Predicting Proficiency on the Georgia Milestones End-of-Course Algebra: Concepts and Connections Assessment Based on NWEA MAP Growth Scores

December 2025

NWEA Psychometrics and Analytics

nwea

Linking Study Updates

Date	Description
2020-07	Conducted a linking study for the Georgia Milestone End-of-Course (EOC) Algebra 1 assessment.
2025-12	Conducted a new linking study for Algebra: Concepts and Connections using both the 2022 and 2025 norms with Spring 2024 data.

Acknowledgements: This report was made possible with the contributions of Yan Zhou, Ann Hu, Justin Schreiber, Christopher Wells, and Derek May. We appreciate our colleagues at NWEA and all our partners who provided data for the study.

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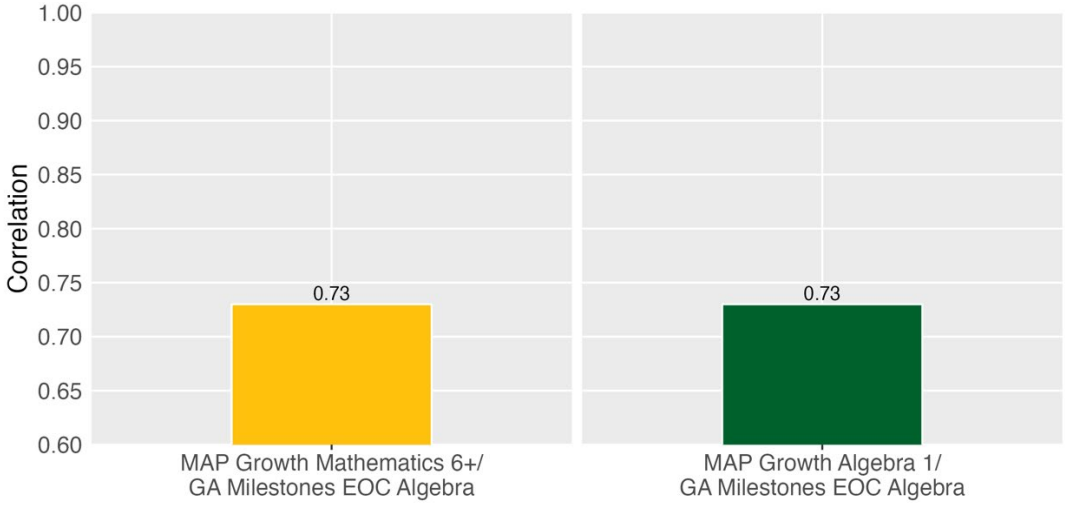
Executive Summary

Linking studies allow partners to use MAP® Growth™ Rasch Unit (RIT) scores throughout the year to predict students' performance levels on state summative assessments. This is accomplished through statistical analyses that produce RIT cut scores that correspond to state summative performance levels. A "cut score" is the minimum score a student must get on a test to be placed at a certain performance level. The linking study for the Georgia (GA) Milestones End-of-Course (EOC) Algebra: Concepts and Connections assessment described in this report provides RIT cut scores for the fall, winter, and spring MAP Growth administrations that correspond to the performance levels on the GA Milestones EOC Algebra: Concepts and Connections assessment. Educators can use the RIT cut scores to identify students at risk of not meeting state proficiency standards and provide targeted instruction to improve academic outcomes.

The linking study is based on test scores from students who participated in both the MAP Growth mathematics 6+ or Algebra 1 assessments and the GA Milestones EOC Algebra: Concepts and Connections assessment in Spring 2024. In total, this study included 16,374 students from 147 schools within 17 districts in Georgia.

Prior to initiating the linking study, NWEA's content team confirmed that the content standards used to construct the MAP Growth interim assessment were aligned with those of the GA Milestones EOC Algebra: Concepts and Connections assessment, thus warranting a connection. Further investigation into the relationship between the MAP Growth and GA Milestones EOC Algebra: Concepts and Connections assessments involved calculating correlation coefficients to confirm the alignment between the MAP Growth scores and the summative test scores of the GA Milestones EOC Algebra: Concepts and Connections assessment. A high positive correlation (e.g., ≥ 0.70) shows that students who perform well on one assessment also tend to perform well on the other, and vice versa, with 1.00 being a perfect positive correlation. As shown in Figure E.1, the correlations between the MAP Growth test scores and GA Milestones EOC Algebra: Concepts and Connections test scores are higher than 0.70, indicating that MAP Growth is a good assessment for predicting performance on the GA Milestones EOC Algebra: Concepts and Connections assessment.

Figure E.1. Correlations Between MAP Growth and State Summative Assessment Scores



The equipercentile linking method (Kolen & Brennan, 2004) was used to produce the RIT cut scores for the spring administration that correspond to performance levels on the GA Milestones EOC Algebra: Concepts and Connections summative assessment. These cut scores were derived from the spring cuts and the growth norms for the fall and winter administrations to the spring administration. While RIT cut scores were generated for every performance level on the GA Milestones EOC Algebra: Concepts and Connections assessment, Table E.1 presents the *Proficient Learner* cut scores that indicate the minimum score a student must get to be considered proficient for accountability purposes.

