



# Linking the PARCC Assessments to NWEA MAP Growth Tests

November 2016

## 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. In this report, we present the 2<sup>rd</sup> through 8<sup>th</sup> grade cut scores on MAP reading and mathematics scales that correspond to the benchmarks on the 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., “Met”) 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. 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<sup>1</sup> 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

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<sup>1</sup> PARCC participating states adopt different cut scores for Level 5.

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 8 report the PARCC scaled scores associated with each of the five performance levels, as well as the estimated cut scores on the MAP tests associated with those performance levels. Tables 1-4 are associated with PARCC Benchmark I<sup>2</sup>, and Tables 5-8 are associated with PARCC Benchmark II<sup>3</sup>. Specifically, Tables 1-2 and Tables 5-6 apply to MAP scores obtained during the spring testing season for reading and math, respectively. Tables 3-4 and Tables 7-8 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 students' most probable PARCC performance level, based on their observed MAP scores. For example, a 3<sup>rd</sup> grade student who obtained a MAP math score of 220 in the spring testing season is likely to be at the very high end of Level 4 (Met) on the PARCC test taken during that same testing season (see Tables 2 and 6). Similarly, a 6<sup>th</sup> grade student who obtained a MAP reading score of 225 in the fall testing season is likely to be at Level 4 (Met) on the PARCC test taken in the spring of 6<sup>th</sup> grade (see Tables 3 and 7).

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<sup>2</sup> As of 2016, Colorado, District of Columbia, Illinois, New Jersey, New Mexico, and Rhode Island adopt PARCC Benchmark I.

<sup>3</sup> As of 2016, Maryland and Massachusetts adopt PARCC Benchmark II.

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

PARCC BENCHMARK I (CO, DC, IL, NJ, NM, RI)										
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		<b>750-809</b>		810-850	
4	650-699		700-724		725-749		<b>750-789</b>		790-850	
5	650-699		700-724		725-749		<b>750-798</b>		799-850	
6	650-699		700-724		725-749		<b>750-789</b>		790-850	
7	650-699		700-724		725-749		<b>750-784</b>		785-850	
8	650-699		700-724		725-749		<b>750-793</b>		794-850	

  

MAP										
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
2	100-176	1-21	177-186	22-44	187-194	45-64	<b>195-213</b>	65-94	214-350	95-99
3	100-186	1-21	187-196	22-44	197-204	45-65	<b>205-223</b>	66-95*	224-350	95*-99
4	100-190	1-15	191-202	16-40	203-212	41-67	<b>213-227</b>	68-92	228-350	93-99
5	100-196	1-14	197-209	15-43	210-220	44-72	<b>221-238</b>	73-96	239-350	97-99
6	100-200	1-14	201-213	15-43	214-223	44-70	<b>224-238</b>	71-93	239-350	94-99
7	100-208	1-26	209-218	27-50	219-227	51-73	<b>228-238</b>	74-91	239-350	92-99
8	100-211	1-29	212-221	30-53	222-230	54-74	<b>231-244</b>	75-93	245-350	94-99

Notes. 1. %ile=percentile.

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

3. High-lighted text denotes Grade 2 benchmarks are extrapolated from Grade 3 cut scores.

4. \* 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 PARCC MATH AND MAP MATH (WHEN MAP IS TAKEN IN SPRING)

PARCC BENCHMARK I (CO, DC, IL, NJ, NM, RI)										
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		<b>750-789</b>		790-850	
4	650-699		700-724		725-749		<b>750-795</b>		796-850	
5	650-699		700-724		725-749		<b>750-789</b>		790-850	
6	650-699		700-724		725-749		<b>750-787</b>		788-850	
7	650-699		700-724		725-749		<b>750-785</b>		786-850	
8	650-699		700-724		725-749		<b>750-800</b>		801-850	

  

MAP										
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
2	100-177	1-14	178-187	15-36	188-195	37-59	<b>196-209</b>	60-90	210-350	91-99
3	100-188	1-14	189-198	15-36	199-207	37-61	<b>208-221</b>	62-90	222-350	91-99
4	100-198	1-15	199-210	16-42	211-221	43-70	<b>222-240</b>	71-96*	241-350	96*-99
5	100-202	1-12	203-216	13-38	217-230	39-71	<b>231-250</b>	72-96*	251-350	96*-99
6	100-208	1-15	209-222	16-43	223-235	44-72	<b>236-252</b>	73-94	253-350	95-99
7	100-211	1-16	212-226	17-45	227-241	46-76	<b>242-262</b>	77-97*	263-350	97*-99
8	100-222	1-32	223-234	33-57	235-245	58-77	<b>246-267</b>	78-97*	268-350	97*-99

Notes. 1. %ile=percentile.

