

Predicting Proficiency on the North Carolina End-of-Course (NC EOC) Assessments based on NWEA MAP Growth Scores

July 2023

NWEA Psychometric Solutions

Linking Study Updates

Date	Description
2023-07-05	Initial study conducted for NC EOC using Spring 2022 data.

Acknowledgements: This report benefited from the project management and editorial assistance of Debbie Bauman, the data analysis of Sarah-Truclinh Tran, psychometric analysis of Yuhong Ji, and the psychometric leadership of Ann Hu. We appreciate our colleagues at NWEA who assisted in partner recruitment and are grateful to all our partners who provided data for the study.

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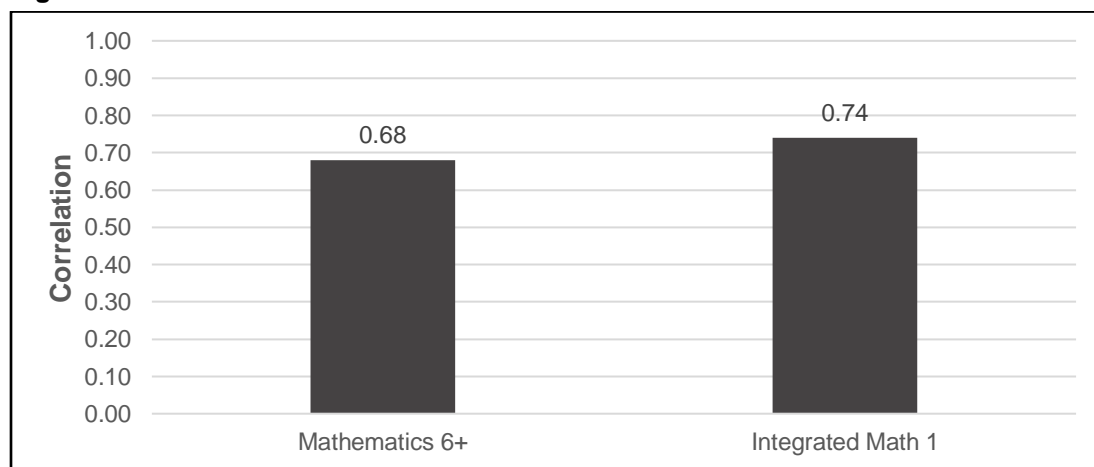
Executive Summary

Linking studies allow partners to use MAP® Growth™ RIT scores throughout the year to predict their students' likely achievement levels on the state summative assessment. This is accomplished through statistical analyses that produce RIT cut scores corresponding to the state summative achievement levels. A *cut score* is the minimum score a student must get on a test to be placed at a certain achievement level. The linking study for the North Carolina End-of-Course (NC EOC) Math 1 described in this report provides RIT cut scores for the fall, winter, and spring MAP Growth administrations that correspond to the NC EOC achievement levels for each subject and grade.

The linking study is based on test scores from students who took both the MAP Growth Mathematics 6+ or Integrated Math 1 and NC EOC Math 1 assessments in Spring 2022 for the targeted grades. The linking study sample included approximately 3,798 students across 3 districts and 52 schools in North Carolina. Scores from both tests were used as the basis for linking the two assessments.

Before the linking analyses began, NWEA confirmed that the MAP Growth and NC EOC assessments are aligned to the same or similar set of content standards to warrant a connection. The test links were further investigated by calculating the Pearson correlation coefficients that describe the relationship between the specific MAP Growth and NC EOC test scores. At NWEA, we consider a correlation of $r \geq 0.70$ as “high” correlation. This indicates that students who perform well on one assessment also tend to perform well on the other, and vice versa. A perfect positive correlation is 1.00. As shown in Figure E.1, the correlation between the MAP Growth Mathematics 6+ and NC EOC Math 1 test scores from Spring is 0.68. While this value indicates a positive relationship between the two tests, it falls slightly below our threshold of 0.70. In contrast, the correlation between the MAP Growth Integrated Math 1 and NC EOC Math 1 assessments is 0.74, suggesting that MAP Growth Integrated Math 1 is a better predictor of performance on the NC EOC Math test compared to Mathematics 6+.

