Linking Study Report: Predicting Performance on the New Jersey State Learning Assessment (NJSLA) based on MAP® Growth™ Scores

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NWEA Psychometric Solutions

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1. Introduction

NWEA® is committed to providing partners with useful tools to help make inferences from the MAP® Growth™ interim assessment scores. One important tool is to use the MAP Growth scores to predict students' performance levels on the state summative assessments. The equipercentile method (Kolen & Brennan, 2004) has been used for decades to link scores on different tests measuring similar but distinct constructs. The linking study results provide a direct link between scores on different tests and serve various purposes. Aside from describing how a score on one test relates to performance on another test, they can also be used to identify benchmark scores on one test corresponding to performance categories on another test, or to maintain continuity of scores on a test after the test is redesigned or changed. The linking study results are helpful for educators, parents, administrators, researchers, and policy makers to evaluate and formulate academic standing and growth.

NWEA completed a linking study to connect the scales of the New Jersey State Learning Assessment (NJSLA) in English Language Arts (ELA) and Mathematics with those of the MAP Growth Reading and Mathematics assessments as part of a study combining data from several states. This report presents the Grades 2–8 cut scores on the MAP Growth Reading and Mathematics scales that correspond to the state summative benchmarks. Information about the consistency rate of classification based on the estimated MAP Growth cut scores is also provided, along with a series of tables that predict the probability of receiving a Level 4 (i.e., "Meeting Expectations") or higher performance designation on the state summative tests based on the observed MAP Growth scores taken during the same school year. A detailed description of the data and analysis method used in this study is provided in Appendix A.

2. Overview of Assessments

NJSLA tests include a series of computer-based achievement tests aligned to the New Jersey Student Learning Standards incorporating the Common Core State Standards (CCSS) in ELA and Mathematics for Grades K–8 and high school. Each grade and subject has four cut scores that distinguish between performance levels: Level 1: *Not Yet Meeting Expectations*, Level 2: *Partially Meeting Expectations*, Level 3: *Approaching Expectations*, Level 4: *Meeting Expectations*, and Level 5: *Exceeding Expectations*. The Level 4 cut score demarks the minimum level of performance considered to be proficient for accountability purposes.

MAP Growth tests are interim assessments administered in the form of a computerized adaptive test (CAT). MAP Growth tests are constructed to measure student achievement from Grades K–12 in Mathematics, Reading, Language Usage, and Science and are aligned to the New Jersey Student Learning Standards. Unlike NJSLA tests, MAP Growth assessments are vertically scaled across grades, a feature that supports direct measurement of academic growth and change. MAP Growth scores are reported on a Rasch Unit (RIT) scale with a range from 100–350. Each subject has its own RIT scale.

To aid interpretation of MAP Growth scores, NWEA periodically conducts norming studies of student and school performance on MAP Growth. For example, the 2015 RIT Scale norming study (Thum & Hauser, 2015) employed multi-level growth models on nearly 500,000 longitudinal test scores from over 100,000 students that were weighted to create large, nationally representative norms for Mathematics, Reading, Language Usage, and general Science.

3. Estimated MAP Growth Cut Scores

Table 3.1 – Table 3.4 report the state summative scaled scores associated with each of the five performance levels, as well as the estimated cut scores on the MAP Growth tests associated with those performance levels. Specifically, Table 3.1 and Table 3.2 apply to MAP Growth scores obtained during the spring testing season for Reading and Mathematics, respectively. Table 3.3 and Table 3.4 apply to MAP Growth tests taken in a prior testing season (fall or winter) for Reading and Mathematics, respectively. The tables also report the percentile rank (based on the *NWEA 2015 MAP Growth Norms*) associated with each estimated MAP Growth cut score. The MAP Growth cut scores can be used to predict New Jersey students' most probable NJSLA performance level based on their observed MAP Growth scores. For example, a Grade 3 student who obtained a MAP Growth Mathematics score of 220 in the spring testing season is likely to be at the very high end of Level 4 (Meeting Expectations) on the NJSLA test taken during that same testing season (see Table 3.2).

Table 3.1. Concordance of Performance Level Score Ranges between State Summative ELA and MAP Growth Reading (when MAP Growth is taken in Spring)

	NJ, IL, CO, DC, NM, RI (ELA)				
Grade	Level 1: Did Not Meet	Level 2: Partially Met	Level 3: Approached	Level 4: Met*	Level 5: Exceeded
3	650–699	700–724	725–749	**750**–809	810–850
4	650–699	700–724	725–749	**750**–789	790–850
5	650–699	700–724	725–749	**750**–798	799–850
6	650–699	700–724	725–749	**750**–789	790–850
7	650–699	700–724	725–749	**750**–784	785–850
8	650–699	700–724	725–749	**750**–793	794–850

	MAP Growth Reading									
	Level 1: Did Not Meet		Level 2: Partially Met		Level 3: Approached		Level 4: Met*		Level 5: Exceeded	
Grade	RIT	Percentile	RIT	Percentile	RIT	Percentile	RIT	Percentile	RIT	Percentile
2**	100–176	1–21	177–186	22–44	187–194	45–64	**195**–213	65–94	214–350	95–99
3	100–186	1–21	187–196	22–44	197–204	45–65	**205**–223	66–95***	224–350	95***–99
4	100–190	1–15	191–202	16–40	203–212	41–67	**213**–227	68–92	228–350	93–99
5	100–196	1–14	197–209	15–43	210–220	44–72	**221**–238	73–96	239–350	97–99
6	100–200	1–14	201–213	15–43	214–223	44–70	**224**–238	71–93	239–350	94–99
7	100–208	1–26	209–218	27–50	219–227	51–73	**228**–238	74–91	239–350	92–99
8	100–211	1–29	212–221	30–53	222–230	54–74	**231**–244	75–93	245–350	94–99

*Bolded numbers indicate the cut scores considered to be at least proficient for accountability purposes.
**Spring cut scores were extrapolated from the Grade 3 cohort using the 2015 MAP Growth norms.
***Reflects occasional departure from one-to-one correspondence between RITs and percentile due to the larger range of the RIT scale relative to the percentile scale.

