

# **Linking Study Report: Predicting Performance on the South Dakota Smarter Balanced Summative Assessments based on NWEA MAP Growth Scores**

March 2021

NWEA Psychometric Solutions





## Table of Contents

Executive Summary .....	4
1. Introduction .....	7
1.1. Purpose of the Study.....	7
1.2. Assessment Overview.....	7
2. Methods .....	8
2.1. Data Collection.....	8
2.2. Post-Stratification Weighting .....	8
2.3. MAP Growth Cut Scores .....	8
2.4. Classification Accuracy .....	9
2.5. Proficiency Projection.....	10
3. Results.....	11
3.1. Study Sample.....	11
3.2. Descriptive Statistics .....	13
3.3. MAP Growth Cut Scores .....	14
3.4. Classification Accuracy .....	17
3.5. Proficiency Projection.....	17
4. References.....	26

## List of Tables

Table 2.1. Description of Classification Accuracy Summary Statistics .....	10
Table 3.1. Linking Study Sample Demographics (Unweighted) .....	11
Table 3.2. Spring 2019 SD SBAC Student Population Demographics .....	12
Table 3.3. Linking Study Sample Demographics (Weighted).....	13
Table 3.4. Descriptive Statistics of Test Scores.....	14
Table 3.5. MAP Growth Cut Scores—ELA/Reading .....	15
Table 3.6. MAP Growth Cut Scores—Mathematics.....	16
Table 3.7. Classification Accuracy Results .....	17
Table 3.8. Proficiency Projection based on RIT Scores—ELA/Reading.....	18
Table 3.9. Proficiency Projection based on RIT Scores—Mathematics .....	22

## Executive Summary

To predict student achievement on the South Dakota Smarter Balanced Assessment Consortium (SD SBAC) summative assessments in Grades 3–8 English Language Arts/Literacy (ELA) and Mathematics, NWEA® conducted a linking study using Spring 2019 data to derive Rasch Unit (RIT) cut scores on the MAP® Growth™ assessments that correspond to the SD SBAC achievement levels. With this information, educators can identify students at risk of failing to meet state proficiency standards early in the year and provide tailored educational interventions.<sup>1</sup> The linking study has been updated since the previous SBAC version published in June 2017 based on multiple states’ data to incorporate the new 2020 NWEA MAP Growth norms (Thum & Kuhfeld, 2020) and to report the results for South Dakota only.

Table E.1 presents the SD SBAC *Level 3* achievement level cut scores and the corresponding MAP Growth RIT cut scores that allow teachers to identify students who are on track for proficiency on the state summative test and those who are not. For example, the *Level 3* cut score on the SD SBAC Grade 3 ELA test is 2432. A Grade 3 student with a MAP Growth Reading RIT score of 190 in the fall is likely to meet proficiency on the SD SBAC ELA test in the spring, whereas a Grade 3 student with a MAP Growth Reading RIT score lower than 190 in the fall is in jeopardy of not meeting proficiency. MAP Growth cut scores for Grade 2 are also provided so educators can track early learners’ progress toward proficiency on the SD SBAC test by Grade 3. These cut scores were derived based on the Grade 3 cuts and the 2020 NWEA growth norms for the adjacent grade (i.e., Grades 2 to 3).

**Table E.1. MAP Growth Cut Scores for SD SBAC Proficiency**

Assessment		Level 3 Cut Scores by Grade						
		2	3	4	5	6	7	8
<b>ELA/Reading</b>								
SD SBAC Spring		–	2432	2473	2502	2531	2552	2567
MAP Growth	Fall	176	190	199	204	212	215	219
	Winter	185	197	205	209	216	218	222
	Spring	189	200	207	211	217	219	223
<b>Mathematics</b>								
SD SBAC Spring		–	2436	2485	2528	2552	2567	2586
MAP Growth	Fall	178	190	203	215	221	226	234
	Winter	187	198	210	221	226	230	237
	Spring	192	203	214	225	229	233	239

Please note that the results in this report may differ from those found in the NWEA reporting system for individual districts. The typical growth scores from fall to spring or winter to spring used 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). However, instructional weeks often vary by district, so the cut scores in this report may differ slightly from the MAP Growth score reports that reflect the specific instructional weeks set by partners.

<sup>1</sup> This study provides MAP Growth cut scores that predict proficiency on the SD SBAC for Grades 2–8 only. They represent a higher level of achievement than universal screening cut scores designed to identify students with the most severe learning difficulties who may need intensive intervention. MAP Growth universal screening cut scores for Grades K–8 are available in a separate report (He & Meyer, 2021).

### E.1. Assessment Overview

The SD SBAC Grades 3–8 ELA and Mathematics tests are South Dakota’s state summative assessments aligned to the South Dakota Content Standards. Based on their test scores, students are placed into one of four achievement levels: *Level 1*, *Level 2*, *Level 3*, and *Level 4*. The *Level 3* cut score demarks the minimum level of achievement 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 100–350.

### E.2. Linking Methods

Based on scores from the Spring 2019 test administration, the equipercentile linking method was used to identify the spring MAP Growth scores that correspond to the spring SD SBAC achievement level cut scores. Spring cuts for Grade 2 were derived based on the cuts for Grade 3 and the 2020 NWEA growth norms. MAP Growth fall and winter cut scores that predict proficiency on the spring SD SBAC test were then projected using the 2020 NWEA conditional growth norms that provide expected score gains across test administrations.

### E.3. Student Sample

Only students who took both the MAP Growth and SD SBAC assessments in Spring 2019 were included in the study sample. Table E.2 presents the weighted number of South Dakota students from five districts and 62 schools who were included in the linking study. The linking study sample is voluntary and can only include student scores from partners who share their data. Also, not all students in a state take MAP Growth. The sample may therefore not represent the general student population as well as it should. To ensure that the linking study sample represents the state student population in terms of race, sex, and achievement level, weighting (i.e., a statistical method that matches the distributions of the variables of interest to those of the target population) was applied to the sample. As a result, the RIT cuts derived from the study sample can be generalized to any student from the target population. All analyses in this study for Grades 3–8 were conducted based on the weighted sample.

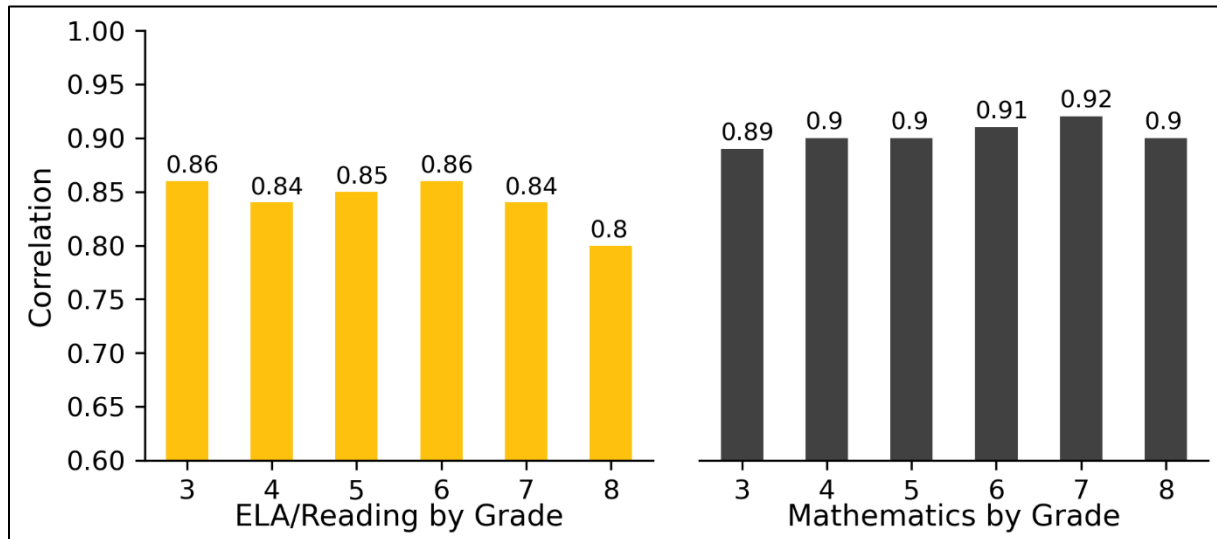
**Table E.2. Linking Study Sample**

Grade	#Students	
	ELA/Reading	Mathematics
3	2,913	2,951
4	2,923	2,956
5	2,868	2,862
6	2,801	2,823
7	2,721	2,731
8	2,506	2,355

