	100–164	1–11	165–181	12–52	182–199	53–91	200–350	92–99
2**	100–176	1–12	177–192	13–51	193–210	52–91	211–350	92–99
3	100–187	1–12	188–204	13–53	205–222	54–91	223–350	92–99
4	100–197	1–14	198–216	15–57	217–235	58–92	236–350	93–99
5	100–199	1–8	200–225	9–60	226–249	61–95	250–350	96–99
6	100–204	1–10	205–227	11–55	228–251	56–93	252–350	94–99
7	100–207	1–11	208–234	12–63	235–256	64–93	257–350	94–99
8	100–208	1–12	209–238	13–65	239–259	66–92	260–350	93–99

*Bolded numbers indicate the cut scores considered to be at least proficient for accountability purposes.

**Spring cut scores were extrapolated from the Grade 3 cohort using the 2015 MAP Growth norms.

3.4. Classification Accuracy Summary Statistics

Table 3.5 presents the overall classification accuracy rate, sensitivity, specificity, false positive rate, false negative rate, and area under the ROC curve (AUC). These summary statistics provide insight into the predictive validity of MAP Growth tests on the MCAS test. The overall classification accuracy rate ranges from 0.72 to 0.83 for ELA/Reading and 0.70 to 0.90 for Mathematics. These values suggest that the MAP Growth cut scores for each content area and grade are good predictors of the students' proficiency status on the MCAS test. For Grades K–2, the classification accuracy rate refers to how well the MAP Growth cuts shown can predict students' proficiency status on the MCAS test in Grade 3. Consequently, the further back from Grade 3 that the cut scores were extrapolated, the lower the expected classification accuracy rate.

Table 3.5. Classification Accuracy Summary Statistics for MAP Growth and MCAS Level 3 (Meeting Expectations) Proficiency for Grades K–8 Students

ELA/Reading									
Grade	Sample Size	Cut Score		Class. Accuracy*	Rate		Sensitivity	Specificity	AUC*
		MAP Growth	MCAS		FP*	FN*			
K**	491	162	500	0.72	0.26	0.34	0.66	0.75	0.76
1**	473	182	500	0.78	0.16	0.37	0.63	0.84	0.84
2**	1,297	193	500	0.80	0.16	0.28	0.72	0.84	0.86
3	2,389	203	500	0.81	0.16	0.25	0.75	0.84	0.88
4	2,650	211	500	0.81	0.16	0.23	0.77	0.84	0.89
5	2,516	216	500	0.82	0.16	0.20	0.80	0.84	0.89
6	2,045	221	500	0.83	0.12	0.26	0.74	0.88	0.90
7	1,414	223	500	0.83	0.13	0.24	0.76	0.87	0.90
8	1,218	226	500	0.81	0.14	0.30	0.70	0.86	0.89
Mathematics									
Grade	Sample Size	Cut Score		Class. Accuracy*	Rate		Sensitivity	Specificity	AUC*
		MAP Growth	MCAS		FP*	FN*			
K**	491	161	500	0.70	0.33	0.27	0.73	0.67	0.75
1**	471	182	500	0.77	0.21	0.26	0.74	0.80	0.85
2**	1,416	193	500	0.80	0.14	0.32	0.68	0.86	0.86
3	2,649	205	500	0.84	0.16	0.17	0.83	0.84	0.92
4	2,858	217	500	0.85	0.15	0.16	0.84	0.85	0.93
5	2,835	226	500	0.86	0.14	0.13	0.87	0.86	0.94
6	2,436	228	500	0.87	0.13	0.13	0.87	0.87	0.95
7	1,381	235	500	0.90	0.11	0.10	0.91	0.89	0.97
8	1,172	239	500	0.88	0.10	0.20	0.80	0.91	0.93

*Class. Accuracy = overall classification accuracy rate. FP = false positives. FN = false negatives. AUC = area under the ROC curve.

**Spring cut scores were extrapolated from the Grade 3 cohort using 2015 MAP Growth norms.

3.5. Proficiency Projection

Table 3.6 – Table 3.7 present the MCAS scale scores for each achievement level and the corresponding MAP Growth scores and percentile ranges applied to MAP Growth tests taken in fall or winter prior to the testing season. These tables can be used to predict a student’s likely achievement level on the MCAS assessment when MAP Growth is taken in fall or winter. For example, a Grade 3 student with a MAP Growth Reading score of 218 in the fall is likely to be at Level 4 (Exceeding Expectations) on the MCAS taken in the spring (see Table 3.6).