Table 3.2. Concordance of Performance Level Score Ranges between State Summative and MAP Growth Mathematics (when MAP Growth is taken in Spring)

	NJ, IL, CO, DC, NM, RI (Mathematics)				
Grade	Level 1: Did Not Meet	Level 2: Partially Met	Level 3: Approached	Level 4: Met*	Level 5: Exceeded
3	650–699	700–724	725–749	**750**–789	790–850
4	650–699	700–724	725–749	**750**–795	796–850
5	650–699	700–724	725–749	**750**–789	790–850
6	650–699	700–724	725–749	**750**–787	788–850
7	650–699	700–724	725–749	**750**–785	786–850
8	650–699	700–724	725–749	**750**–800	801–850

	MAP Growth Mathematics									
	Level 1: Did Not Meet		Level 2: Partially Met		Level 3: Approached		Level 4: Met*		Level 5: Exceeded	
Grade	RIT	Percentile	RIT	Percentile	RIT	Percentile	RIT	Percentile	RIT	Percentile
2**	100–177	1–14	178–187	15–36	188–195	37–59	**196**–209	60–90	210–350	91–99
3	100–188	1–14	189–198	15–36	199–207	37–61	**208**–221	62–90	222–350	91–99
4	100–198	1–15	199–210	16–42	211–221	43–70	**222**–240	71–96***	241–350	96***–99
5	100–202	1–12	203–216	13–38	217–230	39–71	**231**–250	72–96***	251–350	96***–99
6	100–208	1–15	209–222	16–43	223–235	44–72	**236**–252	73–94	253–350	95–99
7	100–211	1–16	212–226	17–45	227–241	46–76	**242**–262	77–97***	263–350	97***–99
8	100–222	1–32	223–234	33–57	235–245	58–77	**246**–267	78–97***	268–350	97***–99

*Bolded numbers indicate the cut scores considered to be at least proficient for accountability purposes.
**Spring cut scores were extrapolated from the Grade 3 cohort using the 2015 MAP Growth norms.
***Reflects occasional departure from one-to-one correspondence between RITs and percentile due to the larger range of the RIT scale relative to the percentile scale.

Table 3.3. Concordance of Performance Level Score Ranges between State Summative ELA and MAP Growth Reading (when MAP Growth is taken in Fall or Winter)

	NJ, IL, CO, DC, NM, RI (ELA)				
Grade	Level 1: Did Not Meet	Level 2: Partially Met	Level 3: Approached	Level 4: Met*	Level 5: Exceeded
3	650–699	700–724	725–749	**750**–809	810–850
4	650–699	700–724	725–749	**750**–789	790–850
5	650–699	700–724	725–749	**750**–798	799–850
6	650–699	700–724	725–749	**750**–789	790–850
7	650–699	700–724	725–749	**750**–784	785–850
8	650–699	700–724	725–749	**750**–793	794–850

	MAP Growth Reading									
	Level 1: Did Not Meet		Level 2: Partially Met		Level 3: Approached		Level 4: Met*		Level 5: Exceeded	
Grade	RIT	Percentile	RIT	Percentile	RIT	Percentile	RIT	Percentile	RIT	Percentile
Fall										
2**	100–160	1–17	161–172	18–44	173–181	45–66	**182**–204	67–97***	205–350	97***–99
3	100–173	1–17	174–185	18–43	186–195	44–67	**196**–217	68–96	218–350	97–99
4	100–180	1–12	181–194	13–40	195–205	41–68	**206**–223	69–94	224–350	95–99
5	100–187	1–11	188–203	12–44	204–215	45–74	**216**–236	75–97	237–350	98–99
6	100–193	1–12	194–208	13–43	209–219	44–71	**220**–236	72–95	237–350	96–99
7	100–203	1–23	204–214	24–50	215–225	51–76	**226**–236	77–92	237–350	93–99
8	100–207	1–26	208–218	27–53	219–228	54–76	**229**–242	77–94	243–350	95–99

	MAP Growth Reading									
	Level 1: Did Not Meet		**Level 2: Partially Met**		**Level 3: Approached**		**Level 4: Met***		**Level 5: Exceeded**	
Grade	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**
Winter										
2**	100–171	1–19	172–181	20–42	182–190	43–66	**191**–210	67–96***	221–350	96***–99
3	100–182	1–19	183–193	20–44	194–201	45–65	**202**–222	66–96***	223–350	96***–99
4	100–187	1–14	188–199	15–39	200–210	40–67	**211**–226	68–93	227–350	94–99
5	100–193	1–13	194–207	14–43	208–219	44–74	**220**–237	75–97***	238–350	97***–99
6	100–198	1–13	199–211	14–42	212–222	43–71	**223**–237	72–94	238–350	95–99
7	100–206	1–24	207–217	25–51	218–226	52–73	**227**–237	74–91	238–350	92–99
8	100–210	1–28	211–220	29–53	221–229	54–75	**230**–243	76–94	244–350	95–99

*Bolded numbers indicate the cut scores considered to be at least proficient for accountability purposes.
**Spring cut scores were extrapolated from the Grade 3 cohort using the 2015 MAP Growth norms.
***Reflects occasional departure from one-to-one correspondence between RITs and percentile due to the larger range of the RIT scale relative to the percentile scale.

Table 3.4. Concordance of Performance Level Score Ranges between State Summative and MAP Growth Mathematics (when MAP Growth is taken in Fall or Winter)

	NJ, IL, CO, DC, NM, RI (Mathematics)				
Grade	**Level 1: Did Not Meet**	**Level 2: Partially Met**	**Level 3: Approached**	**Level 4: Met***	**Level 5: Exceeded**
3	650–699	700–724	725–749	**750**–789	790–850
4	650–699	700–724	725–749	**750**–795	796–850
5	650–699	700–724	725–749	**750**–789	790–850
6	650–699	700–724	725–749	**750**–787	788–850
7	650–699	700–724	725–749	**750**–785	786–850
8	650–699	700–724	725–749	**750**–800	801–850

	MAP Growth Mathematics									
	Level 1: Did Not Meet		**Level 2: Partially Met**		**Level 3: Approached**		**Level 4: Met***		**Level 5: Exceeded**	
Grade	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**	**RIT**	**Percentile**
Fall										
2**	100–160	1–10	161–171	11–34	172–180	35–60	**181**–196	61–93	197–350	94–99
3	100–174	1–11	175–185	12–35	186–194	36–62	**195**–209	63–92	210–350	93–99
4	100–186	1–13	187–198	14–40	199–210	41–73	**211**–229	74–97	230–350	98–99
5	100–192	1–9	193–206	10–36	207–220	37–73	**221**–240	74–97***	241–350	97***–99
6	100–200	1–13	201–214	14–42	215–227	43–73	**228**–245	74–96***	246–350	96–99
7	100–205	1–15	206–220	16–44	221–235	45–78	**236**–256	79–97	257–350	98***–99
8	100–217	1–31	218–229	32–57	230–241	58–80	**242**–263	81–98***	264–350	98***–99
Winter										
2**	100–171	1–12	172–181	13–35	182–189	36–59	**190**–204	60–91	205–350	92–99
3	100–182	1–11	183–193	12–36	194–202	37–62	**203**–216	63–91	217–350	92–99
4	100–193	1–14	194–205	15–41	206–216	42–70	**217**–235	71–96	236–350	97–99
5	100–198	1–11	199–212	12–37	213–226	38–72	**227**–246	73–97***	247–350	97***–99
6	100–205	1–15	206–219	16–43	220–232	44–74	**233**–249	75–95	250–350	96–99
7	100–209	1–16	210–224	17–46	225–239	47–78	**240**–260	79–97	261–350	98–99
8	100–220	1–31	221–232	32–57	233–243	58–78	**244**–265	79–97***	266–350	97***–99

*Bolded numbers indicate the cut scores considered to be at least proficient for accountability purposes.
**Spring cut scores were extrapolated from the Grade 3 cohort using the 2015 MAP Growth norms.
***Reflects occasional departure from one-to-one correspondence between RITs and percentile due to the larger range of the RIT scale relative to the percentile scale.