Figure E.1. Correlations between MAP Growth and NC EOC Test Scores



The equipercentile linking method (Kolen & Brennan, 2004) and the NWEA 2022 MAP Growth course-specific norms (He, 2022) were then used to produce the RIT cut scores that correspond to performance on the NC EOC Math 1 assessment for every subject and grade. While RIT cut

scores were generated for every performance level on the NC EOC Math 1 assessment, Table E.1 presents the *Level 3* cut scores that indicate the minimum score a student must get to be considered proficient (reaching *Level 3* or higher).

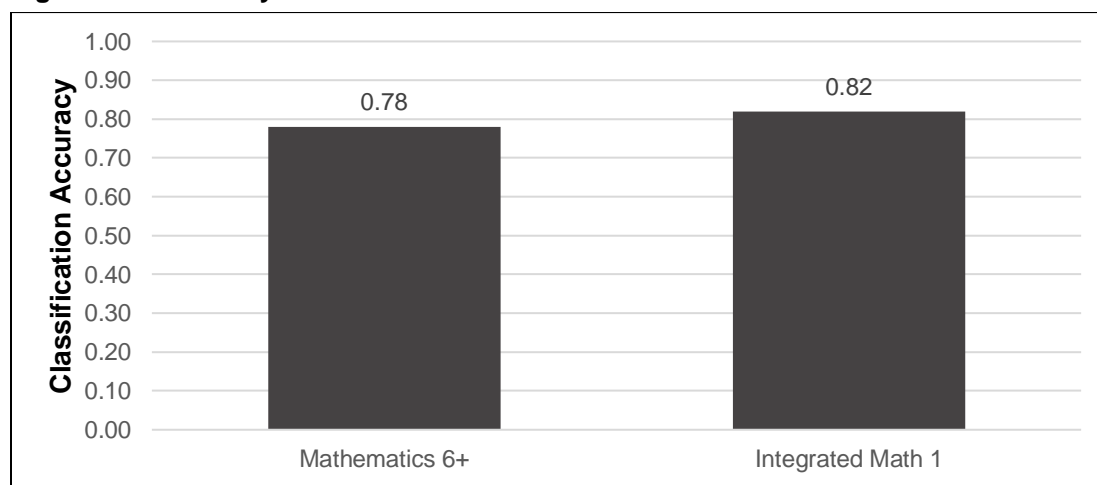
Table E.1. MAP Growth RIT Cut Scores for NC EOC Math 1 Proficiency

Assessment		Level 3 Cut Scores by Grade				
		7	8	9	10	11
NC EOC Spring		548				
MAP Growth Mathematics 6+	Fall	233	235	237	237	238
	Winter	237	238	239	239	239
	Spring	240	240	240	240	240
MAP Growth Integrated Math 1	Fall	236				
	Winter	239				
	Spring	241				

Educators can use these cut scores to determine whether students are likely on track for proficiency on the state assessment. For example, the *Level 3* cut score on the Grade 3 NC EOC Math 1 test is 548. A Grade 8 student who took the MAP Growth Mathematics 6+ test in fall and scored 235 is likely to meet expectations on the NC EOC Math 1 test in the spring, whereas if the student scored lower than 235, they would be in jeopardy of not meeting proficiency by spring.

As further evidence that MAP Growth scores can be used to predict students' proficiency on the state test, NWEA calculated classification accuracy statistics that show how well the RIT cuts correctly classified students as proficient on the state EOC tests. Figure E.2 shows the MAP Growth Mathematics 6+ *Level 3* cut score has a 0.78 accuracy rate, meaning it accurately predicted student achievement on the state test for 78% of the sample. Similarly, the MAP Growth Integrated Math 1 *Level 3* cut score has a 0.82 classification accuracy rate. These results indicate that MAP Growth scores have a high accuracy rate of identifying student proficiency on the NC EOC Math 1 test.

