Predicting Proficiency on the State of Texas Assessments of Academic Readiness (STAAR) End-of-Course (EOC) Assessments based on NWEA MAP Growth Scores

November 2022

NWEA Psychometric Solutions

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Linking Study Updates

Date	Description
2020-07-24	Initial study conducted for Texas End-of-Course (EOC) for Algebra 1 using Spring 2019 data incorporating the 2020 MAP Growth norms.
2022-11-30	Incorporated EOC English 1, English 2, and Biology. NWEA norms are not yet available for Biology.

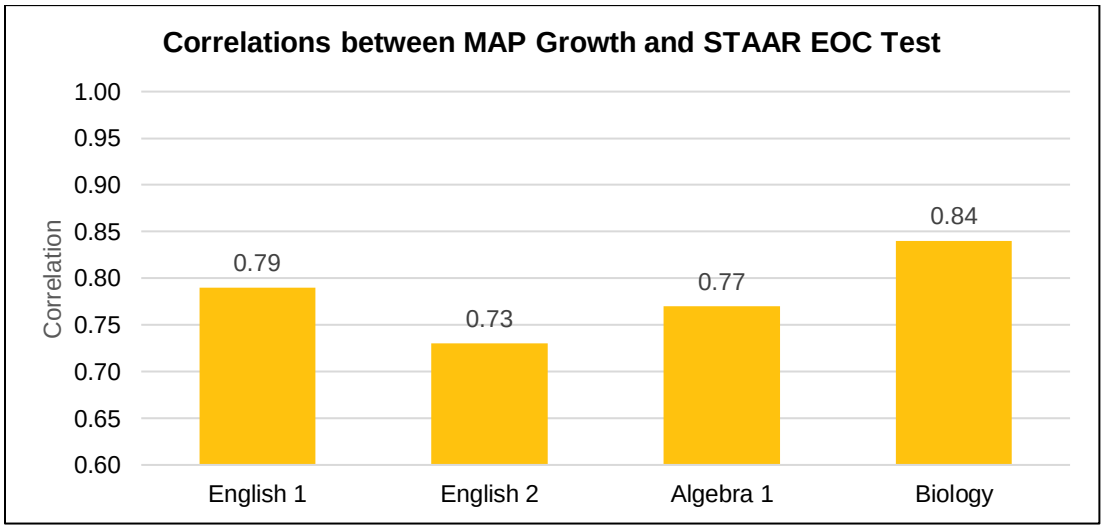
Acknowledgements: This report benefited from the project management and editorial assistance of Debbie Bauman, the data analysis of Sarah-Truclinh Tran, and the psychometric leadership of Ann Hu. We appreciate our colleagues at NWEA who assisted in partner recruitment and are grateful to all our partners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

Executive Summary

Linking studies allow partners to use MAP® Growth™ RIT scores throughout the year to predict their students' performance levels on the state summative assessment. This is accomplished through statistical analyses that produce RIT cut scores that correspond to the state summative performance levels. A *cut score* is the minimum score a student must get on a test to be placed in a certain performance level. The linking study for the State of Texas Assessments of Academic Readiness (STAAR) End-of-Course (EOC) described in this report provides RIT cut scores for the fall, winter, and spring MAP Growth administrations that correspond to the STAAR performance levels for each subject and grade. Educators can use this information 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 took both the MAP Growth Reading 6+ and Biology assessments and STAAR EOC English 1, English 2, and Biology assessments in Spring 2022 and the MAP Growth Algebra 1 and STAAR EOC Algebra 1 in Spring 2019. The linking study sample included approximately 31,905 students across 25 districts and 99 schools in Spring 2022 and 7,772 students across 18 districts and 83 schools in Spring 2019 in Texas. The test scores from both tests were used as the basis for linking the two assessments together.

Before the linking analyses began, NWEA confirmed that the MAP Growth and STAAR assessments were constructed based on the same or similar set of content standards to warrant a connection. The link between the two tests was further investigated by calculating correlation coefficients that indicate the relationship between the MAP Growth and STAAR test scores, as shown below. 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. The correlations are 0.79 between Reading 6+ to English 1, 0.73 between Reading 6+ to English 2, 0.77 for Algebra 1 and 0.84 for Biology. These results are consistent with our linking study expectations, indicating that MAP Growth is a good assessment for predicting performance on the STAAR.



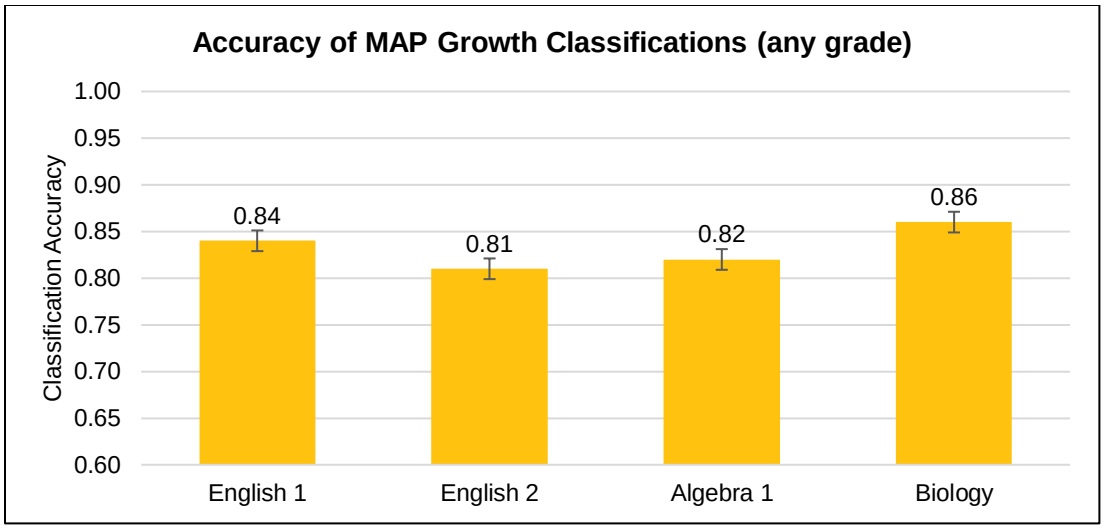
The equipercentile linking method and the 2020 MAP Growth norms (Thum & Kuhfeld, 2020) were then used to produce the RIT cut scores that correlate to performance on the STAAR assessment for every subject and grade. While RIT cut scores were generated for every performance level on the STAAR assessment, Table E.1 presents the *Meets Grade Level* cut scores that indicate the minimum score a student must get to be considered proficient.