4. Consistency Rate of Classification

Consistency rate of classification (Pommerich, Hanson, Harris, & Sconing, 2004), expressed in the form of a rate between 0 and 1, provides a means to measure the departure from equity for concordances (Hanson, Harris, Pommerich, Sconing, & Yi, 2001). This index can also be used as an indicator for the predictive validity of the MAP Growth tests (i.e., how accurately the MAP Growth scores can predict a student's proficiency status on the state summative test). For each pair of concordant scores, a classification is considered consistent if the examinee is classified into the same performance category regardless of the test used for making a decision. Consistency rate provided in this report can be calculated as, for the "proficient" performance category concordant scores, the percentage of examinees who score at or above both concordant scores plus the percentage of examinees who score below both concordant scores on each test. Higher consistency rate indicates stronger congruence between state summative and MAP Growth scores. The results in Table 4.1 demonstrate that, on average, MAP Growth Reading scores can consistently classify students' proficiency (Level 4 or higher) status on the state summative ELA tests 83% of the time, and MAP Growth Mathematics scores can consistently classify students on the state summative Mathematics tests 88% of the time. Those numbers are high, suggesting that both MAP Growth Reading and Mathematics tests are great predictors of students' proficiency status on the NJSLA tests.

Table 4.1. Consistency Rate of Classification for MAP Growth and Level 4 Equipercentile Concordances

| | ELA/Reading | | | Mathematics | | |
| | Consistency Rate | False | | Consistency Rate | False | |
Grade		Positives	Negatives		Positives	Negatives
3	0.84	0.09	0.07	0.85	0.07	0.07
4	0.83	0.09	0.08	0.88	0.05	0.07
5	0.84	0.08	0.09	0.87	0.06	0.07
6	0.83	0.09	0.08	0.89	0.05	0.06
7	0.82	0.08	0.10	0.89	0.06	0.06
8	0.81	0.09	0.10	0.88	0.05	0.07

5. Proficiency Projections

Proficiency projection tells how likely a student is classified as "proficient" on state summative tests based on their observed MAP Growth scores. The conditional growth norms provided in the 2015 MAP Growth Norms were used to calculate this information (Thum & Hauser, 2015). The results of proficiency projection and corresponding probability of achieving proficiency on the state summative tests are presented in Table 5.1, Table 5.2, and Table 5.3. These tables estimate the probability of scoring at Level 4 or above on the state summative test in the spring and the prior fall or winter testing season. For example, if a Grade 3 student obtained a MAP Growth Mathematics score of 201 in the fall, the probability of obtaining a Level 4 or higher score on the state summative test in the spring of Grade 3 is 78%. Table 5.1 presents the estimated probability of meeting the Level 4 benchmark when MAP Growth is taken in the spring, whereas Table 5.2 and Table 5.3 present the estimated probability of meeting the Level 4 benchmark when MAP Growth is taken in the fall or winter prior to taking the NJSLA tests.

Table 5.1. Proficiency Projection and Probability for Passing Level 4 (Meeting Expectations) when MAP Growth is taken in the Spring

Grade	Start Percentile	ELA/Reading				Mathematics			
		RIT Spring	Projected Proficiency			RIT Spring	Projected Proficiency		
			Cut Score	Level 4	Prob.		Cut Score	Level 4	Prob.
2	5	164	195	No	<0.01	170	196	No	<0.01
	10	169	195	No	<0.01	175	196	No	<0.01
	15	173	195	No	<0.01	178	196	No	<0.01
	20	176	195	No	<0.01	181	196	No	<0.01
	25	178	195	No	<0.01	183	196	No	<0.01
	30	181	195	No	<0.01	185	196	No	<0.01
	35	183	195	No	<0.01	187	196	No	<0.01
	40	185	195	No	<0.01	189	196	No	0.01
	45	187	195	No	0.01	190	196	No	0.02
	50	189	195	No	0.03	192	196	No	0.08
	55	191	195	No	0.11	194	196	No	0.25
	60	193	195	No	0.27	196	196	Yes	0.50
	65	195	195	Yes	0.50	197	196	Yes	0.63
	70	197	195	Yes	0.73	199	196	Yes	0.85
	75	199	195	Yes	0.89	201	196	Yes	0.96
	80	201	195	Yes	0.97	204	196	Yes	>0.99
	85	204	195	Yes	>0.99	206	196	Yes	>0.99
	90	208	195	Yes	>0.99	209	196	Yes	>0.99
	95	214	195	Yes	>0.99	214	196	Yes	>0.99
3	5	174	205	No	<0.01	181	208	No	<0.01
	10	179	205	No	<0.01	186	208	No	<0.01
	15	183	205	No	<0.01	189	208	No	<0.01
	20	186	205	No	<0.01	192	208	No	<0.01
	25	188	205	No	<0.01	194	208	No	<0.01
	30	191	205	No	<0.01	196	208	No	<0.01
	35	193	205	No	<0.01	198	208	No	<0.01
	40	195	205	No	<0.01	200	208	No	<0.01
	45	197	205	No	0.01	202	208	No	0.02
	50	199	205	No	0.03	203	208	No	0.04
	55	201	205	No	0.11	205	208	No	0.15
	60	202	205	No	0.17	207	208	No	0.37
	65	204	205	No	0.38	209	208	Yes	0.63
	70	207	205	Yes	0.73	211	208	Yes	0.85
	75	209	205	Yes	0.89	213	208	Yes	0.96
	80	211	205	Yes	0.97	215	208	Yes	0.99
	85	214	205	Yes	>0.99	218	208	Yes	>0.99
	90	218	205	Yes	>0.99	221	208	Yes	>0.99
	95	223	205	Yes	>0.99	226	208	Yes	>0.99