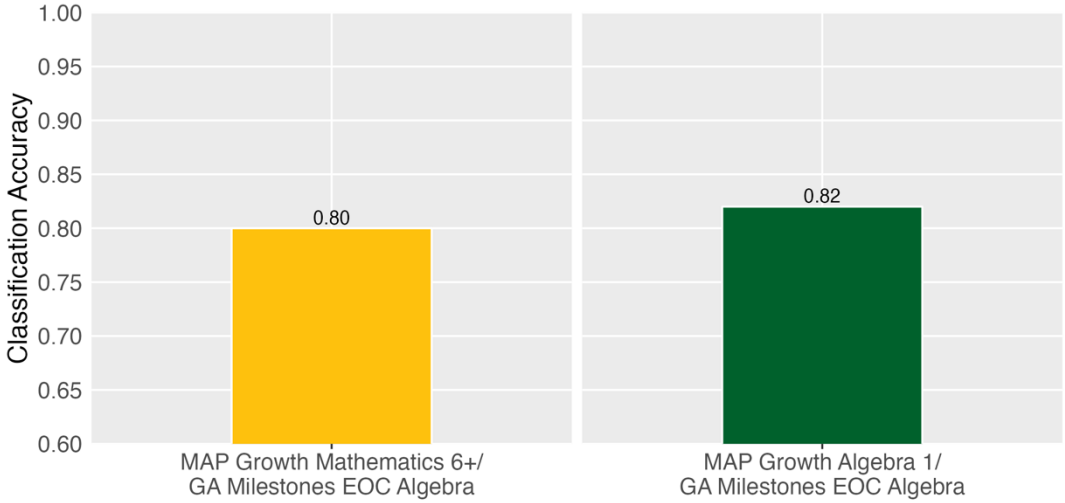
Table E.1. MAP Growth RIT Cut Scores Linked to GA Milestones EOC Algebra *Proficient Learner* Cut Scores

Assessment		*Proficient Learner* Cut Scores by Grade				
		6	7	8	9	10
GA Milestones EOC Algebra Spring				525		
MAP Growth Mathematics 6+	Fall	226	230	230	234	233
	Winter	233	235	234	236	236
	Spring	237	237	237	237	237
GA Milestones EOC Algebra Spring				525		
MAP Growth Algebra 1	Fall			226		
	Winter			230		
	Spring			234		

Educators can use these cut scores to determine whether students are on track for proficiency (*Proficient Learner* or higher) on the state assessment. For example, the *Proficient Learner* cut score on the GA Milestones EOC Algebra: Concepts and Connections test is 525. A grade 6 student with a MAP Growth mathematics 6+ RIT score of 226 in the fall is likely to meet proficiency on the GA Milestones EOC Algebra: Concepts and Connections test in the spring, whereas a grade 6 student with a RIT score lower than 226 in the fall is in jeopardy of not meeting proficiency.

As further evidence that MAP Growth scores can be used to predict students' proficiency on state tests, NWEA calculated classification accuracy statistics that show how well the RIT scores correctly classified, or predicted, students as proficient (*Proficient Learner* or higher) on the GA Milestones EOC Algebra: Concepts and Connections test. For example, the MAP Growth mathematics 6+ *Proficient Learner* cut score has a 0.80 accuracy rate, meaning it accurately predicted student performance on the state test for 80% of the sample. A high statistic indicates high accuracy. Overall, MAP Growth scores have a high accuracy rate of identifying student proficiency on the GA Milestones EOC Algebra: Concepts and Connections test, as illustrated in Figure E.2.

Figure E.2. Accuracy of MAP Growth Classifications



Please note that the purpose of this report is to explain NWEA's linking study methodology. It is not meant as the main reference for determining a student's likely performance on state summative assessments. The cut scores in this report are based on the default instructional weeks most encountered for each term (i.e., Weeks 4, 20, and 32 for fall, winter, and spring, respectively), whereas instructional weeks often vary by district. The cut scores in this report may therefore differ from the results in the NWEA reporting system that reflect the specific instructional weeks set by partners. Partners should therefore reference their MAP Growth score reports instead.

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 MAP® Growth™ test scores. One important use of MAP Growth results is to predict a student's performance on state summative assessments 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 school year or, given a student's learning profile, is on track to obtain rigorous, realistic growth in their content knowledge and skills.

This report presents findings from a linking study performed by NWEA aiming to statistically connect the Rasch Unit (RIT) scores obtained from the MAP Growth assessment with the results of the GA Milestones EOC Algebra: Concepts and Connections summative assessment. The data utilized to generate this report are comprised of the GA Milestones EOC Algebra: Concepts and Connections test scores collected during Spring 2024. Specifically, this report presents the following results:

1. Student sample demographics
2. Descriptive statistics of test scores
3. MAP Growth cut scores from fall, winter, and spring that correspond to the performance levels on the GA Milestones EOC Algebra: Concepts and Connections assessment
4. Classification accuracy statistics to determine the degree to which MAP Growth accurately predicts student proficiency status on the GA Milestones EOC Algebra: Concepts and Connections assessment
5. The probability of achieving proficiency on the GA Milestones EOC Algebra: Concepts and Connections assessment based on MAP Growth RIT scores from fall, winter, and spring

1.2. Assessment Overview

The GA Milestones EOC Algebra: Concepts and Connections test is Georgia's state summative assessment aligned to the Georgia Standards of Excellence. Based on their test scores, students are placed into one of four performance levels: *Beginning Learner*, *Developing Learner*, *Proficient Learner*, and *Distinguished Learner*. The *Proficient Learner* cut score demarks the minimum level of performance considered to be proficient for accountability purposes.