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

3. High-lighted text denotes Grade 2 benchmarks are extrapolated from Grade 3 cut scores.

4. \* 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 PARCC ELA AND MAP READING (WHEN MAP IS TAKEN IN FALL OR WINTER PRIOR TO SPRING PARCC TESTS)

PARCC BENCHMARK I (CO, DC, IL, NJ, NM, RI)										
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		<b>750-809</b>		810-850	
4	650-699		700-724		725-749		<b>750-789</b>		790-850	
5	650-699		700-724		725-749		<b>750-798</b>		799-850	
6	650-699		700-724		725-749		<b>750-789</b>		790-850	
7	650-699		700-724		725-749		<b>750-784</b>		785-850	
8	650-699		700-724		725-749		<b>750-793</b>		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
2	100-160	1-17	161-172	18-44	173-181	45-66	<b>182-204</b>	67-97*	205-350	97*-99
3	100-173	1-17	174-185	18-43	186-195	44-67	<b>196-217</b>	68-96	218-350	97-99
4	100-180	1-12	181-194	13-40	195-205	41-68	<b>206-223</b>	69-94	224-350	95-99
5	100-187	1-11	188-203	12-44	204-215	45-74	<b>216-236</b>	75-97	237-350	98-99
6	100-193	1-12	194-208	13-43	209-219	44-71	<b>220-236</b>	72-95	237-350	96-99
7	100-203	1-23	204-214	24-50	215-225	51-76	<b>226-236</b>	77-92	237-350	93-99
8	100-207	1-26	208-218	27-53	219-228	54-76	<b>229-242</b>	77-94	243-350	95-99
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
2	100-171	1-19	172-181	20-42	182-190	43-66	<b>191-210</b>	67-96*	211-350	96*-99
3	100-182	1-19	183-193	20-44	194-201	45-65	<b>202-222</b>	66-96*	223-350	96*-99
4	100-187	1-14	188-199	15-39	200-210	40-67	<b>211-226</b>	68-93	227-350	94-99
5	100-193	1-13	194-207	14-43	208-219	44-74	<b>220-237</b>	75-97*	238-350	97*-99
6	100-198	1-13	199-211	14-42	212-222	43-71	<b>223-237</b>	72-94	238-350	95-99
7	100-206	1-24	207-217	25-51	218-226	52-73	<b>227-237</b>	74-91	238-350	92-99
8	100-210	1-28	211-220	29-53	221-229	54-75	<b>230-243</b>	76-94	244-350	95-99

Notes. 1. %ile=percentile.

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

3. High-lighted text denotes Grade 2 benchmarks are extrapolated from Grade 3 cut scores.

4. \* 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 PARCC MATH AND MAP MATH (WHEN MAP IS TAKEN IN FALL OR WINTER PRIOR TO SPRING PARCC TESTS)

PARCC BENCHMARK I (CO, DC, IL, NJ, NM, RI)										
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		<b>750-789</b>		790-850	
4	650-699		700-724		725-749		<b>750-795</b>		796-850	
5	650-699		700-724		725-749		<b>750-789</b>		790-850	
6	650-699		700-724		725-749		<b>750-787</b>		788-850	
7	650-699		700-724		725-749		<b>750-785</b>		786-850	
8	650-699		700-724		725-749		<b>750-800</b>		801-850	

  