#### E.4. Test Score Relationships

Correlations between MAP Growth RIT scores and SD SBAC scores range from 0.80 to 0.92 across content areas, as shown in Figure E.1. These values indicate a strong relationship among the scores, which is important validity evidence for the claim that MAP Growth scores are good predictors of performance on the SD SBAC summative assessments.

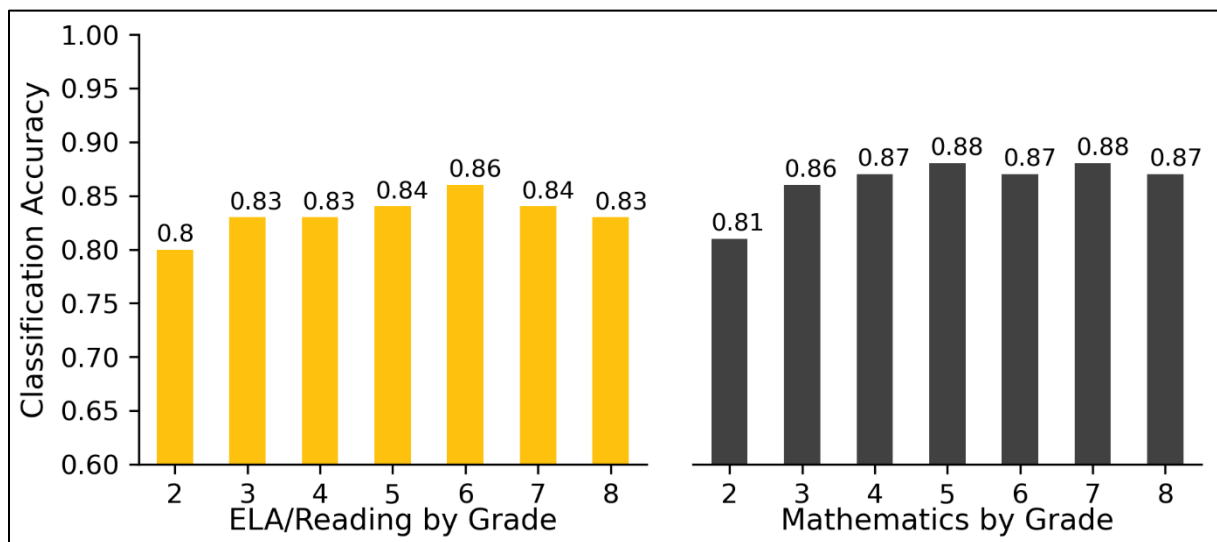
Figure E.1. Correlations between MAP Growth and SD SBAC Test Scores



#### E.5. Accuracy of MAP Growth Classifications

Figure E.2 presents the classification accuracy statistics that show the proportion of students correctly classified by their RIT scores as proficient or not proficient on the SD SBAC summative tests. For example, the MAP Growth Reading Grade 3 *Level 3* cut score has a 0.83 accuracy rate, meaning it accurately classified student achievement on the state test for 83% of the sample. The results range from 0.80 to 0.88 across content areas, indicating that RIT scores have a high accuracy rate of identifying student proficiency on the SD SBAC summative tests.

Figure E.2. Accuracy of MAP Growth Classifications



## 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 in March 2021 to statistically connect the scores of the South Dakota Smarter Balanced Assessment Consortium (SD SBAC) Grades 3–8 English Language Arts/Literacy (ELA) and Mathematics assessments with Rasch Unit (RIT) scores from the MAP Growth assessments taken during the Spring 2019 term. The linking study has been updated since the previous SBAC version published in June 2017 based on multiple states' data to incorporate the new 2020 NWEA MAP Growth norms (Thum & Kuhfeld, 2020) and to report the results for South Dakota only. In this updated study, MAP Growth cut scores are also included for Grade 2 so educators can track early learners' progress toward proficiency on the SD SBAC summative test by Grade 3. This report presents the following results:

1. Student sample demographics
2. Descriptive statistics of test scores
3. MAP Growth cut scores that correspond to the SD SBAC achievement levels using the equipercentile linking procedure for the spring results and the 2020 norms for the fall and winter results
4. Classification accuracy statistics to determine the degree to which MAP Growth accurately predicts student proficiency status on the SD SBAC summative tests
5. The probability of achieving grade-level proficiency on the SD SBAC assessment based on MAP Growth RIT scores from fall, winter, and spring using the 2020 norms

### 1.2. Assessment Overview

The SD SBAC Grades 3–8 ELA and Mathematics summative assessments are aligned to the South Dakota Content Standards. Each assessment has three cut scores (i.e., the minimum score a student must get on a test to be placed in a certain achievement level) that distinguish between the following achievement levels: *Level 1*, *Level 2*, *Level 3*, and *Level 4*. The *Level 3* cut score demarks the minimum level of performance considered to be proficient for accountability purposes.

MAP Growth interim assessments from NWEA are computer adaptive and aligned to state-specific content standards. Scores are reported on the RIT vertical scale with a range of 100–350. Each content area has its own scale. To aid the interpretation of scores, NWEA periodically conducts norming studies of student and school performance on MAP Growth. Achievement status norms show how well a student performed on the MAP Growth test compared to students in the norming group by associating the student's performance on the MAP Growth test, expressed as a RIT score, with a percentile ranking. Growth norms provide expected score gains across test administrations (e.g., the relative evaluation of a student's growth from fall to spring). 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 administrations of the MAP Growth and SD SBAC assessments. NWEA recruited South Dakota districts to participate in the study by sharing their student and score data for the target term. Districts also gave NWEA permission to access students' associated MAP Growth scores from 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 by using 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 and SD SBAC assessments in Spring 2019 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 population in terms of race, sex, and achievement level. These variables were selected because they are correlated with the student's academic achievement within this study and are often provided in the data for the state population. The weighted sample matches the target population as closely as possible on the key demographics and test score characteristics. Specifically, a raking procedure was used to calculate the post-stratification weights and improve the representativeness of the sample. Raking uses iterative procedures to obtain weights that match sample marginal distributions to known population margins. The following steps were taken during this process:

- Calculate marginal distributions of race, sex, and achievement level for the sample and population.
- Calculate post-stratification weights with the rake function from the survey package in R (Lumley, 2019).
- Trim the weight if it is not in the range of 0.3 to 3.0.
- Apply the weights to the sample before conducting the linking study analyses.

### 2.3. MAP Growth Cut Scores

The equipercntile linking method (Kolen & Brennan, 2004) was used to identify the spring MAP Growth RIT scores that correspond to the spring SD SBAC achievement level cut scores. Spring cuts for Grade 2 were derived based on the cuts for Grade 3 and the 2020 NWEA growth norms. RIT fall and winter cut scores that predict proficiency on the spring SD SBAC summative test were then projected using the 2020 growth norms. Percentile ranks are also provided that show how a nationally representative sample of students in the same grade scored on MAP Growth for each administration, which is an important interpretation of RIT scores. This is useful for understanding (1) how student scores compared to peers nationwide and (2) the relative rigor of a state's achievement level designations for its summative assessment.