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 the state summative assessment. 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), 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 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 to statistically connect the scores of the North Carolina End-of-Course (NC EOC) Math 1 assessment with Rasch Unit (RIT) scores from the MAP Growth Mathematics 6+ and Integrated Math 1 taken during the Spring 2022 term. 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 achievement levels on the spring NC EOC Math 1 assessment
4. Classification accuracy statistics to determine the degree to which MAP Growth accurately predicts student proficiency status on the NC EOC Math 1 tests
5. The probability of achieving grade-level proficiency on the NC EOC Math 1 assessment based on MAP Growth RIT scores from fall, winter, and spring

1.2. Assessment Overview

The NC EOC Math 1 assessment is part of North Carolina's state summative assessment system aligned to the North Carolina Standard Course of Study (NCSCOS). Based on their test scores, students are placed into one of four achievement levels: *Not Proficient*, *Level 3*, *Level 4*, and *Level 5*. The *Level 3* cut score demarks the minimum level of performance considered to be proficient for state accountability purposes.

MAP Growth tests are adaptive interim assessments 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. NWEA conducts norming studies of student and school performance on MAP Growth assessments to aid the interpretation of scores. Growth norms provide expected score gains for a test from term to term, such as from fall to spring terms. The most recent course-specific norms study was completed in 2022 and published in Summer 2023.

2. Methods

2.1. Data Collection

This linking study is based on data from the Spring 2022 administrations of the MAP Growth Mathematics 6+ and Integrated Math 1 and NC EOC Math 1 assessments. NWEA recruited North Carolina districts to participate in the study by sharing their student and score data for the target term. Districts also gave NWEA permission to use their students' MAP Growth scores from the NWEA in-house database. Once state score information was received by NWEA, each student's state testing record was matched to their MAP Growth score based on the student's first and last names, date of birth, student ID, and other available identifying information. Only students who took both the MAP Growth Mathematics 6+ or Integrated Math 1 assessments and the NC EOC Math 1 assessments in Spring 2022 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 achievement 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 on the key demographics and performance characteristics as 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 achievement level for the sample and population.
2. Calculate post-stratification weights with the rake function from the survey package in R (Lumley, 2019).
3. Trim the weights that are outside the range of 0.3 to 3.0.
4. 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 both the MAP Growth and NC EOC Math 1 assessments, including the 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 between the MAP Growth RIT scores and NC EOC scores are also provided to answer the question, "How well do the test scores from MAP Growth that reference the RIT scale correlate to the scores obtained from the NC EOC test that references some other scale in the same subject?" The correlations were calculated as follows:

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}} \quad (1)$$

where r is the correlation coefficient, x_i and y_i are the values of the x- and y-variables in a sample, and \bar{x} and \bar{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 NC EOC Math 1 assessment are reported for Grades 7–11. Since the NC EOC Math 1 test is not grade-dependent (i.e., any student can take the assessment once they finish the course), the spring RIT cuts were established based on all the students in the study sample regardless of their grades. Fall and winter RIT cut scores were then projected using the 2022 course-specific growth norms, conditional on the spring RIT cuts. When reporting results for the MAP Growth Mathematics 6+ assessment, the RIT cuts for Grades 7–11 were included because it is common for students in this grade range to take this assessment. In contrast, with the MAP Growth Integrated Math 1 test, the overall RIT cuts were reported independent of grade level.

Percentile ranks are based on the 2022 norms. These are useful for understanding how students' scores compare to peers nationwide and the relative rigor of a state's achievement level designations for its summative assessment.

The equipercentile linking method was used to identify the spring MAP Growth RIT scores that correspond to the spring NC EOC Math 1 achievement 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., NC EOC). 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 NC EOC on the scale of MAP Growth, $P(x)$ is the percentile rank of a given score on NC EOC, 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 from spring of a lower grade to spring of the adjacent higher grade. This information was used to calculate the fall and winter cut scores. Equation 2 was used to determine the previous terms or grades MAP Growth score needed to reach the spring cut score, considering the expected growth associated with the previous RIT score:

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

where:

- $RIT_{PredSpring}$ is the predicted MAP Growth spring score.
- $RIT_{previous}$ is the previous terms or grades RIT score.
- g is the expected growth from the previous fall or winter RIT to the spring RIT score.