Table 3.6. Projection of Achievement Level Score Ranges between MCAS and MAP Growth when MAP Growth is taken in Fall or Winter—ELA/Reading

MCAS ELA								
Grade	Level 1: Not Meeting Expectations		Level 2: Partially Meeting Expectations		Level 3: Meeting Expectations*		Level 4: Exceeding Expectations	
3	440–469		470–499		500–529		530–560	
4	440–469		470–499		500–529		530–560	
5	440–469		470–499		500–529		530–560	
6	440–469		470–499		500–529		530–560	
7	440–469		470–499		500–529		530–560	
8	440–469		470–499		500–529		530–560	

MAP Growth Reading (Fall)								
Grade	Level 1: Not Meeting Expectations		Level 2: Partially Meeting Expectations		Level 3: Meeting Expectations*		Level 4: Exceeding Expectations	
	RIT	Percentile	RIT	Percentile	RIT*	Percentile	RIT	Percentile
K**	100–119	1–5	120–145	6–62	146–166	63–96	167–350	97–99
1**	100–141	1–7	142–164	8–61	165–184	62–96	185–350	97–99
2**	100–151	1–6	152–179	7–62	180–201	63–95	202–350	96–99
3	100–165	1–7	166–192	8–60	193–215	61–95	216–350	96–99
4	100–176	1–8	177–203	9–63	204–223	64–94	224–350	95–99
5	100–180	1–4	181–209	5–59	210–233	60–96	234–350	97–99
6	100–188	1–6	189–216	7–64	217–235	65–94	236–350	95–99
7	100–193	1–8	194–219	9–62	220–240	63–95	241–350	96–99
8	100–196	1–9	197–223	10–65	224–242	66–94	243–350	95–99

MAP Growth Reading (Winter)								
Grade	Level 1: Not Meeting Expectations		Level 2: Partially Meeting Expectations		Level 3: Meeting Expectations*		Level 4: Exceeding Expectations	
	RIT	Percentile	RIT	Percentile	RIT*	Percentile	RIT	Percentile
K**	100–133	1–8	134–154	9–59	155–172	60–94	173–350	95–99
1**	100–153	1–9	154–175	10–61	176–193	62–94	194–350	95–99
2**	100–163	1–8	164–188	9–61	189–208	62–94	209–350	95–99
3	100–175	1–9	176–199	10–60	200–220	61–94	221–350	95–99
4	100–183	1–8	184–208	9–62	209–226	63–93	227–350	94–99
5	100–187	1–6	188–213	7–59	214–234	60–95	235–350	96–99
6	100–193	1–7	194–219	8–64	220–236	65–93	237–350	94–99
7	100–197	1–9	198–221	10–62	222–241	63–94	242–350	95–99
8	100–200	1–11	201–224	12–63	225–243	64–94	244–350	95–99

*Bolded numbers indicate the cut scores considered to be at least proficient for accountability purposes.

**Spring cut scores were extrapolated from the Grade 3 cohort using 2015 MAP Growth norms.

Table 3.7. Projection of Achievement Level Score Ranges between MCAS and MAP Growth when MAP Growth is taken in Fall or Winter—Mathematics

MCAS Mathematics								
Grade	Level 1: Not Meeting Expectations		Level 2: Partially Meeting Expectations		Level 3: Meeting Expectations*		Level 4: Exceeding Expectations	
3	440–469		470–499		500–529		530–560	
4	440–469		470–499		500–529		530–560	
5	440–469		470–499		500–529		530–560	
6	440–469		470–499		500–529		530–560	
7	440–469		470–499		500–529		530–560	
8	440–469		470–499		500–529		530–560	

MAP Growth Mathematics (Fall)								
Grade	Level 1: Not Meeting Expectations		Level 2: Partially Meeting Expectations		Level 3: Meeting Expectations*		Level 4: Exceeding Expectations	
	RIT	Percentile	RIT	Percentile	RIT*	Percentile	RIT	Percentile
K**	100–120	1–9	121–141	10–53	142–163	54–93	164–350	94–99
1**	100–144	1–8	145–163	9–53	164–183	54–94	184–350	95–99
2**	100–159	1–9	160–177	10–51	178–197	52–93	198–350	94–99
3	100–173	1–9	174–191	10–53	192–210	54–93	211–350	94–99
4	100–185	1–11	186–205	12–60	206–224	61–94	225–350	95–99
5	100–189	1–6	190–215	7–60	216–239	61–96	240–350	97–99
6	100–196	1–8	197–219	9–54	220–244	55–95	245–350	96–99
7	100–201	1–10	202–228	11–63	229–250	64–94	251–350	95–99
8	100–203	1–10	204–234	11–67	235–255	68–94	256–350	95–99

MAP Growth Mathematics (Winter)								
Grade	Level 1: Not Meeting Expectations		Level 2: Partially Meeting Expectations		Level 3: Meeting Expectations*		Level 4: Exceeding Expectations	
	RIT	Percentile	RIT	Percentile	RIT*	Percentile	RIT	Percentile
K**	100–134	1–11	135–152	12–52	153–171	53–92	172–350	93–99
1**	100–157	1–10	158–174	11–52	175–192	53–92	193–350	93–99
2**	100–170	1–11	171–186	12–50	187–205	51–92	206–350	93–99
3	100–181	1–10	182–199	11–53	200–217	54–92	218–350	93–99
4	100–192	1–12	193–211	13–57	212–230	58–93	231–350	94–99
5	100–195	1–7	196–221	8–60	222–245	61–96	246–350	97–99
6	100–201	1–9	202–224	10–56	225–248	57–94	249–350	95–99
7	100–205	1–11	206–232	12–64	233–254	65–94	255–350	95–99
8	100–206	1–10	207–236	11–65	237–257	66–93	258–350	94–99

*Bolted numbers indicate the cut scores considered to be at least proficient for accountability purposes.