Grade	Start Percentile	ELA/Reading				Mathematics			
		RIT Spring	Projected Proficiency			RIT Spring	Projected Proficiency		
			Cut Score	Level 4	Prob.		Cut Score	Level 4	Prob.
4	5	181	213	No	<0.01	189	222	No	<0.01
	10	187	213	No	<0.01	194	222	No	<0.01
	15	190	213	No	<0.01	198	222	No	<0.01
	20	193	213	No	<0.01	201	222	No	<0.01
	25	196	213	No	<0.01	203	222	No	<0.01
	30	198	213	No	<0.01	206	222	No	<0.01
	35	200	213	No	<0.01	208	222	No	<0.01
	40	202	213	No	<0.01	210	222	No	<0.01
	45	204	213	No	<0.01	212	222	No	<0.01
	50	206	213	No	0.01	213	222	No	<0.01
	55	208	213	No	0.06	215	222	No	0.01
	60	210	213	No	0.17	217	222	No	0.04
	65	212	213	No	0.38	219	222	No	0.15
	70	214	213	Yes	0.62	221	222	No	0.37
	75	216	213	Yes	0.83	224	222	Yes	0.75
	80	218	213	Yes	0.94	226	222	Yes	0.92
	85	221	213	Yes	0.99	229	222	Yes	0.99
	90	225	213	Yes	>0.99	233	222	Yes	>0.99
	95	230	213	Yes	>0.99	238	222	Yes	>0.99
5	5	188	221	No	<0.01	195	231	No	<0.01
	10	193	221	No	<0.01	201	231	No	<0.01
	15	197	221	No	<0.01	205	231	No	<0.01
	20	199	221	No	<0.01	208	231	No	<0.01
	25	202	221	No	<0.01	210	231	No	<0.01
	30	204	221	No	<0.01	213	231	No	<0.01
	35	206	221	No	<0.01	215	231	No	<0.01
	40	208	221	No	<0.01	217	231	No	<0.01
	45	210	221	No	<0.01	219	231	No	<0.01
	50	212	221	No	<0.01	221	231	No	<0.01
	55	214	221	No	0.01	223	231	No	<0.01
	60	216	221	No	0.06	225	231	No	0.02
	65	217	221	No	0.11	228	231	No	0.15
	70	220	221	No	0.38	230	231	No	0.37
	75	222	221	Yes	0.62	232	231	Yes	0.63
	80	224	221	Yes	0.83	235	231	Yes	0.92
	85	227	221	Yes	0.97	238	231	Yes	0.99
	90	231	221	Yes	>0.99	242	231	Yes	>0.99
	95	236	221	Yes	>0.99	248	231	Yes	>0.99

Grade	Start Percentile	ELA/Reading				Mathematics			
		RIT Spring	Projected Proficiency			RIT Spring	Projected Proficiency		
			Cut Score	Level 4	Prob.		Cut Score	Level 4	Prob.
6	5	192	224	No	<0.01	198	236	No	<0.01
	10	197	224	No	<0.01	204	236	No	<0.01
	15	201	224	No	<0.01	208	236	No	<0.01
	20	203	224	No	<0.01	211	236	No	<0.01
	25	206	224	No	<0.01	214	236	No	<0.01
	30	208	224	No	<0.01	217	236	No	<0.01
	35	210	224	No	<0.01	219	236	No	<0.01
	40	212	224	No	<0.01	221	236	No	<0.01
	45	214	224	No	<0.01	223	236	No	<0.01
	50	216	224	No	0.01	225	236	No	<0.01
	55	218	224	No	0.03	227	236	No	<0.01
	60	219	224	No	0.06	230	236	No	0.02
	65	221	224	No	0.17	232	236	No	0.08
	70	223	224	No	0.38	234	236	No	0.25
	75	226	224	Yes	0.73	237	236	Yes	0.63
	80	228	224	Yes	0.89	239	236	Yes	0.85
	85	231	224	Yes	0.99	243	236	Yes	0.99
	90	235	224	Yes	>0.99	247	236	Yes	>0.99
	95	240	224	Yes	>0.99	253	236	Yes	>0.99
7	5	193	228	No	<0.01	199	242	No	<0.01
	10	199	228	No	<0.01	206	242	No	<0.01
	15	202	228	No	<0.01	210	242	No	<0.01
	20	205	228	No	<0.01	214	242	No	<0.01
	25	208	228	No	<0.01	217	242	No	<0.01
	30	210	228	No	<0.01	219	242	No	<0.01
	35	212	228	No	<0.01	222	242	No	<0.01
	40	214	228	No	<0.01	224	242	No	<0.01
	45	216	228	No	<0.01	226	242	No	<0.01
	50	218	228	No	<0.01	229	242	No	<0.01
	55	220	228	No	0.01	231	242	No	<0.01
	60	222	228	No	0.03	233	242	No	<0.01
	65	224	228	No	0.11	235	242	No	0.01
	70	226	228	No	0.27	238	242	No	0.08
	75	228	228	Yes	0.50	241	242	No	0.37
	80	231	228	Yes	0.83	244	242	Yes	0.75
	85	234	228	Yes	0.97	247	242	Yes	0.96
	90	238	228	Yes	>0.99	251	242	Yes	>0.99
	95	243	228	Yes	>0.99	258	242	Yes	>0.99

Grade	Start Percentile	ELA/Reading				Mathematics			
			Projected Proficiency				Projected Proficiency		
		RIT Spring	Cut Score	Level 4	Prob.	RIT Spring	Cut Score	Level 4	Prob.
8	5	194	231	No	<0.01	199	246	No	<0.01
	10	200	231	No	<0.01	206	246	No	<0.01
	15	204	231	No	<0.01	211	246	No	<0.01
	20	207	231	No	<0.01	215	246	No	<0.01
	25	209	231	No	<0.01	218	246	No	<0.01
	30	212	231	No	<0.01	221	246	No	<0.01
	35	214	231	No	<0.01	224	246	No	<0.01
	40	216	231	No	<0.01	226	246	No	<0.01
	45	218	231	No	<0.01	229	246	No	<0.01
	50	220	231	No	<0.01	231	246	No	<0.01
	55	222	231	No	<0.01	233	246	No	<0.01
	60	224	231	No	0.01	236	246	No	<0.01
	65	226	231	No	0.06	238	246	No	<0.01
	70	228	231	No	0.17	241	246	No	0.04
	75	231	231	Yes	0.50	244	246	No	0.25
	80	233	231	Yes	0.73	247	246	Yes	0.63
	85	236	231	Yes	0.94	251	246	Yes	0.96
	90	240	231	Yes	>0.99	255	246	Yes	>0.99
	95	246	231	Yes	>0.99	262	246	Yes	>0.99