The MAP Growth spring cut scores for Grades 3–8 could be calculated using the equipercntile linking method because that data are directly connected to the SD SBAC spring data used in the study. The equipercntile 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., SD SBAC). Its equipercntile 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 SD SBAC on the scale of MAP Growth,  $P(x)$  is the percentile rank of a given score on SD SBAC, 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 or winter to spring within the same grade or from spring of a lower grade to the spring of the adjacent higher grade. This information can be used to calculate the fall and winter cut scores for Grades 3–8 and the fall, winter, and spring cut scores for Grade 2. 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.

To derive the spring cut scores for Grade 2, the growth score from spring of one year to the next was used (i.e., the growth score from spring Grade 2 to spring Grade 3). The calculation of fall and winter cuts for Grade 2 followed the same process as the other grades. For example, the growth score from fall to spring in Grade 2 was used to calculate the fall cuts for Grade 2.

#### 2.4. Classification Accuracy

The degree to which MAP Growth predicts student proficiency status on the SD SBAC tests can be described using classification accuracy statistics based on the MAP Growth spring RIT cut scores that show the proportion of students correctly classified by their RIT scores as proficient (*Level 3* or *Level 4*) or not proficient (*Level 1* or *Level 2*). Table 2.1 describes the classification accuracy statistics provided in this report (Pommerich et al., 2004). The results are based on the Spring 2019 MAP Growth and SD SBAC data for the *Level 3* cut score.

South Dakota students do not begin taking the SD SBAC assessment until Grade 3, so longitudinal data were collected for the Grade 3 cohort to link the SD SBAC summative assessment to MAP Growth for Grade 2 to calculate the classification accuracy statistics. To accomplish this, 2018–2019 SD SBAC Grade 3 results were linked to MAP Growth data from Grade 3 students in 2018–2019 and Grade 2 students in 2017–2018. In this way, the data came from the same cohort of students beginning when they were in Grade 2 and continuing through Grade 3.

**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.

## 2.5. Proficiency Projection

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 SD SBAC summative 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 *Level 3* performance on the SD SBAC summative 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:

- $\Phi$  is a standardized normal cumulative distribution.
- $RIT_{previous}$  is the student’s RIT score in fall or winter (or in spring of Grade 2).
- $g$  is the expected growth from the previous RIT (e.g., fall or winter) to the spring RIT.
- $RIT_{SpringCut}$  is the MAP Growth *Level 3* cut score for spring. For Grade 2, this is the Grade 3 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 *Level 3* performance on the SD SBAC summative 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 SD SBAC assessments in Spring 2019 were included in the study sample. Data used in this study were collected from five districts and 62 schools in South Dakota. Table 3.1 presents the demographic distributions of race, sex, and achievement level in the original unweighted study sample. Table 3.2 presents the distributions of the student population that took the Spring 2019 SD SBAC summative assessments. Since the unweighted data are different from the general SD SBAC population, post-stratification weights were applied to the linking study sample to improve its representativeness. Table 3.3 presents the demographic distributions of the sample after weighting, which are almost identical to the SD SBAC student population distributions. The analyses in this study were therefore conducted based on the weighted sample.

**Table 3.1. Linking Study Sample Demographics (Unweighted)**

Linking Study Sample (Unweighted)							
Demographic Subgroup		%Students by Grade					
		3	4	5	6	7	8
<b>ELA/Reading</b>							
Total N		2,913	2,923	2,868	2,801	2,721	2,506
Race*	AI/AN	3.1	3.1	3.3	2.9	3.1	2.8
	Asian	1.9	2.2	2.4	2.4	2.8	2.8
	Black	8.1	7.9	8.2	7.7	8.2	8.1
	Hispanic	9.0	9.0	8.9	9.5	7.5	9.8
	Multi-Race	7.5	6.9	5.7	6.3	4.3	4.8
	NH/PI	0.3	0.3	0.1	0.4	0.4	0.3
	White	70.1	70.6	71.3	70.8	73.7	71.5
Sex	Female	48.8	50.5	50.3	48.3	49.0	48.2
	Male	51.2	49.5	49.7	51.7	51.0	51.8
Achievement Level	Level 1	25.5	27.7	23.3	20.8	18.8	17.8
	Level 2	25.0	21.0	21.2	26.5	24.7	27.4
	Level 3	24.5	26.2	33.9	34.7	37.9	37.5
	Level 4	25.0	25.1	21.6	18.0	18.5	17.3
<b>Mathematics</b>							
Total N		2,951	2,927	2,862	2,823	2,731	2,379
Race*	AI/AN	3.2	3.1	3.3	2.8	3.0	2.9
	Asian	2.0	2.1	2.4	2.4	2.8	2.7
	Black	8.3	8.0	8.4	7.8	8.3	8.7
	Hispanic	9.5	9.3	9.2	9.6	7.6	10.6
	Multi-Race	7.5	6.8	5.7	6.2	4.5	4.8
	NH/PI	0.3	0.3	0.1	0.4	0.3	0.1
	White	69.4	70.3	70.9	70.7	73.6	70.3
Sex	Female	48.7	50.6	50.1	48.2	48.6	48.8
	Male	51.3	49.4	49.9	51.8	51.4	51.2

Linking Study Sample (Unweighted)							
Demographic Subgroup		%Students by Grade					
		3	4	5	6	7	8
Achievement Level	Level 1	23.3	20.7	29.1	27.5	23.8	24.8
	Level 2	23.1	30.7	29.6	32.8	25.2	26.1
	Level 3	30.1	30.4	22.6	22.0	27.5	22.7
	Level 4	23.4	18.2	18.7	17.7	23.5	26.3

\*AI/AN = American Indian/Alaska Native. NH/PI = Native Hawaiian or Other Pacific Islander.

**Table 3.2. Spring 2019 SD SBAC Student Population Demographics**

Spring 2019 SD SBAC Population							
Demographic Subgroup		%Students by Grade					
		3	4	5	6	7	8
<b>ELA</b>							
	Total N	11,161	11,295	11,434	11,427	11,049	10,817
Race*	AI/AN	14.5	14.5	14.7	14.6	14.4	14.3
	Asian	1.4	1.4	1.5	1.4	1.6	1.5
	Black	3.0	2.8	2.9	2.9	2.9	2.8
	Hispanic	6.7	6.6	6.3	6.5	5.7	6.2
	Multi-Race	5.7	4.9	5.1	4.6	4.3	3.7
	NH/PI	0.1	0.1	0.1	0.1	0.1	0.1
	White	68.5	69.8	69.5	69.8	71.0	71.4
Sex	Female	48.9	49.0	49.4	48.9	48.7	48.5
	Male	51.1	51.0	50.6	51.1	51.3	51.5
Achievement Level	Level 1	27.0	30.0	26.0	24.0	23.0	22.0
	Level 2	25.0	21.0	21.0	26.0	24.0	27.0
	Level 3	24.0	25.0	32.0	35.0	38.0	37.0
	Level 4	24.0	24.0	21.0	15.0	15.0	14.0
<b>Mathematics</b>							
	Total N	11,194	11,301	11,454	11,470	11,066	10,840
Race*	AI/AN	14.5	14.5	14.6	14.5	14.3	14.3
	Asian	1.5	1.4	1.5	1.5	1.7	1.5
	Black	3.1	2.9	3.0	2.9	3.0	2.8
	Hispanic	6.8	6.9	6.4	6.7	5.9	6.4
	Multi-Race	5.7	4.8	5.1	4.6	4.2	3.7
	NH/PI	0.1	0.1	0.1	0.1	0.1	0.1
	White	68.3	69.5	69.3	69.6	70.9	71.2
Sex	Female	48.8	49.0	49.3	49.0	48.8	48.5
	Male	51.2	51.0	50.7	51.0	51.2	51.5
Achievement Level	Level 1	24.0	22.0	31.0	29.0	28.0	31.0
	Level 2	24.0	31.0	29.0	31.0	28.0	26.0
	Level 3	31.0	30.0	21.0	23.0	25.0	21.0
	Level 4	21.0	18.0	19.0	17.0	19.0	21.0

\*AI/AN = American Indian/Alaska Native. NH/PI = Native Hawaiian or Other Pacific Islander.