**Spring cut scores were extrapolated from the Grade 3 cohort using 2015 MAP Growth norms.

Table 3.8 presents the estimated probability of meeting the Level 3 benchmark (i.e., being classified as proficient on MCAS) based on students' observed MAP Growth score when MAP Growth is taken in the spring. Table 3.9 and Table 3.10 present the estimated probability of meeting the Level 3 benchmark when MAP Growth is taken in the fall or winter prior to taking MCAS. The conditional growth norms provided in the 2015 MAP Growth norms report were used to calculate this information (Thum & Hauser, 2015). For example, a Grade 3 student who obtained a MAP Growth Mathematics score of 190 in the fall has an 38% chance of reaching Level 3 (Meeting Expectations) or higher on the MCAS test taken in the spring (see Table 3.10).

Table 3.8. Proficiency Projection and Probability of Reaching Level 3 on MCAS when MAP Growth is taken in Spring

Grade	Start Percentile	ELA/Reading				Mathematics			
		Spring RIT	Projected Proficiency			Spring RIT	Projected Proficiency		
			Cut Score	Level 3	Prob.*		Cut Score	Level 3	Prob.*
2	5	164	193	No	<0.01	170	193	No	<0.01
	10	169	193	No	<0.01	175	193	No	<0.01
	15	173	193	No	<0.01	178	193	No	<0.01
	20	176	193	No	<0.01	181	193	No	<0.01
	25	178	193	No	<0.01	183	193	No	<0.01
	30	181	193	No	<0.01	185	193	No	<0.01
	35	183	193	No	<0.01	187	193	No	0.02
	40	185	193	No	0.01	189	193	No	0.08
	45	187	193	No	0.03	190	193	No	0.15
	50	189	193	No	0.11	192	193	No	0.37
	55	191	193	No	0.27	194	193	Yes	0.64
	60	193	193	Yes	0.50	196	193	Yes	0.85
	65	195	193	Yes	0.73	197	193	Yes	0.92
	70	197	193	Yes	0.89	199	193	Yes	0.98
	75	199	193	Yes	0.97	201	193	Yes	>0.99
	80	201	193	Yes	0.99	204	193	Yes	>0.99
	85	204	193	Yes	>0.99	206	193	Yes	>0.99
90	208	193	Yes	>0.99	209	193	Yes	>0.99	
95	214	193	Yes	>0.99	214	193	Yes	>0.99	
3	5	174	203	No	<0.01	181	205	No	<0.01
	10	179	203	No	<0.01	186	205	No	<0.01
	15	183	203	No	<0.01	189	205	No	<0.01
	20	186	203	No	<0.01	192	205	No	<0.01
	25	188	203	No	<0.01	194	205	No	<0.01
	30	191	203	No	<0.01	196	205	No	<0.01
	35	193	203	No	<0.01	198	205	No	0.01
	40	195	203	No	0.01	200	205	No	0.04
	45	197	203	No	0.03	202	205	No	0.15
	50	199	203	No	0.11	203	205	No	0.25
	55	201	203	No	0.27	205	205	Yes	0.50
	60	202	203	No	0.38	207	205	Yes	0.76
	65	204	203	Yes	0.62	209	205	Yes	0.92
	70	207	203	Yes	0.89	211	205	Yes	0.98
	75	209	203	Yes	0.97	213	205	Yes	>0.99
	80	211	203	Yes	0.99	215	205	Yes	>0.99
	85	214	203	Yes	>0.99	218	205	Yes	>0.99
90	218	203	Yes	>0.99	221	205	Yes	>0.99	
95	223	203	Yes	>0.99	226	205	Yes	>0.99	

