

# **Linking Study Report: Predicting Performance on the Missouri Assessment Program (MAP) Grade-Level Assessments based on NWEA MAP Growth Scores**

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NWEA Psychometric Solutions





### Linking Study Updates

Date	Description
2020-02-01	Initial linking study conducted for Missouri
2021-01-29	Linking study updated to incorporate the new 2020 NWEA MAP Growth norms (Thum & Kuhfeld, 2020)
2021-05-17	Linking study updated to include science
2021-06-10	Fixed error in titling the “Below Basic” and “Basic” proficiency level columns on Page 17–19 tables.

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## Executive Summary

To predict student achievement on the Missouri Assessment Program (MAP) Grade-Level assessments in Grades 3–8 English Language Arts (ELA) and Mathematics and Grades 5 and 8 Science, NWEA® conducted a linking study using Spring 2018 data for ELA and mathematics and Spring 2019 data for science to derive Rasch Unit (RIT) cut scores on the MAP® Growth™ assessments that correspond to the Missouri performance 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 version published in January 2021 to include science.

Table E.1 presents the *Proficient* performance 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 *Proficient* cut score on the Missouri Grade 3 ELA test is 364. A Grade 3 student with a MAP Growth Reading RIT score of 191 in the fall is likely to meet proficiency on the state summative test in the spring, whereas a Grade 3 student with a MAP Growth Reading RIT score lower than 191 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 state summative 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 MAP Proficiency**

Assessment		Proficient Cut Scores by Grade						
		2	3	4	5	6	7	8
<b>ELA/Reading</b>								
Missouri MAP Spring		–	364	388	403	413	435	443
MAP Growth	Fall	177	191	199	209	213	219	221
	Winter	186	198	205	213	217	222	223
	Spring	190	201	207	215	218	223	224
<b>Mathematics</b>								
Missouri MAP Spring		–	362	387	410	417	435	468
MAP Growth	Fall	178	190	201	213	218	224	233
	Winter	187	198	208	219	223	228	236
	Spring	192	203	212	223	226	231	238
<b>Science</b>								
Missouri MAP Spring		–	–	–	310	–	–	510
MAP Growth	Fall	–	–	–	206	–	–	216
	Winter	–	–	–	210	–	–	218
	Spring	–	–	–	211	–	–	219

<sup>1</sup> This study provides MAP Growth cut scores that predict proficiency on the Missouri summative assessments 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 in ELA and mathematics are available in a separate report (He & Meyer, 2021).

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.

### E.1. Assessment Overview

The MAP Grade-Level assessments are Missouri’s state summative tests aligned to the Missouri Learning Standards. All students in Grades 3–8 in Missouri public and charter schools take the Grade-Level assessment. ELA and mathematics are administered in Grades 3–8, whereas science is administered in Grades 5 and 8. Based on their test scores, students are placed into one of four performance levels: *Below Basic*, *Basic*, *Proficient*, and *Advanced*. The *Proficient* cut score demarks the minimum level of achievement considered to be proficient. 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 2018 or Spring 2019 test administration, the equipercentile linking method was used to identify the spring MAP Growth scores that correspond to the spring Missouri performance 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 state summative 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 Missouri state assessments in either Spring 2018 or Spring 2019 were included in the study sample. Table E.2 presents the weighted number of Missouri students from 17 districts and 75 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 performance 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.

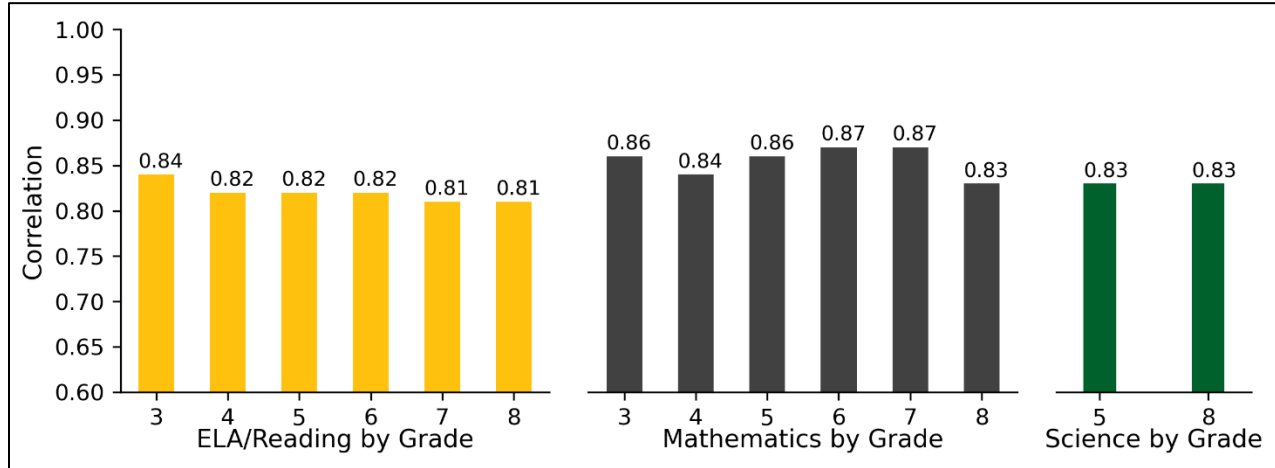
**Table E.2. Linking Study Sample**

Grade	#Students		
	ELA/Reading	Mathematics	Science
3	2,692	2,742	–
4	2,655	2,765	–
5	2,462	2,645	1,707
6	2,539	2,783	–
7	2,273	2,553	–
8	1,765	1,828	1,370

#### E.4. Test Score Relationships

Correlations between MAP Growth RIT scores and Missouri state test scores range from 0.81 to 0.87 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 Missouri state summative assessments.

