



Linking the PARCC Assessments to NWEA MAP Tests for Illinois

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Introduction

Northwest Evaluation Association™ (NWEA™) is committed to providing partners with useful tools to help make inferences from the Measures of Academic Progress® (MAP®) interim assessment scores. One important tool is the concordance table between MAP and state summative assessments. Concordance tables have been used for decades to relate scores on different tests measuring similar but distinct constructs. These tables, typically derived from statistical linking procedures, 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. Concordance tables are helpful for educators, parents, administrators, researchers, and policy makers to evaluate and formulate academic standing and growth.

Recently, NWEA completed a concordance study to connect the scales of the Partnership for Assessment of Readiness for College and Careers (PARCC) English language arts (ELA) and math with those of the MAP Reading and MAP for Mathematics assessments for Illinois (IL). In this report, we present the 3rd through 8th grade cut scores on MAP reading and mathematics scales that correspond to the benchmarks that Illinois adopted for its PARCC ELA and math tests. Information about the consistency rate of classification based on the estimated MAP cut scores is also provided, along with a series of tables that predict the probability of receiving a Level 4 (i.e., “Proficient”) or higher performance designation on the PARCC assessments, based on the observed MAP scores taken during the same school year. A detailed description of the data and analysis method used in this study is provided in the Appendix.

Overview of Assessments

PARCC assessments include a series of computer-based achievement tests aligned to the Common Core State Standards (CCSS) in ELA and math for grades 3-8 and high school. For Illinois, each grade and subject has four cut scores that distinguish between performance levels: Level 1: *Did not yet meet expectations*, Level 2: *Partially met expectations*, Level 3: *Approached expectations*, Level 4: *Met expectations*, and Level 5: *Exceeded expectations*. The Level 4 cut score demarks the minimum level of performance considered to be “Proficient” for accountability purposes.

MAP tests are interim assessments that are administered in the form of a computerized adaptive test (CAT). MAP tests are constructed to measure student achievement from Grades K

to 12 in math, reading, language usage, and science and aligned to the CCSS. Unlike PARCC tests, MAP assessments are vertically scaled across grades, a feature that supports direct measurement of academic growth and change. MAP scores are reported on a Rasch Unit (RIT) scale with a range from 100 to 350. Each subject has its own RIT scale.

To aid interpretation of MAP scores, NWEA periodically conducts norming studies of student and school performance on MAP. 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 math, reading, language usage, and general science.

Estimated MAP Cut Scores Associated with PARCC Readiness Levels

Tables 1 to 4 report the PARCC scaled scores associated with each of the five performance levels adopted by Illinois, as well as the estimated cut scores on the MAP tests associated with those performance levels. Specifically, Tables 1 and 2 apply to MAP scores obtained during the spring testing season for reading and math, respectively. Tables 3 and 4 apply to MAP tests taken in a prior testing season (fall or winter) for reading and math, respectively. The tables also report the percentile rank (based on the *NWEA 2015 MAP Norms*) associated with each estimated MAP cut score. The MAP cut scores can be used to predict Illinois students' most probable PARCC performance level, based on their observed MAP scores. For example, a 4th grade student who obtained a MAP math score of 240 in the spring testing season is likely to be at the very high end of Level 4 (Proficient) on the PARCC test taken during that same testing season (see Table 2). Similarly, a 3rd grade student who obtained a MAP reading score of 230 in the fall testing season is likely to be at Level 5 on the PARCC test taken in the spring of 3rd grade (see Table 3).

TABLE 1. CONCORDANCE OF PERFORMANCE LEVEL SCORE RANGES BETWEEN IL PARCC ELA AND MAP READING (WHEN MAP IS TAKEN IN SPRING)

Grade	PARCC									
	Level 1		Level 2		Level 3		Level 4		Level 5	
	<i>Did not Meet</i>		<i>Partially Met</i>		<i>Approached</i>		<i>Met</i>		<i>Exceeded</i>	
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	

Grade	MAP									
	Level 1		Level 2		Level 3		Level 4		Level 5	
	<i>Did not Meet</i>		<i>Partially Met</i>		<i>Approached</i>		<i>Met</i>		<i>Exceeded</i>	
	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile
3	100-187	1-23	188-197	24-47	198-206	48-69	207-224	70-95	225-350	96-99
4	100-189	1-13	190-201	14-38	202-212	39-67	213-227	68-92	228-350	93-99
5	100-194	1-12	195-207	13-38	208-218	39-67	219-237	68-95	238-350	96-99
6	100-198	1-11	199-211	12-38	212-222	39-67	223-238	68-93	239-350	94-99
7	100-203	1-16	204-214	17-40	215-224	41-66	225-237	67-89	238-350	90-99
8	100-209	1-25	210-219	26-48	220-228	49-70	229-243	71-93*	244-350	93*-99

Notes. 1. %ile=percentile.

2. Bolded numbers indicate the cut scores considered to be at least “proficient” for accountability purposes.

3. * reflects occasional departure from one-to-one correspondence between RITs and percentiles due to the larger range of the RIT scale relative to the percentile scale.