Grade	Start Percentile	ELA/Reading				Mathematics			
		Spring RIT	Projected Proficiency			Spring RIT	Projected Proficiency		
			Cut Score	Level 3	Prob.*		Cut Score	Level 3	Prob.*
4	5	181	211	No	<0.01	189	217	No	<0.01
	10	187	211	No	<0.01	194	217	No	<0.01
	15	190	211	No	<0.01	198	217	No	<0.01
	20	193	211	No	<0.01	201	217	No	<0.01
	25	196	211	No	<0.01	203	217	No	<0.01
	30	198	211	No	<0.01	206	217	No	<0.01
	35	200	211	No	<0.01	208	217	No	<0.01
	40	202	211	No	<0.01	210	217	No	0.01
	45	204	211	No	0.01	212	217	No	0.04
	50	206	211	No	0.06	213	217	No	0.08
	55	208	211	No	0.17	215	217	No	0.25
	60	210	211	No	0.38	217	217	Yes	0.50
	65	212	211	Yes	0.62	219	217	Yes	0.76
	70	214	211	Yes	0.83	221	217	Yes	0.92
	75	216	211	Yes	0.94	224	217	Yes	0.99
	80	218	211	Yes	0.99	226	217	Yes	>0.99
	85	221	211	Yes	>0.99	229	217	Yes	>0.99
90	225	211	Yes	>0.99	233	217	Yes	>0.99	
95	230	211	Yes	>0.99	238	217	Yes	>0.99	
5	5	188	216	No	<0.01	195	226	No	<0.01
	10	193	216	No	<0.01	201	226	No	<0.01
	15	197	216	No	<0.01	205	226	No	<0.01
	20	199	216	No	<0.01	208	226	No	<0.01
	25	202	216	No	<0.01	210	226	No	<0.01
	30	204	216	No	<0.01	213	226	No	<0.01
	35	206	216	No	<0.01	215	226	No	<0.01
	40	208	216	No	0.01	217	226	No	<0.01
	45	210	216	No	0.03	219	226	No	0.01
	50	212	216	No	0.11	221	226	No	0.04
	55	214	216	No	0.27	223	226	No	0.15
	60	216	216	Yes	0.50	225	226	No	0.37
	65	217	216	Yes	0.62	228	226	Yes	0.76
	70	220	216	Yes	0.89	230	226	Yes	0.92
	75	222	216	Yes	0.97	232	226	Yes	0.98
	80	224	216	Yes	0.99	235	226	Yes	>0.99
	85	227	216	Yes	>0.99	238	226	Yes	>0.99
90	231	216	Yes	>0.99	242	226	Yes	>0.99	
95	236	216	Yes	>0.99	248	226	Yes	>0.99	

Grade	Start Percentile	ELA/Reading				Mathematics			
		Spring RIT	Projected Proficiency			Spring RIT	Projected Proficiency		
			Cut Score	Level 3	Prob.*		Cut Score	Level 3	Prob.*
6	5	192	221	No	<0.01	198	228	No	<0.01
	10	197	221	No	<0.01	204	228	No	<0.01
	15	201	221	No	<0.01	208	228	No	<0.01
	20	203	221	No	<0.01	211	228	No	<0.01
	25	206	221	No	<0.01	214	228	No	<0.01
	30	208	221	No	<0.01	217	228	No	<0.01
	35	210	221	No	<0.01	219	228	No	<0.01
	40	212	221	No	<0.01	221	228	No	0.01
	45	214	221	No	0.01	223	228	No	0.04
	50	216	221	No	0.06	225	228	No	0.15
	55	218	221	No	0.17	227	228	No	0.37
	60	219	221	No	0.27	230	228	Yes	0.76
	65	221	221	Yes	0.50	232	228	Yes	0.92
	70	223	221	Yes	0.73	234	228	Yes	0.98
	75	226	221	Yes	0.94	237	228	Yes	>0.99
	80	228	221	Yes	0.99	239	228	Yes	>0.99
	85	231	221	Yes	>0.99	243	228	Yes	>0.99
90	235	221	Yes	>0.99	247	228	Yes	>0.99	
95	240	221	Yes	>0.99	253	228	Yes	>0.99	
7	5	193	223	No	<0.01	199	235	No	<0.01
	10	199	223	No	<0.01	206	235	No	<0.01
	15	202	223	No	<0.01	210	235	No	<0.01
	20	205	223	No	<0.01	214	235	No	<0.01
	25	208	223	No	<0.01	217	235	No	<0.01
	30	210	223	No	<0.01	219	235	No	<0.01
	35	212	223	No	<0.01	222	235	No	<0.01
	40	214	223	No	<0.01	224	235	No	<0.01
	45	216	223	No	0.01	226	235	No	<0.01
	50	218	223	No	0.06	229	235	No	0.02
	55	220	223	No	0.17	231	235	No	0.08
	60	222	223	No	0.38	233	235	No	0.25
	65	224	223	Yes	0.62	235	235	Yes	0.50
	70	226	223	Yes	0.83	238	235	Yes	0.85
	75	228	223	Yes	0.94	241	235	Yes	0.98
	80	231	223	Yes	0.99	244	235	Yes	>0.99
	85	234	223	Yes	>0.99	247	235	Yes	>0.99
90	238	223	Yes	>0.99	251	235	Yes	>0.99	
95	243	223	Yes	>0.99	258	235	Yes	>0.99	

Grade	Start Percentile	ELA/Reading				Mathematics			
		Spring RIT	Projected Proficiency			Spring RIT	Projected Proficiency		
			Cut Score	Level 3	Prob.*		Cut Score	Level 3	Prob.*
8	5	194	226	No	<0.01	199	239	No	<0.01
	10	200	226	No	<0.01	206	239	No	<0.01
	15	204	226	No	<0.01	211	239	No	<0.01
	20	207	226	No	<0.01	215	239	No	<0.01
	25	209	226	No	<0.01	218	239	No	<0.01
	30	212	226	No	<0.01	221	239	No	<0.01
	35	214	226	No	<0.01	224	239	No	<0.01
	40	216	226	No	<0.01	226	239	No	<0.01
	45	218	226	No	0.01	229	239	No	<0.01
	50	220	226	No	0.03	231	239	No	<0.01
	55	222	226	No	0.11	233	239	No	0.02
	60	224	226	No	0.27	236	239	No	0.15
	65	226	226	Yes	0.50	238	239	No	0.37
	70	228	226	Yes	0.73	241	239	Yes	0.76
	75	231	226	Yes	0.94	244	239	Yes	0.96
	80	233	226	Yes	0.99	247	239	Yes	>0.99
	85	236	226	Yes	>0.99	251	239	Yes	>0.99
	90	240	226	Yes	>0.99	255	239	Yes	>0.99
95	246	226	Yes	>0.99	262	239	Yes	>0.99	

*Prob. = Probability of obtaining proficient status on the MCAS test in the spring.