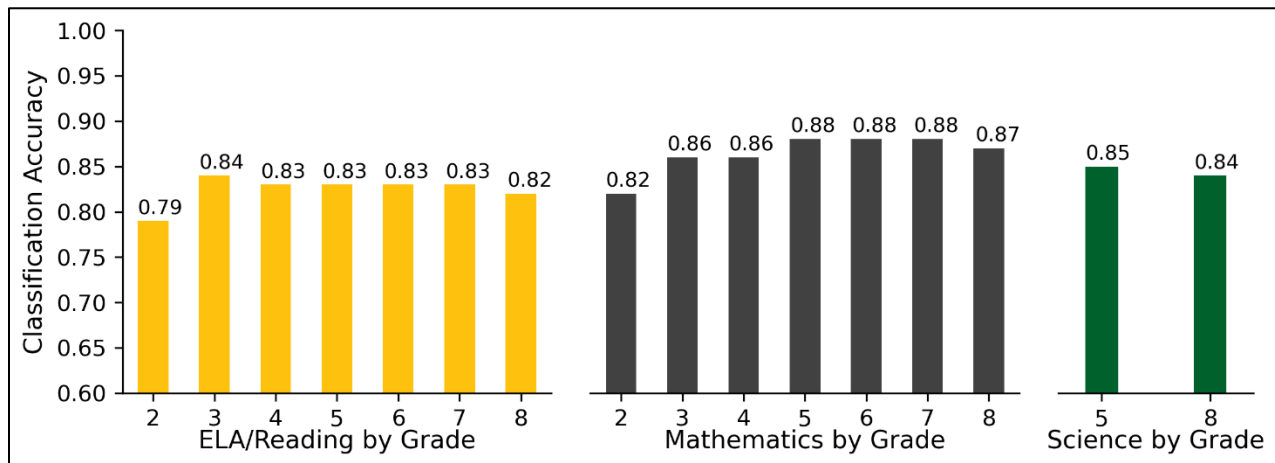
Figure E.1. Correlations between MAP Growth and Missouri State Test Scores



#### 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 Missouri state tests. For example, the MAP Growth Reading Grade 3 *Proficient* cut score has a 0.84 accuracy rate, meaning it accurately classified student achievement on the state test for 84% of the sample. The results range from 0.79 to 0.88 across content areas, indicating that RIT scores have a high accuracy rate of identifying student proficiency on the Missouri state summative assessments.

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 May 2021 to statistically connect the scores of the Missouri Assessment Program (MAP) Grade-Level assessments in Grades 3–8 English Language Arts (ELA) and mathematics Grades 5 and 8 science with Rasch Unit (RIT) scores from the MAP Growth assessments taken during the Spring 2018 term for ELA and mathematics and the Spring 2019 term for science. The linking study has been updated since the previous version published in January 2021 to include science. MAP Growth cut scores are also included for Grade 2 so educators can track early learners' progress toward proficiency on the state 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 Missouri performance 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 Missouri state tests
5. The probability of achieving grade-level proficiency on the Missouri state assessment based on MAP Growth RIT scores from fall, winter, and spring using the 2020 norms

### 1.2. Assessment Overview

The MAP Grade-Level summative assessments in Grades 3–8 ELA and mathematics and Grades 5 and 8 science are aligned to the Missouri Learning 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 performance level) that distinguish between the following performance levels: *Below Basic*, *Basic*, *Proficient*, and *Advanced*. The *Proficient* 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 2018 administrations of MAP Growth and the Missouri state assessments for ELA and mathematics and from Spring 2019 for science. NWEA recruited Missouri 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 interim and state summative assessments in either Spring 2018 or 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 performance 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 performance 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 Missouri performance 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 state 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 performance 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 Missouri 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., Missouri MAP). 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 Test  $X$  on the scale of MAP Growth,  $P(x)$  is the percentile rank of a given score on Test  $X$ , 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 state summative 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 (*Proficient* or *Advanced*) or not proficient (*Below Basic* or *Basic*). Table 2.1 describes the classification accuracy statistics provided in this report (Pommerich et al., 2004). The results are based on either the Spring 2018 or Spring 2019 MAP Growth and Missouri state test data for the *Proficient* cut score.

Since Missouri students do not begin taking the state summative assessment until Grade 3, the Grade 2 classification accuracy statistics were estimated by obtaining the Grade 3 cohort's previous MAP Growth scores. For example, to accomplish this for ELA and mathematics, 2017–2018 Missouri Grade 3 students in the linking study sample were matched to their Grade 2 MAP Growth test scores from 2016–2017. 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 Missouri state 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 *Proficient* performance on the state summative test based on their fall or winter RIT score:

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

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 *Proficient* 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 *Proficient* performance on the state summative test based on their spring RIT score ( $RIT_{Spring}$ ):

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

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 Missouri state summative assessments in either Spring 2018 for ELA and mathematics or Spring 2019 for science were included in the study sample. Data used in this study were collected from 17 districts and 75 schools in Missouri. Table 3.1 presents the demographic distributions of race, sex, and performance level in the original unweighted study sample. Table 3.2 presents the distributions of the student population that took the Spring 2018 Missouri state tests in ELA and mathematics and the Spring 2019 tests in science. Since the unweighted data are different from the general Missouri student 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 Missouri 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		2,697	2,663	2,467	2,547	2,280	1,770
Race*	Asian/PI	1.6	1.7	1.4	2.1	2.2	1.6
	Black	5.5	6.6	7.5	6.4	5.6	7.3
	Hispanic	6.8	5.9	7.4	7.8	7.2	9.4
	Other	5.1	5.3	5.6	6.4	5.3	5.4
	White	81.1	80.5	78.2	77.3	79.7	76.4
Sex	Female	49.6	49.7	48.3	50.5	50.3	49.5
	Male	50.4	50.3	51.7	49.5	49.7	50.5
Performance Level	<i>Below Basic</i>	18.8	7.3	7.3	9.5	11.0	10.9
	<i>Basic</i>	26.7	33.9	37.3	34.0	39.0	40.4
	<i>Proficient</i>	28.8	33.8	30.3	28.3	21.1	31.9
	<i>Advanced</i>	25.7	24.9	25.1	28.3	28.9	16.8
<b>Mathematics</b>							
Total N		2,742	2,765	2,645	2,783	2,556	1,832
Race*	Asian/PI	2.4	2.4	2.3	2.9	2.7	1.3
	Black	6.5	7.2	8.7	7.2	6.4	8.3
	Hispanic	6.6	6.1	7.9	7.3	7.1	8.7
	Other	5.7	6.0	6.6	6.5	5.6	5.1
	White	78.9	78.3	74.5	76.1	78.2	76.6
Sex	Female	48.8	49.8	47.9	50.6	50.6	48.9
	Male	51.2	50.2	52.1	49.4	49.4	51.1
Performance Level	<i>Below Basic</i>	20.4	21.0	20.0	22.7	18.7	31.3
	<i>Basic</i>	25.5	25.6	30.9	29.9	35.6	41.3
	<i>Proficient</i>	26.6	27.9	27.0	21.0	23.9	22.4
	<i>Advanced</i>	27.5	25.5	22.2	26.4	21.8	5.0

Linking Study Sample (Unweighted)							
Demographic Subgroup		%Students by Grade					
		3	4	5	6	7	8
<b>Science</b>							
Total N		–	–	1,707	–	–	1,370
Race*	Asian/PI	–	–	2.5	–	–	3.1
	Black	–	–	9.0	–	–	8.0
	Hispanic	–	–	7.7	–	–	9.7
	Other	–	–	5.7	–	–	4.7
	White	–	–	75.2	–	–	74.6
Sex	Female	–	–	49.9	–	–	50.9
	Male	–	–	50.1	–	–	49.1
Performance Level	<i>Below Basic</i>	–	–	20.6	–	–	17.4
	<i>Basic</i>	–	–	30.8	–	–	34.9
	<i>Proficient</i>	–	–	33.7	–	–	27.4
	<i>Advanced</i>	–	–	14.8	–	–	20.3

\*PI = Pacific Islander. Other = American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, or not specified.