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

Assessment		*Meets Grade Level* Cut Scores by Grade				
		8	**9**	**10**	**11**	**12**
STAAR English 1				4000		
MAP Growth Reading 6+	Fall	216	217	218	218	218
	Winter	219	219	219	219	219
	Spring	220	220	220	220	220
STAAR English 2				4000		
MAP Growth Reading 6+	Fall	214	215	215	216	216
	Winter	217	217	217	217	217
	Spring	218	218	218	218	218
STAAR Algebra 1				4000		
MAP Growth Algebra 1	Fall			232		
	Spring			240		
STAAR Biology				4000		
MAP Biology	Spring			217		

Educators can use these cut scores to determine whether students are on track for proficiency on the state assessment. For example, the *Meets Grade Level* cut score on the Grade 8 STAAR EOC English 1 test is 4000. A Grade 8 student with a MAP Growth Reading 6+ RIT score of 216 in the fall is likely to meet proficiency on the STAAR EOC English 1 test in the spring, whereas a Grade 8 student with a RIT score lower than 216 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 the state test, NWEA calculated classification accuracy statistics that show how well the RIT scores correctly classified, or predicted, students as proficient on the STAAR EOC tests. A high statistic indicates high accuracy. Across the subject areas, the MAP Growth assessments have at least a 0.81 classification accuracy rate, meaning it accurately predicted student proficiency on the state tests for 81% or more of the sample. These results indicate that MAP Growth scores have a high accuracy rate of identifying student proficiency on the STAAR EOC English 1, English 2, Algebra 1, and Biology tests that are the focus of this report, as illustrated below.



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 State of Texas Assessments of Academic Readiness (STAAR) End-of-Course (EOC) English 1, English 2, Algebra 1, and Biology assessments with Rasch Unit (RIT) scores from the MAP Growth Reading 6+, Algebra 1 and Biology assessments. 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 spring STAAR EOC assessment
4. Classification accuracy statistics to determine the degree to which MAP Growth accurately predicts student proficiency status on the STAAR EOC tests
5. The probability of achieving grade-level proficiency on the STAAR EOC assessment based on MAP Growth RIT scores from fall, winter, and spring

The linking study has been updated since the previous version published in July 2020 to provide percentiles corresponding to the new 2020 NWEA MAP Growth norms (Thum & Kuhfeld, 2020).

1.2. Assessment Overview

The STAAR EOC assessment is part of Texas' state summative assessment system aligned to the Texas Essential Knowledge and Skills (TEKS) curriculum. Based on their test scores, students are placed into one of four performance levels: *Did Not Meet Grade Level*, *Approaches Grade Level*, *Meets Grade Level*, and *Masters Grade Level*. The *Meets Grade Level* cut score demarks the minimum level of performance considered to be proficient for 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. 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 2020 (Thum & Kuhfeld, 2020).

2. Methods

2.1. Data Collection

This linking study is based on data from the Spring 2019 administration of the MAP Growth Algebra 1 and the Spring 2022 administration of MAP Growth Reading 6+ and Biology and STAAR EOC English 1, English 2, Algebra 1, and Biology assessments. NWEA recruited Texas districts to participate in the study by sharing their student and score data for the target terms. 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 assessments and the STAAR EOC assessments in Spring 2019 and 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 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 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 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. 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 STAAR EOC 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 STAAR 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 STAAR 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 $\overline{x}$ 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 STAAR EOC English 1, English 2, Algebra 1, and Biology assessments are reported for Grades 8–12. Since the state EOC tests are 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 2020 growth norms and the spring RIT cuts. The RIT cuts for Grades 8–12were reported because it is common for students in this grade range to take the STAAR EOC tests. The same spring RIT cuts on the MAP Growth Reading 6+ test were reported for each grade because the corresponding national percentile ranks are different for each grade. The growth norms from fall or winter to spring are grade-specific for the MAP Growth Reading 6+ test, so the corresponding RIT cut scores were reported for each grade. In contrast, the growth norms for the MAP Growth Algebra 1 test are available for fall-to-spring projections for all eligible grades combined. Therefore, only the fall RIT cut was reported independent of grade level. Biology norms are currently not available. Therefore, we are unable to provide percentile ranks and fall-to-spring and winter-to-spring RIT cut projections for Biology in this report.