**Table 3.3. Linking Study Sample Demographics (Weighted)**

Demographic Subgroup		Linking Study Sample (Weighted)					
		%Students by Grade					
		3	4	5	6	7	8
<b>ELA/Reading</b>							
Total N		2,913	2,923	2,868	2,801	2,721	2,506
Race*	AI/AN	14.5	14.5	14.7	14.6	14.4	14.3
	Asian	1.4	1.4	1.5	1.4	1.7	1.5
	Black	3.0	2.8	3.0	2.9	2.9	2.8
	Hispanic	6.7	6.6	6.3	6.5	5.7	6.2
	Multi-Race	5.7	4.9	5.1	4.6	4.3	3.7
	NH/PI	0.1	0.1	0.1	0.1	0.1	0.1
	White	68.5	69.8	69.5	69.8	71.0	71.4
Sex	Female	48.9	49.0	49.4	48.9	48.7	48.5
	Male	51.1	51.0	50.6	51.1	51.3	51.5
Achievement Level	Level 1	27.0	30.0	26.0	24.0	23.0	22.0
	Level 2	25.0	21.0	21.0	26.0	24.0	27.0
	Level 3	24.0	25.0	32.0	35.0	38.0	37.0
	Level 4	24.0	24.0	21.0	15.0	15.0	14.0
<b>Mathematics</b>							
Total N		2,951	2,956	2,862	2,823	2,731	2,355
Race*	AI/AN	14.5	14.4	14.6	14.5	14.3	14.3
	Asian	1.5	1.4	1.5	1.5	1.7	1.5
	Black	3.1	2.9	3.0	2.9	3.0	2.8
	Hispanic	6.8	6.9	6.4	6.7	5.9	6.4
	Multi-Race	5.7	4.8	5.1	4.6	4.3	3.7
	NH/PI	0.1	0.1	0.1	0.1	0.1	0.1
	White	68.3	69.5	69.4	69.6	70.9	71.2
Sex	Female	48.8	49.0	49.3	48.9	48.7	48.5
	Male	51.2	51.0	50.7	51.1	51.3	51.5
Achievement Level	Level 1	24.0	21.8	31.0	29.0	28.0	31.3
	Level 2	24.0	30.7	29.0	31.0	28.0	26.3
	Level 3	31.0	29.7	21.0	23.0	25.0	21.2
	Level 4	21.0	17.8	19.0	17.0	19.0	21.2

\*AI/AN = American Indian/Alaska Native. NH/PI = Native Hawaiian or Other Pacific Islander.

### 3.2. Descriptive Statistics

Table 3.4 presents descriptive statistics of the MAP Growth and SD SBAC test scores from Spring 2019, including the correlation coefficient ( $r$ ) between them. The correlation coefficients between the scores range from 0.80 to 0.86 for ELA/reading and 0.89 to 0.92 for mathematics. These values indicate a strong relationship among the scores, which is important validity evidence for the claim that MAP Growth scores are good predictors of performance on the SD SBAC summative assessments.

**Table 3.4. Descriptive Statistics of Test Scores**

Grade	N	r	SD SBAC*				MAP Growth*			
			Mean	SD	Min.	Max.	Mean	SD	Min.	Max.
<b>ELA/Reading</b>										
3	2,913	0.86	2422.8	87.3	2119	2685	197.6	15.8	146	240
4	2,923	0.84	2465.8	89.2	2181	2742	205.3	15.1	144	256
5	2,868	0.85	2503.6	91.5	2155	2787	210.7	15.0	150	255
6	2,801	0.86	2523.6	94.1	2230	2793	215.3	15.3	155	262
7	2,721	0.84	2551.3	95.7	2254	2823	218.5	15.1	160	261
8	2,506	0.80	2564.2	97.4	2164	2874	221.9	15.6	155	264
<b>Mathematics</b>										
3	2,951	0.89	2435.0	81.2	2106	2762	202.1	13.6	141	271
4	2,956	0.90	2475.5	79.1	2090	2719	212.1	14.8	131	275
5	2,862	0.90	2499.0	86.4	2234	2775	219.6	16.7	144	281
6	2,823	0.91	2519.1	100.8	2103	2880	223.9	16.5	163	284
7	2,731	0.92	2541.8	105.8	2126	2869	228.8	18.0	168	291
8	2,355	0.90	2558.3	115.5	2113	2976	233.2	20.0	164	292

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

### 3.3. MAP Growth Cut Scores

Table 3.5 and Table 3.6 present the SD SBAC scale score ranges and the corresponding MAP Growth RIT cut scores and percentile ranges by content area and grade. These tables can be used to predict a student's likely achievement level on the SD SBAC spring assessment when MAP Growth is taken in the fall, winter, or spring. For example, a Grade 3 student who obtained a MAP Growth Reading RIT score of 190 in the fall is likely to achieve *Level/ 3* performance on the SD SBAC ELA test. A Grade 3 student who obtained a MAP Growth Reading RIT score of 200 in the spring is also likely to achieve *Level/ 3* performance on the SD SBAC summative assessment. 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 from the default ones, a student's projected achievement level could be different from the generic projection presented in this document. Partners are therefore encouraged to use the projected achievement level in students' score reports since they reflect the specific instructional weeks set by partners.

**Table 3.5. MAP Growth Cut Scores—ELA/Reading**

SD SBAC ELA									
Grade	Level 1		Level 2		Level 3		Level 4		
3	2001–2366		2367–2431		<b>2432–2489</b>		2490–2811		
4	2032–2415		2416–2472		<b>2473–2532</b>		2533–2867		
5	2056–2441		2442–2501		<b>2502–2581</b>		2582–2916		
6	2079–2456		2457–2530		<b>2531–2617</b>		2618–2937		
7	2082–2478		2479–2551		<b>2552–2648</b>		2649–2964		
8	2097–2486		2487–2566		<b>2567–2667</b>		2668–2989		
MAP Growth Reading*									
Grade	Level 1		Level 2		Level 3		Level 4		
	RIT	Percentile	RIT	Percentile	RIT	Percentile	RIT	Percentile	
<b>Fall</b>									
2	100–159	1–20	160–175	21–58	<b>176–189</b>	59–87	190–350	88–99	
3	100–175	1–25	176–189	26–57	<b>190–200</b>	58–80	201–350	81–99	
4	100–188	1–31	189–198	32–55	<b>199–210</b>	56–79	211–350	80–99	
5	100–193	1–25	194–203	26–48	<b>204–217</b>	49–79	218–350	80–99	
6	100–198	1–24	199–211	25–53	<b>212–226</b>	54–84	227–350	85–99	
7	100–202	1–24	203–214	25–51	<b>215–229</b>	52–82	230–350	83–99	
8	100–205	1–23	206–218	24–51	<b>219–235</b>	52–84	236–350	85–99	
<b>Winter</b>									
2	100–169	1–22	170–184	23–59	<b>185–196</b>	60–84	197–350	85–99	
3	100–183	1–26	184–196	27–57	<b>197–206</b>	58–78	207–350	79–99	
4	100–194	1–31	195–204	32–55	<b>205–214</b>	56–77	215–350	78–99	
5	100–199	1–27	200–208	28–49	<b>209–221</b>	50–78	222–350	79–99	
6	100–203	1–26	204–215	27–54	<b>216–228</b>	55–82	229–350	83–99	
7	100–205	1–24	206–217	25–51	<b>218–231</b>	52–81	232–350	82–99	
8	100–208	1–24	209–221	25–53	<b>222–236</b>	54–83	237–350	84–99	
<b>Spring</b>									
2	100–174	1–24	175–188	25–58	<b>189–200</b>	59–83	201–350	84–99	
3	100–187	1–28	188–199	29–56	<b>200–209</b>	57–78	210–350	79–99	
4	100–197	1–33	198–206	34–54	<b>207–216</b>	55–76	217–350	77–99	
5	100–201	1–28	202–210	29–49	<b>211–222</b>	50–76	223–350	77–99	
6	100–205	1–27	206–216	28–53	<b>217–229</b>	54–81	230–350	82–99	
7	100–207	1–25	208–218	26–51	<b>219–232</b>	52–80	233–350	81–99	
8	100–210	1–25	211–222	26–52	<b>223–237</b>	53–82	238–350	83–99	