**Table 3.2. Missouri Student Population Demographics**

Missouri Student Population							
Demographic Subgroup		%Students by Grade					
		3	4	5	6	7	8
<b>ELA (Spring 2018)</b>							
Total N		67,932	69,593	69,835	67,941	66,833	66,276
Race*	Asian/PI	2.2	2.2	2.1	2.2	2.2	2.3
	Black	16.6	16.4	16.3	16.0	15.4	15.6
	Hispanic	6.5	6.6	6.6	6.5	6.5	6.1
	Other	5.0	4.9	4.7	4.2	4.1	3.7
	White	69.7	69.9	70.2	71.1	71.8	72.4
Sex	Female	48.6	49.0	49.0	48.8	48.9	48.9
	Male	51.4	51.0	51.0	51.2	51.1	51.1
Performance Level	<i>Below Basic</i>	23.3	12.1	11.4	14.3	15.5	13.2
	<i>Basic</i>	27.9	37.5	40.4	37.1	40.5	37.5
	<i>Proficient</i>	27.0	29.9	26.2	26.3	19.9	30.0
	<i>Advanced</i>	21.6	20.2	21.8	22.0	23.8	19.0
<b>Mathematics (Spring 2018)</b>							
Total N		68,080	69,719	69,919	67,968	66,041	54,518
Race*	Asian/PI	2.3	2.2	2.2	2.2	2.1	1.8
	Black	16.5	16.4	16.3	16.0	15.6	16.9
	Hispanic	6.5	6.6	6.6	6.6	6.6	6.3
	Other	5.0	4.9	4.7	4.2	4.1	3.7
	White	69.6	69.8	70.1	71.0	71.6	71.3

Missouri Student Population							
Demographic Subgroup		%Students by Grade					
		3	4	5	6	7	8
Sex	Female	48.6	49.0	49.0	48.8	49.0	48.1
	Male	51.4	51.0	51.0	51.2	51.0	51.9
Performance Level	<i>Below Basic</i>	25.1	27.3	24.2	27.7	25.2	32.9
	<i>Basic</i>	27.7	26.6	34.6	30.8	36.5	37.1
	<i>Proficient</i>	25.3	25.2	24.1	21.9	22.2	20.8
	<i>Advanced</i>	21.9	20.9	17.1	19.6	16.0	9.0
<b>Science (Spring 2019)</b>							
Total N		–	–	69,900	–	–	66,991
Race*	Asian/PI	–	–	2.3	–	–	2.3
	Black	–	–	16.2	–	–	15.3
	Hispanic	–	–	7.0	–	–	6.8
	Other	–	–	5.0	–	–	4.3
	White	–	–	69.5	–	–	71.4
Sex	Female	–	–	48.9	–	–	48.8
	Male	–	–	51.1	–	–	51.2
Performance Level	<i>Below Basic</i>	–	–	26.1	–	–	22.7
	<i>Basic</i>	–	–	31.1	–	–	28.7
	<i>Proficient</i>	–	–	29.3	–	–	28.7
	<i>Advanced</i>	–	–	13.5	–	–	20.0

\*PI = Pacific Islander. Other = American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, or not specified.

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

Linking Study Sample (Weighted)							
Demographic Subgroup		%Students by Grade					
		3	4	5	6	7	8
<b>ELA/Reading</b>							
Total N		2,692	2,655	2,462	2,539	2,273	1,765
Race*	Asian/PI	2.2	2.2	2.1	2.2	2.2	2.3
	Black	16.6	16.4	16.3	16.0	15.4	15.6
	Hispanic	6.5	6.6	6.6	6.5	6.5	6.1
	Other	5.0	4.9	4.7	4.2	4.1	3.7
	White	69.7	69.9	70.3	71.1	71.8	72.3
Sex	Female	48.6	49.0	49.0	48.8	48.9	48.9
	Male	51.4	51.0	51.0	51.2	51.1	51.1
Performance Level	<i>Below Basic</i>	23.3	12.1	11.4	14.3	15.5	13.2
	<i>Basic</i>	28.0	37.6	40.5	37.2	40.6	37.6
	<i>Proficient</i>	27.1	30.0	26.3	26.4	20.0	30.1
	<i>Advanced</i>	21.6	20.3	21.8	22.1	23.9	19.1

Linking Study Sample (Weighted)							
Demographic Subgroup		%Students by Grade					
		3	4	5	6	7	8
<b>Mathematics</b>							
Total N		2,742	2,765	2,645	2,783	2,553	1,828
Race*	Asian/PI	2.3	2.2	2.2	2.2	2.1	1.8
	Black	16.5	16.4	16.3	16.0	15.6	16.9
	Hispanic	6.5	6.6	6.6	6.6	6.6	6.3
	Other	5.0	4.9	4.7	4.2	4.1	3.7
	White	69.7	69.9	70.2	71.0	71.6	71.3
Sex	Female	48.6	49.0	49.0	48.8	49.0	48.1
	Male	51.4	51.0	51.0	51.2	51.0	51.9
Performance Level	<i>Below Basic</i>	25.1	27.3	24.2	27.7	25.2	33.0
	<i>Basic</i>	27.7	26.6	34.6	30.8	36.5	37.2
	<i>Proficient</i>	25.3	25.2	24.1	21.9	22.2	20.8
	<i>Advanced</i>	21.9	20.9	17.1	19.6	16.0	9.0
<b>Science</b>							
Total N		–	–	1,707	–	–	1,370
Race*	Asian/PI	–	–	2.3	–	–	2.3
	Black	–	–	16.2	–	–	15.3
	Hispanic	–	–	7.0	–	–	6.8
	Other	–	–	5.0	–	–	4.3
	White	–	–	69.5	–	–	71.4
Sex	Female	–	–	48.9	–	–	48.8
	Male	–	–	51.1	–	–	51.2
Performance Level	<i>Below Basic</i>	–	–	26.1	–	–	22.7
	<i>Basic</i>	–	–	31.1	–	–	28.7
	<i>Proficient</i>	–	–	29.3	–	–	28.7
	<i>Advanced</i>	–	–	13.5	–	–	20.0

\*PI = Pacific Islander. Other = American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, or not specified.