2.5. Classification Accuracy

The degree to which MAP Growth predicts student proficiency status on the NC EOC Math 1 tests 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 or not proficient on the NC EOC Math 1 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	$(TP + TN) / (\text{total sample size})$	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 not-proficient students identified by MAP Growth in those observed as proficient on the state test
False Positive (FP) Rate	$FP / (FP + TN)$	Proportion of proficient students identified by MAP Growth in those observed as not proficient on the state test
Sensitivity	$TP / (TP + FN)$	Proportion of proficient students identified by MAP Growth in those observed as such on the state test
Specificity	$TN / (TN + FP)$	Proportion of not-proficient students identified by MAP Growth in those observed as such on the state test
Precision	$TP / (TP + FP)$	Proportion of observed proficient students 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.

*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 *Level 3* RIT cut does not guarantee that the student is proficient at the state test. Instead, we can claim that a student with the RIT cut score has a 50% chance of reaching proficiency 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 NC EOC Math 1 test in the spring based on a student's RIT scores from fall, winter, and spring. Equation 3 was used to calculate the probability of a student achieving *Level 3* performance on the NC EOC Math 1 test based on their fall or winter RIT 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 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 fall or winter RIT to the spring RIT.
- $RIT_{SpringCut}$ is the MAP Growth cut score associated with state proficiency spring.
- SD is the conditional standard deviation of the expected growth, g .

Equation 4 was used to estimate the probability of a student achieving *Level 3* performance on the NC EOC Math 1 test based on their spring RIT score (RIT_{Spring}):

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

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

3. Results

3.1. Study Sample

Only students who took both the MAP Growth and NC EOC Math 1 assessments in Spring 2022 for the targeted subjects were included in the sample. Data were collected from 3 districts and 52 schools in North Carolina across the sample. Table 3.1 presents the distributions of student race, sex, and achievement level of the NC EOC Math 1 student population and both the unweighted and weighted linking study samples. Since the original unweighted study sample is different from the target NC EOC Math 1 population, post-stratification weights were applied. Table 3.1 presents the demographic distributions of the final analytic samples after weighting are almost identical to the NC EOC Math 1 student population distributions.

Table 3.1. Linking Study Sample Demographics

Linking Study Sample						
Demographic Subgroup		%Students by Sample				
		NC Population*	Unweighted Samples		Weighted Samples	
			Integrated Math 1	Math 6+	Integrated Math 1	Math 6+
Total N-Count		95,294	937	2,861	937	2,861
Race	American Indian or Alaska Native	1.2	0.4	0.2	1.2	1.2
	Asian, NHOPI	2.0	10.5	10.3	2.0	2.0
	Black	28.0	17.4	24.3	28.0	28.0
	Hispanic/Latino any race	24.0	17.8	19.0	24.0	24.0
	Two or More Races	5.1	2.9	2.9	5.1	5.1
	White	39.7	51.0	43.2	39.7	39.7
Sex	Female	47.9	52.4	53.1	47.9	47.9
	Male	52.1	47.6	46.9	52.1	52.1
Achievement Level	<i>Not Proficient</i>	66.9	16.1	15.9	66.9	66.9
	<i>Level 3</i>	22.4	26.5	27.6	22.4	22.4
	<i>Level 4</i>	9.5	37.9	38.4	9.5	9.5
	<i>Level 5</i>	1.2	19.5	18.0	1.2	1.2

*The number of students who took the NC EOC Math 1 assessment in Spring 2022.

3.2. Descriptive Statistics

Table 3.2 presents descriptive statistics of the MAP Growth and NC EOC test scores from Spring 2022, including the correlation coefficient (r) between them. The correlations between the scores are 0.68 and 0.74. These values indicate a relatively 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 NC EOC Math 1 assessments.