\*Cut scores for fall and winter are derived from the spring cuts and growth norms based on the typical instructional weeks. Spring cut scores for Grade 2 were derived from the Grade 3 cuts using the growth norms. Bolded numbers indicate the cut scores considered to be at least proficient for accountability purposes.

**Table 3.6. MAP Growth Cut Scores—Mathematics**

SD SBAC Mathematics									
Grade	Level 1		Level 2		Level 3		Level 4		
3	2071–2380		2381–2435		<b>2436–2500</b>		2501–2762		
4	2090–2410		2411–2484		<b>2485–2548</b>		2549–2834		
5	2095–2454		2455–2527		<b>2528–2578</b>		2579–2891		
6	2103–2472		2473–2551		<b>2552–2609</b>		2610–2911		
7	2108–2483		2484–2566		<b>2567–2634</b>		2635–2964		
8	2113–2503		2504–2585		<b>2586–2652</b>		2653–2993		
MAP Growth Mathematics*									
Grade	Level 1		Level 2		Level 3		Level 4		
	RIT	Percentile	RIT	Percentile	RIT	Percentile	RIT	Percentile	
<b>Fall</b>									
2	100–165	1–23	166–177	24–58	<b>178–188</b>	59–85	189–350	86–99	
3	100–179	1–25	180–189	26–54	<b>190–200</b>	55–81	201–350	82–99	
4	100–188	1–22	189–202	23–58	<b>203–214</b>	59–85	215–350	86–99	
5	100–201	1–31	202–214	32–64	<b>215–224</b>	65–84	225–350	85–99	
6	100–207	1–33	208–220	34–64	<b>221–230</b>	65–83	231–350	84–99	
7	100–212	1–33	213–225	34–62	<b>226–237</b>	63–84	238–350	85–99	
8	100–219	1–39	220–233	40–67	<b>234–244</b>	68–85	245–350	86–99	
<b>Winter</b>									
2	100–174	1–23	175–186	24–58	<b>187–196</b>	59–83	197–350	84–99	
3	100–187	1–26	188–197	27–54	<b>198–207</b>	55–80	208–350	81–99	
4	100–194	1–22	195–209	23–59	<b>210–221</b>	60–85	222–350	86–99	
5	100–207	1–33	208–220	34–64	<b>221–230</b>	65–84	231–350	85–99	
6	100–212	1–34	213–225	35–64	<b>226–235</b>	65–83	236–350	84–99	
7	100–215	1–32	216–229	33–62	<b>230–241</b>	63–83	242–350	84–99	
8	100–222	1–39	223–236	40–67	<b>237–247</b>	68–84	248–350	85–99	
<b>Spring</b>									
2	100–180	1–26	181–191	27–57	<b>192–201</b>	58–82	202–350	83–99	
3	100–192	1–27	193–202	28–54	<b>203–212</b>	55–79	213–350	80–99	
4	100–199	1–24	200–213	25–58	<b>214–225</b>	59–83	226–350	84–99	
5	100–211	1–33	212–224	34–64	<b>225–234</b>	65–82	235–350	83–99	
6	100–215	1–34	216–228	35–63	<b>229–238</b>	64–81	239–350	82–99	
7	100–218	1–33	219–232	34–62	<b>233–244</b>	63–83	245–350	84–99	
8	100–224	1–39	225–238	40–66	<b>239–249</b>	67–83	250–350	84–99	

\*Cut scores for fall and winter are derived from the spring cuts and growth norms based on the typical instructional weeks. Spring cut scores for Grade 2 were derived from the Grade 3 cuts using the growth norms. Bolded 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 rate. These results indicate how well MAP Growth spring RIT scores predict proficiency on the SD SBAC summative tests, providing insight into the predictive validity of MAP Growth. The overall classification accuracy rate ranges from 0.80 to 0.86 for ELA/reading and 0.81 to 0.88 for mathematics. These values suggest that the RIT cut scores are good at classifying students as proficient or not proficient on the SD SBAC summative assessment. For Grade 2, the classification accuracy rate refers to how well the MAP Growth cuts can predict students' proficiency status on SD SBAC in Grade 3.

Although the results show that MAP Growth scores can be used to accurately classify students as likely to be proficient on the SD SBAC summative tests, there is a notable limitation to how these results should be used and interpreted. The SD SBAC 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 3.7. Classification Accuracy Results**

Grade	N	Cut Score		Class. Accuracy*	Rate*		Sensitivity	Specificity	Precision	AUC*
		MAP Growth	SD SBAC		FP	FN				
<b>ELA/Reading</b>										
2	2,756	189	2432	0.80	0.18	0.22	0.78	0.82	0.82	0.89
3	2,913	200	2432	0.83	0.19	0.14	0.86	0.81	0.80	0.92
4	2,923	207	2473	0.83	0.19	0.15	0.85	0.81	0.81	0.92
5	2,868	211	2502	0.84	0.20	0.13	0.87	0.80	0.83	0.93
6	2,801	217	2531	0.86	0.15	0.13	0.87	0.85	0.85	0.94
7	2,721	219	2552	0.84	0.19	0.14	0.86	0.81	0.84	0.92
8	2,506	223	2567	0.83	0.20	0.14	0.86	0.80	0.82	0.91
<b>Mathematics</b>										
2	2,771	192	2436	0.81	0.25	0.14	0.86	0.75	0.81	0.90
3	2,951	203	2436	0.86	0.14	0.14	0.86	0.86	0.87	0.94
4	2,956	214	2485	0.87	0.14	0.11	0.89	0.86	0.85	0.95
5	2,862	225	2528	0.88	0.10	0.14	0.86	0.90	0.85	0.96
6	2,823	229	2552	0.87	0.12	0.14	0.86	0.88	0.83	0.95
7	2,731	233	2567	0.88	0.11	0.12	0.88	0.89	0.86	0.96
8	2,355	239	2586	0.87	0.11	0.16	0.84	0.89	0.85	0.95

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

### 3.5. Proficiency Projection

Table 3.8 and Table 3.9 present the estimated probability of achieving *Level 3* performance on the SD SBAC summative test based on RIT scores from fall, winter, or spring. "Prob." indicates the probability of obtaining proficient status on the SD SBAC summative test in the spring. For example, a Grade 3 student who obtained a MAP Growth Reading score of 201 in the fall has a 91% chance of reaching *Level 3* or higher on the SD SBAC summative test.