TABLE 2. CONCORDANCE OF PERFORMANCE LEVEL SCORE RANGES BETWEEN IL PARCC AND MAP MATH (WHEN MAP IS TAKEN IN SPRING)

Grade	PARCC									
	Level 1		Level 2		Level 3		Level 4		Level 5	
	<i>Did not Meet</i>		<i>Partially Met</i>		<i>Approached</i>		<i>Met</i>		<i>Exceeded</i>	
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	

Grade	MAP									
	Level 1		Level 2		Level 3		Level 4		Level 5	
	<i>Did not Meet</i>		<i>Partially Met</i>		<i>Approached</i>		<i>Met</i>		<i>Exceeded</i>	
	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile
3	100-186	1-11	187-197	12-33	198-207	34-61	208-223	62-92	224-350	93-99
4	100-195	1-11	196-209	12-39	210-222	40-72	223-244	73-98*	245-350	98*-99
5	100-201	1-10	202-217	11-40	218-231	41-73	232-252	74-97*	253-350	97*-99
6	100-205	1-11	206-219	12-36	220-233	37-68	234-252	69-94	253-350	95-99
7	100-206	1-10	207-223	11-38	224-239	39-73	240-260	74-96*	261-350	96*-99
8	100-217	1-24	218-231	25-51	232-243	52-74	244-266	75-96	267-350	97-99

Notes. 1. %ile=percentile.

2. Bolded numbers indicate the cut scores considered to be at least “proficient” for accountability purposes.

3. * reflects occasional departure from one-to-one correspondence between RITs and percentiles due to the larger range of the RIT scale relative to the percentile scale.

TABLE 3. CONCORDANCE OF PERFORMANCE LEVEL SCORE RANGES BETWEEN IL PARCC ELA AND MAP READING (WHEN MAP IS TAKEN IN FALL OR WINTER PRIOR TO SPRING PARCC TESTS)

PARCC										
Grade	Level 1		Level 2		Level 3		Level 4		Level 5	
	<i>Did not Meet</i>		<i>Partially Met</i>		<i>Approached</i>		<i>Met</i>		<i>Exceeded</i>	
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 FALL										
Grade	Level 1		Level 2		Level 3		Level 4		Level 5	
	<i>Did not Meet</i>		<i>Partially Met</i>		<i>Approached</i>		<i>Met</i>		<i>Exceeded</i>	
	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile
3	100-175	1-20	176-186	21-45	187-197	46-71	198-219	72-97*	220-350	97*-99
4	100-179	1-11	180-193	12-38	194-205	39-68	206-223	69-94	224-350	95-99
5	100-185	1-9	186-200	10-36	201-213	37-69	214-235	70-97*	236-350	97*-99
6	100-191	1-9	192-206	10-38	207-218	39-69	219-236	70-95	237-350	96-99
7	100-197	1-13	198-210	14-39	211-221	40-67	222-235	68-91	236-350	92-99
8	100-205	1-22	206-216	23-48	217-226	49-72	227-241	73-93	242-350	94-99

MAP WINTER										
Grade	Level 1		Level 2		Level 3		Level 4		Level 5	
	<i>Did not Meet</i>		<i>Partially Met</i>		<i>Approached</i>		<i>Met</i>		<i>Exceeded</i>	
	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile
3	100-183	1-21	184-194	22-47	195-204	48-72	205-223	73-96	224-350	97-99
4	100-186	1-12	187-198	13-36	199-210	37-67	211-226	68-93	227-350	94-99
5	100-191	1-10	192-205	11-38	206-216	39-67	217-236	68-96	237-350	97-99
6	100-195	1-9	196-209	10-37	210-221	38-69	222-237	70-94	238-350	95-99
7	100-201	1-15	202-213	16-40	214-223	41-66	224-236	67-90	237-350	91-99
8	100-208	1-24	209-218	25-48	219-227	49-70	228-242	71-93	243-350	94-99

Notes. 1. %ile=percentile.

2. Bolded numbers indicate the cut scores considered to be at least "proficient" for accountability purposes.

3. * reflects occasional departure from one-to-one correspondence between RITs and percentiles due to the larger range of the RIT scale relative to the percentile scale.

TABLE 4. CONCORDANCE OF PERFORMANCE LEVEL SCORE RANGES BETWEEN IL PARCC AND MAP MATH (WHEN MAP IS TAKEN IN FALL OR WINTER PRIOR TO SPRING PARCC TESTS)

Grade	PARCC									
	Level 1		Level 2		Level 3		Level 4		Level 5	
	<i>Did not Meet</i>		<i>Partially Met</i>		<i>Approached</i>		<i>Met</i>		<i>Exceeded</i>	
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	

Grade	MAP FALL									
	Level 1		Level 2		Level 3		Level 4		Level 5	
	<i>Did not Meet</i>		<i>Partially Met</i>		<i>Approached</i>		<i>Met</i>		<i>Exceeded</i>	
	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile
3	100-172	1-8	173-184	9-32	185-194	33-62	195-211	63-94	212-350	95-99
4	100-183	1-9	184-197	10-37	198-211	38-75	212-233	76-98	234-350	99
5	100-191	1-8	192-207	9-39	208-221	40-75	222-242	76-98*	243-350	98*-99
6	100-197	1-9	198-211	10-34	212-225	35-69	226-245	70-96*	246-350	96*-99
7	100-200	1-9	201-217	10-37	218-233	38-74	234-254	75-97*	255-350	97*-99
8	100-212	1-21	213-226	22-50	227-239	51-77	240-262	78-97	263-350	98-99

Grade	MAP WINTER									
	Level 1		Level 2		Level 3		Level 4		Level 5	
	<i>Did not Meet</i>		<i>Partially Met</i>		<i>Approached</i>		<i>Met</i>		<i>Exceeded</i>	
	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile
3	100-180	1-9	181-192	10-33	193-202	34-62	203-218	63-93	219-350	94-99
4	100-190	1-10	191-204	11-38	205-217	39-73	218-239	74-98*	240-350	98*-99
5	100-197	1-9	198-213	10-40	214-227	41-74	228-248	75-97	249-350	98-99
6	100-202	1-11	203-216	12-36	217-230	37-70	231-249	71-95	250-350	96-99
7	100-204	1-10	205-221	11-39	222-237	40-74	238-258	75-97*	259-350	97*-99
8	100-215	1-22	216-229	23-50	230-241	51-75	242-264	76-97*	265-350	97*-99

Notes. 1. %ile=percentile.