### 3.2. Descriptive Statistics

Table 3.4 presents descriptive statistics of the MAP Growth and Missouri state test scores from Spring 2018 for ELA and mathematics and Spring 2019 for science, including the correlation coefficient ( $r$ ) between them. The correlation coefficients between the scores range from 0.81 to 0.84 for ELA/reading and 0.83 to 0.87 for mathematics and is 0.83 for both grades in science. 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 Missouri state summative assessments.

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

Grade	N	r	Missouri MAP*				MAP Growth*			
			Mean	SD	Min.	Max.	Mean	SD	Min.	Max.
<b>ELA/Reading</b>										
3	2,692	0.84	361.3	42.3	160	560	198.3	15.5	148	238
4	2,655	0.82	386.0	40.5	170	570	205.8	14.6	150	251
5	2,462	0.82	401.1	40.0	286	600	211.7	15.4	151	256
6	2,539	0.82	410.9	35.7	302	583	215.8	14.7	158	253
7	2,273	0.81	427.1	39.1	304	630	218.3	15.3	154	260
8	1,765	0.81	438.9	40.4	284	586	221.7	14.7	159	253
<b>Mathematics</b>										
3	2,742	0.86	353.1	49.2	185	520	201.1	14.3	135	254
4	2,765	0.84	377.3	49.0	210	540	211.1	15.5	149	275
5	2,645	0.86	400.2	39.2	250	570	219.5	17.2	145	290
6	2,783	0.87	407.1	38.1	260	580	222.6	15.8	161	281
7	2,553	0.87	420.1	45.5	270	600	225.8	17.1	153	280
8	1,828	0.83	440.7	46.3	310	588	228.5	16.1	159	272
<b>Science</b>										
5	1,707	0.83	300.4	39.4	124	414	208.5	12.0	160	249
8	1,370	0.83	500.5	41.0	264	603	215.8	13.4	164	252

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

### 3.3. MAP Growth Cut Scores

Table 3.5, Table 3.6 and Table 3.7 present the Missouri state 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 performance level on the spring Missouri state 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 191 in the fall is likely to achieve *Proficient* performance on the state summative ELA test. A Grade 3 student who obtained a MAP Growth Reading RIT score of 201 in the spring is also likely to achieve *Proficient* performance on the Missouri state 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 performance level could be different from the generic projection 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 3.5. MAP Growth Cut Scores—ELA/Reading**

Missouri MAP ELA									
Grade	Below Basic		Basic		Proficient		Advanced		
3	160–330		331–363		<b>364–394</b>		395–560		
4	170–336		337–387		<b>388–418</b>		419–570		
5	210–350		351–402		<b>403–430</b>		431–600		
6	230–370		371–412		<b>413–437</b>		438–620		
7	240–383		384–434		<b>435–455</b>		456–630		
8	250–392		393–442		<b>443–475</b>		476–650		
MAP Growth Reading*									
Grade	Below Basic		Basic		Proficient		Advanced		
	RIT	Percentile	RIT	Percentile	RIT	Percentile	RIT	Percentile	
<b>Fall</b>									
2	100–161	1–24	162–176	25–61	<b>177–190</b>	62–88	191–350	89–99	
3	100–176	1–27	177–190	28–59	<b>191–202</b>	60–83	203–350	84–99	
4	100–179	1–15	180–198	16–55	<b>199–211</b>	56–81	212–350	82–99	
5	100–182	1–8	183–208	9–60	<b>209–217</b>	61–79	218–350	80–99	
6	100–192	1–14	193–212	15–56	<b>213–222</b>	57–77	223–350	78–99	
7	100–196	1–14	197–218	15–60	<b>219–225</b>	61–75	226–350	76–99	
8	100–199	1–14	200–220	15–56	<b>221–232</b>	57–80	233–350	81–99	
<b>Winter</b>									
2	100–170	1–24	171–185	25–62	<b>186–197</b>	63–86	198–350	87–99	
3	100–184	1–28	185–197	29–59	<b>198–207</b>	60–80	208–350	81–99	
4	100–186	1–16	187–204	17–55	<b>205–215</b>	56–79	216–350	80–99	
5	100–188	1–9	189–212	10–59	<b>213–221</b>	60–78	222–350	79–99	
6	100–197	1–15	198–216	16–57	<b>217–225</b>	58–77	226–350	78–99	
7	100–200	1–15	201–221	16–61	<b>222–227</b>	62–74	228–350	75–99	
8	100–203	1–15	204–222	16–55	<b>223–233</b>	56–78	234–350	79–99	
<b>Spring</b>									
2	100–175	1–26	176–189	27–60	<b>190–201</b>	61–85	202–350	86–99	
3	100–188	1–30	189–200	31–58	<b>201–210</b>	59–79	211–350	80–99	
4	100–189	1–17	190–206	18–54	<b>207–217</b>	55–78	218–350	79–99	
5	100–191	1–11	192–214	12–59	<b>215–222</b>	60–76	223–350	77–99	
6	100–199	1–16	200–217	17–56	<b>218–226</b>	57–76	227–350	77–99	
7	100–202	1–16	203–222	17–60	<b>223–228</b>	61–73	229–350	74–99	
8	100–205	1–17	206–223	18–55	<b>224–234</b>	56–78	235–350	79–99	