Table 3.9. Proficiency Projection and Probability of Reaching Level 3 on MCAS in Spring when MAP Growth is taken in the Fall or Winter—ELA/Reading

Grade	Start Percentile	ELA/Reading (Fall)				ELA/Reading (Winter)			
		Fall RIT	Projected Proficiency			Winter RIT	Projected Proficiency		
			Spring Cut	Level 3	Prob.*		Spring Cut	Level 3	Prob.*
2	5	149	193	No	<0.01	160	193	No	<0.01
	10	155	193	No	<0.01	165	193	No	<0.01
	15	159	193	No	0.01	169	193	No	<0.01
	20	162	193	No	0.03	172	193	No	<0.01
	25	164	193	No	0.05	174	193	No	0.01
	30	167	193	No	0.08	176	193	No	0.01
	35	169	193	No	0.12	178	193	No	0.03
	40	171	193	No	0.19	180	193	No	0.07
	45	173	193	No	0.22	182	193	No	0.13
	50	175	193	No	0.30	184	193	No	0.23
	55	177	193	No	0.40	186	193	No	0.29
	60	179	193	No	0.45	188	193	No	0.43
	65	181	193	Yes	0.55	190	193	Yes	0.57
	70	183	193	Yes	0.65	192	193	Yes	0.71
	75	185	193	Yes	0.70	194	193	Yes	0.82
	80	188	193	Yes	0.81	197	193	Yes	0.93
	85	191	193	Yes	0.88	200	193	Yes	0.98
90	195	193	Yes	0.95	203	193	Yes	0.99	
95	200	193	Yes	0.99	209	193	Yes	>0.99	
3	5	162	203	No	<0.01	171	203	No	<0.01
	10	168	203	No	<0.01	176	203	No	<0.01
	15	172	203	No	0.01	180	203	No	<0.01
	20	175	203	No	0.01	183	203	No	<0.01
	25	178	203	No	0.03	185	203	No	<0.01
	30	180	203	No	0.06	188	203	No	0.02
	35	182	203	No	0.08	190	203	No	0.03
	40	184	203	No	0.13	192	203	No	0.06
	45	186	203	No	0.20	194	203	No	0.13
	50	188	203	No	0.24	196	203	No	0.22
	55	190	203	No	0.34	198	203	No	0.35
	60	192	203	No	0.44	199	203	No	0.42
	65	194	203	Yes	0.50	201	203	Yes	0.58
	70	197	203	Yes	0.66	204	203	Yes	0.72
	75	199	203	Yes	0.76	206	203	Yes	0.83
	80	202	203	Yes	0.84	208	203	Yes	0.91
	85	205	203	Yes	0.92	211	203	Yes	0.97
90	209	203	Yes	0.97	215	203	Yes	>0.99	
95	214	203	Yes	0.99	221	203	Yes	>0.99	

Grade	Start Percentile	ELA/Reading (Fall)				ELA/Reading (Winter)			
		Fall RIT	Projected Proficiency			Winter RIT	Projected Proficiency		
			Spring Cut	Level 3	Prob.*		Spring Cut	Level 3	Prob.*
4	5	173	211	No	<0.01	179	211	No	<0.01
	10	178	211	No	<0.01	184	211	No	<0.01
	15	182	211	No	<0.01	188	211	No	<0.01
	20	185	211	No	0.01	191	211	No	<0.01
	25	188	211	No	0.02	194	211	No	<0.01
	30	190	211	No	0.04	196	211	No	0.01
	35	192	211	No	0.07	198	211	No	0.02
	40	194	211	No	0.09	200	211	No	0.06
	45	196	211	No	0.15	202	211	No	0.08
	50	198	211	No	0.23	204	211	No	0.16
	55	200	211	No	0.33	205	211	No	0.22
	60	202	211	No	0.38	207	211	No	0.35
	65	204	211	Yes	0.50	209	211	Yes	0.50
	70	206	211	Yes	0.62	211	211	Yes	0.65
	75	209	211	Yes	0.72	214	211	Yes	0.84
	80	211	211	Yes	0.81	216	211	Yes	0.92
	85	214	211	Yes	0.91	219	211	Yes	0.96
90	218	211	Yes	0.96	223	211	Yes	0.99	
95	224	211	Yes	0.99	228	211	Yes	>0.99	
5	5	181	216	No	<0.01	186	216	No	<0.01
	10	186	216	No	<0.01	191	216	No	<0.01
	15	190	216	No	<0.01	195	216	No	<0.01
	20	193	216	No	0.01	197	216	No	<0.01
	25	195	216	No	0.03	200	216	No	0.01
	30	198	216	No	0.05	202	216	No	0.01
	35	200	216	No	0.09	204	216	No	0.03
	40	202	216	No	0.15	206	216	No	0.06
	45	204	216	No	0.19	208	216	No	0.12
	50	206	216	No	0.28	210	216	No	0.22
	55	208	216	No	0.38	212	216	No	0.35
	60	210	216	Yes	0.50	214	216	Yes	0.5
	65	212	216	Yes	0.56	215	216	Yes	0.58
	70	214	216	Yes	0.67	218	216	Yes	0.72
	75	216	216	Yes	0.77	220	216	Yes	0.83
	80	218	216	Yes	0.81	222	216	Yes	0.91
	85	221	216	Yes	0.91	225	216	Yes	0.97
90	225	216	Yes	0.96	229	216	Yes	>0.99	
95	231	216	Yes	>0.99	234	216	Yes	>0.99	