Table 3.2. Descriptive Statistics of Test Scores

Sample	N	r	Standard			
			Mean	Deviation	Minimum	Maximum
NC EOC Math 1	2,861	0.68	545.8	7	530	575
MAP Mathematics 6+			234.4	14	164	301
NC EOC Math 1	937	0.74	546	6.9	530	575
MAP Integrated Math 1			236.9	12.3	209	298

3.3. MAP Growth Cut Scores

Table 3.3 and Table 3.4 present the NC EOC Math 1 scale score ranges and the corresponding MAP Growth RIT cut scores and percentile ranges. Bolded numbers highlight the cut scores considered to be proficient. These tables can be used to gauge a student’s likely achievement level on the NC EOC Math 1 spring assessment when MAP Growth is taken in the fall, winter, or spring. For example, a Grade 8 student who obtained a MAP Growth Mathematics 6+ RIT score of 235 in the fall is likely to achieve *Level 3* performance on the NC EOC Math 1 test in the spring. The same is true for a Grade 8 student who obtained a MAP Growth RIT score of 240 in the spring. The spring cut score is higher than the fall cut score because of expected growth during the school year as students receive more instruction.

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, a student’s expected achievement level could be different from the projections presented in this document. Partners are encouraged to use the projected achievement level in students’ score reports since they reflect the specific instructional weeks set by partners.

Table 3.3. MAP Growth Cut Scores—Mathematics 6+, NC Math 1

NC EOC Math 1								
	<i>Not Proficient</i>		<i>Level 3</i>		<i>Level 4</i>		<i>Level 5</i>	
Spring	528–547		548 –554		555–562		563–575	
MAP Growth Math 6+								
Grade	<i>Not Proficient</i>		<i>Level 3</i>		<i>Level 4</i>		<i>Level 5</i>	
	RIT	Percentile	RIT	Percentile	RIT	Percentile	RIT	Percentile
Fall								
7	100–232	1–76	233 –244	77–91	245–254	92–97	255–350	98–99
8	100–234	1–69	235 –246	70–87	247–256	88–94	257–350	95–99
9	100–236	1–69	237 –248	70–86	249–258	87–94	259–350	95–99
10	100–236	1–64	237 –248	65–83	249–258	84–92	259–350	93–99
11	100–237	1–61	238 –249	62–80	250–259	81–90	260–350	91–99
Winter								
7	100–236	1–75	237 –248	76–91	249–258	92–96	259–350	97–99
8	100–237	1–69	238 –249	70–86	250–259	87–94	260–350	95–99
9	100–238	1–69	239 –250	70–86	251–260	87–94	261–350	95–99
10	100–238	1–64	239 –250	65–82	251–260	83–92	261–350	93–99
11	100–238	1–59	239 –250	60–79	251–260	80–90	261–350	91–99
Spring								
7	100–239	1–75	240 –251	76–90	252–261	91–96	262–350	97–99
8	100–239	1–68	240 –251	69–85	252–261	86–93	262–350	94–99
9	100–239	1–68	240 –251	69–85	252–261	86–93	262–350	94–99
10	100–239	1–63	240 –251	64–81	252–261	82–91	262–350	92–99
11	100–239	1–59	240 –251	60–78	252–261	79–89	262–350	90–99

Table 3.4. MAP Growth Cut Scores—Integrated Math 1, NC Math 1

NC EOC Math 1									
	Not Proficient		Level 3		Level 4		Level 5		
Spring	528–547		548–554		555–562		563–575		
MAP Growth Integrated Math 1									
	Not Proficient		Level 3		Level 4		Level 5		
	RIT	Percentile	RIT	Percentile	RIT	Percentile	RIT	Percentile	
Fall	100–235	1–72	236–246	73–88	247–258	89–96	259–350	97–99	
Winter	100–238	1–70	239–250	71–87	251–263	88–96	264–350	97–99	
Spring	100–240	1–69	241–252	70–86	253–264	87–95	265–350	96–99	

3.4. Classification Accuracy

Table 3.5 presents the classification accuracy summary statistics, including the overall classification accuracy rate. These results indicate how well MAP Growth spring RIT scores predict proficiency on the NC EOC Math 1 tests, providing insight into the predictive validity of MAP Growth. The overall classification accuracy rate is 0.78 for Mathematics 6+ and 0.82 for Integrated Math 1. These values suggest that the RIT cut scores are effective at classifying students as proficient or not proficient on the NC EOC Math 1 assessment.