Percentile ranks based on the 2020 NWEA norms are also provided. These are useful for understanding how students' scores compare to 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 that correspond to the spring STAAR EOC 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., STAAR). 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 STAAR on the scale of MAP Growth, $P(x)$ is the percentile rank of a given score on STAAR, 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 term's or grade's MAP Growth score needed to reach the spring cut score, considering the expected growth associated with the previous RIT score:

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

where:

- $RIT_{PredSpring}$ is the predicted MAP Growth spring score.
- $RIT_{previous}$ is the previous term's or grade's RIT score.
- g is the expected growth from the previous RIT (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 STAAR EOC 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 STAAR EOC 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 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 *Meets Grade Level* 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 STAAR EOC test based on a student's RIT scores from fall, winter, and spring. Equation 3 was used to calculate the probability of a student achieving *Meets Grade Level* performance on the STAAR EOC test based on their fall or winter RIT score:

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

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 RIT (e.g., fall or winter) to the spring RIT.
- $RIT_{SpringCut}$ is the MAP Growth *Meets Grade Level* cut score for spring.
- SD is the conditional standard deviation of the expected growth, g.

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

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

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

3. Results

3.1. Study Sample

Data used in this study were collected across Texas from 18 districts and 83 schools in Spring 2019 for Algebra 1 and 35 districts and 99 schools in Spring 2022 for English 1, English 2, and Biology. Only students who took both the MAP Growth and STAAR EOC assessments were included in the study sample. Table 3.1 – Table 3.4 presents the demographic distributions of race, sex, and performance level of the STAAR EOC student population and both the unweighted and weighted linking study sample for each subject. Since the original unweighted study sample is different from the target STAAR EOC population, post-stratification weights were applied to the linking study sample to improve its representativeness. The demographic distributions of the sample after weighting are almost identical to the STAAR EOC student population distributions. The analyses in this study were therefore conducted using the weighted sample.

Table 3.1. Linking Study Sample Demographics—English 1

Demographic Subgroup		%Students by Sample		
		Texas Population*	Unweighted Sample	Weighted Sample
	Total N-Count	499,921	17,488	17,488
Race	American Indian/Alaskan Native	0.3	1.1	0.3
	Asian/Pacific Islander	4.2	5.1	4.2
	Black	13.3	17.2	13.3
	Hispanic	55.3	49.5	55.3
	Multi-Race /Other	3.4	1.7	3.4
	White	23.5	25.4	23.5
Sex	Female	47.0	47.9	47.0
	Male	53.0	52.1	53.0
Performance Level	*Did Not Meet*	37.3	38.3	37.3
	Approaches	14.6	16.0	14.6
	Meets	37.2	36.9	37.2
	Masters	10.9	8.8	10.9

*The number of students who took the STAAR EOC English 1 assessment in Spring 2022.

Table 3.2. Linking Study Sample Demographics—English 2

Demographic Subgroup		%Students by Sample		
		Texas Population*	Unweighted Sample	Weighted Sample
	Total N-Count	441,811	12,627	12,627
Race	American Indian/Alaskan Native	0.3	1.0	0.3
	Asian/Pacific Islander	4.6	2.4	4.6
	Black	13.1	16.4	13.1
	Hispanic	54.0	52.2	54.0
	Multi-Race /Other	3.4	1.6	3.4
	White	24.6	26.3	24.6
Sex	Female	48.0	49.6	48.0
	Male	52.0	50.4	52.0
Performance Level	*Did Not Meet*	29.1	25.9	29.1
	Approaches	13.9	14.7	13.9
	Meets	48.2	52.8	48.2
	Masters	8.8	6.6	8.8

*The number of students who took the STAAR EOC English 2 assessment in Spring 2022.

Table 3.3. Linking Study Sample Demographics—Algebra 1

Demographic Subgroup		%Students by Sample		
		Texas Population*	Unweighted Sample	Weighted Sample
	Total N-Count	416,354	7,772	7,772
Race	Asian	4.3	4.0	4.3
	Black	13.2	16.8	13.2
	Hispanic	53.1	49.4	53.1
	Multi-Race	2.2	1.9	2.2
	Other	0.6	2.0	0.6
	White	26.6	25.8	26.6
Sex	Female	48.1	49.5	48.1
	Male	51.9	50.5	51.9
Performance Level	*Did Not Meet*	16.2	10.8	16.2
	Approaches	22.1	24.0	22.1
	Meets	22.3	25.4	22.3
	Masters	39.4	39.8	39.4

*The number of students who took the STAAR EOC Algebra 1 assessment in Spring 2019.

Table 3.4. Linking Study Sample Demographics—Biology

Demographic Subgroup		%Students by Sample		
		Texas Population*	Unweighted Sample	Weighted Sample
Total N-Count		446,155	6,109	6,109
Race	American Indian/Alaskan Native	0.3	1.3	0.3
	Asian/Pacific Islander	4.6	9.9	4.6
	Black	13.1	11.2	13.1
	Hispanic	53.6	39.7	53.6
	Multi-Race /Other	3.6	1.6	3.6
	White	24.8	36.4	24.8
Sex	Female	48.4	48.7	48.4
	Male	51.6	51.3	51.6
Performance Level	*Did Not Meet*	17.5	11.9	17.5
	Approaches	25.1	23.9	25.1
	Meets	34.8	40.3	34.8
	Masters	22.6	23.9	22.6

*The number of students who took the STAAR EOC Biology assessment in Spring 2022.

3.2. Descriptive Statistics

Table 3.5 presents descriptive statistics of the MAP Growth and STAAR EOC test scores from Spring 2019 and Spring 2022, including the correlation coefficient (*r*) between them. The coefficients between the scores range from 0.73 to 0.84. 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 STAAR EOC assessments.