MAP Growth tests are an adaptive interim assessment aligned to state-specific content standards and administered in the fall, winter, and spring. Scores are reported on the RIT vertical scale with a range of 100 to 350. To aid the interpretation of scores, NWEA conducts norming studies of student and school performance on MAP Growth. Growth norms provide expected score gains across test administrations (e.g., the relative evaluation of a student's growth from fall to spring), which are used to conduct the linking studies. The most recent norms study was conducted in 2025 (NWEA, 2025) for the general mathematics, reading, language arts, and science tests, while the most recent norms study for the MAP Growth course-specific tests was conducted and published in 2022 (He, 2022).

2. Methods

2.1. Data Collection

This linking study is based on data from the Spring 2024 administration of the MAP Growth assessment and the GA Milestones EOC Algebra: Concepts and Connections assessment. Each student's state testing record was matched to their MAP Growth scores based on the student's first and last names, date of birth, student ID, and other available identifying information. Only students who have scores on both the MAP Growth and GA Milestones EOC Algebra: Concepts and Connections assessments in Spring 2024 were included in the study sample.

2.2. Post-Stratification Weighting

Post-stratification weights were applied to the calculations to ensure that the linking study sample represented the state's test-taking student population in terms of race, sex, and performance level. These variables were selected because they are known to be correlated with students' academic achievement and are often available in state summative assessment reports. The weighted sample will match the target population as closely as possible for the key demographics and performance characteristics defined by the state.

A raking procedure was used to calculate the post-stratification weights that either compensate for the underrepresentation of certain groups or attenuate the overrepresentation of certain groups. Raking uses iterative procedures to obtain weights that match sample marginal distributions to known population margins. The following steps were taken during this process:

1. Calculate marginal distributions of race, sex, and performance level for the sample and population.
2. Calculate post-stratification weights with the rake function from the survey package in R (Lumley, 2019).
3. Apply the weights to the sample before conducting the linking study analyses.

2.3. Descriptive Statistics

Descriptive statistics are provided to summarize the test scores for the MAP Growth and GA Milestones EOC Algebra: Concepts and Connections assessments, including test score mean, standard deviation (SD), minimum, and maximum. The mean presents the average test scores across all students in the study sample, and the SD indicates the variability of test scores, revealing how students' scores are distributed around the average score, or mean. Correlation coefficients are also provided to answer the question "How well do the test scores from the MAP Growth mathematics 6+ or Algebra 1 tests (that reference the RIT scale) correlate to the scores obtained from the GA Milestones EOC Algebra: Concepts and Connections test (that references some other scale)?" The correlations were calculated as:

$$r = \frac{\sum (x_i - \overline{x})(y_i - \overline{y})}{\sqrt{\sum (x_i - \overline{x})^2 \sum (y_i - \overline{y})^2}}$$

where r is the correlation coefficient, x_i and y_i are the values of the *x*- and *y*-variables in a sample, and $\overline{x}$ and $\overline{y}$ are the mean of the values of the *x*- and *y*-variables.

2.4. MAP Growth Cut Scores

MAP Growth cut scores that predict student achievement on the GA Milestones EOC Algebra: Concepts and Connections summative assessment are reported so that educators can track learners' progress toward proficiency on the GA Milestones EOC Algebra: Concepts and Connections summative test. Percentile ranks based on the most recent NWEA norms are also provided. These are useful for understanding how students' scores compare with peers nationwide and the relative rigor of a state's performance level designations for its summative assessment.

The equipercentile linking method (Kolen & Brennan, 2004) was used to identify the spring MAP Growth RIT scores for MAP Growth mathematics 6+ and Algebra 1 that correspond to the GA Milestones EOC Algebra: Concepts and Connections summative performance level cut scores. The equipercentile linking procedure matches scores on the two scales that have the same percentile rank (i.e., the proportion of tests at or below each score). For example, let x represent a score on Test X (e.g., GA Milestones EOC Algebra: Concepts and Connections test). 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 as:

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

where $e_y(x)$ is the equipercentile equivalent of score x on the GA Milestones EOC Algebra: Concepts and Connections test on the scale of MAP Growth, $P(x)$ is the percentile rank of a given score on the GA Milestones EOC Algebra: Concepts and Connections test, and G^{-1} is the inverse of the percentile rank function for MAP Growth that indicates the score on MAP Growth corresponding to a given percentile. Polynomial loglinear pre-smoothing was applied to reduce irregularities of the score distributions and equipercentile linking curve.

The MAP Growth conditional growth norms provide students' expected score gains across terms, such as growth from fall to spring within the same grade or course. This information was used to calculate the fall and winter cut scores for MAP Growth mathematics 6+ in grades 6–10 as well as those for MAP Growth Algebra 1. The equation below was used to determine the previous term's MAP Growth score needed to reach the spring cut score, considering the expected growth associated with the previous RIT score:

$$RIT_{PredSpring} = RIT_{previous} + g$$

where:

- $RIT_{PredSpring}$ is the predicted MAP Growth spring score,
- $RIT_{previous}$ is the previous term's RIT score, and
- g is the expected growth from the previous RIT score (e.g., fall or winter) to the spring RIT score.