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
2	100-160	1-10	161-171	11-34	172-180	35-60	<b>181-196</b>	61-93	197-350	94-99
3	100-174	1-11	175-185	12-35	186-194	36-62	<b>195-209</b>	63-92	210-350	93-99
4	100-186	1-13	187-198	14-40	199-210	41-73	<b>211-229</b>	74-97	230-350	98-99
5	100-192	1-9	193-206	10-36	207-220	37-73	<b>221-240</b>	74-97*	241-350	97*-99
6	100-200	1-13	201-214	14-42	215-227	43-73	<b>228-245</b>	74-96*	246-350	96-99
7	100-205	1-15	206-220	16-44	221-235	45-78	<b>236-256</b>	79-97	257-350	98*-99
8	100-217	1-31	218-229	32-57	230-241	58-80	<b>242-263</b>	81-98*	264-350	98*-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
2	100-171	1-12	172-181	13-35	182-189	36-59	<b>190-204</b>	60-91	205-350	92-99
3	100-182	1-11	183-193	12-36	194-202	37-62	<b>203-216</b>	63-91	217-350	92-99
4	100-193	1-14	194-205	15-41	206-216	42-70	<b>217-235</b>	71-96	236-350	97-99
5	100-198	1-11	199-212	12-37	213-226	38-72	<b>227-246</b>	73-97*	247-350	97*-99
6	100-205	1-15	206-219	16-43	220-232	44-74	<b>233-249</b>	75-95	250-350	96-99
7	100-209	1-16	210-224	17-46	225-239	47-78	<b>240-260</b>	79-97	261-350	98-99
8	100-220	1-31	221-232	32-57	233-243	58-78	<b>244-265</b>	79-97*	266-350	97*-99

Notes. 1. %ile=percentile.

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

3. High-lighted text denotes Grade 2 benchmarks are extrapolated from Grade 3 cut scores.

4. \* 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 5. CONCORDANCE OF PERFORMANCE LEVEL SCORE RANGES BETWEEN PARCC ELA AND MAP READING (WHEN MAP IS TAKEN IN SPRING)

PARCC BENCHMARK II (MD, MA)										
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		<b>750-802</b>		803-850	
4	650-699		700-724		725-749		<b>750-802</b>		803-850	
5	650-699		700-724		725-749		<b>750-802</b>		803-850	
6	650-699		700-724		725-749		<b>750-802</b>		803-850	
7	650-699		700-724		725-749		<b>750-802</b>		803-850	
8	650-699		700-724		725-749		<b>750-802</b>		803-850	

  

MAP										
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
2	100-176	1-21	177-186	22-44	187-194	45-64	<b>195-211</b>	65-93	212-350	94-99
3	100-186	1-21	187-196	22-44	197-204	45-65	<b>205-221</b>	66-93	222-350	94-99
4	100-190	1-15	191-202	16-40	203-212	41-67	<b>213-232</b>	68-96*	233-350	96*-99
5	100-196	1-14	197-209	15-43	210-220	44-72	<b>221-240</b>	73-97*	241-350	97*-99
6	100-200	1-14	201-213	15-43	214-223	44-70	<b>224-242</b>	71-96	243-350	97-99
7	100-208	1-26	209-218	27-50	219-227	51-73	<b>228-243</b>	74-95*	244-350	95*-99
8	100-211	1-29	212-221	30-53	222-230	54-74	<b>231-247</b>	75-95	248-350	96-99

Notes. 1. %ile=percentile.

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

3. High-lighted text denotes Grade 2 benchmarks are extrapolated from Grade 3 cut scores.

4. \* 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 6. CONCORDANCE OF PERFORMANCE LEVEL SCORE RANGES BETWEEN PARCC MATH AND MAP MATH (WHEN MAP IS TAKEN IN SPRING)

PARCC BENCHMARK II (MD, MA)										
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		<b>750-802</b>		803-850	
4	650-699		700-724		725-749		<b>750-802</b>		803-850	
5	650-699		700-724		725-749		<b>750-802</b>		803-850	
6	650-699		700-724		725-749		<b>750-802</b>		803-850	
7	650-699		700-724		725-749		<b>750-802</b>		803-850	
8	650-699		700-724		725-749		<b>750-802</b>		803-850	

  

MAP										
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
2	100-177	1-14	178-187	15-36	188-195	37-59	<b>196-213</b>	60-94	214-350	95-99
3	100-188	1-14	189-198	15-36	199-207	37-61	<b>208-226</b>	62-95*	227-350	95*-99
4	100-198	1-15	199-210	16-42	211-221	43-70	<b>222-243</b>	71-97	244-350	98-99
5	100-202	1-12	203-216	13-38	217-230	39-71	<b>231-257</b>	72-98*	258-350	98*-99
6	100-208	1-15	209-222	16-43	223-235	44-72	<b>236-259</b>	73-97	260-350	98-99
7	100-211	1-16	212-226	17-45	227-241	46-76	<b>242-267</b>	77-98*	268-350	98*-99
8	100-222	1-32	223-234	33-57	235-245	58-77	<b>246-268</b>	78-97*	269-350	97*-99

Notes. 1. %ile=percentile.