2. Bolded numbers indicate the cut scores considered to be at least “proficient” for accountability purposes.

3. * reflects occasional departure from one-to-one correspondence between RITs and percentiles due to the larger range of the RIT scale relative to the percentile scale.

Consistency Rate of Classification

Consistency rate of classification (Pommerich, Hanson, Harris, & Scoring, 2004), expressed in the form of a rate between 0 and 1, provides a means to measure the departure from equity for concordances (Hanson et al., 2001). This index can also be used as an indicator for the predictive validity of the MAP tests, i.e., how accurately the MAP scores can predict a student’s proficiency status in the PARCC 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 PARCC and MAP scores. The results in Table 5 demonstrate that on average, MAP reading scores can consistently classify students’ proficiency (Level 4 or higher) status on PARCC ELA test approximately 82% of the time and MAP math scores can consistently classify students on PARCC math test approximately 88% of the time. Those numbers are high suggesting that both MAP reading and math tests are great predictors of the students’ proficiency status on the PARCC tests.

TABLE 5. CONSISTENCY RATE OF CLASSIFICATION FOR MAP AND PARCC LEVEL 4 EQUIPERCENTILE CONCORDANCES

Grade	ELA/Reading			Math		
	Consistency Rate	False		Consistency Rate	False	
		Positives	Negatives		Positives	Negatives
3	0.84	0.09	0.07	0.86	0.07	0.07
4	0.83	0.09	0.08	0.88	0.06	0.06
5	0.81	0.09	0.10	0.89	0.05	0.06
6	0.83	0.09	0.08	0.90	0.05	0.05
7	0.83	0.09	0.08	0.90	0.05	0.05
8	0.79	0.10	0.11	0.83	0.08	0.09

Proficiency Projection

Proficiency projection tells how likely a student is classified as “proficient” on PARCC tests based on his/her observed MAP scores. The conditional growth norms provided in the 2015 MAP Norms were used to calculate this information (Thum & Hauser, 2015). The results of proficiency projection and corresponding probability of achieving “proficient” on the PARCC tests are presented in Tables 6 to 8. These tables estimate the probability of scoring at Level 4 or above on PARCC in the spring and the prior fall or winter testing season. For example, if a 3rd grade student obtained a MAP math score of 201 in the fall, the probability of obtaining a Level 4 or higher PARCC score in the spring of 3rd grade is 78%. Table 6 presents the estimated probability of meeting Level 4 benchmark when MAP is taken in the spring, whereas Tables 7 and 8 present the estimated probability of meeting Level 4 benchmark when MAP is taken in the fall or winter prior to taking the PARCC tests.

TABLE 6. PROFICIENCY PROJECTION AND PROBABILITY FOR PASSING PARCC LEVEL 4 (PROFICIENT) WHEN MAP IS TAKEN IN THE SPRING

Grade	ELA/Reading					Math				
	Start %ile	RIT Spring	Projected Proficiency			Start %ile	RIT Spring	Projected Proficiency		
			Cut Score	Level 4	Prob.			Cut Score	Level 4	Prob.
3	5	174	207	No	<0.01	5	181	208	No	<0.01
	10	179	207	No	<0.01	10	186	208	No	<0.01
	15	183	207	No	<0.01	15	189	208	No	<0.01
	20	186	207	No	<0.01	20	192	208	No	<0.01
	25	188	207	No	<0.01	25	194	208	No	<0.01
	30	191	207	No	<0.01	30	196	208	No	<0.01
	35	193	207	No	<0.01	35	198	208	No	<0.01
	40	195	207	No	<0.01	40	200	208	No	<0.01
	45	197	207	No	<0.01	45	202	208	No	0.02
	50	199	207	No	0.01	50	203	208	No	0.04
	55	201	207	No	0.03	55	205	208	No	0.15
	60	202	207	No	0.06	60	207	208	No	0.37
	65	204	207	No	0.17	65	209	208	Yes	0.63
	70	207	207	Yes	0.50	70	211	208	Yes	0.85
	75	209	207	Yes	0.73	75	213	208	Yes	0.96
	80	211	207	Yes	0.89	80	215	208	Yes	0.99
85	214	207	Yes	0.99	85	218	208	Yes	>0.99	
90	218	207	Yes	>0.99	90	221	208	Yes	>0.99	
95	223	207	Yes	>0.99	95	226	208	Yes	>0.99	
4	5	181	213	No	<0.01	5	189	223	No	<0.01
	10	187	213	No	<0.01	10	194	223	No	<0.01
	15	190	213	No	<0.01	15	198	223	No	<0.01
	20	193	213	No	<0.01	20	201	223	No	<0.01
	25	196	213	No	<0.01	25	203	223	No	<0.01
	30	198	213	No	<0.01	30	206	223	No	<0.01
	35	200	213	No	<0.01	35	208	223	No	<0.01
	40	202	213	No	<0.01	40	210	223	No	<0.01
	45	204	213	No	<0.01	45	212	223	No	<0.01
	50	206	213	No	0.01	50	213	223	No	<0.01
	55	208	213	No	0.06	55	215	223	No	<0.01
	60	210	213	No	0.17	60	217	223	No	0.02
	65	212	213	No	0.38	65	219	223	No	0.08
	70	214	213	Yes	0.62	70	221	223	No	0.25
	75	216	213	Yes	0.83	75	224	223	Yes	0.63
	80	218	213	Yes	0.94	80	226	223	Yes	0.85
85	221	213	Yes	0.99	85	229	223	Yes	0.98	
90	225	213	Yes	>0.99	90	233	223	Yes	>0.99	
95	230	213	Yes	>0.99	95	238	223	Yes	>0.99	