Grade	Start Percentile	ELA/Reading (Fall)				ELA/Reading (Winter)			
		Fall RIT	Projected Proficiency			Winter RIT	Projected Proficiency		
			Spring Cut	Level 3	Prob.*		Spring Cut	Level 3	Prob.*
6	5	186	221	No	<0.01	190	221	No	<0.01
	10	192	221	No	<0.01	196	221	No	<0.01
	15	196	221	No	<0.01	199	221	No	<0.01
	20	198	221	No	0.01	202	221	No	<0.01
	25	201	221	No	0.02	204	221	No	<0.01
	30	203	221	No	0.04	207	221	No	0.01
	35	205	221	No	0.07	209	221	No	0.03
	40	207	221	No	0.10	211	221	No	0.06
	45	209	221	No	0.16	212	221	No	0.09
	50	211	221	No	0.23	214	221	No	0.17
	55	213	221	No	0.28	216	221	No	0.22
	60	215	221	No	0.39	218	221	No	0.35
	65	217	221	Yes	0.50	220	221	Yes	0.50
	70	219	221	Yes	0.61	222	221	Yes	0.65
	75	221	221	Yes	0.67	224	221	Yes	0.78
	80	224	221	Yes	0.81	226	221	Yes	0.88
	85	226	221	Yes	0.88	229	221	Yes	0.96
90	230	221	Yes	0.94	233	221	Yes	0.99	
95	236	221	Yes	0.99	238	221	Yes	>0.99	
7	5	189	223	No	<0.01	192	223	No	<0.01
	10	195	223	No	<0.01	198	223	No	<0.01
	15	199	223	No	<0.01	201	223	No	<0.01
	20	202	223	No	0.01	204	223	No	<0.01
	25	204	223	No	0.02	207	223	No	<0.01
	30	206	223	No	0.04	209	223	No	0.01
	35	209	223	No	0.07	211	223	No	0.03
	40	211	223	No	0.12	213	223	No	0.04
	45	213	223	No	0.19	215	223	No	0.09
	50	214	223	No	0.23	217	223	No	0.17
	55	216	223	No	0.33	219	223	No	0.28
	60	218	223	No	0.39	221	223	No	0.42
	65	220	223	Yes	0.50	223	223	Yes	0.58
	70	222	223	Yes	0.61	225	223	Yes	0.72
	75	225	223	Yes	0.72	227	223	Yes	0.83
	80	227	223	Yes	0.81	230	223	Yes	0.94
	85	230	223	Yes	0.90	232	223	Yes	0.97
90	234	223	Yes	0.97	236	223	Yes	>0.99	
95	240	223	Yes	>0.99	242	223	Yes	>0.99	

Grade	Start Percentile	ELA/Reading (Fall)				ELA/Reading (Winter)			
		Fall RIT	Projected Proficiency			Winter RIT	Projected Proficiency		
			Spring Cut	Level 3	Prob.*		Spring Cut	Level 3	Prob.*
8	5	191	226	No	<0.01	194	226	No	<0.01
	10	197	226	No	<0.01	199	226	No	<0.01
	15	201	226	No	0.01	203	226	No	<0.01
	20	204	226	No	0.02	206	226	No	<0.01
	25	207	226	No	0.03	209	226	No	<0.01
	30	209	226	No	0.05	211	226	No	0.01
	35	211	226	No	0.08	213	226	No	0.01
	40	213	226	No	0.10	215	226	No	0.03
	45	215	226	No	0.16	217	226	No	0.07
	50	217	226	No	0.22	219	226	No	0.14
	55	219	226	No	0.31	221	226	No	0.23
	60	221	226	No	0.35	223	226	No	0.36
	65	223	226	No	0.45	225	226	Yes	0.50
	70	225	226	Yes	0.55	227	226	Yes	0.64
	75	228	226	Yes	0.69	229	226	Yes	0.77
	80	230	226	Yes	0.78	232	226	Yes	0.90
	85	234	226	Yes	0.90	235	226	Yes	0.97
90	237	226	Yes	0.95	239	226	Yes	0.99	
95	243	226	Yes	0.99	244	226	Yes	>0.99	

*Prob. = Probability of obtaining proficient status on the MCAS test in the spring.