2.5. Classification Accuracy

The degree to which MAP Growth predicts student proficiency status on the GA Milestones EOC Algebra: Concepts and Connections summative test can be described using classification accuracy statistics based on the MAP Growth spring RIT cut scores. The results show the proportion of students correctly classified by their RIT scores as proficient (*Proficient Learner* or higher) or not proficient (lower than *Proficient Learner*) on the GA Milestones EOC Algebra:

Concepts and Connections summative test. Table 2.1 describes the classification accuracy statistics provided in this report (Pommerich et al., 2004).

Table 2.1. Description of Classification Accuracy Summary Statistics

Statistic	Description	Interpretation
Overall Classification Accuracy Rate	(TP + TN) / (total sample size)	Proportion of the study sample whose proficiency classification on the state test was correctly predicted by MAP Growth cut scores
False Negative (FN) Rate	FN / (FN + TP)	Proportion of students identified by MAP Growth as not proficient in those observed as proficient on the state test
False Positive (FP) Rate	FP / (FP + TN)	Proportion of students identified by MAP Growth as not proficient in those observed as not proficient on the state test
Sensitivity	TP / (TP + FN)	Proportion of students identified by MAP Growth as proficient in those observed as such on the state test
Specificity	TN / (TN + FP)	Proportion of students identified by MAP Growth as not proficient in those observed as such on the state test
Precision	TP / (TP + FP)	Proportion of students observed as proficient on the state test in those identified as such by the MAP Growth test
Area Under the Curve (AUC)	Area under the receiver operating characteristics (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.

Note. FP = false positives; FN = false negatives; TP = true positives; TN = true negatives.

2.6. Proficiency Projections

Given that all test scores contain measurement errors, reaching the *Proficient Learner* RIT cut score does not guarantee that a student is proficient on the state test. Instead, it can be claimed that a student meeting the RIT cut score has a 50% chance of reaching proficiency (*Proficient Learner* or higher) on the state test, with their chances increasing the greater their score is from the cut. The proficiency projections indicate these probabilities for various RIT scores throughout the year.

In addition to calculating the MAP Growth fall and winter cut scores, the MAP Growth conditional growth norms data were also used to calculate the probability of reaching proficiency on the GA Milestones EOC Algebra: Concepts and Connections summative test based on a student's RIT scores from fall and winter:

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

where:

- Φ is the standard normal cumulative distribution function,
- $RIT_{previous}$ is the student's RIT score in fall or winter,
- g is the expected growth from the previous RIT (e.g., fall or winter) to the spring RIT,
- $RIT_{SpringCut}$ is the MAP Growth *Proficient Learner* cut score for spring, and
- SD is the conditional standard deviation of the expected growth, g.

The equation below was used to estimate the probability of a student achieving proficiency performance on the GA Milestones EOC Algebra: Concepts and Connections summative test based on their spring RIT score (RIT_{Spring}):

$$Pr(Achieving\ proficiency\ in\ spring \mid spring\ RIT) = \Phi\left(\frac{RIT_{Spring} - RIT_{SpringCut}}{SE}\right)$$

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

3. Results

3.1. Study Sample

Only students who have scores on both the MAP Growth mathematics 6+ or Algebra 1 assessments and the GA Milestones EOC Algebra: Concepts and Connections assessment during Spring 2024 were included in the study sample. The GA Milestones EOC Algebra: Concepts and Connections data used in this study were collected from 147 schools within 17 districts in Georgia. Table 3.1 presents the distributions of students by race, sex, and performance level in the original unweighted study sample. Table 3.2 presents the distributions of the target population of students who took the GA Milestones EOC Algebra: Concepts and Connections summative test. Since the original study sample is different from the target population taking the GA Milestones EOC Algebra: Concepts and Connections test, post-stratification weights were applied. Table 3.3 presents the demographic distributions of the sample after weighting, which are almost identical to the student population distributions for the GA Milestones EOC Algebra: Concepts and Connections assessment.

Table 3.1. Linking Study Sample Demographics (Unweighted)

Demographic Subgroup		% Students by Assessment [c]	
		MG Mathematics 6+	MG Algebra 1
		GA EOC Algebra	GA EOC Algebra
Total N		13,747	2,627
Race	Asian/PI [a]	4.2	1.3
	Black, Non-Hispanic	54.2	57.7
	Hispanic	17.2	22.2
	Other [b]	4.6	3.8
	White, Non-Hispanic	19.8	15.0
Sex	Female	50.2	50.8
	Male	49.8	49.2
Performance Level	*Beginning Learner*	31.0	42.3
	Developing Learner	27.5	33.3
	Proficient Learner	25.6	19.1
	Distinguished Learner	15.9	5.3

[a] The “PI” indicates Pacific Islander.

[b] The “Other” category includes races of Multi-Racial, Native American, Alaskan Native, and Not Reported.