TABLE 6. (CONTINUED)

Grade	ELA/Reading					Math				
	Start %ile	RIT Spring	Projected Proficiency			Start %ile	RIT Spring	Projected Proficiency		
			Cut Score	Level 4	Prob.			Cut Score	Level 4	Prob.
5	5	188	219	No	<0.01	5	195	232	No	<0.01
	10	193	219	No	<0.01	10	201	232	No	<0.01
	15	197	219	No	<0.01	15	205	232	No	<0.01
	20	199	219	No	<0.01	20	208	232	No	<0.01
	25	202	219	No	<0.01	25	210	232	No	<0.01
	30	204	219	No	<0.01	30	213	232	No	<0.01
	35	206	219	No	<0.01	35	215	232	No	<0.01
	40	208	219	No	<0.01	40	217	232	No	<0.01
	45	210	219	No	<0.01	45	219	232	No	<0.01
	50	212	219	No	0.01	50	221	232	No	<0.01
	55	214	219	No	0.06	55	223	232	No	<0.01
	60	216	219	No	0.17	60	225	232	No	0.01
	65	217	219	No	0.27	65	228	232	No	0.08
	70	220	219	Yes	0.62	70	230	232	No	0.25
	75	222	219	Yes	0.83	75	232	232	Yes	0.50
	80	224	219	Yes	0.94	80	235	232	Yes	0.85
85	227	219	Yes	0.99	85	238	232	Yes	0.98	
90	231	219	Yes	>0.99	90	242	232	Yes	>0.99	
95	236	219	Yes	>0.99	95	248	232	Yes	>0.99	
6	5	192	223	No	<0.01	5	198	234	No	<0.01
	10	197	223	No	<0.01	10	204	234	No	<0.01
	15	201	223	No	<0.01	15	208	234	No	<0.01
	20	203	223	No	<0.01	20	211	234	No	<0.01
	25	206	223	No	<0.01	25	214	234	No	<0.01
	30	208	223	No	<0.01	30	217	234	No	<0.01
	35	210	223	No	<0.01	35	219	234	No	<0.01
	40	212	223	No	<0.01	40	221	234	No	<0.01
	45	214	223	No	<0.01	45	223	234	No	<0.01
	50	216	223	No	0.01	50	225	234	No	<0.01
	55	218	223	No	0.06	55	227	234	No	0.01
	60	219	223	No	0.11	60	230	234	No	0.08
	65	221	223	No	0.27	65	232	234	No	0.25
	70	223	223	Yes	0.50	70	234	234	Yes	0.50
	75	226	223	Yes	0.83	75	237	234	Yes	0.85
	80	228	223	Yes	0.94	80	239	234	Yes	0.96
85	231	223	Yes	0.99	85	243	234	Yes	>0.99	
90	235	223	Yes	>0.99	90	247	234	Yes	>0.99	
95	240	223	Yes	>0.99	95	253	234	Yes	>0.99	

TABLE 6. (CONTINUED)

Grade	ELA/Reading					Math				
	Start %ile	RIT Spring	Projected Proficiency			Start %ile	RIT Spring	Projected Proficiency		
			Cut Score	Level 4	Prob.			Cut Score	Level 4	Prob.
7	5	193	225	No	<0.01	5	199	240	No	<0.01
	10	199	225	No	<0.01	10	206	240	No	<0.01
	15	202	225	No	<0.01	15	210	240	No	<0.01
	20	205	225	No	<0.01	20	214	240	No	<0.01
	25	208	225	No	<0.01	25	217	240	No	<0.01
	30	210	225	No	<0.01	30	219	240	No	<0.01
	35	212	225	No	<0.01	35	222	240	No	<0.01
	40	214	225	No	<0.01	40	224	240	No	<0.01
	45	216	225	No	<0.01	45	226	240	No	<0.01
	50	218	225	No	0.01	50	229	240	No	<0.01
	55	220	225	No	0.06	55	231	240	No	<0.01
	60	222	225	No	0.17	60	233	240	No	0.01
	65	224	225	No	0.38	65	235	240	No	0.04
	70	226	225	Yes	0.62	70	238	240	No	0.25
	75	228	225	Yes	0.83	75	241	240	Yes	0.63
	80	231	225	Yes	0.97	80	244	240	Yes	0.92
85	234	225	Yes	>0.99	85	247	240	Yes	0.99	
90	238	225	Yes	>0.99	90	251	240	Yes	>0.99	
95	243	225	Yes	>0.99	95	258	240	Yes	>0.99	
8	5	194	229	No	<0.01	5	199	244	No	<0.01
	10	200	229	No	<0.01	10	206	244	No	<0.01
	15	204	229	No	<0.01	15	211	244	No	<0.01
	20	207	229	No	<0.01	20	215	244	No	<0.01
	25	209	229	No	<0.01	25	218	244	No	<0.01
	30	212	229	No	<0.01	30	221	244	No	<0.01
	35	214	229	No	<0.01	35	224	244	No	<0.01
	40	216	229	No	<0.01	40	226	244	No	<0.01
	45	218	229	No	<0.01	45	229	244	No	<0.01
	50	220	229	No	<0.01	50	231	244	No	<0.01
	55	222	229	No	0.01	55	233	244	No	<0.01
	60	224	229	No	0.06	60	236	244	No	<0.01
	65	226	229	No	0.17	65	238	244	No	0.02
	70	228	229	No	0.38	70	241	244	No	0.15
	75	231	229	Yes	0.73	75	244	244	Yes	0.50
	80	233	229	Yes	0.89	80	247	244	Yes	0.85
85	236	229	Yes	0.99	85	251	244	Yes	0.99	
90	240	229	Yes	>0.99	90	255	244	Yes	>0.99	
95	246	229	Yes	>0.99	95	262	244	Yes	>0.99	