Table 5.2. Proficiency Projection and Probability for Passing Level 4 (Meeting Expectations) in ELA when MAP Growth Reading is taken in the Fall and Winter

Grade	Start Percentile	RIT Fall	ELA/Reading (Fall) Projected Proficiency Cut Score	Level 4	Prob.	RIT Winter	ELA/Reading (Winter) Projected Proficiency Cut Score	Level 4	Prob.
	5	149	195	No	<0.01	160	195	No	<0.01
	10	155	195	No	<0.01	165	195	No	<0.01
	15	159	195	No	0.01	169	195	No	<0.01
	20	162	195	No	0.01	172	195	No	<0.01
	25	164	195	No	0.03	174	195	No	<0.01
	30	167	195	No	0.05	176	195	No	0.01
	35	169	195	No	0.08	178	195	No	0.01
	40	171	195	No	0.12	180	195	No	0.03
	45	173	195	No	0.15	182	195	No	0.07
2	50	175	195	No	0.22	184	195	No	0.14
	55	177	195	No	0.30	186	195	No	0.18
	60	179	195	No	0.35	188	195	No	0.29
	65	181	195	No	0.45	190	195	No	0.43
	70	183	195	Yes	0.55	192	195	Yes	0.57
	75	185	195	Yes	0.60	194	195	Yes	0.71
	80	188	195	Yes	0.74	197	195	Yes	0.86
	85	191	195	Yes	0.81	200	195	Yes	0.95
	90	195	195	Yes	0.92	203	195	Yes	0.99
	95	200	195	Yes	0.97	209	195	Yes	>0.99
	5	162	205	No	<0.01	171	205	No	<0.01
	10	168	205	No	<0.01	176	205	No	<0.01
	15	172	205	No	<0.01	180	205	No	<0.01
	20	175	205	No	0.01	183	205	No	<0.01
	25	178	205	No	0.02	185	205	No	<0.01
	30	180	205	No	0.03	188	205	No	0.01
	35	182	205	No	0.05	190	205	No	0.01
	40	184	205	No	0.08	192	205	No	0.03
	45	186	205	No	0.13	194	205	No	0.06
3	50	188	205	No	0.16	196	205	No	0.13
	55	190	205	No	0.24	198	205	No	0.22
	60	192	205	No	0.34	199	205	No	0.28
	65	194	205	No	0.39	201	205	No	0.42
	70	197	205	Yes	0.56	204	205	Yes	0.65
	75	199	205	Yes	0.66	206	205	Yes	0.72
	80	202	205	Yes	0.76	208	205	Yes	0.83
	85	205	205	Yes	0.87	211	205	Yes	0.94
	90	209	205	Yes	0.94	215	205	Yes	0.99
	95	214	205	Yes	0.98	221	205	Yes	>0.99

Grade	Start Percentile	ELA/Reading (Fall)				ELA/Reading (Winter)			
			Projected Proficiency				Projected Proficiency		
		RIT Fall	Cut Score	Level 4	Prob.	RIT Winter	Cut Score	Level 4	Prob.
4	5	173	213	No	<0.01	179	213	No	<0.01
	10	178	213	No	<0.01	184	213	No	<0.01
	15	182	213	No	<0.01	188	213	No	<0.01
	20	185	213	No	<0.01	191	213	No	<0.01
	25	188	213	No	0.01	194	213	No	<0.01
	30	190	213	No	0.02	196	213	No	<0.01
	35	192	213	No	0.04	198	213	No	0.01
	40	194	213	No	0.05	200	213	No	0.02
	45	196	213	No	0.09	202	213	No	0.04
	50	198	213	No	0.15	204	213	No	0.08
	55	200	213	No	0.18	205	213	No	0.12
	60	202	213	No	0.27	207	213	No	0.22
	65	204	213	No	0.38	209	213	No	0.35
	70	206	213	Yes	0.50	211	213	Yes	0.50
	75	209	213	Yes	0.62	214	213	Yes	0.72
	80	211	213	Yes	0.73	216	213	Yes	0.84
	85	214	213	Yes	0.82	219	213	Yes	0.92
	90	218	213	Yes	0.93	223	213	Yes	0.98
	95	224	213	Yes	0.99	228	213	Yes	>0.99
5	5	181	221	No	<0.01	186	221	No	<0.01
	10	186	221	No	<0.01	191	221	No	<0.01
	15	190	221	No	<0.01	195	221	No	<0.01
	20	193	221	No	<0.01	197	221	No	<0.01
	25	195	221	No	<0.01	200	221	No	<0.01
	30	198	221	No	0.01	202	221	No	<0.01
	35	200	221	No	0.02	204	221	No	<0.01
	40	202	221	No	0.04	206	221	No	0.01
	45	204	221	No	0.05	208	221	No	0.02
	50	206	221	No	0.09	210	221	No	0.04
	55	208	221	No	0.15	212	221	No	0.09
	60	210	221	No	0.23	214	221	No	0.17
	65	212	221	No	0.28	215	221	No	0.22
	70	214	221	No	0.38	218	221	No	0.42
	75	216	221	Yes	0.50	220	221	Yes	0.50
	80	218	221	Yes	0.56	222	221	Yes	0.65
	85	221	221	Yes	0.72	225	221	Yes	0.83
	90	225	221	Yes	0.85	229	221	Yes	0.96
	95	231	221	Yes	0.97	234	221	Yes	>0.99