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

3. High-lighted text denotes Grade 2 benchmarks are extrapolated from Grade 3 cut scores.

4. \* 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 7. CONCORDANCE OF PERFORMANCE LEVEL SCORE RANGES BETWEEN PARCC ELA AND MAP READING (WHEN MAP IS TAKEN IN FALL OR WINTER PRIOR TO SPRING PARCC TESTS)

PARCC BENCHMARK II (MD, MA)										
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		<b>750-802</b>		803-850	
4	650-699		700-724		725-749		<b>750-802</b>		803-850	
5	650-699		700-724		725-749		<b>750-802</b>		803-850	
6	650-699		700-724		725-749		<b>750-802</b>		803-850	
7	650-699		700-724		725-749		<b>750-802</b>		803-850	
8	650-699		700-724		725-749		<b>750-802</b>		803-850	
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
2	100-160	1-17	161-172	18-44	173-181	45-66	<b>182-201</b>	67-95	202-350	96-99
3	100-173	1-17	174-185	18-43	186-195	44-67	<b>196-215</b>	68-95	216-350	96-99
4	100-180	1-12	181-194	13-40	195-205	41-68	<b>206-229</b>	69-97	230-350	98-99
5	100-187	1-11	188-203	12-44	204-215	45-74	<b>216-238</b>	75-98*	239-350	98*-99
6	100-193	1-12	194-208	13-43	209-219	44-71	<b>220-240</b>	72-97*	241-350	97*-99
7	100-203	1-23	204-214	24-50	215-225	51-76	<b>226-241</b>	77-96*	242-350	96*-99
8	100-207	1-26	208-218	27-53	219-228	54-76	<b>229-245</b>	77-96*	246-350	96*-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
2	100-171	1-19	172-181	20-42	182-190	43-66	<b>191-208</b>	67-94	209-350	95-99
3	100-182	1-19	183-193	20-44	194-201	45-65	<b>202-220</b>	66-94	221-350	95-99
4	100-187	1-14	188-199	15-39	200-210	40-67	<b>211-231</b>	68-96	232-350	97-99
5	100-193	1-13	194-207	14-43	208-219	44-74	<b>220-239</b>	75-97	240-350	98-99
6	100-198	1-13	199-211	14-42	212-222	43-71	<b>223-241</b>	72-96	242-350	97-99
7	100-206	1-24	207-217	25-51	218-226	52-73	<b>227-242</b>	74-95	243-350	96-99
8	100-210	1-28	211-220	29-53	221-229	54-75	<b>230-246</b>	76-96*	247-350	96*-99

Notes. 1. %ile=percentile.