\*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**

Missouri MAP Mathematics								
Grade	Below Basic		Basic		Proficient		Advanced	
3	185–325		326–361		<b>362–389</b>		390–520	
4	210–357		358–386		<b>387–412</b>		413–540	
5	250–376		377–409		<b>410–434</b>		435–570	
6	260–387		388–416		<b>417–437</b>		438–580	
7	270–393		394–434		<b>435–461</b>		462–600	
8	310–419		420–467		<b>468–505</b>		506–660	
MAP Growth Mathematics*								
Grade	Below Basic		Basic		Proficient		Advanced	
	RIT	Percentile	RIT	Percentile	RIT	Percentile	RIT	Percentile
<b>Fall</b>								
2	100–164	1–21	165–177	22–58	<b>178–187</b>	59–83	188–350	84–99
3	100–178	1–23	179–189	24–54	<b>190–199</b>	55–79	200–350	80–99
4	100–190	1–27	191–200	28–53	<b>201–211</b>	54–80	212–350	81–99
5	100–198	1–24	199–212	25–59	<b>213–224</b>	60–84	225–350	85–99
6	100–205	1–28	206–217	29–57	<b>218–227</b>	58–78	228–350	79–99
7	100–209	1–27	210–223	28–58	<b>224–234</b>	59–79	235–350	80–99
8	100–216	1–33	217–232	34–66	<b>233–245</b>	67–86	246–350	87–99
<b>Winter</b>								
2	100–173	1–21	174–186	22–58	<b>187–195</b>	59–81	196–350	82–99
3	100–186	1–24	187–197	25–54	<b>198–206</b>	55–78	207–350	79–99
4	100–197	1–28	198–207	29–54	<b>208–218</b>	55–80	219–350	81–99
5	100–203	1–24	204–218	25–60	<b>219–230</b>	61–84	231–350	85–99
6	100–210	1–29	211–222	30–57	<b>223–232</b>	58–78	233–350	79–99
7	100–212	1–26	213–227	27–58	<b>228–238</b>	59–79	239–350	80–99
8	100–219	1–33	220–235	34–65	<b>236–248</b>	66–85	249–350	86–99
<b>Spring</b>								
2	100–179	1–23	180–191	24–57	<b>192–200</b>	58–80	201–350	81–99
3	100–191	1–25	192–202	26–54	<b>203–211</b>	55–77	212–350	78–99
4	100–201	1–28	202–211	29–53	<b>212–222</b>	54–78	223–350	79–99
5	100–207	1–25	208–222	26–59	<b>223–234</b>	60–82	235–350	83–99
6	100–213	1–30	214–225	31–56	<b>226–235</b>	57–76	236–350	77–99
7	100–215	1–27	216–230	28–58	<b>231–241</b>	59–78	242–350	79–99
8	100–221	1–33	222–237	34–64	<b>238–250</b>	65–84	251–350	85–99

\*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 3.7. MAP Growth Cut Scores—Science**

Missouri MAP Science									
Grade	Below Basic		Basic		Proficient		Advanced		
5	100–274		275–309		310–343		344–540		
8	285–467		468–509		510–536		537–710		
MAP Growth Science*									
Grade	Below Basic		Basic		Proficient		Advanced		
	RIT	Percentile	RIT	Percentile	RIT	Percentile	RIT	Percentile	
Fall									
5	100–193	1–29	194–205	30–68	<b>206</b> –218	69–93	219–350	94–99	
8	100–199	1–22	200–215	23–67	<b>216</b> –225	68–88	226–350	89–99	
Winter									
5	100–198	1–32	199–209	33–68	<b>210</b> –220	69–91	221–350	92–99	
8	100–202	1–23	203–217	24–65	<b>218</b> –226	66–86	227–350	87–99	
Spring									
5	100–200	1–32	201–210	33–64	<b>211</b> –221	65–89	222–350	90–99	
8	100–204	1–26	205–218	27–65	<b>219</b> –227	66–85	228–350	86–99	

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

### 3.4. Classification Accuracy

Table 3.8 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 state summative tests, providing insight into the predictive validity of MAP Growth. The overall classification accuracy rate ranges from 0.79 to 0.84 for ELA/reading, 0.82 to 0.88 for mathematics, and 0.84 to 0.85 for science. These values suggest that the RIT cut scores are good at classifying students as proficient or not proficient on the Missouri state assessment. For Grade 2, the classification accuracy rate refers to how well the MAP Growth cuts can predict students' proficiency status on the Missouri state test 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 Missouri state summative assessments, there is a notable limitation to how these results should be used and interpreted. The Missouri state test 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 3.8. Classification Accuracy Results**

Grade	N	Cut Score		Class. Accuracy*	Rate*		Sensitivity	Specificity	Precision	AUC*
		MAP Growth	Missouri		FP	FN				
<b>ELA/Reading</b>										
2	1,346	190	364	0.79	0.15	0.27	0.73	0.85	0.85	0.87
3	2,692	201	364	0.84	0.17	0.15	0.85	0.83	0.82	0.93
4	2,655	207	388	0.83	0.20	0.14	0.86	0.80	0.81	0.91
5	2,462	215	403	0.83	0.15	0.19	0.81	0.85	0.83	0.92
6	2,539	218	413	0.83	0.16	0.17	0.83	0.84	0.83	0.92
7	2,273	223	435	0.83	0.13	0.21	0.79	0.87	0.82	0.92
8	1,765	224	443	0.82	0.18	0.17	0.83	0.82	0.82	0.91
<b>Mathematics</b>										
2	1,369	192	362	0.82	0.19	0.18	0.82	0.81	0.85	0.91
3	2,742	203	362	0.86	0.15	0.12	0.88	0.85	0.84	0.94
4	2,765	212	387	0.86	0.17	0.10	0.90	0.83	0.82	0.95
5	2,645	223	410	0.88	0.11	0.13	0.87	0.89	0.85	0.95
6	2,783	226	417	0.88	0.13	0.09	0.91	0.87	0.83	0.96
7	2,553	231	435	0.88	0.11	0.12	0.88	0.89	0.83	0.96
8	1,828	238	468	0.87	0.09	0.22	0.78	0.91	0.79	0.94
<b>Science</b>										
5	1,707	211	310	0.85	0.13	0.18	0.82	0.87	0.82	0.92
8	1,370	219	510	0.84	0.13	0.19	0.81	0.87	0.86	0.92

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

### 3.5. Proficiency Projection

Table 3.9, Table 3.10, and Table 3.11 present the estimated probability of achieving *Proficient* performance on the Missouri state summative assessment based on RIT scores from fall, winter, or spring. “Prob.” indicates the probability of obtaining proficient status on the state summative test in the spring. For example, a Grade 3 student who obtained a MAP Growth Reading score of 201 in the fall has an 89% chance of reaching the *Proficient* level or higher on the Missouri state test.