Note. %ile=percentile

TABLE 7. PROFICIENCY PROJECTION AND PROBABILITY FOR PASSING PARCC ELA LEVEL 4 (PROFICIENT) WHEN MAP IS TAKEN IN THE FALL OR WINTER PRIOR TO SPRING PARCC TESTS

Grade	Start %ile	RIT Fall	Projected Proficiency			Start %ile	RIT Winter	Projected Proficiency		
			Cut Score	Level 4	Prob.			Cut Score	Level 4	Prob.
3	5	162	207	No	<0.01	5	171	207	No	<0.01
	10	168	207	No	<0.01	10	176	207	No	<0.01
	15	172	207	No	<0.01	15	180	207	No	<0.01
	20	175	207	No	<0.01	20	183	207	No	<0.01
	25	178	207	No	0.01	25	185	207	No	<0.01
	30	180	207	No	0.02	30	188	207	No	<0.01
	35	182	207	No	0.03	35	190	207	No	<0.01
	40	184	207	No	0.05	40	192	207	No	0.01
	45	186	207	No	0.08	45	194	207	No	0.03
	50	188	207	No	0.10	50	196	207	No	0.06
	55	190	207	No	0.16	55	198	207	No	0.13
	60	192	207	No	0.24	60	199	207	No	0.17
	65	194	207	No	0.29	65	201	207	No	0.28
	70	197	207	No	0.44	70	204	207	Yes	0.50
	75	199	207	Yes	0.56	75	206	207	Yes	0.58
	80	202	207	Yes	0.66	80	208	207	Yes	0.72
85	205	207	Yes	0.80	85	211	207	Yes	0.87	
90	209	207	Yes	0.90	90	215	207	Yes	0.97	
95	214	207	Yes	0.97	95	221	207	Yes	>0.99	
4	5	173	213	No	<0.01	5	179	213	No	<0.01
	10	178	213	No	<0.01	10	184	213	No	<0.01
	15	182	213	No	<0.01	15	188	213	No	<0.01
	20	185	213	No	<0.01	20	191	213	No	<0.01
	25	188	213	No	0.01	25	194	213	No	<0.01
	30	190	213	No	0.02	30	196	213	No	<0.01
	35	192	213	No	0.04	35	198	213	No	0.01
	40	194	213	No	0.05	40	200	213	No	0.02
	45	196	213	No	0.09	45	202	213	No	0.04
	50	198	213	No	0.15	50	204	213	No	0.08
	55	200	213	No	0.18	55	205	213	No	0.12
	60	202	213	No	0.27	60	207	213	No	0.22
	65	204	213	No	0.38	65	209	213	No	0.35
	70	206	213	Yes	0.50	70	211	213	Yes	0.50
	75	209	213	Yes	0.62	75	214	213	Yes	0.72
	80	211	213	Yes	0.73	80	216	213	Yes	0.84
85	214	213	Yes	0.82	85	219	213	Yes	0.92	
90	218	213	Yes	0.93	90	223	213	Yes	0.98	
95	224	213	Yes	0.99	95	228	213	Yes	>0.99	

TABLE 7. (CONTINUED)

Grade	Start %ile	RIT Fall	Projected Proficiency			Start %ile	RIT Winter	Projected Proficiency		
			Cut-Score	Level 4	Prob.			Cut-Score	Level 4	Prob.
5	5	181	219	No	<0.01	5	186	219	No	<0.01
	10	186	219	No	<0.01	10	191	219	No	<0.01
	15	190	219	No	<0.01	15	195	219	No	<0.01
	20	193	219	No	<0.01	20	197	219	No	<0.01
	25	195	219	No	0.01	25	200	219	No	<0.01
	30	198	219	No	0.02	30	202	219	No	<0.01
	35	200	219	No	0.04	35	204	219	No	0.01
	40	202	219	No	0.07	40	206	219	No	0.02
	45	204	219	No	0.09	45	208	219	No	0.04
	50	206	219	No	0.15	50	210	219	No	0.09
	55	208	219	No	0.23	55	212	219	No	0.17
	60	210	219	No	0.33	60	214	219	No	0.28
	65	212	219	No	0.38	65	215	219	No	0.35
	70	214	219	Yes	0.50	70	218	219	Yes	0.58
	75	216	219	Yes	0.62	75	220	219	Yes	0.65
	80	218	219	Yes	0.67	80	222	219	Yes	0.78
	85	221	219	Yes	0.81	85	225	219	Yes	0.91
90	225	219	Yes	0.91	90	229	219	Yes	0.98	
95	231	219	Yes	0.99	95	234	219	Yes	>0.99	
6	5	186	223	No	<0.01	5	190	223	No	<0.01
	10	192	223	No	<0.01	10	196	223	No	<0.01
	15	196	223	No	<0.01	15	199	223	No	<0.01
	20	198	223	No	<0.01	20	202	223	No	<0.01
	25	201	223	No	0.01	25	204	223	No	<0.01
	30	203	223	No	0.02	30	207	223	No	<0.01
	35	205	223	No	0.04	35	209	223	No	0.01
	40	207	223	No	0.06	40	211	223	No	0.03
	45	209	223	No	0.10	45	212	223	No	0.04
	50	211	223	No	0.16	50	214	223	No	0.09
	55	213	223	No	0.23	55	216	223	No	0.12
	60	215	223	No	0.28	60	218	223	No	0.22
	65	217	223	No	0.39	65	220	223	No	0.35
	70	219	223	Yes	0.50	70	222	223	Yes	0.50
	75	221	223	Yes	0.56	75	224	223	Yes	0.65
	80	224	223	Yes	0.72	80	226	223	Yes	0.78
	85	226	223	Yes	0.81	85	229	223	Yes	0.91
90	230	223	Yes	0.90	90	233	223	Yes	0.98	
95	236	223	Yes	0.99	95	238	223	Yes	>0.99	