Table 3.10. Proficiency Projection and Probability of Reaching Level 3 on MCAS in Spring when MAP Growth is taken in the Fall or Winter—Mathematics

Grade	Start Percentile	Mathematics (Fall)				Mathematics (Winter)			
		Fall RIT	Projected Proficiency			Winter RIT	Projected Proficiency		
			Spring Cut	Level 3	Prob.*		Spring Cut	Level 3	Prob.*
2	5	155	193	No	<0.01	165	193	No	<0.01
	10	160	193	No	0.01	170	193	No	<0.01
	15	163	193	No	0.03	173	193	No	<0.01
	20	166	193	No	0.07	175	193	No	0.01
	25	168	193	No	0.10	178	193	No	0.03
	30	170	193	No	0.16	180	193	No	0.08
	35	172	193	No	0.24	181	193	No	0.11
	40	174	193	No	0.33	183	193	No	0.21
	45	175	193	No	0.33	185	193	No	0.34
	50	177	193	No	0.44	186	193	No	0.42
	55	179	193	Yes	0.56	188	193	Yes	0.58
	60	180	193	Yes	0.61	190	193	Yes	0.73
	65	182	193	Yes	0.72	191	193	Yes	0.79
	70	184	193	Yes	0.76	193	193	Yes	0.85
	75	186	193	Yes	0.84	195	193	Yes	0.92
	80	188	193	Yes	0.90	197	193	Yes	0.97
	85	191	193	Yes	0.96	200	193	Yes	0.99
90	194	193	Yes	0.98	203	193	Yes	>0.99	
95	199	193	Yes	>0.99	208	193	Yes	>0.99	
3	5	169	205	No	<0.01	176	205	No	<0.01
	10	174	205	No	<0.01	181	205	No	<0.01
	15	177	205	No	0.01	184	205	No	<0.01
	20	179	205	No	0.03	187	205	No	<0.01
	25	182	205	No	0.08	189	205	No	0.01
	30	184	205	No	0.11	191	205	No	0.03
	35	185	205	No	0.14	193	205	No	0.07
	40	187	205	No	0.22	195	205	No	0.14
	45	189	205	No	0.32	197	205	No	0.26
	50	190	205	No	0.38	198	205	No	0.34
	55	192	205	Yes	0.50	200	205	Yes	0.50
	60	194	205	Yes	0.62	202	205	Yes	0.66
	65	195	205	Yes	0.68	203	205	Yes	0.74
	70	197	205	Yes	0.78	205	205	Yes	0.86
	75	199	205	Yes	0.83	207	205	Yes	0.93
	80	201	205	Yes	0.89	209	205	Yes	0.97
	85	204	205	Yes	0.96	212	205	Yes	0.99
90	207	205	Yes	0.99	215	205	Yes	>0.99	
95	212	205	Yes	>0.99	220	205	Yes	>0.99	

Grade	Start Percentile	Mathematics (Fall)				Mathematics (Winter)			
		Fall RIT	Projected Proficiency			Winter RIT	Projected Proficiency		
			Spring Cut	Level 3	Prob.*		Spring Cut	Level 3	Prob.*
4	5	179	217	No	<0.01	185	217	No	<0.01
	10	184	217	No	<0.01	190	217	No	<0.01
	15	188	217	No	<0.01	194	217	No	<0.01
	20	190	217	No	0.01	197	217	No	<0.01
	25	193	217	No	0.03	199	217	No	<0.01
	30	195	217	No	0.06	201	217	No	0.01
	35	197	217	No	0.11	203	217	No	0.03
	40	198	217	No	0.14	205	217	No	0.07
	45	200	217	No	0.22	207	217	No	0.14
	50	202	217	No	0.32	209	217	No	0.26
	55	204	217	No	0.44	211	217	No	0.42
	60	205	217	No	0.44	212	217	Yes	0.50
	65	207	217	Yes	0.56	214	217	Yes	0.66
	70	209	217	Yes	0.68	216	217	Yes	0.80
	75	211	217	Yes	0.78	218	217	Yes	0.90
	80	214	217	Yes	0.89	221	217	Yes	0.97
	85	216	217	Yes	0.94	223	217	Yes	0.99
90	220	217	Yes	0.99	227	217	Yes	>0.99	
95	225	217	Yes	>0.99	232	217	Yes	>0.99	
5	5	187	226	No	<0.01	192	226	No	<0.01
	10	193	226	No	<0.01	198	226	No	<0.01
	15	196	226	No	<0.01	201	226	No	<0.01
	20	199	226	No	0.01	204	226	No	<0.01
	25	202	226	No	0.02	207	226	No	<0.01
	30	204	226	No	0.04	209	226	No	<0.01
	35	206	226	No	0.07	211	226	No	0.01
	40	208	226	No	0.12	213	226	No	0.03
	45	210	226	No	0.19	215	226	No	0.07
	50	211	226	No	0.23	217	226	No	0.15
	55	213	226	No	0.33	219	226	No	0.27
	60	215	226	No	0.44	221	226	No	0.42
	65	217	226	Yes	0.56	223	226	Yes	0.58
	70	219	226	Yes	0.67	225	226	Yes	0.73
	75	221	226	Yes	0.77	228	226	Yes	0.89
	80	224	226	Yes	0.88	230	226	Yes	0.95
	85	227	226	Yes	0.95	233	226	Yes	0.99
90	230	226	Yes	0.98	237	226	Yes	>0.99	
95	236	226	Yes	>0.99	242	226	Yes	>0.99	