Table 3.5. Descriptive Statistics of Test Scores

Assessment*	N	*r*	Mean	SD	Min.	Max.
MAP Growth Reading	17,488	0.79	3963.5	560.5	1164	6469
STAAR EOC English 1			216.1	19.7	151	270
MAP Growth Reading	12,627	0.73	4062.4	561.2	1017	6444
STAAR EOC English 2			219.1	18.9	149	271
MAP Growth Reading	7,772	0.77	4200.5	634.7	2466	6181
STAAR EOC Algebra 1			243.5	20.8	180	307
MAP Growth Biology	6,109	0.84	4111	569.3	1357	6376
STAAR EOC Biology			218.3	18.5	164	268

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

3.3. MAP Growth Cut Scores

Table 3.6 – Table 3.9 presents the STAAR EOC scale score ranges and the corresponding MAP Growth RIT cut scores and percentile ranges. Bolded numbers indicate the cut scores considered to be at least proficient. These tables can be used to predict a student's likely performance level on the STAAR EOC spring assessment when MAP Growth is taken in the fall, winter, or spring. For example, a Grade 8 student who obtained a MAP Growth Reading RIT score of 216 in the fall is likely to achieve *Meets Grade Level* performance on the STAAR EOC test. The same is true for a Grade 8 student who obtained a MAP Growth RIT score of 220 in the spring. The spring cut score is higher than the fall cut score because growth is expected between fall and spring 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 document. Partners are therefore encouraged to use the projected performance level in students' score reports since they reflect the specific instructional weeks set by partners.

Table 3.6. Cut Scores—MAP Growth Reading 6+, STAAR EOC English 1

STAAR EOC English 1								
	Did Not Meet		***Approaches***		***Meets***		***Masters***	
Spring	1164–3774		3775–3999		**4000**–4690		4691–6469	
MAP Growth Reading 6+								
	Did Not Meet		***Approaches***		***Meets***		***Masters***	
Grade	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**
Fall								
8	100–206	1–25	207–215	26–44	**216**–236	45–86	237–350	87–99
9	100–207	1–27	208–216	28–45	**217**–236	46–82	237–350	83–99
10	100–208	1–23	209–217	24–41	**218**–236	42–80	237–350	81–99
11	100–209	1–21	210–217	22–37	**218**–236	38–77	237–350	78–99
12	100–209	1–23	210–217	24–37	**218**–236	38–74	237–350	75–99
Winter								
8	100–209	1–25	210–218	26–45	**219**–237	46–84	238–350	85–99
9	100–210	1–30	211–218	31–46	**219**–237	47–81	238–350	82–99
10	100–210	1–24	211–218	25–40	**219**–237	41–79	238–350	80–99
11	100–210	1–21	211–218	22–37	**219**–237	38–76	238–350	77–99
12	100–210	1–26	211–218	27–40	**219**–237	41–74	238–350	75–99
Spring								
8	100–211	1–27	212–219	28–45	**220**–238	46–84	239–350	85–99
9	100–211	1–30	212–219	31–46	**220**–238	47–81	239–350	82–99
10	100–211	1–25	212–219	26–41	**220**–238	42–79	239–350	80–99
11	100–211	1–24	212–219	25–39	**220**–238	40–77	239–350	78–99
12	100–211	1–29	212–219	30–42	**220**–238	43–73	239–350	74–99

Table 3.7. Cut Scores—MAP Growth Reading 6+, STAAR EOC English 2

STAAR EOC English 2								
	Did Not Meet		*Approaches*		*Meets*		*Masters*	
Spring	1017–3774		3775–3999		**4000**–4830		4831–6444	
MAP Growth Reading 6+								
	Did Not Meet		*Approaches*		*Meets*		*Masters*	
Grade	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**
Fall								
8	100–205	1–23	206–213	24–40	**214**–240	41–90	241–350	91–99
9	100–206	1–26	207–214	27–41	**215**–240	42–87	241–350	88–99
10	100–207	1–22	208–214	23–35	**215**–240	36–85	241–350	86–99
11	100–208	1–20	209–215	21–33	**216**–240	34–83	241–350	84–99
12	100–208	1–21	209–215	22–33	**216**–240	34–80	241–350	81–99
Winter								
8	100–208	1–24	209–216	25–41	**217**–241	42–89	242–350	90–99
9	100–209	1–28	210–216	29–42	**217**–241	43–86	242–350	87–99
10	100–209	1–22	210–216	23–36	**217**–241	37–85	242–350	86–99
11	100–209	1–20	210–216	21–32	**217**–241	33–83	242–350	84–99
12	100–209	1–25	210–216	26–36	**217**–241	37–79	242–350	80–99
Spring								
8	100–210	1–25	211–217	26–40	**218**–242	41–89	243–350	90–99
9	100–210	1–28	211–217	29–42	**218**–242	43–86	243–350	87–99
10	100–210	1–24	211–217	25–37	**218**–242	38–85	243–350	86–99
11	100–210	1–22	211–217	23–35	**218**–242	36–83	243–350	84–99
12	100–210	1–27	211–217	28–38	**218**–242	39–78	243–350	79–99

Table 3.8. Cut Scores—MAP Growth Algebra 1, STAAR EOC Algebra 1

STAAR Algebra 1								
	Did Not Meet		*Approaches*		*Meets*		*Masters*	
Spring	0–3549		3550–3999		**4000**–4332		4333–6373	
MAP Growth Algebra 1								
	Did Not Meet		*Approaches*		*Meets*		*Masters*	
Grade	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**
Fall								
8–12	100–212	1–12	213–231	13–52	**232**–242	53–76	243–350	77–99
Spring								
8–12	100–219	1–15	220–239	16–51	**240**–251	52–75	252–350	76–99

Table 3.9. Cut Scores—MAP Growth Biology, STAAR EOC Biology

STAAR EOC Biology								
	Did Not Meet		*Approaches*		*Meets*		*Masters*	
Spring	1357–3549		3550–3999		**4000**–4575		4576–6376	
MAP Growth Biology*								
	Did Not Meet		*Approaches*		*Meets*		*Masters*	
Grade	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**
Spring								
8–12	100–199	–	200–216	–	**217**–233	–	234–350	–

*The norms are not available for Biology test; therefore, no percentiles can be provided.