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

3. High-lighted text denotes Grade 2 benchmarks are extrapolated from Grade 3 cut scores.

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

PARCC BENCHMARK II (MD, MA)										
Grade	Level 1 <i>Did not Meet</i>		Level 2 <i>Partially Met</i>		Level 3 <i>Approached</i>		Level 4 <i>Met</i>		Level 5 <i>Exceeded</i>	
3	650-699		700-724		725-749		<b>750-802</b>		803-850	
4	650-699		700-724		725-749		<b>750-802</b>		803-850	
5	650-699		700-724		725-749		<b>750-802</b>		803-850	
6	650-699		700-724		725-749		<b>750-802</b>		803-850	
7	650-699		700-724		725-749		<b>750-802</b>		803-850	
8	650-699		700-724		725-749		<b>750-802</b>		803-850	
MAP FALL										
Grade	Level 1 <i>Did not Meet</i>		Level 2 <i>Partially Met</i>		Level 3 <i>Approached</i>		Level 4 <i>Met</i>		Level 5 <i>Exceeded</i>	
	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile
2	100-160	1-10	161-171	11-34	172-180	35-60	<b>181-201</b>	61-96	202-350	97-99
3	100-174	1-11	175-185	12-35	186-194	36-62	<b>195-215</b>	63-97*	216-350	97*-99
4	100-186	1-13	187-198	14-40	199-210	41-73	<b>211-232</b>	74-98*	233-350	98*-99
5	100-192	1-9	193-206	10-36	207-220	37-73	<b>221-247</b>	74-99*	248-350	99*-99
6	100-200	1-13	201-214	14-42	215-227	43-73	<b>228-252</b>	74-98*	253-350	98*-99
7	100-205	1-15	206-220	16-44	221-235	45-78	<b>236-261</b>	79-99*	262-350	99*-99
8	100-217	1-31	218-229	32-57	230-241	58-80	<b>242-264</b>	81-98*	265-350	98*-99
MAP WINTER										
Grade	Level 1 <i>Did not Meet</i>		Level 2 <i>Partially Met</i>		Level 3 <i>Approached</i>		Level 4 <i>Met</i>		Level 5 <i>Exceeded</i>	
	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile	RIT	%ile
2	100-171	1-12	172-181	13-35	182-189	36-59	<b>190-208</b>	60-95	209-350	96-99
3	100-182	1-11	183-193	12-36	194-202	37-62	<b>203-221</b>	63-96*	222-350	96*-99
4	100-193	1-14	194-205	15-41	206-216	42-70	<b>217-238</b>	71-98*	239-350	98*-99
5	100-198	1-11	199-212	12-37	213-226	38-72	<b>227-253</b>	73-99*	254-350	99*-99
6	100-205	1-15	206-219	16-43	220-232	44-74	<b>233-256</b>	75-98*	257-350	98*-99
7	100-209	1-16	210-224	17-46	225-239	47-78	<b>240-265</b>	79-98	266-350	99-99
8	100-220	1-31	221-232	32-57	233-243	58-78	<b>244-266</b>	79-97	267-350	98-99

Notes. 1. %ile=percentile.

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

3. High-lighted text denotes Grade 2 benchmarks are extrapolated from Grade 3 cut scores.

4. \* 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, & 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 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 9 demonstrate that on average, MAP reading scores can consistently classify students’ proficiency (Level 4 or higher) status on PARCC ELA test approximately 83% 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 9. 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	0.85	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

## 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 10 to 12. 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 3<sup>rd</sup> 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 3<sup>rd</sup> grade is 78%. Table 10 presents the estimated probability of meeting Level 4 benchmark when MAP is taken in the spring, whereas Tables 11 and 12 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 10. PROFICIENCY PROJECTION AND PROBABILITY FOR PASSING PARCC LEVEL 4 (MET) 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.
2	5	164	195	No	<0.01	5	170	196	No	<0.01
	10	169	195	No	<0.01	10	175	196	No	<0.01
	15	173	195	No	<0.01	15	178	196	No	<0.01
	20	176	195	No	<0.01	20	181	196	No	<0.01
	25	178	195	No	<0.01	25	183	196	No	<0.01
	30	181	195	No	<0.01	30	185	196	No	<0.01
	35	183	195	No	<0.01	35	187	196	No	<0.01
	40	185	195	No	<0.01	40	189	196	No	0.01
	45	187	195	No	0.01	45	190	196	No	0.02
	50	189	195	No	0.03	50	192	196	No	0.08
	55	191	195	No	0.11	55	194	196	No	0.25
	60	193	195	No	0.27	60	196	196	Yes	0.50
	65	195	195	Yes	0.50	65	197	196	Yes	0.63
	70	197	195	Yes	0.73	70	199	196	Yes	0.85
	75	199	195	Yes	0.89	75	201	196	Yes	0.96
	80	201	195	Yes	0.97	80	204	196	Yes	>0.99
	85	204	195	Yes	>0.99	85	206	196	Yes	>0.99
90	208	195	Yes	>0.99	90	209	196	Yes	>0.99	
95	214	195	Yes	>0.99	95	214	196	Yes	>0.99	
3	5	174	205	No	<0.01	5	181	208	No	<0.01
	10	179	205	No	<0.01	10	186	208	No	<0.01
	15	183	205	No	<0.01	15	189	208	No	<0.01
	20	186	205	No	<0.01	20	192	208	No	<0.01
	25	188	205	No	<0.01	25	194	208	No	<0.01
	30	191	205	No	<0.01	30	196	208	No	<0.01
	35	193	205	No	<0.01	35	198	208	No	<0.01
	40	195	205	No	<0.01	40	200	208	No	<0.01
	45	197	205	No	0.01	45	202	208	No	0.02
	50	199	205	No	0.03	50	203	208	No	0.04
	55	201	205	No	0.11	55	205	208	No	0.15
	60	202	205	No	0.17	60	207	208	No	0.37
	65	204	205	No	0.38	65	209	208	Yes	0.63
	70	207	205	Yes	0.73	70	211	208	Yes	0.85
	75	209	205	Yes	0.89	75	213	208	Yes	0.96
	80	211	205	Yes	0.97	80	215	208	Yes	0.99
	85	214	205	Yes	>0.99	85	218	208	Yes	>0.99
90	218	205	Yes	>0.99	90	221	208	Yes	>0.99	
95	223	205	Yes	>0.99	95	226	208	Yes	>0.99	