**Table 3.8. Proficiency Projection based on RIT Scores—ELA/Reading**

ELA/Reading											
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.
2	5	189	147	No	<0.01	156	No	<0.01	160	No	<0.01
	10	189	153	No	<0.01	162	No	<0.01	166	No	<0.01
	15	189	157	No	0.01	166	No	<0.01	170	No	<0.01
	20	189	160	No	0.03	169	No	<0.01	173	No	<0.01
	25	189	162	No	0.04	171	No	0.01	175	No	<0.01
	30	189	164	No	0.07	173	No	0.02	177	No	<0.01
	35	189	166	No	0.12	175	No	0.05	180	No	<0.01
	40	189	168	No	0.18	177	No	0.10	182	No	0.01
	45	189	170	No	0.21	179	No	0.13	184	No	0.06
	50	189	172	No	0.30	181	No	0.23	186	No	0.17
	55	189	174	No	0.40	183	No	0.35	188	No	0.38
	60	189	176	Yes	0.50	185	Yes	0.50	189	Yes	0.50
	65	189	178	Yes	0.60	187	Yes	0.65	192	Yes	0.83
	70	189	180	Yes	0.65	189	Yes	0.77	194	Yes	0.94
	75	189	183	Yes	0.79	191	Yes	0.87	196	Yes	0.99
	80	189	185	Yes	0.85	194	Yes	0.95	199	Yes	>0.99
	85	189	188	Yes	0.91	197	Yes	0.99	202	Yes	>0.99
90	189	192	Yes	0.97	200	Yes	>0.99	205	Yes	>0.99	
95	189	197	Yes	0.99	206	Yes	>0.99	211	Yes	>0.99	
3	5	200	159	No	<0.01	167	No	<0.01	170	No	<0.01
	10	200	165	No	<0.01	173	No	<0.01	176	No	<0.01
	15	200	169	No	0.01	177	No	<0.01	180	No	<0.01
	20	200	173	No	0.02	180	No	<0.01	183	No	<0.01
	25	200	175	No	0.04	183	No	0.01	186	No	<0.01
	30	200	178	No	0.09	185	No	0.02	189	No	<0.01
	35	200	180	No	0.11	188	No	0.07	191	No	<0.01
	40	200	182	No	0.17	190	No	0.09	193	No	0.01
	45	200	185	No	0.30	192	No	0.17	195	No	0.06
	50	200	187	No	0.34	194	No	0.29	197	No	0.17
	55	200	189	No	0.45	196	No	0.43	199	No	0.38
	60	200	191	Yes	0.55	198	Yes	0.57	201	Yes	0.62
	65	200	193	Yes	0.66	200	Yes	0.71	203	Yes	0.83
	70	200	195	Yes	0.70	202	Yes	0.83	206	Yes	0.97
	75	200	198	Yes	0.83	205	Yes	0.93	208	Yes	0.99
	80	200	201	Yes	0.91	207	Yes	0.97	211	Yes	>0.99
	85	200	204	Yes	0.95	211	Yes	0.99	214	Yes	>0.99
90	200	208	Yes	0.98	215	Yes	>0.99	218	Yes	>0.99	
95	200	214	Yes	>0.99	220	Yes	>0.99	224	Yes	>0.99	

ELA/Reading											
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.
4	5	207	169	No	<0.01	176	No	<0.01	178	No	<0.01
	10	207	175	No	<0.01	182	No	<0.01	184	No	<0.01
	15	207	179	No	0.01	186	No	<0.01	188	No	<0.01
	20	207	183	No	0.03	189	No	<0.01	191	No	<0.01
	25	207	185	No	0.05	192	No	0.01	194	No	<0.01
	30	207	188	No	0.08	194	No	0.03	196	No	<0.01
	35	207	190	No	0.13	196	No	0.06	199	No	0.01
	40	207	192	No	0.20	198	No	0.13	201	No	0.03
	45	207	195	No	0.29	200	No	0.17	203	No	0.11
	50	207	197	No	0.39	202	No	0.28	205	No	0.27
	55	207	199	Yes	0.50	205	Yes	0.50	207	Yes	0.50
	60	207	201	Yes	0.61	207	Yes	0.65	209	Yes	0.73
	65	207	203	Yes	0.66	209	Yes	0.78	211	Yes	0.89
	70	207	205	Yes	0.76	211	Yes	0.87	213	Yes	0.97
	75	207	208	Yes	0.87	213	Yes	0.94	216	Yes	>0.99
	80	207	211	Yes	0.92	216	Yes	0.98	219	Yes	>0.99
85	207	214	Yes	0.96	219	Yes	>0.99	222	Yes	>0.99	
90	207	218	Yes	0.99	223	Yes	>0.99	226	Yes	>0.99	
95	207	224	Yes	>0.99	229	Yes	>0.99	232	Yes	>0.99	
5	5	211	178	No	<0.01	183	No	<0.01	185	No	<0.01
	10	211	183	No	<0.01	189	No	<0.01	191	No	<0.01
	15	211	187	No	0.02	193	No	<0.01	194	No	<0.01
	20	211	191	No	0.05	196	No	0.01	198	No	<0.01
	25	211	193	No	0.08	198	No	0.02	200	No	<0.01
	30	211	196	No	0.17	201	No	0.06	203	No	0.01
	35	211	198	No	0.20	203	No	0.13	205	No	0.03
	40	211	200	No	0.29	205	No	0.22	207	No	0.11
	45	211	202	No	0.39	207	No	0.35	209	No	0.27
	50	211	204	Yes	0.50	209	Yes	0.50	211	Yes	0.50
	55	211	207	Yes	0.61	211	Yes	0.65	213	Yes	0.73
	60	211	209	Yes	0.71	213	Yes	0.78	215	Yes	0.89
	65	211	211	Yes	0.80	215	Yes	0.87	217	Yes	0.97
	70	211	213	Yes	0.83	217	Yes	0.91	219	Yes	0.99
	75	211	216	Yes	0.92	220	Yes	0.97	222	Yes	>0.99
	80	211	218	Yes	0.95	222	Yes	0.99	224	Yes	>0.99
85	211	221	Yes	0.97	226	Yes	>0.99	228	Yes	>0.99	
90	211	225	Yes	0.99	229	Yes	>0.99	231	Yes	>0.99	
95	211	231	Yes	>0.99	235	Yes	>0.99	237	Yes	>0.99	