TABLE 7. (CONTINUED)

Grade	Start %ile	RIT Fall	Projected Proficiency			Start %ile	RIT Winter	Projected Proficiency		
			Cut-Score	Level 4	Prob.			Cut-Score	Level 4	Prob.
7	5	189	225	No	<0.01	5	192	225	No	<0.01
	10	195	225	No	<0.01	10	198	225	No	<0.01
	15	199	225	No	<0.01	15	201	225	No	<0.01
	20	202	225	No	<0.01	20	204	225	No	<0.01
	25	204	225	No	0.01	25	207	225	No	<0.01
	30	206	225	No	0.02	30	209	225	No	<0.01
	35	209	225	No	0.04	35	211	225	No	0.01
	40	211	225	No	0.07	40	213	225	No	0.02
	45	213	225	No	0.12	45	215	225	No	0.04
	50	214	225	No	0.15	50	217	225	No	0.09
	55	216	225	No	0.19	55	219	225	No	0.17
	60	218	225	No	0.28	60	221	225	No	0.28
	65	220	225	No	0.39	65	223	225	No	0.42
	70	222	225	Yes	0.50	70	225	225	Yes	0.58
	75	225	225	Yes	0.61	75	227	225	Yes	0.72
	80	227	225	Yes	0.72	80	230	225	Yes	0.88
	85	230	225	Yes	0.85	85	232	225	Yes	0.91
90	234	225	Yes	0.93	90	236	225	Yes	0.98	
95	240	225	Yes	0.99	95	242	225	Yes	>0.99	
8	5	191	229	No	<0.01	5	194	229	No	<0.01
	10	197	229	No	<0.01	10	199	229	No	<0.01
	15	201	229	No	<0.01	15	203	229	No	<0.01
	20	204	229	No	0.01	20	206	229	No	<0.01
	25	207	229	No	0.01	25	209	229	No	<0.01
	30	209	229	No	0.02	30	211	229	No	<0.01
	35	211	229	No	0.04	35	213	229	No	<0.01
	40	213	229	No	0.05	40	215	229	No	0.01
	45	215	229	No	0.08	45	217	229	No	0.02
	50	217	229	No	0.13	50	219	229	No	0.05
	55	219	229	No	0.19	55	221	229	No	0.10
	60	221	229	No	0.22	60	223	229	No	0.18
	65	223	229	No	0.31	65	225	229	No	0.29
	70	225	229	No	0.40	70	227	229	No	0.43
	75	228	229	Yes	0.50	75	229	229	Yes	0.57
	80	230	229	Yes	0.60	80	232	229	Yes	0.71
	85	234	229	Yes	0.78	85	235	229	Yes	0.86
90	237	229	Yes	0.84	90	239	229	Yes	0.97	
95	243	229	Yes	0.96	95	244	229	Yes	>0.99	

Note. %ile=percentile

TABLE 8. PROFICIENCY PROJECTION AND PROBABILITY FOR PASSING PARCC MATH LEVEL 4 (PROFICIENT) WHEN MAP IS TAKEN IN THE FALL OR WINTER PRIOR TO SPRING PARCC TESTS

Grade	Start %ile	RIT Fall	Projected Proficiency			Start %ile	RIT Winter	Projected Proficiency		
			Cut Score	Level 4	Prob.			Cut Score	Level 4	Prob.
3	5	169	208	No	<0.01	5	176	208	No	<0.01
	10	174	208	No	<0.01	10	181	208	No	<0.01
	15	177	208	No	<0.01	15	184	208	No	<0.01
	20	179	208	No	0.01	20	187	208	No	<0.01
	25	182	208	No	0.03	25	189	208	No	<0.01
	30	184	208	No	0.04	30	191	208	No	0.01
	35	185	208	No	0.06	35	193	208	No	0.02
	40	187	208	No	0.11	40	195	208	No	0.05
	45	189	208	No	0.17	45	197	208	No	0.10
	50	190	208	No	0.22	50	198	208	No	0.14
	55	192	208	No	0.32	55	200	208	No	0.26
	60	194	208	No	0.44	60	202	208	No	0.42
	65	195	208	Yes	0.50	65	203	208	Yes	0.50
	70	197	208	Yes	0.62	70	205	208	Yes	0.66
	75	199	208	Yes	0.68	75	207	208	Yes	0.80
	80	201	208	Yes	0.78	80	209	208	Yes	0.90
	4	5	179	223	No	<0.01	5	185	223	No
10		184	223	No	<0.01	10	190	223	No	<0.01
15		188	223	No	<0.01	15	194	223	No	<0.01
20		190	223	No	<0.01	20	197	223	No	<0.01
25		193	223	No	<0.01	25	199	223	No	<0.01
30		195	223	No	0.01	30	201	223	No	<0.01
35		197	223	No	0.01	35	203	223	No	<0.01
40		198	223	No	0.02	40	205	223	No	<0.01
45		200	223	No	0.04	45	207	223	No	0.01
50		202	223	No	0.08	50	209	223	No	0.03
55		204	223	No	0.14	55	211	223	No	0.07
60		205	223	No	0.14	60	212	223	No	0.10
65		207	223	No	0.22	65	214	223	No	0.20
70		209	223	No	0.32	70	216	223	No	0.34
75		211	223	No	0.44	75	218	223	Yes	0.50
80		214	223	Yes	0.62	80	221	223	Yes	0.74
85		216	223	Yes	0.73	85	223	223	Yes	0.86
90	220	223	Yes	0.89	90	227	223	Yes	0.97	
95	225	223	Yes	0.98	95	232	223	Yes	>0.99	