Grade	Start Percentile	ELA/Reading (Fall)				ELA/Reading (Winter)			
			Projected Proficiency				Projected Proficiency		
		RIT Fall	Cut Score	Level 4	Prob.	RIT Winter	Cut Score	Level 4	Prob.
6	5	186	224	No	<0.01	190	224	No	<0.01
	10	192	224	No	<0.01	196	224	No	<0.01
	15	196	224	No	<0.01	199	224	No	<0.01
	20	198	224	No	<0.01	202	224	No	<0.01
	25	201	224	No	0.01	204	224	No	<0.01
	30	203	224	No	0.01	207	224	No	<0.01
	35	205	224	No	0.03	209	224	No	0.01
	40	207	224	No	0.04	211	224	No	0.02
	45	209	224	No	0.07	212	224	No	0.03
	50	211	224	No	0.12	214	224	No	0.06
	55	213	224	No	0.19	216	224	No	0.09
	60	215	224	No	0.23	218	224	No	0.17
	65	217	224	No	0.33	220	224	No	0.28
	70	219	224	No	0.44	222	224	No	0.42
	75	221	224	Yes	0.50	224	224	Yes	0.58
	80	224	224	Yes	0.67	226	224	Yes	0.72
	85	226	224	Yes	0.77	229	224	Yes	0.88
	90	230	224	Yes	0.88	233	224	Yes	0.97
	95	236	224	Yes	0.98	238	224	Yes	>0.99
7	5	189	228	No	<0.01	192	228	No	<0.01
	10	195	228	No	<0.01	198	228	No	<0.01
	15	199	228	No	<0.01	201	228	No	<0.01
	20	202	228	No	<0.01	204	228	No	<0.01
	25	204	228	No	<0.01	207	228	No	<0.01
	30	206	228	No	0.01	209	228	No	<0.01
	35	209	228	No	0.01	211	228	No	<0.01
	40	211	228	No	0.03	213	228	No	<0.01
	45	213	228	No	0.05	215	228	No	0.01
	50	214	228	No	0.07	217	228	No	0.03
	55	216	228	No	0.10	219	228	No	0.06
	60	218	228	No	0.15	221	228	No	0.12
	65	220	228	No	0.23	223	228	No	0.22
	70	222	228	No	0.33	225	228	No	0.35
	75	225	228	No	0.44	227	228	Yes	0.50
	80	227	228	Yes	0.56	230	228	Yes	0.72
	85	230	228	Yes	0.72	232	228	Yes	0.78
	90	234	228	Yes	0.85	236	228	Yes	0.94
	95	240	228	Yes	0.97	242	228	Yes	>0.99

| Grade | Start Percentile | ELA/Reading (Fall) | | | | ELA/Reading (Winter) | | | |
| | | | Projected Proficiency | | | | Projected Proficiency | | |
		RIT Fall	Cut Score	Level 4	Prob.	RIT Winter	Cut Score	Level 4	Prob.
8	5	191	231	No	<0.01	194	231	No	<0.01
	10	197	231	No	<0.01	199	231	No	<0.01
	15	201	231	No	<0.01	203	231	No	<0.01
	20	204	231	No	<0.01	206	231	No	<0.01
	25	207	231	No	0.01	209	231	No	<0.01
	30	209	231	No	0.01	211	231	No	<0.01
	35	211	231	No	0.02	213	231	No	<0.01
	40	213	231	No	0.03	215	231	No	<0.01
	45	215	231	No	0.05	217	231	No	0.01
	50	217	231	No	0.08	219	231	No	0.02
	55	219	231	No	0.13	221	231	No	0.05
	60	221	231	No	0.16	223	231	No	0.10
	65	223	231	No	0.22	225	231	No	0.18
	70	225	231	No	0.31	227	231	No	0.29
	75	228	231	No	0.40	229	231	No	0.43
	80	230	231	Yes	0.50	232	231	Yes	0.57
	85	234	231	Yes	0.69	235	231	Yes	0.77
	90	237	231	Yes	0.78	239	231	Yes	0.93
	95	243	231	Yes	0.94	244	231	Yes	0.99

Table 5.3. Proficiency Projection and Probability for Passing Level 4 (Meeting Expectations) in Mathematics when MAP Growth Mathematics is taken in the Fall or Winter

Grade	Start Percentile	Mathematics (Fall)				Mathematics (Winter)			
		RIT Fall	Projected Proficiency			RIT Winter	Projected Proficiency		
			Cut Score	Level 4	Prob.		Cut Score	Level 4	Prob.
2	5	155	196	No	<0.01	165	196	No	<0.01
	10	160	196	No	<0.01	170	196	No	<0.01
	15	163	196	No	0.01	173	196	No	<0.01
	20	166	196	No	0.03	175	196	No	<0.01
	25	168	196	No	0.04	178	196	No	0.01
	30	170	196	No	0.07	180	196	No	0.02
	35	172	196	No	0.12	181	196	No	0.03
	40	174	196	No	0.19	183	196	No	0.08
	45	175	196	No	0.19	185	196	No	0.15
	50	177	196	No	0.28	186	196	No	0.21
	55	179	196	No	0.39	188	196	No	0.34
	60	180	196	No	0.44	190	196	Yes	0.50
	65	182	196	Yes	0.56	191	196	Yes	0.58
	70	184	196	Yes	0.61	193	196	Yes	0.66
	75	186	196	Yes	0.72	195	196	Yes	0.79
	80	188	196	Yes	0.81	197	196	Yes	0.89
	85	191	196	Yes	0.90	200	196	Yes	0.97
	90	194	196	Yes	0.94	203	196	Yes	0.99
	95	199	196	Yes	0.99	208	196	Yes	>0.99
3	5	169	208	No	<0.01	176	208	No	<0.01
	10	174	208	No	<0.01	181	208	No	<0.01
	15	177	208	No	<0.01	184	208	No	<0.01
	20	179	208	No	0.01	187	208	No	<0.01
	25	182	208	No	0.03	189	208	No	<0.01
	30	184	208	No	0.04	191	208	No	0.01
	35	185	208	No	0.06	193	208	No	0.02
	40	187	208	No	0.11	195	208	No	0.05
	45	189	208	No	0.17	197	208	No	0.10
	50	190	208	No	0.22	198	208	No	0.14
	55	192	208	No	0.32	200	208	No	0.26
	60	194	208	No	0.44	202	208	No	0.42
	65	195	208	Yes	0.50	203	208	No	0.50
	70	197	208	Yes	0.62	205	208	Yes	0.66
	75	199	208	Yes	0.68	207	208	Yes	0.80
	80	201	208	Yes	0.78	209	208	Yes	0.90
	85	204	208	Yes	0.89	212	208	Yes	0.97
	90	207	208	Yes	0.96	215	208	Yes	0.99
	95	212	208	Yes	0.99	220	208	Yes	>0.99