[c] “MG” = MAP Growth; “GA EOC” = GA Milestones EOC Algebra: Concepts and Connections

Table 3.2. Linking Study Population Demographics

Demographic Subgroup		% Students by Assessment [c]	
		MG Mathematics 6+	MG Algebra 1
		GA EOC Algebra	GA EOC Algebra
Total N		125,825	125,825
Race	Asian/PI [a]	5.5	5.5
	Black, Non-Hispanic	36.8	36.8
	Hispanic	20.2	20.2
	Other [b]	4.5	4.5
	White, Non-Hispanic	33.0	33.0

Demographic Subgroup		% Students by Assessment [c]	
		MG Mathematics 6+	MG Algebra 1
		GA EOC Algebra	GA EOC Algebra
Sex	Female	48.7	48.7
	Male	51.3	51.3
Performance Level	*Beginning Learner*	28.2	28.2
	Developing Learner	26.6	26.6
	Proficient Learner	26.5	26.5
	Distinguished Learner	18.6	18.6

[a] The "PI" indicates Pacific Islander.

[b] The "Other" category includes races of Multi-Racial, Native American, Alaskan Native, and Not Reported.

[c] "MG" = MAP Growth; "GA EOC" = GA Milestones EOC Algebra: Concepts and Connections

Table 3.3. Linking Study Sample Demographics (Weighted)

Demographic Subgroup		% Students by Assessment [c]	
		MG Mathematics 6+	MG Algebra 1
		GA EOC Algebra	GA EOC Algebra
	Total N	13,747	2,627
Race	Asian/PI [a]	5.5	5.5
	Black, Non-Hispanic	36.8	36.8
	Hispanic	20.2	20.2
	Other [b]	4.5	4.5
	White, Non-Hispanic	33.0	33.0
Sex	Female	48.7	48.7
	Male	51.3	51.3
Performance Level	*Beginning Learner*	28.2	28.2
	Developing Learner	26.6	26.6
	Proficient Learner	26.5	26.5
	Distinguished Learner	18.6	18.6

[a] The "PI" indicates Pacific Islander.

[b] The "Other" category includes races of Multi-Racial, Native American, Alaskan Native, and Not Reported.

[c] "MG" = MAP Growth; "GA EOC" = GA Milestones EOC Algebra: Concepts and Connections

3.2. Descriptive Statistics

Table 3.4 presents descriptive statistics of the MAP Growth and GA Milestones EOC Algebra: Concepts and Connections test scores from Spring 2024, including the correlation coefficients (*r*) between them. The coefficients between the scores are both 0.73 for the two linking operations (MAP Growth mathematics 6+ to GA Milestones EOC Algebra: Concepts and Connections and MAP Growth Algebra 1 to GA Milestones EOC Algebra: Concepts and Connections). These values indicate a high positive correlation among the scores, which is important validity evidence for the claim that MAP Growth scores are good predictors of performance on the GA Milestones EOC Algebra: Concepts and Connections assessment.

Table 3.4. Descriptive Statistics of Test Scores

Assessment	N	r	Mean	SD	Min.	Max.
MAP Growth Mathematics 6+	13,747	0.73	233.2	22.3	136	309
GA Milestones EOC Algebra			520.1	65.3	200	785
MAP Growth MAP Algebra 1	2,627	0.73	230.7	19.8	172	295
GA Milestones EOC Algebra			517.8	61.2	304	734

Note. SD = standard deviation; Min. = minimum; Max. = maximum.

3.3. MAP Growth Cut Scores

Table 3.5 and Table 3.6 present the GA Milestones EOC Algebra: Concepts and Connections scale score ranges and the corresponding MAP Growth RIT cut scores and percentile ranges by content area and grade. Bold numbers indicate the cut scores considered to be at least proficient for accountability purposes. These tables can be used to predict a student's likely performance level on the GA Milestones EOC Algebra: Concepts and Connections summative assessment when MAP Growth mathematics 6+ or Algebra 1 is taken in the fall, winter, and spring. For example, a grade 6 student who obtained a MAP Growth mathematics 6+ RIT score of 226 in the fall is likely to achieve *Proficient Learner* performance on the GA Milestones EOC Algebra: Concepts and Connections summative test. A grade 6 student who obtained a MAP Growth mathematics 6+ RIT score of 233 in the winter is also likely to achieve *Proficient Learner* performance on the GA Milestones EOC Algebra: Concepts and Connections summative test. The winter cut score is higher than the fall cut score because growth is expected between fall and winter as students receive more instruction during the school year.

Within this report, the cut scores for fall and winter are derived from the spring cuts and the typical growth scores from fall-to-spring or winter-to-spring. The typical growth scores are based on the default instructional weeks most encountered for each term (Weeks 4, 20, and 32 for fall, winter, and spring, respectively). Since instructional weeks often vary by district, the cut scores in this report may differ slightly from the MAP Growth score reports that reflect instructional weeks set by partners. If the actual instructional weeks deviate substantially from the default ones, a student's expected performance level could be different from the projections presented in this report. Partners are therefore encouraged to use the projected performance level in students' score reports, since these reflect the specific instructional weeks set by partners.