3.4. Classification Accuracy

Table 3.10 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 STAAR EOC tests, providing insight into the predictive validity of MAP Growth. The overall classification accuracy rate is between 0.81 – 0.84 for Reading 6+, 0.82 for Algebra 1, and 0.86 for Biology. These values suggest that the RIT cut scores are good at classifying students as proficient or not proficient on the STAAR EOC assessment.

Although the results show that MAP Growth scores can be used to accurately classify students as likely to be proficient on the STAAR EOC test, there is a notable limitation to how these results should be used and interpreted. The STAAR 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 3.10. Classification Accuracy Results

	Cut Score		Class.	Rate*					
N	**MAP**	**STAAR**	**Accuracy***	**FP**	**FN**	**Sensitivity**	**Specificity**	**Precision**	**AUC***
MAP Growth Reading 6+ to STAAR English 1									
17,488	220	4000	0.84	0.17	0.15	0.85	0.83	0.82	0.92
MAP Growth Reading 6+ to STAAR English 2									
12,627	218	4000	0.81	0.26	0.14	0.86	0.74	0.81	0.89
MAP Growth Algebra 1 to STAAR Algebra 1									
7,772	240	4000	0.82	0.19	0.18	0.82	0.81	0.87	0.90
MAP Growth Biology to STAAR Biology									
6,109	217	4000	0.86	0.14	0.14	0.86	0.86	0.89	0.93

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

3.5. Proficiency Projections

Table 3.11 – Table 3.13 present the estimated probability of achieving *Meets Grade Level* performance on the STAAR EOC test based on RIT scores from fall, winter, or spring for the Reading 6+ sample and from fall and spring for the Algebra 1 sample. There are currently no proficiency projections available for Biology. Due to measurement error in all test scores, the *Meets Grade Level* MAP Growth cuts do not guarantee that a student will reach proficiency on the STAAR EOC test. They instead indicate a 50% chance that a student will reach a particular performance level. Therefore, these projections further elucidate the *Meets Grade Level* 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 *Meets Grade Level* cut score for reading is 220, which indicates a 50% chance of achieving proficiency in the spring, as shown in Table 3.11 However, an educator can also use this table to estimate that a Grade 8 student who obtained a MAP Growth score of 216 in the fall has a 50% probability of reaching *Meets Grade Level* or higher on the STAAR EOC test in the spring.

Table 3.11. Proficiency Projections based on RIT Scores—Reading 6+, English 1

MAP Growth Reading 6+ to STAAR EOC English 1											
			Fall			Winter			Spring		
Grade	Start %ile*	Spring Cut	Fall RIT	Projected Proficiency		Winter RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
				Meets	Prob.		*Meets*	Prob.		*Meets*	Prob.
8	5	220	190	No	<0.01	193	No	<0.01	194	No	<0.01
	10	220	196	No	0.01	199	No	<0.01	200	No	<0.01
	15	220	200	No	0.03	203	No	<0.01	204	No	<0.01
	20	220	204	No	0.06	206	No	0.01	207	No	<0.01
	25	220	207	No	0.13	209	No	0.04	210	No	<0.01
	30	220	209	No	0.20	212	No	0.09	213	No	0.02
	35	220	211	No	0.24	214	No	0.17	215	No	0.06
	40	220	214	No	0.39	216	No	0.28	217	No	0.18
	45	220	216	Yes	0.50	218	No	0.42	220	Yes	0.50
	50	220	218	Yes	0.61	221	Yes	0.65	222	Yes	0.73
	55	220	220	Yes	0.66	223	Yes	0.78	224	Yes	0.89
	60	220	222	Yes	0.76	225	Yes	0.87	226	Yes	0.97
	65	220	225	Yes	0.87	227	Yes	0.94	228	Yes	0.99
	70	220	227	Yes	0.92	229	Yes	0.97	231	Yes	>0.99
	75	220	230	Yes	0.95	232	Yes	0.99	233	Yes	>0.99
	80	220	232	Yes	0.97	235	Yes	>0.99	236	Yes	>0.99
	85	220	236	Yes	0.99	238	Yes	>0.99	239	Yes	>0.99
	90	220	240	Yes	>0.99	242	Yes	>0.99	243	Yes	>0.99
	95	220	246	Yes	>0.99	248	Yes	>0.99	249	Yes	>0.99