**Table 3.9. 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	
				Proficient	Prob.		Proficient	Prob.		Proficient	Prob.
2	5	190	147	No	<0.01	156	No	<0.01	160	No	<0.01
	10	190	153	No	<0.01	162	No	<0.01	166	No	<0.01
	15	190	157	No	0.01	166	No	<0.01	170	No	<0.01
	20	190	160	No	0.02	169	No	<0.01	173	No	<0.01
	25	190	162	No	0.03	171	No	<0.01	175	No	<0.01
	30	190	164	No	0.06	173	No	0.01	177	No	<0.01
	35	190	166	No	0.09	175	No	0.03	180	No	<0.01
	40	190	168	No	0.15	177	No	0.07	182	No	0.01
	45	190	170	No	0.18	179	No	0.10	184	No	0.03
	50	190	172	No	0.25	181	No	0.17	186	No	0.11
	55	190	174	No	0.35	183	No	0.29	188	No	0.27
	60	190	176	No	0.45	185	No	0.43	189	No	0.38
	65	190	178	Yes	0.55	187	Yes	0.57	192	Yes	0.73
	70	190	180	Yes	0.60	189	Yes	0.71	194	Yes	0.89
	75	190	183	Yes	0.75	191	Yes	0.83	196	Yes	0.97
	80	190	185	Yes	0.82	194	Yes	0.93	199	Yes	>0.99
	85	190	188	Yes	0.88	197	Yes	0.98	202	Yes	>0.99
90	190	192	Yes	0.96	200	Yes	>0.99	205	Yes	>0.99	
95	190	197	Yes	0.99	206	Yes	>0.99	211	Yes	>0.99	
3	5	201	159	No	<0.01	167	No	<0.01	170	No	<0.01
	10	201	165	No	<0.01	173	No	<0.01	176	No	<0.01
	15	201	169	No	0.01	177	No	<0.01	180	No	<0.01
	20	201	173	No	0.02	180	No	<0.01	183	No	<0.01
	25	201	175	No	0.03	183	No	<0.01	186	No	<0.01
	30	201	178	No	0.07	185	No	0.01	189	No	<0.01
	35	201	180	No	0.09	188	No	0.05	191	No	<0.01
	40	201	182	No	0.14	190	No	0.07	193	No	0.01
	45	201	185	No	0.25	192	No	0.13	195	No	0.03
	50	201	187	No	0.30	194	No	0.23	197	No	0.11
	55	201	189	No	0.39	196	No	0.35	199	No	0.27
	60	201	191	Yes	0.50	198	Yes	0.50	201	Yes	0.50
	65	201	193	Yes	0.61	200	Yes	0.65	203	Yes	0.73
	70	201	195	Yes	0.66	202	Yes	0.77	206	Yes	0.94
	75	201	198	Yes	0.79	205	Yes	0.91	208	Yes	0.99
	80	201	201	Yes	0.89	207	Yes	0.95	211	Yes	>0.99
	85	201	204	Yes	0.93	211	Yes	0.99	214	Yes	>0.99
90	201	208	Yes	0.98	215	Yes	>0.99	218	Yes	>0.99	
95	201	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	
				Proficient	Prob.		Proficient	Prob.		Proficient	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	215	178	No	<0.01	183	No	<0.01	185	No	<0.01
	10	215	183	No	<0.01	189	No	<0.01	191	No	<0.01
	15	215	187	No	<0.01	193	No	<0.01	194	No	<0.01
	20	215	191	No	0.01	196	No	<0.01	198	No	<0.01
	25	215	193	No	0.03	198	No	<0.01	200	No	<0.01
	30	215	196	No	0.06	201	No	0.01	203	No	<0.01
	35	215	198	No	0.08	203	No	0.03	205	No	<0.01
	40	215	200	No	0.13	205	No	0.06	207	No	0.01
	45	215	202	No	0.20	207	No	0.13	209	No	0.03
	50	215	204	No	0.29	209	No	0.22	211	No	0.11
	55	215	207	No	0.39	211	No	0.35	213	No	0.27
	60	215	209	Yes	0.50	213	Yes	0.50	215	Yes	0.50
	65	215	211	Yes	0.61	215	Yes	0.65	217	Yes	0.73
	70	215	213	Yes	0.66	217	Yes	0.72	219	Yes	0.89
	75	215	216	Yes	0.80	220	Yes	0.87	222	Yes	0.99
	80	215	218	Yes	0.87	222	Yes	0.94	224	Yes	>0.99
	85	215	221	Yes	0.92	226	Yes	0.99	228	Yes	>0.99
90	215	225	Yes	0.97	229	Yes	>0.99	231	Yes	>0.99	
95	215	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	
				Proficient	Prob.		Proficient	Prob.		Proficient	Prob.
6	5	218	183	No	<0.01	188	No	<0.01	189	No	<0.01
	10	218	189	No	<0.01	193	No	<0.01	195	No	<0.01
	15	218	193	No	<0.01	197	No	<0.01	199	No	<0.01
	20	218	196	No	0.02	200	No	<0.01	202	No	<0.01
	25	218	199	No	0.04	203	No	0.01	205	No	<0.01
	30	218	202	No	0.08	205	No	0.02	207	No	<0.01
	35	218	204	No	0.13	208	No	0.06	209	No	<0.01
	40	218	206	No	0.19	210	No	0.12	211	No	0.01
	45	218	208	No	0.24	212	No	0.22	213	No	0.06
	50	218	210	No	0.33	214	No	0.35	215	No	0.17
	55	218	212	No	0.44	216	No	0.42	217	No	0.38
	60	218	214	Yes	0.56	218	Yes	0.58	219	Yes	0.62
	65	218	217	Yes	0.67	220	Yes	0.72	222	Yes	0.89
	70	218	219	Yes	0.76	222	Yes	0.83	224	Yes	0.97
	75	218	221	Yes	0.84	225	Yes	0.94	226	Yes	0.99
	80	218	224	Yes	0.90	227	Yes	0.97	229	Yes	>0.99
85	218	227	Yes	0.96	230	Yes	0.99	232	Yes	>0.99	
90	218	231	Yes	0.99	234	Yes	>0.99	236	Yes	>0.99	
95	218	237	Yes	>0.99	240	Yes	>0.99	242	Yes	>0.99	
7	5	223	187	No	<0.01	190	No	<0.01	191	No	<0.01
	10	223	193	No	<0.01	196	No	<0.01	197	No	<0.01
	15	223	197	No	<0.01	200	No	<0.01	201	No	<0.01
	20	223	200	No	0.01	203	No	<0.01	205	No	<0.01
	25	223	203	No	0.02	206	No	<0.01	207	No	<0.01
	30	223	206	No	0.04	209	No	0.01	210	No	<0.01
	35	223	208	No	0.08	211	No	0.03	212	No	<0.01
	40	223	210	No	0.12	213	No	0.04	214	No	<0.01
	45	223	212	No	0.16	215	No	0.09	216	No	0.01
	50	223	214	No	0.24	217	No	0.17	218	No	0.06
	55	223	216	No	0.33	219	No	0.28	220	No	0.17
	60	223	218	No	0.44	221	No	0.42	223	Yes	0.50
	65	223	221	Yes	0.56	223	Yes	0.58	225	Yes	0.73
	70	223	223	Yes	0.67	226	Yes	0.78	227	Yes	0.89
	75	223	225	Yes	0.76	228	Yes	0.88	229	Yes	0.97
	80	223	228	Yes	0.88	231	Yes	0.96	232	Yes	>0.99
85	223	231	Yes	0.92	234	Yes	0.99	235	Yes	>0.99	
90	223	235	Yes	0.98	238	Yes	>0.99	239	Yes	>0.99	
95	223	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	
				Proficient	Prob.		Proficient	Prob.		Proficient	Prob.
8	5	224	190	No	<0.01	193	No	<0.01	194	No	<0.01
	10	224	196	No	<0.01	199	No	<0.01	200	No	<0.01
	15	224	200	No	0.01	203	No	<0.01	204	No	<0.01
	20	224	204	No	0.02	206	No	<0.01	207	No	<0.01
	25	224	207	No	0.05	209	No	0.01	210	No	<0.01
	30	224	209	No	0.08	212	No	0.02	213	No	<0.01
	35	224	211	No	0.11	214	No	0.04	215	No	<0.01
	40	224	214	No	0.20	216	No	0.09	217	No	0.01
	45	224	216	No	0.29	218	No	0.17	220	No	0.11
	50	224	218	No	0.39	221	No	0.35	222	No	0.27
	55	224	220	No	0.45	223	Yes	0.50	224	Yes	0.50
	60	224	222	Yes	0.55	225	Yes	0.65	226	Yes	0.73
	65	224	225	Yes	0.71	227	Yes	0.78	228	Yes	0.89
	70	224	227	Yes	0.80	229	Yes	0.87	231	Yes	0.99
	75	224	230	Yes	0.87	232	Yes	0.96	233	Yes	>0.99
	80	224	232	Yes	0.92	235	Yes	0.99	236	Yes	>0.99
	85	224	236	Yes	0.97	238	Yes	>0.99	239	Yes	>0.99
90	224	240	Yes	0.99	242	Yes	>0.99	243	Yes	>0.99	
95	224	246	Yes	>0.99	248	Yes	>0.99	249	Yes	>0.99	