Although the results show that MAP Growth scores can be used to predict student proficiency with relatively high accuracy on the NC EOC Math 1 test, there is a notable limitation to how these results should be used and interpreted. The NC EOC and MAP Growth assessments are designed for different purposes and measure slightly different constructs even within the same content area. Therefore, scores on the two tests cannot be assumed to be interchangeable. MAP Growth may not be used as a substitute for the state tests and vice versa.

Table 3.5. Classification Accuracy Results

Sample	N	Cut Score		Class. Accuracy*	Rate*		Sensitivity	Specificity	Precision	AUC*
		MAP Growth	NC EOC		FP	FN				
MAP Math 6+ NC Math 1	2,861	240	548	0.78	0.17	0.30	0.70	0.83	0.67	0.86
MAP Int. Math 1 NC Math 1	937	241	548	0.82	0.15	0.25	0.75	0.85	0.71	0.89

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

3.5. Proficiency Projections

Table 3.6 and Table 3.7 present the estimated probability of achieving *Level 3* performance on the NC EOC Math 1 test based on RIT scores from fall, winter, or spring for each of the MAP Growth tests. Due to measurement error in all test scores, the *Level 3* MAP Growth cuts do not guarantee that a student will reach proficiency on the NC EOC Math 1 test. They instead indicate a 50% chance that a student will reach a particular performance level. Therefore, these projections further elucidate the *Level 3* cut scores by providing the likelihood of reaching proficiency on the state test in the spring at a given percentile throughout the year.

For example, the spring Grade 8 *Level 3* RIT cut score for Mathematics 6+ is 240, which indicates a 50% chance of achieving state proficiency in the spring, as shown in Table 3.6. An educator can also use this table to estimate that a Grade 8 student who obtained a MAP Growth score of 235 in the fall has a 50% probability of reaching *Level 3* or higher on the state test in the spring.

Table 3.6. Proficiency Projections based on RIT Scores—Mathematics 6+, NC Math 1

Mathematics 6+											
Grade	Start %ile*	Spring Cut	Fall			Winter			Spring		
			Fall RIT	Projected Proficiency		Winter RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
				Level 3	Prob.		Level 3	Prob.		Level 3	Prob.
7	5	240	192	No	<0.01	194	No	<0.01	196	No	<0.01
	10	240	198	No	<0.01	201	No	<0.01	203	No	<0.01
	15	240	202	No	<0.01	205	No	<0.01	207	No	<0.01
	20	240	206	No	<0.01	209	No	<0.01	211	No	<0.01
	25	240	208	No	<0.01	212	No	<0.01	214	No	<0.01
	30	240	211	No	<0.01	215	No	<0.01	217	No	<0.01
	35	240	213	No	<0.01	217	No	<0.01	220	No	<0.01
	40	240	216	No	<0.01	219	No	<0.01	222	No	<0.01
	45	240	218	No	0.01	222	No	<0.01	224	No	<0.01
	50	240	220	No	0.02	224	No	<0.01	227	No	<0.01
	55	240	222	No	0.04	226	No	0.01	229	No	<0.01
	60	240	225	No	0.10	229	No	0.04	231	No	<0.01
	65	240	227	No	0.17	231	No	0.10	234	No	0.02
	70	240	229	No	0.26	233	No	0.20	236	No	0.08
	75	240	232	No	0.44	236	No	0.42	239	No	0.37
	80	240	235	Yes	0.63	239	Yes	0.67	242	Yes	0.75
	85	240	238	Yes	0.79	243	Yes	0.90	246	Yes	0.98
90	240	243	Yes	0.95	247	Yes	0.98	251	Yes	>0.99	
95	240	249	Yes	>0.99	254	Yes	>0.99	257	Yes	>0.99	
8	5	240	194	No	<0.01	196	No	<0.01	197	No	<0.01
	10	240	201	No	<0.01	203	No	<0.01	205	No	<0.01
	15	240	205	No	<0.01	208	No	<0.01	210	No	<0.01
	20	240	209	No	<0.01	212	No	<0.01	214	No	<0.01
	25	240	212	No	<0.01	215	No	<0.01	217	No	<0.01
	30	240	215	No	<0.01	218	No	<0.01	220	No	<0.01
	35	240	218	No	0.01	221	No	<0.01	223	No	<0.01
	40	240	220	No	0.02	223	No	<0.01	225	No	<0.01
	45	240	223	No	0.04	226	No	0.01	228	No	<0.01
	50	240	225	No	0.07	228	No	0.02	230	No	<0.01
	55	240	227	No	0.12	231	No	0.07	233	No	0.01
	60	240	230	No	0.24	233	No	0.15	235	No	0.04
	65	240	232	No	0.33	236	No	0.34	238	No	0.25
	70	240	235	Yes	0.50	238	Yes	0.50	241	Yes	0.63
	75	240	238	Yes	0.67	241	Yes	0.73	244	Yes	0.92
	80	240	241	Yes	0.81	244	Yes	0.89	247	Yes	0.99
	85	240	245	Yes	0.93	248	Yes	0.98	251	Yes	>0.99
90	240	249	Yes	0.98	253	Yes	>0.99	256	Yes	>0.99	
95	240	256	Yes	>0.99	260	Yes	>0.99	263	Yes	>0.99	