MAP Growth Reading 6+ to STAAR EOC English 1											
			Fall			Winter			Spring		
	Start	Spring	Fall	Projected Proficiency		Winter	Projected Proficiency		Spring	Projected Proficiency	
Grade	%ile*	Cut	RIT	*Meets*	Prob.	RIT	*Meets*	Prob.	RIT	*Meets*	Prob.
9	5	220	188	No	<0.01	190	No	<0.01	190	No	<0.01
	10	220	195	No	0.01	197	No	<0.01	197	No	<0.01
	15	220	199	No	0.02	201	No	<0.01	202	No	<0.01
	20	220	203	No	0.05	205	No	0.01	205	No	<0.01
	25	220	206	No	0.11	208	No	0.02	209	No	<0.01
	30	220	209	No	0.16	211	No	0.07	211	No	<0.01
	35	220	212	No	0.27	213	No	0.14	214	No	0.03
	40	220	214	No	0.35	216	No	0.29	217	No	0.18
	45	220	217	Yes	0.50	218	No	0.43	219	No	0.38
	50	220	219	Yes	0.55	221	Yes	0.64	221	Yes	0.62
	55	220	221	Yes	0.65	223	Yes	0.77	224	Yes	0.89
	60	220	224	Yes	0.77	225	Yes	0.86	226	Yes	0.97
	65	220	226	Yes	0.84	228	Yes	0.95	229	Yes	>0.99
	70	220	229	Yes	0.91	230	Yes	0.98	231	Yes	>0.99
	75	220	232	Yes	0.96	233	Yes	0.99	234	Yes	>0.99
	80	220	235	Yes	0.98	236	Yes	>0.99	237	Yes	>0.99
	85	220	239	Yes	>0.99	240	Yes	>0.99	241	Yes	>0.99
	90	220	243	Yes	>0.99	245	Yes	>0.99	246	Yes	>0.99
	95	220	250	Yes	>0.99	251	Yes	>0.99	253	Yes	>0.99
10	5	220	192	No	<0.01	194	No	<0.01	194	No	<0.01
	10	220	199	No	0.01	200	No	<0.01	200	No	<0.01
	15	220	203	No	0.05	204	No	<0.01	205	No	<0.01
	20	220	206	No	0.08	208	No	0.02	208	No	<0.01
	25	220	209	No	0.15	211	No	0.07	211	No	<0.01
	30	220	212	No	0.26	214	No	0.18	214	No	0.03
	35	220	215	No	0.40	216	No	0.29	217	No	0.18
	40	220	217	No	0.45	218	No	0.43	219	No	0.38
	45	220	219	Yes	0.55	221	Yes	0.65	221	Yes	0.62
	50	220	221	Yes	0.65	223	Yes	0.77	224	Yes	0.89
	55	220	224	Yes	0.78	225	Yes	0.87	226	Yes	0.97
	60	220	226	Yes	0.85	227	Yes	0.93	228	Yes	0.99
	65	220	228	Yes	0.90	230	Yes	0.98	231	Yes	>0.99
	70	220	231	Yes	0.95	232	Yes	0.99	233	Yes	>0.99
	75	220	234	Yes	0.98	235	Yes	>0.99	236	Yes	>0.99
	80	220	237	Yes	0.99	238	Yes	>0.99	239	Yes	>0.99
	85	220	240	Yes	>0.99	241	Yes	>0.99	242	Yes	>0.99
	90	220	244	Yes	>0.99	246	Yes	>0.99	247	Yes	>0.99
	95	220	251	Yes	>0.99	252	Yes	>0.99	253	Yes	>0.99

MAP Growth Reading 6+ to STAAR EOC English 1											
			Fall			Winter			Spring		
	Start	Spring	Fall	Projected Proficiency		Winter	Projected Proficiency		Spring	Projected Proficiency	
Grade	%ile*	Cut	RIT	*Meets*	Prob.	RIT	*Meets*	Prob.	RIT	*Meets*	Prob.
11	5	220	194	No	<0.01	195	No	<0.01	194	No	<0.01
	10	220	201	No	0.03	202	No	<0.01	201	No	<0.01
	15	220	205	No	0.08	206	No	0.01	206	No	<0.01
	20	220	209	No	0.15	210	No	0.05	209	No	<0.01
	25	220	212	No	0.24	213	No	0.14	212	No	0.01
	30	220	214	No	0.32	215	No	0.24	215	No	0.06
	35	220	217	No	0.45	218	No	0.43	218	No	0.27
	40	220	219	Yes	0.55	220	Yes	0.57	220	Yes	0.50
	45	220	221	Yes	0.64	222	Yes	0.70	222	Yes	0.73
	50	220	224	Yes	0.76	225	Yes	0.86	225	Yes	0.94
	55	220	226	Yes	0.82	227	Yes	0.92	227	Yes	0.98
	60	220	228	Yes	0.88	229	Yes	0.96	229	Yes	>0.99
	65	220	230	Yes	0.92	231	Yes	0.98	232	Yes	>0.99
	70	220	233	Yes	0.96	234	Yes	>0.99	234	Yes	>0.99
	75	220	235	Yes	0.98	237	Yes	>0.99	237	Yes	>0.99
	80	220	238	Yes	0.99	240	Yes	>0.99	240	Yes	>0.99
	85	220	242	Yes	>0.99	243	Yes	>0.99	244	Yes	>0.99
	90	220	246	Yes	>0.99	247	Yes	>0.99	248	Yes	>0.99
	95	220	253	Yes	>0.99	254	Yes	>0.99	255	Yes	>0.99
12	5	220	192	No	<0.01	189	No	<0.01	186	No	<0.01
	10	220	199	No	0.01	197	No	<0.01	195	No	<0.01
	15	220	204	No	0.05	202	No	<0.01	200	No	<0.01
	20	220	208	No	0.12	206	No	0.01	205	No	<0.01
	25	220	211	No	0.21	210	No	0.05	209	No	<0.01
	30	220	214	No	0.32	213	No	0.14	212	No	0.01
	35	220	216	No	0.41	216	No	0.30	215	No	0.06
	40	220	219	Yes	0.55	218	No	0.43	218	No	0.27
	45	220	221	Yes	0.64	221	Yes	0.64	221	Yes	0.62
	50	220	224	Yes	0.76	224	Yes	0.82	224	Yes	0.89
	55	220	226	Yes	0.82	227	Yes	0.92	227	Yes	0.98
	60	220	229	Yes	0.90	229	Yes	0.96	230	Yes	>0.99
	65	220	231	Yes	0.93	232	Yes	0.99	233	Yes	>0.99
	70	220	234	Yes	0.97	235	Yes	>0.99	236	Yes	>0.99
	75	220	237	Yes	0.99	238	Yes	>0.99	240	Yes	>0.99
	80	220	240	Yes	0.99	242	Yes	>0.99	244	Yes	>0.99
	85	220	244	Yes	>0.99	246	Yes	>0.99	248	Yes	>0.99
	90	220	249	Yes	>0.99	251	Yes	>0.99	254	Yes	>0.99
	95	220	256	Yes	>0.99	259	Yes	>0.99	262	Yes	>0.99

*%tile = Percentile.