Table 3.5. MAP Growth Cut Scores—MAP Growth Mathematics 6+ & GA Milestones EOC Algebra

GA Milestones EOC Algebra: Concepts and Connections								
Level	***Beginning Learner***		***Developing Learner***		***Proficient Learner***		***Distinguished Learner***	
Scale Score	200–474		475–524		**525**–579		580–785	
MAP Growth Mathematics 6+								
Grade	***Beginning Learner***		***Developing Learner***		***Proficient Learner***		***Distinguished Learner***	
	RIT	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**
Fall								
6	100–207	1–43	208–225	44–83	**226**–243	84–97	244–350	98–99
7	100–210	1–35	211–229	36–76	**230**–247	77–95	248–350	96–99
8	100–210	1–26	211–229	27–66	**230**–247	67–91	248–350	92–99
9	100–211	1–22	212–233	23–69	**234**–252	70–93	253–350	94–99
10	100–210	1–19	211–232	20–62	**233**–252	63–91	253–350	92–99
Winter								
6	100–213	1–44	214–232	45–83	**233**–250	84–97	251–350	98–99
7	100–214	1–36	215–234	37–77	**235**–252	78–95	253–350	96–99
8	100–214	1–28	215–233	29–65	**234**–252	66–91	253–350	92–99
9	100–214	1–25	215–235	26–67	**236**–253	68–91	254–350	92–99
10	100–213	1–21	214–235	22–62	**236**–253	63–88	254–350	89–99
Spring								
6	100–217	1–44	218–236	45–81	**237**–254	82–96	255–350	97–99
7	100–217	1–37	218–236	38–74	**237**–254	75–94	255–350	95–99
8	100–217	1–28	218–236	29–65	**237**–254	66–89	255–350	90–99
9	100–217	1–29	218–236	30–64	**237**–254	65–88	255–350	89–99
10	100–217	1–26	218–236	27–59	**237**–254	60–85	255–350	86–99

Note. Bold numbers indicate the cut scores considered to be at least proficient for accountability purposes.

Table 3.6. MAP Growth Cut Scores—MAP Growth Algebra 1 & GA Milestones EOC Algebra

GA Milestones EOC Algebra: Concepts and Connections								
Level	***Beginning Learner***		***Developing Learner***		***Proficient Learner***		***Distinguished Learner***	
Scale Score	200–474		475–524		**525**–579		580–785	
MAP Growth Algebra 1								
Term	***Beginning Learner***		***Developing Learner***		***Proficient Learner***		***Distinguished Learner***	
	RIT	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**
Fall	100–209	1–11	210–225	12–42	**226**–241	43–78	242–350	79–99
Winter	100–212	1–12	213–229	13–42	**230**–246	43–77	247–350	78–99
Spring	100–216	1–15	217–233	16–43	**234**–250	44–75	251–350	76–99

Note. Bold numbers indicate the cut scores considered to be at least proficient for accountability purposes.

3.4. Classification Accuracy

Table 3.7 presents the classification accuracy summary statistics, including the overall classification accuracy rates. These results indicate how well MAP Growth spring RIT scores predict proficiency on the GA Milestones EOC Algebra: Concepts and Connections summative test, providing insight into the predictive validity of MAP Growth. The overall classification accuracy rate is 0.80 for the prediction from the MAP Growth mathematics 6+ test and 0.82 for the prediction from the MAP Growth Algebra 1 test. These values suggest that the RIT cut scores are good at classifying students as proficient (*Proficient Learner* or higher) or not proficient (lower than *Proficient Learner*) on the GA Milestones EOC Algebra: Concepts and Connections summative assessment.

Although the results show that MAP Growth scores can be used to predict student proficiency on the GA Milestones EOC Algebra: Concepts and Connections test with relatively high accuracy, there is a notable limitation to how these results should be used and interpreted. The MAP Growth and GA Milestones EOC Algebra: Concepts and Connections assessments are designed for different purposes and measure slightly different constructs even within the same content area. Therefore, scores on these tests cannot be assumed to be interchangeable. MAP Growth may not be used as a substitute for the state tests and vice versa.

Table 3.7. Classification Accuracy Results

N	Cut Score		Class. Accuracy	Rate		Sensitivity	Specificity	Precision	AUC
	MAP Growth	GA Milestones EOC		FP	FN				
MAP Growth Mathematics 6+ & GA Milestones EOC Algebra: Concepts and Connections									
13,747	237	525	0.80	0.16	0.24	0.76	0.84	0.79	0.80
MAP Growth Algebra 1 & GA Milestones EOC Algebra: Concepts and Connections									
2,627	234	525	0.82	0.15	0.22	0.78	0.85	0.81	0.82

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

3.5. Proficiency Projections

Table 3.8 and Table 3.9 present the estimated probabilities of achieving proficiency performance (*Proficient Learner* or higher) on the GA Milestones EOC Algebra: Concepts and Connections test based on RIT scores from fall, winter, or spring. Due to measurement error in all test scores, the *Proficient Learner* MAP Growth cuts do not guarantee that a student will reach proficiency on the GA Milestones EOC Algebra: Concepts and Connections test. Instead, they indicate a 50% chance that a student will reach a particular performance level. Therefore, these projections further elucidate the *Proficient Learner* cut scores by providing the likelihood of reaching proficiency on the GA Milestones EOC Algebra: Concepts and Connections assessment at a given percentile throughout the year.

For example, a grade 6 student at percentile 90 who obtained a MAP Growth mathematics 6+ score of 231 in the fall has a 73% chance of reaching proficiency on the GA Milestones EOC Algebra: Concepts and Connections test in spring. Additionally, an educator can also use the table to estimate that a grade 6 student who obtained a MAP Growth mathematics 6+ score of 245 in the winter has a 95% probability of reaching proficiency on the GA Milestones EOC Algebra: Concepts and Connections summative assessment.