**Table 3.10. 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	
				Proficient	Prob.		Proficient	Prob.		Proficient	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	
				Proficient	Prob.		Proficient	Prob.		Proficient	Prob.
4	5	212	176	No	<0.01	182	No	<0.01	185	No	<0.01
	10	212	181	No	<0.01	187	No	<0.01	191	No	<0.01
	15	212	185	No	0.01	191	No	<0.01	194	No	<0.01
	20	212	187	No	0.01	194	No	<0.01	197	No	<0.01
	25	212	190	No	0.04	196	No	0.01	200	No	<0.01
	30	212	192	No	0.07	198	No	0.02	202	No	<0.01
	35	212	194	No	0.13	200	No	0.04	205	No	0.01
	40	212	196	No	0.21	202	No	0.10	207	No	0.04
	45	212	198	No	0.32	204	No	0.20	209	No	0.15
	50	212	200	No	0.44	206	No	0.33	211	No	0.37
	55	212	201	Yes	0.50	208	Yes	0.50	212	Yes	0.50
	60	212	203	Yes	0.63	210	Yes	0.67	214	Yes	0.75
	65	212	205	Yes	0.74	212	Yes	0.80	217	Yes	0.96
	70	212	207	Yes	0.83	214	Yes	0.90	219	Yes	0.99
	75	212	209	Yes	0.90	216	Yes	0.96	221	Yes	>0.99
	80	212	212	Yes	0.96	219	Yes	0.99	224	Yes	>0.99
85	212	214	Yes	0.98	221	Yes	>0.99	227	Yes	>0.99	
90	212	218	Yes	>0.99	225	Yes	>0.99	230	Yes	>0.99	
95	212	223	Yes	>0.99	231	Yes	>0.99	236	Yes	>0.99	
5	5	223	184	No	<0.01	189	No	<0.01	191	No	<0.01
	10	223	190	No	<0.01	194	No	<0.01	197	No	<0.01
	15	223	193	No	<0.01	198	No	<0.01	201	No	<0.01
	20	223	196	No	<0.01	201	No	<0.01	205	No	<0.01
	25	223	199	No	0.01	204	No	<0.01	207	No	<0.01
	30	223	201	No	0.03	206	No	<0.01	210	No	<0.01
	35	223	203	No	0.06	209	No	0.02	212	No	<0.01
	40	223	205	No	0.11	211	No	0.05	215	No	<0.01
	45	223	207	No	0.18	213	No	0.10	217	No	0.02
	50	223	209	No	0.27	215	No	0.20	219	No	0.08
	55	223	211	No	0.38	217	No	0.34	221	No	0.25
	60	223	213	Yes	0.50	219	Yes	0.50	223	Yes	0.50
	65	223	215	Yes	0.62	221	Yes	0.66	225	Yes	0.75
	70	223	217	Yes	0.73	223	Yes	0.80	228	Yes	0.96
	75	223	219	Yes	0.82	225	Yes	0.90	230	Yes	0.99
	80	223	222	Yes	0.92	228	Yes	0.97	233	Yes	>0.99
85	223	225	Yes	0.97	231	Yes	0.99	236	Yes	>0.99	
90	223	229	Yes	0.99	235	Yes	>0.99	240	Yes	>0.99	
95	223	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	
				Proficient	Prob.		Proficient	Prob.		Proficient	Prob.
6	5	226	188	No	<0.01	192	No	<0.01	194	No	<0.01
	10	226	194	No	<0.01	198	No	<0.01	200	No	<0.01
	15	226	198	No	<0.01	202	No	<0.01	205	No	<0.01
	20	226	201	No	<0.01	205	No	<0.01	208	No	<0.01
	25	226	204	No	0.01	208	No	<0.01	211	No	<0.01
	30	226	206	No	0.03	211	No	0.01	214	No	<0.01
	35	226	209	No	0.08	213	No	0.02	216	No	<0.01
	40	226	211	No	0.14	215	No	0.04	218	No	<0.01
	45	226	213	No	0.22	217	No	0.10	221	No	0.04
	50	226	215	No	0.32	220	No	0.26	223	No	0.15
	55	226	217	No	0.44	222	No	0.42	225	No	0.37
	60	226	219	Yes	0.56	224	Yes	0.58	227	Yes	0.63
	65	226	221	Yes	0.68	226	Yes	0.74	230	Yes	0.92
	70	226	223	Yes	0.78	228	Yes	0.86	232	Yes	0.98
	75	226	226	Yes	0.90	231	Yes	0.96	235	Yes	>0.99
	80	226	228	Yes	0.94	234	Yes	0.99	238	Yes	>0.99
	85	226	231	Yes	0.98	237	Yes	>0.99	241	Yes	>0.99
90	226	235	Yes	>0.99	241	Yes	>0.99	245	Yes	>0.99	
95	226	241	Yes	>0.99	247	Yes	>0.99	252	Yes	>0.99	
7	5	231	192	No	<0.01	194	No	<0.01	196	No	<0.01
	10	231	198	No	<0.01	201	No	<0.01	203	No	<0.01
	15	231	202	No	<0.01	205	No	<0.01	207	No	<0.01
	20	231	206	No	<0.01	209	No	<0.01	211	No	<0.01
	25	231	208	No	<0.01	212	No	<0.01	214	No	<0.01
	30	231	211	No	0.01	215	No	<0.01	217	No	<0.01
	35	231	213	No	0.03	217	No	0.01	220	No	<0.01
	40	231	216	No	0.07	219	No	0.03	222	No	<0.01
	45	231	218	No	0.17	222	No	0.10	224	No	0.01
	50	231	220	No	0.26	224	No	0.20	227	No	0.08
	55	231	222	No	0.37	226	No	0.33	229	No	0.25
	60	231	225	Yes	0.56	229	Yes	0.58	231	Yes	0.50
	65	231	227	Yes	0.69	231	Yes	0.74	234	Yes	0.85
	70	231	229	Yes	0.79	233	Yes	0.86	236	Yes	0.96
	75	231	232	Yes	0.90	236	Yes	0.96	239	Yes	>0.99
	80	231	235	Yes	0.96	239	Yes	0.99	242	Yes	>0.99
	85	231	238	Yes	0.99	243	Yes	>0.99	246	Yes	>0.99
90	231	243	Yes	>0.99	247	Yes	>0.99	251	Yes	>0.99	
95	231	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	
				Proficient	Prob.		Proficient	Prob.		Proficient	Prob.
8	5	238	194	No	<0.01	196	No	<0.01	197	No	<0.01
	10	238	201	No	<0.01	203	No	<0.01	205	No	<0.01
	15	238	205	No	<0.01	208	No	<0.01	210	No	<0.01
	20	238	209	No	<0.01	212	No	<0.01	214	No	<0.01
	25	238	212	No	<0.01	215	No	<0.01	217	No	<0.01
	30	238	215	No	0.01	218	No	<0.01	220	No	<0.01
	35	238	218	No	0.02	221	No	<0.01	223	No	<0.01
	40	238	220	No	0.03	223	No	<0.01	225	No	<0.01
	45	238	223	No	0.07	226	No	0.02	228	No	<0.01
	50	238	225	No	0.12	228	No	0.05	230	No	<0.01
	55	238	227	No	0.19	231	No	0.15	233	No	0.04
	60	238	230	No	0.33	233	No	0.27	235	No	0.15
	65	238	232	No	0.44	236	Yes	0.50	238	Yes	0.50
	70	238	235	Yes	0.61	238	Yes	0.66	241	Yes	0.85
	75	238	238	Yes	0.76	241	Yes	0.85	244	Yes	0.98
	80	238	241	Yes	0.88	244	Yes	0.95	247	Yes	>0.99
	85	238	245	Yes	0.96	248	Yes	0.99	251	Yes	>0.99
90	238	249	Yes	0.99	253	Yes	>0.99	256	Yes	>0.99	
95	238	256	Yes	>0.99	260	Yes	>0.99	263	Yes	>0.99	