Grade	Start Percentile	Mathematics (Fall)				Mathematics (Winter)			
			Projected Proficiency				Projected Proficiency		
		RIT Fall	Cut Score	Level 4	Prob.	RIT Winter	Cut Score	Level 4	Prob.
4	5	179	222	No	<0.01	185	222	No	<0.01
	10	184	222	No	<0.01	190	222	No	<0.01
	15	188	222	No	<0.01	194	222	No	<0.01
	20	190	222	No	<0.01	197	222	No	<0.01
	25	193	222	No	<0.01	199	222	No	<0.01
	30	195	222	No	0.01	201	222	No	<0.01
	35	197	222	No	0.02	203	222	No	<0.01
	40	198	222	No	0.03	205	222	No	0.01
	45	200	222	No	0.06	207	222	No	0.02
	50	202	222	No	0.11	209	222	No	0.05
	55	204	222	No	0.17	211	222	No	0.10
	60	205	222	No	0.17	212	222	No	0.14
	65	207	222	No	0.27	214	222	No	0.26
	70	209	222	No	0.38	216	222	No	0.42
	75	211	222	Yes	0.50	218	222	Yes	0.58
	80	214	222	Yes	0.68	221	222	Yes	0.80
	85	216	222	Yes	0.78	223	222	Yes	0.90
	90	220	222	Yes	0.92	227	222	Yes	0.98
	95	225	222	Yes	0.99	232	222	Yes	>0.99
5	5	187	231	No	<0.01	192	231	No	<0.01
	10	193	231	No	<0.01	198	231	No	<0.01
	15	196	231	No	<0.01	201	231	No	<0.01
	20	199	231	No	<0.01	204	231	No	<0.01
	25	202	231	No	<0.01	207	231	No	<0.01
	30	204	231	No	0.01	209	231	No	<0.01
	35	206	231	No	0.01	211	231	No	<0.01
	40	208	231	No	0.03	213	231	No	<0.01
	45	210	231	No	0.05	215	231	No	0.01
	50	211	231	No	0.07	217	231	No	0.02
	55	213	231	No	0.12	219	231	No	0.05
	60	215	231	No	0.19	221	231	No	0.11
	65	217	231	No	0.28	223	231	No	0.20
	70	219	231	No	0.38	225	231	No	0.34
	75	221	231	Yes	0.50	228	231	Yes	0.58
	80	224	231	Yes	0.67	230	231	Yes	0.73
	85	227	231	Yes	0.81	233	231	Yes	0.89
	90	230	231	Yes	0.91	237	231	Yes	0.98
	95	236	231	Yes	0.99	242	231	Yes	>0.99

Grade	Start Percentile	Mathematics (Fall)				Mathematics (Winter)			
			Projected Proficiency				Projected Proficiency		
		RIT Fall	Cut Score	Level 4	Prob.	RIT Winter	Cut Score	Level 4	Prob.
6	5	192	236	No	<0.01	196	236	No	<0.01
	10	198	236	No	<0.01	202	236	No	<0.01
	15	202	236	No	<0.01	205	236	No	<0.01
	20	205	236	No	<0.01	209	236	No	<0.01
	25	207	236	No	<0.01	211	236	No	<0.01
	30	209	236	No	<0.01	214	236	No	<0.01
	35	212	236	No	0.01	216	236	No	<0.01
	40	214	236	No	0.02	218	236	No	<0.01
	45	216	236	No	0.04	220	236	No	<0.01
	50	218	236	No	0.07	222	236	No	0.01
	55	220	236	No	0.12	224	236	No	0.03
	60	222	236	No	0.19	226	236	No	0.07
	65	224	236	No	0.28	228	236	No	0.15
	70	226	236	No	0.38	230	236	No	0.27
	75	228	236	Yes	0.50	233	236	Yes	0.50
	80	231	236	Yes	0.67	236	236	Yes	0.73
	85	234	236	Yes	0.77	239	236	Yes	0.89
	90	238	236	Yes	0.91	243	236	Yes	0.98
	95	243	236	Yes	0.98	248	236	Yes	>0.99
7	5	195	242	No	<0.01	198	242	No	<0.01
	10	201	242	No	<0.01	204	242	No	<0.01
	15	205	242	No	<0.01	208	242	No	<0.01
	20	209	242	No	<0.01	212	242	No	<0.01
	25	211	242	No	<0.01	215	242	No	<0.01
	30	214	242	No	<0.01	217	242	No	<0.01
	35	216	242	No	<0.01	220	242	No	<0.01
	40	218	242	No	<0.01	222	242	No	<0.01
	45	221	242	No	0.01	224	242	No	<0.01
	50	223	242	No	0.02	226	242	No	<0.01
	55	225	242	No	0.05	228	242	No	0.01
	60	227	242	No	0.08	230	242	No	0.02
	65	229	242	No	0.14	233	242	No	0.07
	70	231	242	No	0.22	235	242	No	0.15
	75	234	242	No	0.38	238	242	No	0.34
	80	237	242	Yes	0.56	240	242	Yes	0.50
	85	240	242	Yes	0.73	244	242	Yes	0.80
	90	244	242	Yes	0.89	248	242	Yes	0.95
	95	250	242	Yes	0.98	254	242	Yes	>0.99

Grade	Start Percentile	Mathematics (Fall)				Mathematics (Winter)			
			Projected Proficiency				Projected Proficiency		
		RIT Fall	Cut Score	Level 4	Prob.	RIT Winter	Cut Score	Level 4	Prob.
	5	197	246	No	<0.01	199	246	No	<0.01
	10	203	246	No	<0.01	206	246	No	<0.01
	15	208	246	No	<0.01	210	246	No	<0.01
	20	211	246	No	<0.01	214	246	No	<0.01
	25	214	246	No	<0.01	217	246	No	<0.01
	30	217	246	No	<0.01	220	246	No	<0.01
	35	219	246	No	<0.01	222	246	No	<0.01
	40	222	246	No	0.01	225	246	No	<0.01
	45	224	246	No	0.01	227	246	No	<0.01
8	50	226	246	No	0.02	229	246	No	<0.01
	55	229	246	No	0.06	231	246	No	<0.01
	60	231	246	No	0.10	234	246	No	0.02
	65	233	246	No	0.15	236	246	No	0.06
	70	236	246	No	0.22	239	246	No	0.16
	75	238	246	No	0.30	241	246	No	0.28
	80	241	246	No	0.45	245	246	Yes	0.58
	85	245	246	Yes	0.65	248	246	Yes	0.79
	90	249	246	Yes	0.82	253	246	Yes	0.96
	95	256	246	Yes	0.97	259	246	Yes	>0.99

6. Summary and Discussion

This study produced a set of cut scores on MAP Growth Reading and Mathematics tests for Grades 2–8 that correspond to each NJSLA performance level and demonstrated that MAP Growth scores can accurately predict whether a student could be proficient or above on the basis of their MAP Growth scores. This study also used the NWEA 2015 RIT Scale norming study results to project a student's probability to meet proficiency based on that student's prior MAP Growth scores in fall and winter. These results will help educators predict student performance on NJSLA tests as early as possible and identify those students who are at risk of failing to meet required standards so that they can receive necessary resources and assistance to meet their goals.

While linking study results can be helpful and informative, they have general limitations. First, they provide information about score comparability on different tests, but the scores cannot be assumed to be interchangeable. In the case for state summative tests and MAP Growth tests, as they are not parallel in content, scores from the tests should not be directly compared. Second, the sample data used in this study were collected from 393 schools in several states, which may limit the generalizability of the results to test takers who differ significantly from this sample. Finally, cautions should also be exercised if the results are used for a subpopulation. NWEA will continue to gather information about NJSLA performance to enhance the quality and generalizability of the study.