Grade	Start Percentile	Mathematics (Fall)				Mathematics (Winter)			
		Fall RIT	Projected Proficiency			Winter RIT	Projected Proficiency		
			Spring Cut	Level 3	Prob.*		Spring Cut	Level 3	Prob.*
6	5	192	228	No	<0.01	196	228	No	<0.01
	10	198	228	No	<0.01	202	228	No	<0.01
	15	202	228	No	<0.01	205	228	No	<0.01
	20	205	228	No	0.01	209	228	No	<0.01
	25	207	228	No	0.03	211	228	No	<0.01
	30	209	228	No	0.05	214	228	No	0.01
	35	212	228	No	0.12	216	228	No	0.03
	40	214	228	No	0.19	218	228	No	0.07
	45	216	228	No	0.28	220	228	No	0.15
	50	218	228	No	0.38	222	228	No	0.27
	55	220	228	Yes	0.50	224	228	No	0.42
	60	222	228	Yes	0.62	226	228	Yes	0.58
	65	224	228	Yes	0.72	228	228	Yes	0.73
	70	226	228	Yes	0.81	230	228	Yes	0.85
	75	228	228	Yes	0.88	233	228	Yes	0.95
	80	231	228	Yes	0.93	236	228	Yes	0.99
	85	234	228	Yes	0.97	239	228	Yes	>0.99
90	238	228	Yes	0.99	243	228	Yes	>0.99	
95	243	228	Yes	>0.99	248	228	Yes	>0.99	
7	5	195	235	No	<0.01	198	235	No	<0.01
	10	201	235	No	<0.01	204	235	No	<0.01
	15	205	235	No	<0.01	208	235	No	<0.01
	20	209	235	No	<0.01	212	235	No	<0.01
	25	211	235	No	<0.01	215	235	No	<0.01
	30	214	235	No	0.01	217	235	No	<0.01
	35	216	235	No	0.02	220	235	No	<0.01
	40	218	235	No	0.05	222	235	No	0.01
	45	221	235	No	0.11	224	235	No	0.03
	50	223	235	No	0.18	226	235	No	0.07
	55	225	235	No	0.27	228	235	No	0.15
	60	227	235	No	0.38	230	235	No	0.26
	65	229	235	Yes	0.50	233	235	Yes	0.50
	70	231	235	Yes	0.62	235	235	Yes	0.66
	75	234	235	Yes	0.78	238	235	Yes	0.85
	80	237	235	Yes	0.89	240	235	Yes	0.93
	85	240	235	Yes	0.95	244	235	Yes	0.99
90	244	235	Yes	0.99	248	235	Yes	>0.99	
95	250	235	Yes	>0.99	254	235	Yes	>0.99	

Grade	Start Percentile	Mathematics (Fall)				Mathematics (Winter)			
		Fall RIT	Projected Proficiency			Winter RIT	Projected Proficiency		
			Spring Cut	Level 3	Prob.*		Spring Cut	Level 3	Prob.*
8	5	197	239	No	<0.01	199	239	No	<0.01
	10	203	239	No	<0.01	206	239	No	<0.01
	15	208	239	No	<0.01	210	239	No	<0.01
	20	211	239	No	<0.01	214	239	No	<0.01
	25	214	239	No	<0.01	217	239	No	<0.01
	30	217	239	No	0.01	220	239	No	<0.01
	35	219	239	No	0.02	222	239	No	<0.01
	40	222	239	No	0.06	225	239	No	0.01
	45	224	239	No	0.10	227	239	No	0.02
	50	226	239	No	0.15	229	239	No	0.06
	55	229	239	No	0.26	231	239	No	0.12
	60	231	239	No	0.35	234	239	No	0.28
	65	233	239	No	0.40	236	239	No	0.42
	70	236	239	Yes	0.55	239	239	Yes	0.65
	75	238	239	Yes	0.65	241	239	Yes	0.79
	80	241	239	Yes	0.78	245	239	Yes	0.94
	85	245	239	Yes	0.90	248	239	Yes	0.99
90	249	239	Yes	0.97	253	239	Yes	>0.99	
95	256	239	Yes	>0.99	259	239	Yes	>0.99	

*Prob. = Probability of obtaining proficient status on the MCAS test in the spring.

4. References

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