Table 3.12. Proficiency Projections based on RIT Scores—Reading 6+, English 2

MAP Growth Reading 6+ to STAAR EOC English 2											
			Fall			Winter			Spring		
Grade	Start %ile*	Spring Cut	Fall RIT	Projected Proficiency		Winter RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
				Meets	Prob.		*Meets*	Prob.		*Meets*	Prob.
8	5	218	190	No	<0.01	193	No	<0.01	194	No	<0.01
	10	218	196	No	0.01	199	No	<0.01	200	No	<0.01
	15	218	200	No	0.05	203	No	0.01	204	No	<0.01
	20	218	204	No	0.11	206	No	0.03	207	No	<0.01
	25	218	207	No	0.20	209	No	0.09	210	No	0.01
	30	218	209	No	0.29	212	No	0.17	213	No	0.06
	35	218	211	No	0.34	214	No	0.28	215	No	0.18
	40	218	214	Yes	0.50	216	No	0.42	217	No	0.38
	45	218	216	Yes	0.61	218	Yes	0.58	220	Yes	0.73
	50	218	218	Yes	0.71	221	Yes	0.78	222	Yes	0.89
	55	218	220	Yes	0.76	223	Yes	0.87	224	Yes	0.97
	60	218	222	Yes	0.83	225	Yes	0.94	226	Yes	0.99
	65	218	225	Yes	0.92	227	Yes	0.97	228	Yes	>0.99
	70	218	227	Yes	0.95	229	Yes	0.99	231	Yes	>0.99
	75	218	230	Yes	0.97	232	Yes	>0.99	233	Yes	>0.99
	80	218	232	Yes	0.99	235	Yes	>0.99	236	Yes	>0.99
	85	218	236	Yes	>0.99	238	Yes	>0.99	239	Yes	>0.99
	90	218	240	Yes	>0.99	242	Yes	>0.99	243	Yes	>0.99
	95	218	246	Yes	>0.99	248	Yes	>0.99	249	Yes	>0.99
9	5	218	188	No	<0.01	190	No	<0.01	190	No	<0.01
	10	218	195	No	0.01	197	No	<0.01	197	No	<0.01
	15	218	199	No	0.03	201	No	<0.01	202	No	<0.01
	20	218	203	No	0.09	205	No	0.01	205	No	<0.01
	25	218	206	No	0.16	208	No	0.05	209	No	<0.01
	30	218	209	No	0.23	211	No	0.14	211	No	0.02
	35	218	212	No	0.35	213	No	0.23	214	No	0.11
	40	218	214	No	0.45	216	No	0.43	217	No	0.38
	45	218	217	Yes	0.60	218	Yes	0.57	219	Yes	0.62
	50	218	219	Yes	0.65	221	Yes	0.77	221	Yes	0.82
	55	218	221	Yes	0.73	223	Yes	0.86	224	Yes	0.97
	60	218	224	Yes	0.84	225	Yes	0.93	226	Yes	0.99
	65	218	226	Yes	0.89	228	Yes	0.98	229	Yes	>0.99
	70	218	229	Yes	0.95	230	Yes	0.99	231	Yes	>0.99
	75	218	232	Yes	0.98	233	Yes	>0.99	234	Yes	>0.99
	80	218	235	Yes	0.99	236	Yes	>0.99	237	Yes	>0.99
	85	218	239	Yes	>0.99	240	Yes	>0.99	241	Yes	>0.99
	90	218	243	Yes	>0.99	245	Yes	>0.99	246	Yes	>0.99
	95	218	250	Yes	>0.99	251	Yes	>0.99	253	Yes	>0.99