ELA/Reading											
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.
6	5	217	183	No	<0.01	188	No	<0.01	189	No	<0.01
	10	217	189	No	<0.01	193	No	<0.01	195	No	<0.01
	15	217	193	No	0.01	197	No	<0.01	199	No	<0.01
	20	217	196	No	0.02	200	No	<0.01	202	No	<0.01
	25	217	199	No	0.06	203	No	0.01	205	No	<0.01
	30	217	202	No	0.10	205	No	0.03	207	No	<0.01
	35	217	204	No	0.16	208	No	0.09	209	No	0.01
	40	217	206	No	0.24	210	No	0.17	211	No	0.03
	45	217	208	No	0.28	212	No	0.28	213	No	0.11
	50	217	210	No	0.39	214	No	0.42	215	No	0.27
	55	217	212	Yes	0.50	216	Yes	0.50	217	Yes	0.50
	60	217	214	Yes	0.61	218	Yes	0.65	219	Yes	0.73
	65	217	217	Yes	0.72	220	Yes	0.78	222	Yes	0.94
	70	217	219	Yes	0.81	222	Yes	0.88	224	Yes	0.99
	75	217	221	Yes	0.87	225	Yes	0.96	226	Yes	>0.99
	80	217	224	Yes	0.92	227	Yes	0.98	229	Yes	>0.99
85	217	227	Yes	0.97	230	Yes	>0.99	232	Yes	>0.99	
90	217	231	Yes	0.99	234	Yes	>0.99	236	Yes	>0.99	
95	217	237	Yes	>0.99	240	Yes	>0.99	242	Yes	>0.99	
7	5	219	187	No	<0.01	190	No	<0.01	191	No	<0.01
	10	219	193	No	<0.01	196	No	<0.01	197	No	<0.01
	15	219	197	No	0.01	200	No	<0.01	201	No	<0.01
	20	219	200	No	0.03	203	No	<0.01	205	No	<0.01
	25	219	203	No	0.06	206	No	0.02	207	No	<0.01
	30	219	206	No	0.12	209	No	0.06	210	No	<0.01
	35	219	208	No	0.19	211	No	0.12	212	No	0.01
	40	219	210	No	0.28	213	No	0.17	214	No	0.06
	45	219	212	No	0.33	215	No	0.28	216	No	0.17
	50	219	214	No	0.44	217	No	0.42	218	No	0.38
	55	219	216	Yes	0.56	219	Yes	0.58	220	Yes	0.62
	60	219	218	Yes	0.67	221	Yes	0.72	223	Yes	0.89
	65	219	221	Yes	0.76	223	Yes	0.83	225	Yes	0.97
	70	219	223	Yes	0.84	226	Yes	0.94	227	Yes	0.99
	75	219	225	Yes	0.90	228	Yes	0.97	229	Yes	>0.99
	80	219	228	Yes	0.96	231	Yes	0.99	232	Yes	>0.99
85	219	231	Yes	0.98	234	Yes	>0.99	235	Yes	>0.99	
90	219	235	Yes	>0.99	238	Yes	>0.99	239	Yes	>0.99	
95	219	241	Yes	>0.99	244	Yes	>0.99	245	Yes	>0.99	

ELA/Reading											
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.
8	5	223	190	No	<0.01	193	No	<0.01	194	No	<0.01
	10	223	196	No	<0.01	199	No	<0.01	200	No	<0.01
	15	223	200	No	0.01	203	No	<0.01	204	No	<0.01
	20	223	204	No	0.03	206	No	<0.01	207	No	<0.01
	25	223	207	No	0.06	209	No	0.01	210	No	<0.01
	30	223	209	No	0.11	212	No	0.03	213	No	<0.01
	35	223	211	No	0.13	214	No	0.06	215	No	0.01
	40	223	214	No	0.24	216	No	0.13	217	No	0.03
	45	223	216	No	0.34	218	No	0.22	220	No	0.17
	50	223	218	No	0.45	221	No	0.42	222	No	0.38
	55	223	220	Yes	0.50	223	Yes	0.58	224	Yes	0.62
	60	223	222	Yes	0.61	225	Yes	0.72	226	Yes	0.83
	65	223	225	Yes	0.76	227	Yes	0.83	228	Yes	0.94
	70	223	227	Yes	0.83	229	Yes	0.91	231	Yes	0.99
	75	223	230	Yes	0.89	232	Yes	0.97	233	Yes	>0.99
	80	223	232	Yes	0.94	235	Yes	0.99	236	Yes	>0.99
85	223	236	Yes	0.98	238	Yes	>0.99	239	Yes	>0.99	
90	223	240	Yes	>0.99	242	Yes	>0.99	243	Yes	>0.99	
95	223	246	Yes	>0.99	248	Yes	>0.99	249	Yes	>0.99	

**Table 3.9. Proficiency Projection based on RIT Scores—Mathematics**

Mathematics											
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.
2	5	192	154	No	<0.01	163	No	<0.01	167	No	<0.01
	10	192	158	No	<0.01	167	No	<0.01	172	No	<0.01
	15	192	162	No	0.01	171	No	<0.01	175	No	<0.01
	20	192	164	No	0.02	173	No	<0.01	178	No	<0.01
	25	192	166	No	0.04	175	No	0.01	180	No	<0.01
	30	192	168	No	0.08	177	No	0.03	182	No	<0.01
	35	192	170	No	0.14	179	No	0.07	184	No	<0.01
	40	192	172	No	0.22	181	No	0.10	186	No	0.02
	45	192	173	No	0.27	182	No	0.15	188	No	0.08
	50	192	175	No	0.32	184	No	0.26	189	No	0.15
	55	192	177	No	0.44	186	No	0.42	191	No	0.37
	60	192	178	Yes	0.50	187	Yes	0.50	193	Yes	0.63
	65	192	180	Yes	0.62	189	Yes	0.66	195	Yes	0.85
	70	192	182	Yes	0.73	191	Yes	0.80	196	Yes	0.92
	75	192	184	Yes	0.82	193	Yes	0.90	198	Yes	0.98
	80	192	186	Yes	0.86	195	Yes	0.95	201	Yes	>0.99
	85	192	188	Yes	0.92	198	Yes	0.99	203	Yes	>0.99
90	192	192	Yes	0.98	201	Yes	>0.99	207	Yes	>0.99	
95	192	196	Yes	0.99	205	Yes	>0.99	212	Yes	>0.99	
3	5	203	166	No	<0.01	174	No	<0.01	178	No	<0.01
	10	203	171	No	<0.01	179	No	<0.01	183	No	<0.01
	15	203	175	No	0.01	182	No	<0.01	186	No	<0.01
	20	203	177	No	0.02	185	No	<0.01	189	No	<0.01
	25	203	179	No	0.04	187	No	0.01	192	No	<0.01
	30	203	181	No	0.07	189	No	0.03	194	No	<0.01
	35	203	183	No	0.13	191	No	0.07	196	No	0.01
	40	203	185	No	0.21	193	No	0.14	198	No	0.04
	45	203	187	No	0.31	195	No	0.26	199	No	0.08
	50	203	188	No	0.37	196	No	0.33	201	No	0.25
	55	203	190	Yes	0.50	198	Yes	0.50	203	Yes	0.50
	60	203	192	Yes	0.56	200	Yes	0.67	205	Yes	0.75
	65	203	194	Yes	0.69	201	Yes	0.74	207	Yes	0.92
	70	203	196	Yes	0.79	203	Yes	0.86	208	Yes	0.96
	75	203	198	Yes	0.87	205	Yes	0.93	211	Yes	>0.99
	80	203	200	Yes	0.93	208	Yes	0.98	213	Yes	>0.99
	85	203	202	Yes	0.96	210	Yes	0.99	216	Yes	>0.99
90	203	206	Yes	0.99	214	Yes	>0.99	219	Yes	>0.99	
95	203	211	Yes	>0.99	219	Yes	>0.99	224	Yes	>0.99	