Table 3.8. Proficiency Projections Based on RIT Scores—MAP Growth Mathematics 6+ & GA Milestones EOC Algebra

Grade	Start Percentile	Spring Cut	Fall			Winter			Spring		
			Fall RIT	Projected Proficiency		Winter RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
				Proficient	Prob.		Proficient	Prob.		Proficient	Prob.
6	5	237	184	No	<0.01	187	No	<0.01	190	No	<0.01
	10	237	190	No	<0.01	194	No	<0.01	197	No	<0.01
	15	237	194	No	<0.01	198	No	<0.01	201	No	<0.01
	20	237	197	No	<0.01	201	No	<0.01	205	No	<0.01
	25	237	199	No	<0.01	204	No	<0.01	208	No	<0.01
	30	237	202	No	<0.01	207	No	<0.01	211	No	<0.01
	35	237	204	No	<0.01	209	No	<0.01	213	No	<0.01
	40	237	206	No	<0.01	212	No	<0.01	216	No	<0.01
	45	237	208	No	0.01	214	No	<0.01	218	No	<0.01
	50	237	210	No	0.02	216	No	0.01	220	No	<0.01
	55	237	212	No	0.03	218	No	0.02	223	No	<0.01
	60	237	214	No	0.05	220	No	0.04	225	No	<0.01
	65	237	216	No	0.09	223	No	0.09	227	No	<0.01
	70	237	219	No	0.16	225	No	0.14	230	No	0.02
	75	237	221	No	0.27	228	No	0.25	233	No	0.13
	80	237	224	No	0.40	231	No	0.39	236	No	0.39
	85	237	227	Yes	0.55	234	Yes	0.55	239	Yes	0.72
	90	237	231	Yes	0.73	238	Yes	0.75	244	Yes	0.98
	95	237	237	Yes	0.91	245	Yes	0.95	251	Yes	>0.99
7	5	237	189	No	<0.01	191	No	<0.01	192	No	<0.01
	10	237	195	No	<0.01	197	No	<0.01	199	No	<0.01
	15	237	199	No	<0.01	202	No	<0.01	204	No	<0.01
	20	237	203	No	<0.01	206	No	<0.01	208	No	<0.01
	25	237	206	No	<0.01	209	No	<0.01	211	No	<0.01
	30	237	208	No	<0.01	211	No	<0.01	214	No	<0.01
	35	237	211	No	0.01	214	No	<0.01	216	No	<0.01

Grade	Start Percentile	Spring Cut	Fall			Winter			Spring		
			Fall RIT	Projected Proficiency		Winter RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
				Proficient	Prob.		Proficient	Prob.		Proficient	Prob.
	40	237	213	No	0.02	216	No	0.01	219	No	<0.01
	45	237	215	No	0.03	219	No	0.02	221	No	<0.01
	50	237	217	No	0.06	221	No	0.04	224	No	<0.01
	55	237	219	No	0.09	223	No	0.07	226	No	<0.01
	60	237	222	No	0.17	226	No	0.15	229	No	0.01
	65	237	224	No	0.23	228	No	0.22	231	No	0.04
	70	237	226	No	0.31	231	No	0.30	234	No	0.20
	75	237	229	No	0.45	233	No	0.40	237	Yes	0.50
	80	237	232	Yes	0.60	236	Yes	0.55	240	Yes	0.80
	85	237	235	Yes	0.73	240	Yes	0.74	244	Yes	0.98
	90	237	239	Yes	0.86	245	Yes	0.90	249	Yes	>0.99
	95	237	246	Yes	0.97	251	Yes	0.98	256	Yes	>0.99
8	5	237	192	No	<0.01	194	No	<0.01	196	No	<0.01
	10	237	199	No	<0.01	201	No	<0.01	203	No	<0.01
	15	237	203	No	<0.01	206	No	<0.01	208	No	<0.01
	20	237	207	No	<0.01	210	No	<0.01	212	No	<0.01
	25	237	210	No	0.01	213	No	<0.01	215	No	<0.01
	30	237	212	No	0.02	216	No	0.01	218	No	<0.01
	35	237	215	No	0.04	219	No	0.03	221	No	<0.01
	40	237	217	No	0.07	221	No	0.05	224	No	<0.01
	45	237	220	No	0.13	224	No	0.10	226	No	<0.01
	50	237	222	No	0.18	226	No	0.16	229	No	0.01
	55	237	224	No	0.25	228	No	0.23	231	No	0.04
	60	237	227	No	0.37	231	No	0.35	234	No	0.20
	65	237	229	No	0.45	233	No	0.45	237	Yes	0.50
	70	237	232	Yes	0.59	236	Yes	0.60	239	Yes	0.72
	75	237	234	Yes	0.68	239	Yes	0.69	242	Yes	0.92