MAP Growth Reading 6+ to STAAR EOC English 2											
			Fall			Winter			Spring		
	Start	Spring	Fall	Projected Proficiency		Winter	Projected Proficiency		Spring	Projected Proficiency	
Grade	%ile*	Cut	RIT	*Meets*	Prob.	RIT	*Meets*	Prob.	RIT	*Meets*	Prob.
10	5	218	192	No	<0.01	194	No	<0.01	194	No	<0.01
	10	218	199	No	0.03	200	No	<0.01	200	No	<0.01
	15	218	203	No	0.08	204	No	0.01	205	No	<0.01
	20	218	206	No	0.12	208	No	0.05	208	No	<0.01
	25	218	209	No	0.22	211	No	0.13	211	No	0.02
	30	218	212	No	0.35	214	No	0.29	214	No	0.11
	35	218	215	Yes	0.50	216	No	0.43	217	No	0.38
	40	218	217	Yes	0.55	218	Yes	0.57	219	Yes	0.62
	45	218	219	Yes	0.65	221	Yes	0.77	221	Yes	0.82
	50	218	221	Yes	0.74	223	Yes	0.87	224	Yes	0.97
	55	218	224	Yes	0.85	225	Yes	0.93	226	Yes	0.99
	60	218	226	Yes	0.90	227	Yes	0.97	228	Yes	>0.99
	65	218	228	Yes	0.94	230	Yes	0.99	231	Yes	>0.99
	70	218	231	Yes	0.97	232	Yes	>0.99	233	Yes	>0.99
	75	218	234	Yes	0.99	235	Yes	>0.99	236	Yes	>0.99
	80	218	237	Yes	>0.99	238	Yes	>0.99	239	Yes	>0.99
	85	218	240	Yes	>0.99	241	Yes	>0.99	242	Yes	>0.99
	90	218	244	Yes	>0.99	246	Yes	>0.99	247	Yes	>0.99
	95	218	251	Yes	>0.99	252	Yes	>0.99	253	Yes	>0.99
11	5	218	194	No	0.01	195	No	<0.01	194	No	<0.01
	10	218	201	No	0.05	202	No	<0.01	201	No	<0.01
	15	218	205	No	0.12	206	No	0.03	206	No	<0.01
	20	218	209	No	0.21	210	No	0.11	209	No	<0.01
	25	218	212	No	0.32	213	No	0.24	212	No	0.03
	30	218	214	No	0.41	215	No	0.36	215	No	0.18
	35	218	217	Yes	0.55	218	Yes	0.57	218	Yes	0.50
	40	218	219	Yes	0.64	220	Yes	0.7	220	Yes	0.73
	45	218	221	Yes	0.72	222	Yes	0.81	222	Yes	0.89
	50	218	224	Yes	0.82	225	Yes	0.92	225	Yes	0.98
	55	218	226	Yes	0.88	227	Yes	0.96	227	Yes	>0.99
	60	218	228	Yes	0.92	229	Yes	0.98	229	Yes	>0.99
	65	218	230	Yes	0.95	231	Yes	0.99	232	Yes	>0.99
	70	218	233	Yes	0.98	234	Yes	>0.99	234	Yes	>0.99
	75	218	235	Yes	0.99	237	Yes	>0.99	237	Yes	>0.99
	80	218	238	Yes	0.99	240	Yes	>0.99	240	Yes	>0.99
	85	218	242	Yes	>0.99	243	Yes	>0.99	244	Yes	>0.99
	90	218	246	Yes	>0.99	247	Yes	>0.99	248	Yes	>0.99
	95	218	253	Yes	>0.99	254	Yes	>0.99	255	Yes	>0.99

MAP Growth Reading 6+ to STAAR EOC English 2											
			Fall			Winter			Spring		
Grade	Start %ile*	Spring Cut	Fall RIT	Projected Proficiency		Winter RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
				Meets	Prob.		*Meets*	Prob.		*Meets*	Prob.
12	5	218	192	No	<0.01	189	No	<0.01	186	No	<0.01
	10	218	199	No	0.03	197	No	<0.01	195	No	<0.01
	15	218	204	No	0.08	202	No	<0.01	200	No	<0.01
	20	218	208	No	0.18	206	No	0.02	205	No	<0.01
	25	218	211	No	0.28	210	No	0.10	209	No	<0.01
	30	218	214	No	0.41	213	No	0.24	212	No	0.03
	35	218	216	Yes	0.50	216	No	0.43	215	No	0.18
	40	218	219	Yes	0.64	218	Yes	0.57	218	Yes	0.50
	45	218	221	Yes	0.72	221	Yes	0.76	221	Yes	0.82
	50	218	224	Yes	0.82	224	Yes	0.90	224	Yes	0.97
	55	218	226	Yes	0.88	227	Yes	0.96	227	Yes	>0.99
	60	218	229	Yes	0.93	229	Yes	0.98	230	Yes	>0.99
	65	218	231	Yes	0.96	232	Yes	>0.99	233	Yes	>0.99
	70	218	234	Yes	0.98	235	Yes	>0.99	236	Yes	>0.99
	75	218	237	Yes	0.99	238	Yes	>0.99	240	Yes	>0.99
	80	218	240	Yes	>0.99	242	Yes	>0.99	244	Yes	>0.99
	85	218	244	Yes	>0.99	246	Yes	>0.99	248	Yes	>0.99
	90	218	249	Yes	>0.99	251	Yes	>0.99	254	Yes	>0.99
	95	218	256	Yes	>0.99	259	Yes	>0.99	262	Yes	>0.99

*%tile = Percentile.

Table 3.13. Proficiency Projections based on RIT Scores—Algebra 1

MAP Growth Algebra 1 to STAAR EOC Algebra 1							
		Fall			Spring		
Start %ile*	Spring Cut	Fall RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
			Meets	Prob.		*Meets*	Prob.
5	240	205	No	<0.01	207	No	<0.01
10	240	210	No	0.01	214	No	<0.01
15	240	214	No	0.02	219	No	<0.01
20	240	217	No	0.04	223	No	<0.01
25	240	220	No	0.07	226	No	<0.01
30	240	223	No	0.13	229	No	<0.01
35	240	225	No	0.22	231	No	<0.01
40	240	227	No	0.29	234	No	0.03
45	240	229	No	0.37	236	No	0.11
50	240	231	No	0.46	239	No	0.38
55	240	233	Yes	0.54	241	Yes	0.62
60	240	235	Yes	0.63	244	Yes	0.89
65	240	237	Yes	0.71	246	Yes	0.97
70	240	239	Yes	0.78	249	Yes	>0.99
75	240	242	Yes	0.87	252	Yes	>0.99
80	240	244	Yes	0.93	255	Yes	>0.99
85	240	248	Yes	0.97	259	Yes	>0.99
90	240	251	Yes	0.99	263	Yes	>0.99
95	240	257	Yes	>0.99	270	Yes	>0.99

*%tile = Percentile.

4. References

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