Mathematics											
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.
4	5	214	176	No	<0.01	182	No	<0.01	185	No	<0.01
	10	214	181	No	<0.01	187	No	<0.01	191	No	<0.01
	15	214	185	No	<0.01	191	No	<0.01	194	No	<0.01
	20	214	187	No	0.01	194	No	<0.01	197	No	<0.01
	25	214	190	No	0.02	196	No	<0.01	200	No	<0.01
	30	214	192	No	0.04	198	No	0.01	202	No	<0.01
	35	214	194	No	0.07	200	No	0.02	205	No	<0.01
	40	214	196	No	0.13	202	No	0.04	207	No	0.01
	45	214	198	No	0.21	204	No	0.10	209	No	0.04
	50	214	200	No	0.32	206	No	0.20	211	No	0.15
	55	214	201	No	0.37	208	No	0.33	212	No	0.25
	60	214	203	Yes	0.50	210	Yes	0.50	214	Yes	0.50
	65	214	205	Yes	0.63	212	Yes	0.67	217	Yes	0.85
	70	214	207	Yes	0.74	214	Yes	0.80	219	Yes	0.96
	75	214	209	Yes	0.83	216	Yes	0.90	221	Yes	0.99
	80	214	212	Yes	0.93	219	Yes	0.97	224	Yes	>0.99
85	214	214	Yes	0.96	221	Yes	0.99	227	Yes	>0.99	
90	214	218	Yes	0.99	225	Yes	>0.99	230	Yes	>0.99	
95	214	223	Yes	>0.99	231	Yes	>0.99	236	Yes	>0.99	
5	5	225	184	No	<0.01	189	No	<0.01	191	No	<0.01
	10	225	190	No	<0.01	194	No	<0.01	197	No	<0.01
	15	225	193	No	<0.01	198	No	<0.01	201	No	<0.01
	20	225	196	No	<0.01	201	No	<0.01	205	No	<0.01
	25	225	199	No	<0.01	204	No	<0.01	207	No	<0.01
	30	225	201	No	0.02	206	No	<0.01	210	No	<0.01
	35	225	203	No	0.03	209	No	0.01	212	No	<0.01
	40	225	205	No	0.06	211	No	0.02	215	No	<0.01
	45	225	207	No	0.11	213	No	0.05	217	No	<0.01
	50	225	209	No	0.18	215	No	0.10	219	No	0.02
	55	225	211	No	0.27	217	No	0.20	221	No	0.08
	60	225	213	No	0.38	219	No	0.34	223	No	0.25
	65	225	215	Yes	0.50	221	Yes	0.50	225	Yes	0.50
	70	225	217	Yes	0.62	223	Yes	0.66	228	Yes	0.85
	75	225	219	Yes	0.73	225	Yes	0.80	230	Yes	0.96
	80	225	222	Yes	0.86	228	Yes	0.93	233	Yes	>0.99
85	225	225	Yes	0.94	231	Yes	0.98	236	Yes	>0.99	
90	225	229	Yes	0.98	235	Yes	>0.99	240	Yes	>0.99	
95	225	234	Yes	>0.99	241	Yes	>0.99	246	Yes	>0.99	

Mathematics											
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.
6	5	229	188	No	<0.01	192	No	<0.01	194	No	<0.01
	10	229	194	No	<0.01	198	No	<0.01	200	No	<0.01
	15	229	198	No	<0.01	202	No	<0.01	205	No	<0.01
	20	229	201	No	<0.01	205	No	<0.01	208	No	<0.01
	25	229	204	No	<0.01	208	No	<0.01	211	No	<0.01
	30	229	206	No	0.01	211	No	<0.01	214	No	<0.01
	35	229	209	No	0.03	213	No	<0.01	216	No	<0.01
	40	229	211	No	0.06	215	No	0.01	218	No	<0.01
	45	229	213	No	0.10	217	No	0.03	221	No	<0.01
	50	229	215	No	0.17	220	No	0.10	223	No	0.02
	55	229	217	No	0.27	222	No	0.20	225	No	0.08
	60	229	219	No	0.38	224	No	0.34	227	No	0.25
	65	229	221	Yes	0.50	226	Yes	0.50	230	Yes	0.63
	70	229	223	Yes	0.62	228	Yes	0.66	232	Yes	0.85
	75	229	226	Yes	0.78	231	Yes	0.86	235	Yes	0.98
	80	229	228	Yes	0.86	234	Yes	0.96	238	Yes	>0.99
85	229	231	Yes	0.94	237	Yes	0.99	241	Yes	>0.99	
90	229	235	Yes	0.99	241	Yes	>0.99	245	Yes	>0.99	
95	229	241	Yes	>0.99	247	Yes	>0.99	252	Yes	>0.99	
7	5	233	192	No	<0.01	194	No	<0.01	196	No	<0.01
	10	233	198	No	<0.01	201	No	<0.01	203	No	<0.01
	15	233	202	No	<0.01	205	No	<0.01	207	No	<0.01
	20	233	206	No	<0.01	209	No	<0.01	211	No	<0.01
	25	233	208	No	<0.01	212	No	<0.01	214	No	<0.01
	30	233	211	No	<0.01	215	No	<0.01	217	No	<0.01
	35	233	213	No	0.01	217	No	<0.01	220	No	<0.01
	40	233	216	No	0.04	219	No	0.01	222	No	<0.01
	45	233	218	No	0.10	222	No	0.04	224	No	<0.01
	50	233	220	No	0.17	224	No	0.10	227	No	0.02
	55	233	222	No	0.26	226	No	0.20	229	No	0.08
	60	233	225	No	0.44	229	No	0.42	231	No	0.25
	65	233	227	Yes	0.56	231	Yes	0.58	234	Yes	0.63
	70	233	229	Yes	0.69	233	Yes	0.74	236	Yes	0.85
	75	233	232	Yes	0.83	236	Yes	0.90	239	Yes	0.98
	80	233	235	Yes	0.93	239	Yes	0.97	242	Yes	>0.99
85	233	238	Yes	0.97	243	Yes	>0.99	246	Yes	>0.99	
90	233	243	Yes	>0.99	247	Yes	>0.99	251	Yes	>0.99	
95	233	249	Yes	>0.99	254	Yes	>0.99	257	Yes	>0.99	



Mathematics											
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.
8	5	239	194	No	<0.01	196	No	<0.01	197	No	<0.01
	10	239	201	No	<0.01	203	No	<0.01	205	No	<0.01
	15	239	205	No	<0.01	208	No	<0.01	210	No	<0.01
	20	239	209	No	<0.01	212	No	<0.01	214	No	<0.01
	25	239	212	No	<0.01	215	No	<0.01	217	No	<0.01
	30	239	215	No	<0.01	218	No	<0.01	220	No	<0.01
	35	239	218	No	0.01	221	No	<0.01	223	No	<0.01
	40	239	220	No	0.02	223	No	<0.01	225	No	<0.01
	45	239	223	No	0.06	226	No	0.01	228	No	<0.01
	50	239	225	No	0.10	228	No	0.03	230	No	<0.01
	55	239	227	No	0.16	231	No	0.11	233	No	0.02
	60	239	230	No	0.28	233	No	0.20	235	No	0.08
	65	239	232	No	0.39	236	No	0.42	238	No	0.37
	70	239	235	Yes	0.56	238	Yes	0.58	241	Yes	0.75
	75	239	238	Yes	0.72	241	Yes	0.80	244	Yes	0.96
	80	239	241	Yes	0.84	244	Yes	0.93	247	Yes	>0.99
	85	239	245	Yes	0.94	248	Yes	0.99	251	Yes	>0.99
90	239	249	Yes	0.98	253	Yes	>0.99	256	Yes	>0.99	
95	239	256	Yes	>0.99	260	Yes	>0.99	263	Yes	>0.99	

#### 4. References

- He, W., & Meyer, J. (2021). *MAP Growth universal screening benchmarks*. NWEA Research Report.
- Kolen, M. J., & Brennan, R. L. (2004). *Test equating, scaling, and linking*. Springer.
- Lumley, T. (2019). *Survey: Analysis of complex survey samples*. R package version 3.36. <https://CRAN.R-project.org/package=survey>.
- Pommerich, M., Hanson, B., Harris, D., & Sconing, J. (2004). Issues in conducting linkage between distinct tests. *Applied Psychological Measurement*, 28(4), 247–273.
- Thum, Y. M., & Kuhfeld, M. (2020). *NWEA 2020 MAP Growth achievement status and growth norms for students and schools*. NWEA Research Report.