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

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



TABLE 10. (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.
8	5	194	231	No	<0.01	5	199	246	No	<0.01
	10	200	231	No	<0.01	10	206	246	No	<0.01
	15	204	231	No	<0.01	15	211	246	No	<0.01
	20	207	231	No	<0.01	20	215	246	No	<0.01
	25	209	231	No	<0.01	25	218	246	No	<0.01
	30	212	231	No	<0.01	30	221	246	No	<0.01
	35	214	231	No	<0.01	35	224	246	No	<0.01
	40	216	231	No	<0.01	40	226	246	No	<0.01
	45	218	231	No	<0.01	45	229	246	No	<0.01
	50	220	231	No	<0.01	50	231	246	No	<0.01
	55	222	231	No	<0.01	55	233	246	No	<0.01
	60	224	231	No	0.01	60	236	246	No	<0.01
	65	226	231	No	0.06	65	238	246	No	<0.01
	70	228	231	No	0.17	70	241	246	No	0.04
	75	231	231	Yes	0.50	75	244	246	No	0.25
	80	233	231	Yes	0.73	80	247	246	Yes	0.63
85	236	231	Yes	0.94	85	251	246	Yes	0.96	
90	240	231	Yes	>0.99	90	255	246	Yes	>0.99	
95	246	231	Yes	>0.99	95	262	246	Yes	>0.99	

Note. %ile=percentile

TABLE 11. PROFICIENCY PROJECTION AND PROBABILITY FOR PASSING PARCC ELA LEVEL 4 (MET) 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.
2	5	149	195	No	<0.01	5	160	195	No	<0.01
	10	155	195	No	<0.01	10	165	195	No	<0.01
	15	159	195	No	0.01	15	169	195	No	<0.01
	20	162	195	No	0.01	20	172	195	No	<0.01
	25	164	195	No	0.03	25	174	195	No	<0.01
	30	167	195	No	0.05	30	176	195	No	0.01
	35	169	195	No	0.08	35	178	195	No	0.01
	40	171	195	No	0.12	40	180	195	No	0.03
	45	173	195	No	0.15	45	182	195	No	0.07
	50	175	195	No	0.22	50	184	195	No	0.14
	55	177	195	No	0.30	55	186	195	No	0.18
	60	179	195	No	0.35	60	188	195	No	0.29
	65	181	195	No	0.45	65	190	195	No	0.43
	70	183	195	Yes	0.55	70	192	195	Yes	0.57
	75	185	195	Yes	0.60	75	194	195	Yes	0.71
	80	188	195	Yes	0.74	80	197	195	Yes	0.86
	85	191	195	Yes	0.81	85	200	195	Yes	0.95
90	195	195	Yes	0.92	90	203	195	Yes	0.99	
95	200	195	Yes	0.97	95	209	195	Yes	>0.99	
3	5	162	205	No	<0.01	5	171	205	No	<0.01
	10	168	205	No	<0.01	10	176	205	No	<0.01
	15	172	205	No	<0.01	15	180	205	No	<0.01
	20	175	205	No	0.01	20	183	205	No	<0.01
	25	178	205	No	0.02	25	185	205	No	<0.01
	30	180	205	No	0.03	30	188	205	No	0.01
	35	182	205	No	0.05	35	190	205	No	0.01
	40	184	205	No	0.08	40	192	205	No	0.03
	45	186	205	No	0.13	45	194	205	No	0.06
	50	188	205	No	0.16	50	196	205	No	0.13
	55	190	205	No	0.24	55	198	205	No	0.22
	60	192	205	No	0.34	60	199	205	No	0.28
	65	194	205	No	0.39	65	201	205	No	0.42
	70	197	205	Yes	0.56	70	204	205	Yes	0.65
	75	199	205	Yes	0.66	75	206	205	Yes	0.72
	80	202	205	Yes	0.76	80	208	205	Yes	0.83
	85	205	205	Yes	0.87	85	211	205	Yes	0.94
90	209	205	Yes	0.94	90	215	205	Yes	0.99	
95	214	205	Yes	0.98	95	221	205	Yes	>0.99	