TABLE 8. (CONTINUED)

Grade	Start %ile	RIT Fall	Projected Proficiency			Start %ile	RIT Winter	Projected Proficiency		
			Cut-Score	Level 4	Prob.			Cut-Score	Level 4	Prob.
5	5	187	232	No	<0.01	5	192	232	No	<0.01
	10	193	232	No	<0.01	10	198	232	No	<0.01
	15	196	232	No	<0.01	15	201	232	No	<0.01
	20	199	232	No	<0.01	20	204	232	No	<0.01
	25	202	232	No	<0.01	25	207	232	No	<0.01
	30	204	232	No	<0.01	30	209	232	No	<0.01
	35	206	232	No	0.01	35	211	232	No	<0.01
	40	208	232	No	0.02	40	213	232	No	<0.01
	45	210	232	No	0.04	45	215	232	No	<0.01
	50	211	232	No	0.05	50	217	232	No	0.01
	55	213	232	No	0.09	55	219	232	No	0.03
	60	215	232	No	0.15	60	221	232	No	0.07
	65	217	232	No	0.23	65	223	232	No	0.15
	70	219	232	No	0.33	70	225	232	No	0.27
	75	221	232	No	0.44	75	228	232	Yes	0.50
	80	224	232	Yes	0.62	80	230	232	Yes	0.66
	85	227	232	Yes	0.77	85	233	232	Yes	0.85
90	230	232	Yes	0.88	90	237	232	Yes	0.97	
95	236	232	Yes	0.98	95	242	232	Yes	>0.99	
6	5	192	234	No	<0.01	5	196	234	No	<0.01
	10	198	234	No	<0.01	10	202	234	No	<0.01
	15	202	234	No	<0.01	15	205	234	No	<0.01
	20	205	234	No	<0.01	20	209	234	No	<0.01
	25	207	234	No	<0.01	25	211	234	No	<0.01
	30	209	234	No	0.01	30	214	234	No	<0.01
	35	212	234	No	0.02	35	216	234	No	<0.01
	40	214	234	No	0.04	40	218	234	No	<0.01
	45	216	234	No	0.07	45	220	234	No	0.01
	50	218	234	No	0.12	50	222	234	No	0.03
	55	220	234	No	0.19	55	224	234	No	0.07
	60	222	234	No	0.28	60	226	234	No	0.15
	65	224	234	No	0.38	65	228	234	No	0.27
	70	226	234	Yes	0.50	70	230	234	No	0.42
	75	228	234	Yes	0.62	75	233	234	Yes	0.66
	80	231	234	Yes	0.77	80	236	234	Yes	0.85
	85	234	234	Yes	0.85	85	239	234	Yes	0.95
90	238	234	Yes	0.95	90	243	234	Yes	0.99	
95	243	234	Yes	0.99	95	248	234	Yes	>0.99	

TABLE 8. (CONTINUED)

Grade	Start %ile	RIT Fall	Projected Proficiency			Start %ile	RIT Winter	Projected Proficiency		
			Cut-Score	Level 4	Prob.			Cut-Score	Level 4	Prob.
7	5	195	240	No	<0.01	5	198	240	No	<0.01
	10	201	240	No	<0.01	10	204	240	No	<0.01
	15	205	240	No	<0.01	15	208	240	No	<0.01
	20	209	240	No	<0.01	20	212	240	No	<0.01
	25	211	240	No	<0.01	25	215	240	No	<0.01
	30	214	240	No	<0.01	30	217	240	No	<0.01
	35	216	240	No	<0.01	35	220	240	No	<0.01
	40	218	240	No	0.01	40	222	240	No	<0.01
	45	221	240	No	0.02	45	224	240	No	<0.01
	50	223	240	No	0.05	50	226	240	No	0.01
	55	225	240	No	0.08	55	228	240	No	0.02
	60	227	240	No	0.14	60	230	240	No	0.05
	65	229	240	No	0.22	65	233	240	No	0.15
	70	231	240	No	0.32	70	235	240	No	0.26
	75	234	240	Yes	0.50	75	238	240	Yes	0.50
	80	237	240	Yes	0.68	80	240	240	Yes	0.66
	85	240	240	Yes	0.82	85	244	240	Yes	0.90
90	244	240	Yes	0.94	90	248	240	Yes	0.98	
95	250	240	Yes	0.99	95	254	240	Yes	>0.99	
8	5	197	244	No	<0.01	5	199	244	No	<0.01
	10	203	244	No	<0.01	10	206	244	No	<0.01
	15	208	244	No	<0.01	15	210	244	No	<0.01
	20	211	244	No	<0.01	20	214	244	No	<0.01
	25	214	244	No	<0.01	25	217	244	No	<0.01
	30	217	244	No	<0.01	30	220	244	No	<0.01
	35	219	244	No	<0.01	35	222	244	No	<0.01
	40	222	244	No	0.01	40	225	244	No	<0.01
	45	224	244	No	0.02	45	227	244	No	<0.01
	50	226	244	No	0.04	50	229	244	No	<0.01
	55	229	244	No	0.10	55	231	244	No	0.01
	60	231	244	No	0.15	60	234	244	No	0.06
	65	233	244	No	0.22	65	236	244	No	0.12
	70	236	244	No	0.30	70	239	244	No	0.28
	75	238	244	No	0.40	75	241	244	No	0.42
	80	241	244	Yes	0.55	80	245	244	Yes	0.72
	85	245	244	Yes	0.74	85	248	244	Yes	0.88
90	249	244	Yes	0.88	90	253	244	Yes	0.99	
95	256	244	Yes	0.98	95	259	244	Yes	>0.99	