7. References

Hanson, B. A., Harris, D. J., Pommerich, M., Sconing, J. A., & Yi, Q. (2001). *Suggestions for the evaluation and use of concordance results.* (ACT Research Report No. 2001-1). Iowa City, IA: ACT, Inc.

Kolen, M. J., & Brennan, R. L. (2004). *Test equating, scaling, and linking*. New York: Springer.

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., & Hauser, C. H. (2015). *NWEA 2015 MAP norms for student and school achievement status and growth.* NWEA Research Report. Portland, OR: NWEA.

Appendix A: Data and Analysis

A.1. Data

Data used in this study were collected from 393 schools in New Jersey, Illinois, Colorado, District of Columbia, Maryland, New Mexico, and Rhode Island as part of a study for the Partnership for Assessment of Readiness for College and Careers (PARCC) consortium. The sample contained matched scores in Grades 3–8 from 267,290 students in ELA and 264,583 students in Mathematics from Spring 2015. To understand the statistical characteristics of the test scores, descriptive statistics are provided in Table A.1. As shown in the table, the correlation coefficients between MAP Growth Reading and ELA scores range from 0.76 to 0.80, and the correlation coefficients between MAP Growth and Mathematics scores range from 0.82 to 0.85. These correlations indicate a strong relationship between MAP Growth and NJSLA test scores.

Table A.1. Descriptive Statistics of the Sample Data

Grade	N	r	State Summative				MAP Growth			
			Mean	SD	Min.	Max.	Mean	SD	Min.	Max.
ELA/Reading										
3	47,463	0.80	735.53	41.28	650	850	198.53	16.57	137	251
4	45,045	0.79	737.22	35.18	650	850	206.57	16.00	139	263
5	44,093	0.79	735.11	32.85	650	850	213.03	15.70	140	272
6	46,123	0.78	736.12	32.20	650	850	217.03	14.95	143	273
7	44,179	0.77	737.04	37.03	650	850	221.66	14.69	145	272
8	40,387	0.76	737.15	36.48	650	850	225.19	14.43	142	279
Mathematics										
3	47,534	0.84	739.39	36.52	650	850	203.37	14.17	137	283
4	45,129	0.85	731.84	33.65	650	850	213.42	15.39	136	295
5	44,138	0.85	734.68	31.77	650	850	222.09	17.36	137	301
6	46,184	0.85	731.80	31.93	650	850	225.64	16.99	135	310
7	43,899	0.84	733.30	29.46	650	850	231.55	17.63	145	309
8	37,699	0.82	729.86	39.04	650	850	235.98	18.60	143	318

A.2. Equipercentile Linking Procedure

The equipercentile procedure (e.g., Kolen & Brennan, 2004) was used to establish the concordance relationship between the state summative and MAP Growth scores for Grades 2–8 in ELA/Reading and Mathematics. This procedure matches scores on the two scales that have the same percentile rank (i.e., the proportion of scores at or below each score).

Suppose we need to establish the concorded scores between two tests. x is a score on Test X (e.g., NJSLA). Its equipercentile equivalent score on Test Y (e.g., MAP Growth), $e_y(x)$, can be obtained through a cumulative-distribution-based linking function defined in Equation A1:

$$e_y(x) = G^{-1}[P(x)] \tag{A1}$$

where $e_y(x)$ is the equipercentile equivalent of score x on NJSLA on the scale of MAP Growth, $P(x)$ is the percentile rank of a given score on Test X. G^{-1} is the inverse of the percentile rank function for scores on Test Y which indicates the scores on Test Y corresponding to a given percentile. Polynomial loglinear pre-smoothing was applied to reduce irregularities of the score distributions and equipercentile linking curve.

A.3. Consistency Rate of Classification

Consistency rate of classification accuracy, expressed in the form of a rate between 0 and 1, measures the extent to which MAP Growth scores (and the estimated MAP Growth cut scores) accurately predicted whether students in the sample would be proficient (i.e., Level 4 or higher) on the state summative tests.

To calculate consistency rate of classification, sample students were designated "Below State Cut" or "At or Above State cut" based on their actual state test scores. Similarly, they were also designated as "Below MAP Growth Cut" or "At or Above MAP Growth Cut" based on their actual MAP Growth scores. A two-way contingency table was then tabulated (see Table A2), classifying students as "Proficient" on the basis of state summative cut score and concordant MAP Growth cut score. Students classified in the *true positive* (TP) category were those predicted to be Proficient based on the MAP Growth cut scores and were also classified as Proficient based on the state cut scores. Students classified in the *true negative* (TN) category were those predicted to be Not Proficient based on the MAP Growth cut scores and were also classified as Not Proficient based on the state cut scores. Students classified in the *false positive* (FP) category were those predicted to be Proficient based on the MAP Growth cut scores but were classified as Not Proficient based on the state cut scores. Students classified in the *false negative* (FN) category were those predicated to be Not Proficient based on the MAP Growth cut scores but were classified as Proficient based on the state cut scores. The overall consistency rate of classification was computed as the proportion of correct classifications among the entire sample by (TP+TN) / (TP+TN+FP+FN)

Table A.2. Definition of Consistency Rate for State Summative to MAP Growth Concordance

		State Summative Score	
		Below State Cut	**At or Above State Cut**
MAP Growth Score	Below MAP Growth Cut	True Negative	False Positive
	At or Above MAP Growth Cut	False Negative	True Positive

A.4. Proficiency Projection

MAP Growth conditional growth norms provide student's expected gain scores across testing seasons (Thum & Hauser, 2015). This information is utilized to predict a student's performance on the state summative test based on that student's MAP Growth scores in prior seasons (e.g. fall and winter). The probability of a student achieving Level 4 (Meeting Expectations) on the state test based on their winter MAP Growth score is given in Equation A2.

$$Pr(Achieving\ Level\ 4\ in\ spring|a\ RIT\ score\ of\ x) = \Phi\left(\frac{x+g-c}{SD}\right) \tag{A2}$$

where, Φ is a standardized normal cumulative distribution, x is the student's RIT score in fall or winter, g is the expected growth from fall or winter to spring corresponding to x, c is the MAP Growth cut score for spring, and SD is the conditional standard deviation of growth from fall or winter to spring.

For the probability of a student achieving Level 4 on the state summative tests based on their spring score s, it can be calculated by Equation A3:

$$Pr(Achieving\ Level\ 4\ in\ spring|a\ RIT\ score\ of\ s\ in\ spring) = \Phi\left(\frac{s-c}{SE}\right) \quad\quad (A3)$$

where *SE* is the standard error of measurement for MAP Growth Reading or Mathematics test.