Grade	Start Percentile	Spring Cut	Fall			Winter			Spring		
			Fall RIT	Projected Proficiency		Winter RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
				Proficient	Prob.		Proficient	Prob.		Proficient	Prob.
	80	237	237	Yes	0.79	242	Yes	0.81	246	Yes	0.99
	85	237	241	Yes	0.90	246	Yes	0.92	250	Yes	>0.99
	90	237	246	Yes	0.97	251	Yes	0.98	255	Yes	>0.99
	95	237	252	Yes	0.99	258	Yes	>0.99	262	Yes	>0.99
9	5	237	196	No	0.01	196	No	<0.01	194	No	<0.01
	10	237	202	No	0.03	203	No	0.01	202	No	<0.01
	15	237	207	No	0.05	207	No	0.02	207	No	<0.01
	20	237	210	No	0.07	211	No	0.03	211	No	<0.01
	25	237	213	No	0.11	214	No	0.05	215	No	<0.01
	30	237	216	No	0.14	217	No	0.08	218	No	<0.01
	35	237	218	No	0.17	220	No	0.11	221	No	<0.01
	40	237	220	No	0.20	222	No	0.14	223	No	<0.01
	45	237	223	No	0.25	225	No	0.20	226	No	<0.01
	50	237	225	No	0.29	227	No	0.25	229	No	0.01
	55	237	227	No	0.34	230	No	0.31	231	No	0.04
	60	237	229	No	0.37	232	No	0.37	234	No	0.20
	65	237	232	No	0.45	235	No	0.47	237	Yes	0.50
	70	237	234	Yes	0.50	237	Yes	0.53	240	Yes	0.80
	75	237	237	Yes	0.55	240	Yes	0.63	243	Yes	0.96
	80	237	240	Yes	0.63	243	Yes	0.72	247	Yes	>0.99
	85	237	243	Yes	0.71	247	Yes	0.82	251	Yes	>0.99
	90	237	248	Yes	0.81	252	Yes	0.91	256	Yes	>0.99
	95	237	254	Yes	0.90	259	Yes	0.97	263	Yes	>0.99
10	5	237	196	No	0.02	196	No	<0.01	195	No	<0.01
	10	237	203	No	0.05	204	No	0.02	203	No	<0.01
	15	237	208	No	0.08	208	No	0.03	208	No	<0.01
	20	237	211	No	0.11	212	No	0.05	213	No	<0.01

Grade	Start Percentile	Spring Cut	Fall			Winter			Spring		
			Fall RIT	Projected Proficiency		Winter RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
				Proficient	Prob.		Proficient	Prob.		Proficient	Prob.
	25	237	214	No	0.14	216	No	0.08	216	No	<0.01
	30	237	217	No	0.18	219	No	0.12	220	No	<0.01
	35	237	220	No	0.24	222	No	0.18	223	No	<0.01
	40	237	222	No	0.26	224	No	0.22	226	No	<0.01
	45	237	224	No	0.30	227	No	0.27	229	No	0.01
	50	237	227	No	0.37	229	No	0.32	231	No	0.04
	55	237	229	No	0.40	232	No	0.41	234	No	0.20
	60	237	232	No	0.47	235	No	0.47	237	Yes	0.50
	65	237	234	Yes	0.53	237	Yes	0.53	240	Yes	0.80
	70	237	237	Yes	0.58	240	Yes	0.62	243	Yes	0.96
	75	237	239	Yes	0.63	243	Yes	0.70	246	Yes	0.99
	80	237	242	Yes	0.67	246	Yes	0.78	250	Yes	>0.99
	85	237	246	Yes	0.76	250	Yes	0.86	254	Yes	>0.99
	90	237	251	Yes	0.85	255	Yes	0.93	260	Yes	>0.99
	95	237	257	Yes	0.92	263	Yes	0.98	268	Yes	>0.99

Note. Prob. = Probability.

Table 3.9. Proficiency Projections Based on RIT Scores—MAP Growth Algebra 1 & GA Milestones EOC Algebra

Course	Start Percentile	Spring Cut	Fall			Winter			Spring		
			Fall RIT	Projected Proficiency		Winter RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
				Proficient	Prob.		Proficient	Prob.		Proficient	Prob.
MAP Growth Algebra 1	5	234	202	No	0.01	204	No	<0.01	204	No	<0.01
	10	234	208	No	0.03	210	No	0.01	212	No	<0.01
	15	234	212	No	0.07	214	No	0.04	216	No	<0.01
	20	234	215	No	0.12	218	No	0.09	220	No	<0.01
	25	234	218	No	0.19	221	No	0.15	224	No	<0.01
	30	234	220	No	0.28	224	No	0.25	227	No	0.02
	35	234	223	No	0.38	226	No	0.33	229	No	0.08
	40	234	225	No	0.46	228	No	0.41	232	No	0.28
	45	234	227	Yes	0.54	231	Yes	0.55	234	Yes	0.50
	50	234	229	Yes	0.62	233	Yes	0.63	237	Yes	0.80
	55	234	231	Yes	0.69	235	Yes	0.71	239	Yes	0.92
	60	234	233	Yes	0.75	238	Yes	0.82	242	Yes	0.99
	65	234	235	Yes	0.81	240	Yes	0.87	245	Yes	>0.99
	70	234	237	Yes	0.86	242	Yes	0.91	247	Yes	>0.99
	75	234	240	Yes	0.93	245	Yes	0.96	250	Yes	>0.99
	80	234	243	Yes	0.96	248	Yes	0.98	254	Yes	>0.99
	85	234	246	Yes	0.98	252	Yes	0.99	257	Yes	>0.99
	90	234	250	Yes	0.99	256	Yes	>0.99	262	Yes	>0.99
	95	234	256	Yes	>0.99	263	Yes	>0.99	269	Yes	>0.99

Note. Prob. = Probability.

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