Mathematics 6+											
Grade	Start %ile*	Spring Cut	Fall			Winter			Spring		
			Fall RIT	Projected Proficiency		Winter RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
				Level 3	Prob.		Level 3	Prob.		Level 3	Prob.
9	5	240	194	No	<0.01	196	No	<0.01	196	No	<0.01
	10	240	201	No	<0.01	203	No	<0.01	204	No	<0.01
	15	240	206	No	<0.01	208	No	<0.01	209	No	<0.01
	20	240	210	No	<0.01	212	No	<0.01	213	No	<0.01
	25	240	213	No	<0.01	215	No	<0.01	216	No	<0.01
	30	240	216	No	<0.01	218	No	<0.01	219	No	<0.01
	35	240	219	No	0.01	221	No	<0.01	222	No	<0.01
	40	240	221	No	0.02	224	No	<0.01	225	No	<0.01
	45	240	224	No	0.05	226	No	<0.01	227	No	<0.01
	50	240	226	No	0.09	229	No	0.02	230	No	<0.01
	55	240	229	No	0.17	231	No	0.05	233	No	0.01
	60	240	231	No	0.21	234	No	0.16	235	No	0.04
	65	240	234	No	0.34	236	No	0.27	238	No	0.25
	70	240	237	Yes	0.50	239	Yes	0.50	241	Yes	0.63
	75	240	240	Yes	0.66	242	Yes	0.73	244	Yes	0.92
	80	240	243	Yes	0.79	246	Yes	0.92	247	Yes	0.99
	85	240	247	Yes	0.91	249	Yes	0.98	251	Yes	>0.99
90	240	252	Yes	0.98	254	Yes	>0.99	256	Yes	>0.99	
95	240	259	Yes	>0.99	262	Yes	>0.99	264	Yes	>0.99	
10	5	240	196	No	<0.01	197	No	<0.01	197	No	<0.01
	10	240	203	No	<0.01	205	No	<0.01	205	No	<0.01
	15	240	208	No	<0.01	210	No	<0.01	210	No	<0.01
	20	240	212	No	<0.01	214	No	<0.01	215	No	<0.01
	25	240	215	No	<0.01	217	No	<0.01	218	No	<0.01
	30	240	218	No	0.01	220	No	<0.01	221	No	<0.01
	35	240	221	No	0.01	223	No	<0.01	224	No	<0.01
	40	240	224	No	0.04	226	No	<0.01	227	No	<0.01
	45	240	227	No	0.09	229	No	0.02	230	No	<0.01
	50	240	229	No	0.14	231	No	0.05	232	No	<0.01
	55	240	232	No	0.25	234	No	0.16	235	No	0.04
	60	240	234	No	0.34	236	No	0.27	238	No	0.25
	65	240	237	Yes	0.50	239	Yes	0.50	241	Yes	0.63
	70	240	240	Yes	0.66	242	Yes	0.73	244	Yes	0.92
	75	240	243	Yes	0.79	245	Yes	0.89	247	Yes	0.99
	80	240	246	Yes	0.89	249	Yes	0.98	250	Yes	>0.99
	85	240	250	Yes	0.96	253	Yes	>0.99	254	Yes	>0.99
90	240	255	Yes	0.99	258	Yes	>0.99	260	Yes	>0.99	
95	240	262	Yes	>0.99	265	Yes	>0.99	267	Yes	>0.99	