**Table 3.11. Proficiency Projection based on RIT Scores—Science**

Science											
Grade	Start %ile	Spring Cut	Fall		Winter RIT	Winter		Spring RIT	Spring		
			Fall RIT	Projected Proficiency		Projected Proficiency	Projected Proficiency				
				Proficient	Prob.		Proficient	Prob.	Proficient	Prob.	
5	5	211	181	No	<0.01	185	No	<0.01	186	No	<0.01
	10	211	185	No	<0.01	189	No	<0.01	191	No	<0.01
	15	211	188	No	0.02	192	No	<0.01	194	No	<0.01
	20	211	190	No	0.03	194	No	0.01	196	No	<0.01
	25	211	192	No	0.04	196	No	0.02	198	No	<0.01
	30	211	194	No	0.08	198	No	0.02	200	No	<0.01
	35	211	196	No	0.13	200	No	0.05	202	No	<0.01
	40	211	197	No	0.13	201	No	0.08	203	No	0.01
	45	211	199	No	0.19	203	No	0.14	205	No	0.04
	50	211	200	No	0.24	204	No	0.18	206	No	0.07
	55	211	202	No	0.33	206	No	0.30	208	No	0.19
	60	211	203	No	0.39	207	No	0.36	209	No	0.28
	65	211	205	No	0.44	209	No	0.43	211	Yes	0.50
	70	211	206	Yes	0.50	210	Yes	0.50	213	Yes	0.72
	75	211	208	Yes	0.61	212	Yes	0.64	214	Yes	0.81
	80	211	210	Yes	0.67	214	Yes	0.76	216	Yes	0.93
	85	211	212	Yes	0.76	216	Yes	0.86	219	Yes	0.99
90	211	215	Yes	0.87	219	Yes	0.95	222	Yes	>0.99	
95	211	220	Yes	0.96	224	Yes	0.99	226	Yes	>0.99	
8	5	219	188	No	<0.01	191	No	<0.01	191	No	<0.01
	10	219	193	No	<0.01	196	No	<0.01	196	No	<0.01
	15	219	196	No	0.01	199	No	<0.01	199	No	<0.01
	20	219	198	No	0.02	201	No	<0.01	202	No	<0.01
	25	219	201	No	0.04	204	No	0.01	204	No	<0.01
	30	219	203	No	0.07	206	No	0.02	206	No	<0.01
	35	219	205	No	0.09	207	No	0.03	208	No	<0.01
	40	219	206	No	0.12	209	No	0.06	210	No	<0.01
	45	219	208	No	0.18	211	No	0.11	212	No	0.02
	50	219	210	No	0.25	212	No	0.15	213	No	0.04
	55	219	211	No	0.30	214	No	0.24	215	No	0.12
	60	219	213	No	0.35	216	No	0.36	217	No	0.28
	65	219	215	No	0.45	217	No	0.43	219	Yes	0.50
	70	219	217	Yes	0.55	219	Yes	0.57	221	Yes	0.72
	75	219	219	Yes	0.60	221	Yes	0.70	223	Yes	0.88
	80	219	221	Yes	0.70	223	Yes	0.81	225	Yes	0.96
	85	219	223	Yes	0.79	226	Yes	0.92	228	Yes	>0.99
90	219	227	Yes	0.91	229	Yes	0.97	231	Yes	>0.99	
95	219	231	Yes	0.97	234	Yes	>0.99	236	Yes	>0.99	

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