Note. %ile=percentile

Summary and Discussion

This study produced a set of cut scores on MAP reading and math tests for Grades 3 to 8 that correspond to each Illinois PARCC performance level. By using matched score data from a sample of students from Illinois, the study demonstrates that MAP scores can accurately predict whether a student could be proficient or above on the basis of his/her MAP 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 scores in fall and winter. These results will help educators predict student performance in PARCC 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 concordance tables can be helpful and informative, they have general limitations. First, the concordance tables provide information about score comparability on different tests, but the scores cannot be assumed to be interchangeable. In the case for PARCC and MAP tests, as they are not parallel in content, scores from these two tests should not be directly compared. Second, the sample data used in this study were collected from 71 schools, 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 concorded scores are used for a subpopulation. NWEA will continue to gather information about PARCC performance from other schools in Illinois to enhance the quality and generalizability of the study.

References

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- 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

Data and Analysis

Data

Data used in this study were collected from 13 school districts including 71 schools in Illinois. The sample contained matched PARCC ELA and MAP reading scores from 22,988 students in Grades 3 to 8 and matched PARCC and MAP math scores from 23,318 students in Grades 3 to 8 who completed both PARCC and MAP in the spring of 2015.

To understand the statistical characteristics of the test scores, descriptive statistics are provided in Table A1. As Table A1 indicates, the correlation coefficients between MAP reading and PARCC ELA scores range from 0.75 to 0.81, and the correlation coefficients between MAP and PARCC math scores range from 0.75 to 0.89. All these correlations indicate a strong relationship between MAP and PARCC test scores.

TABLE A1. DESCRIPTIVE STATISTICS OF THE SAMPLE DATA

Subject	Grade	N	<i>r</i>	PARCC				MAP			
				Mean	SD	Min	Max	Mean	SD	Min	Max
ELA/ Reading	3	3,781	0.80	735	40.27	650	850	200	15.87	136	244
	4	3,724	0.81	742	33.27	650	850	208	15.51	146	256
	5	4,097	0.79	741	32.08	650	850	214	14.99	148	265
	6	3,893	0.80	741	30.16	650	848	218	14.21	157	259
	7	3,534	0.80	744	34.40	650	850	222	14.26	154	260
	8	3,959	0.75	743	35.06	650	850	226	13.57	167	280
Math	3	3,801	0.87	740	34.56	650	850	204	14.45	144	257
	4	3,731	0.87	737	31.92	650	850	215	16.76	143	282
	5	4,101	0.85	736	30.37	650	848	223	17.71	157	294
	6	3,908	0.86	737	30.30	650	839	226	16.59	160	288
	7	3,639	0.89	737	26.71	650	850	231	17.05	168	295
	8	4,138	0.75	735	35.95	650	850	235	18.37	170	306

Equipercentile Linking Procedure

The equipercentile procedure (e.g., Kolen & Brennan, 2004) was used to establish the concordance relationship between PARCC and MAP scores for grades 3 to 8 in ELA/reading and math. 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 concordance between two tests. x is a score on Test X (e.g., PARCC). Its equipercentile equivalent score on Test Y (e.g., MAP), $e_y(x)$, can be obtained through a cumulative-distribution-based linking function defined in Equation (A1):

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

where $e_y(x)$ is the equipercentile equivalent of scores on PARCC on the scale of MAP, $P(x)$ 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 frequency distributions as well as equipercentile linking curve.

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 scores (and the estimated MAP cut scores) accurately predicted whether students in the sample would be proficient (i.e., Level 4 or higher) on PARCC tests.

To calculate consistency rate of classification, sample students were designated “Below PARCC cut” or “At or above PARCC cut” based on their actual PARCC scores. Similarly, they were also designated as “Below MAP cut” or “At or above MAP cut” based on their actual MAP scores. A 2-way contingency table was then tabulated (see Table A2), classifying students as “Proficient” on the basis of PARCC cut score and concordant MAP cut score. Students classified in the *true positive* (TP) category were those predicted to be Proficient based on the MAP cut scores and were also classified as Proficient based on the PARCC cut scores. Students classified in the *true negative* (TN) category were those predicted to be Not Proficient based on the MAP cut scores and were also classified as Not Proficient based on the PARCC cut scores. Students classified in the *false positive* (FP) category were those predicted to be Proficient based on the MAP cut scores but were classified as Not Proficient based on the PARCC cut scores. Students classified in the *false negative* (FN) category were those predicted to be Not Proficient based on the MAP cut scores but were classified as Proficient based on the PARCC 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 A2. DEFINITION OF CONSISTENCY RATE FOR PARCC TO MAP CONCORDANCE

		PARCC Score	
		Below PARCC cut	At or Above PARCC cut
MAP Score	Below MAP cut	True Negative	False Positive
	At or Above MAP cut	False Negative	True Positive

Note. Shaded cells are summed to compute the consistency rate.

Proficiency Projection

MAP 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 PARCC based on that student’s MAP scores in prior seasons (e.g. fall and winter). The probability of a student achieving Level 4 (Proficient) on PARCC, based on his/her fall or winter MAP score is given in Equation (A2):

$$Pr(\text{Achieving Level 4 in spring} | a \text{ RIT score of } x) = 1 - \Phi\left(\frac{x + g - c}{SD}\right) \quad (A2)$$

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 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 PARCC tests, based on his/her spring score s , it can be calculated by Equation (A3):

$$Pr(\text{Achieving Level 4 in spring} | a \text{ RIT score of } s \text{ in spring}) = 1 - \Phi\left(\frac{s - c}{SE}\right) \quad (A3)$$

where SE is the standard error of measurement for MAP reading or math test.

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