Mathematics 6+											
Grade	Start %ile*	Spring Cut	Fall			Winter			Spring		
			Fall RIT	Projected Proficiency		Winter RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
				Level 3	Prob.		Level 3	Prob.		Level 3	Prob.
11	5	240	198	No	<0.01	199	No	<0.01	199	No	<0.01
	10	240	205	No	<0.01	207	No	<0.01	207	No	<0.01
	15	240	210	No	<0.01	212	No	<0.01	212	No	<0.01
	20	240	214	No	<0.01	216	No	<0.01	216	No	<0.01
	25	240	218	No	0.01	219	No	<0.01	220	No	<0.01
	30	240	221	No	0.03	223	No	<0.01	223	No	<0.01
	35	240	224	No	0.06	225	No	<0.01	226	No	<0.01
	40	240	227	No	0.12	228	No	0.02	229	No	<0.01
	45	240	229	No	0.17	231	No	0.06	232	No	<0.01
	50	240	232	No	0.27	233	No	0.13	234	No	0.02
	55	240	234	No	0.32	236	No	0.28	237	No	0.15
	60	240	237	No	0.45	239	Yes	0.50	240	Yes	0.50
	65	240	240	Yes	0.59	242	Yes	0.72	243	Yes	0.85
	70	240	243	Yes	0.73	244	Yes	0.83	246	Yes	0.98
	75	240	246	Yes	0.83	248	Yes	0.96	249	Yes	>0.99
	80	240	249	Yes	0.91	251	Yes	0.99	252	Yes	>0.99
	85	240	253	Yes	0.96	255	Yes	>0.99	257	Yes	>0.99
90	240	258	Yes	0.99	260	Yes	>0.99	262	Yes	>0.99	
95	240	266	Yes	>0.99	268	Yes	>0.99	270	Yes	>0.99	

*%tile = Percentile.

Table 3.7. Proficiency Projections based on RIT Scores—Integrated Math 1, NC Math 1

Mathematics 6+										
Start %ile*	Spring Cut	Fall			Winter			Spring		
		Fall RIT	Projected Proficiency		Winter RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
			Level 3	Prob.		Level 3	Prob.		Level 3	Prob.
5	241	196	No	<0.01	197	No	<0.01	198	No	<0.01
10	241	202	No	<0.01	204	No	<0.01	205	No	<0.01
15	241	207	No	<0.01	209	No	<0.01	210	No	<0.01
20	241	210	No	<0.01	212	No	<0.01	214	No	<0.01
25	241	213	No	<0.01	216	No	<0.01	217	No	<0.01
30	241	216	No	0.01	218	No	<0.01	220	No	<0.01
35	241	218	No	0.01	221	No	0.01	223	No	<0.01
40	241	221	No	0.04	224	No	0.02	226	No	<0.01
45	241	223	No	0.06	226	No	0.03	228	No	<0.01
50	241	225	No	0.09	228	No	0.06	231	No	<0.01
55	241	227	No	0.14	231	No	0.13	233	No	0.01
60	241	230	No	0.23	233	No	0.20	236	No	0.08
65	241	232	No	0.31	236	No	0.34	238	No	0.20
70	241	235	No	0.45	238	No	0.44	241	Yes	0.50
75	241	237	Yes	0.55	241	Yes	0.61	244	Yes	0.80
80	241	240	Yes	0.69	244	Yes	0.76	247	Yes	0.96
85	241	244	Yes	0.83	248	Yes	0.90	251	Yes	>0.99
90	241	248	Yes	0.94	253	Yes	0.97	256	Yes	>0.99
95	241	255	Yes	0.99	260	Yes	>0.99	263	Yes	>0.99

*%tile = Percentile.

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