TABLE 11. (CONTINUED)

Grade	Start %ile	RIT Fall	Projected Proficiency			Start %ile	RIT Winter	Projected Proficiency		
			Cut-Score	Level 4	Prob.			Cut-Score	Level 4	Prob.
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	
5	5	181	221	No	<0.01	5	186	221	No	<0.01
	10	186	221	No	<0.01	10	191	221	No	<0.01
	15	190	221	No	<0.01	15	195	221	No	<0.01
	20	193	221	No	<0.01	20	197	221	No	<0.01
	25	195	221	No	<0.01	25	200	221	No	<0.01
	30	198	221	No	0.01	30	202	221	No	<0.01
	35	200	221	No	0.02	35	204	221	No	<0.01
	40	202	221	No	0.04	40	206	221	No	0.01
	45	204	221	No	0.05	45	208	221	No	0.02
	50	206	221	No	0.09	50	210	221	No	0.04
	55	208	221	No	0.15	55	212	221	No	0.09
	60	210	221	No	0.23	60	214	221	No	0.17
	65	212	221	No	0.28	65	215	221	No	0.22
	70	214	221	No	0.38	70	218	221	No	0.42
	75	216	221	Yes	0.50	75	220	221	Yes	0.50
	80	218	221	Yes	0.56	80	222	221	Yes	0.65
	85	221	221	Yes	0.72	85	225	221	Yes	0.83
90	225	221	Yes	0.85	90	229	221	Yes	0.96	
95	231	221	Yes	0.97	95	234	221	Yes	>0.99	

TABLE 11. (CONTINUED)

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

TABLE 11. (CONTINUED)

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

Note. %ile=percentile

TABLE 12. PROFICIENCY PROJECTION AND PROBABILITY FOR PASSING PARCC MATH LEVEL 4 (MET) 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.
2	5	155	196	No	<0.01	5	165	196	No	<0.01
	10	160	196	No	<0.01	10	170	196	No	<0.01
	15	163	196	No	0.01	15	173	196	No	<0.01
	20	166	196	No	0.03	20	175	196	No	<0.01
	25	168	196	No	0.04	25	178	196	No	0.01
	30	170	196	No	0.07	30	180	196	No	0.02
	35	172	196	No	0.12	35	181	196	No	0.03
	40	174	196	No	0.19	40	183	196	No	0.08
	45	175	196	No	0.19	45	185	196	No	0.15
	50	177	196	No	0.28	50	186	196	No	0.21
	55	179	196	No	0.39	55	188	196	No	0.34
	60	180	196	No	0.44	60	190	196	Yes	0.50
	65	182	196	Yes	0.56	65	191	196	Yes	0.58
	70	184	196	Yes	0.61	70	193	196	Yes	0.66
	75	186	196	Yes	0.72	75	195	196	Yes	0.79
	80	188	196	Yes	0.81	80	197	196	Yes	0.89
	85	191	196	Yes	0.90	85	200	196	Yes	0.97
90	194	196	Yes	0.94	90	203	196	Yes	0.99	
95	199	196	Yes	0.99	95	208	196	Yes	>0.99	
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
	85	204	208	Yes	0.89	85	212	208	Yes	0.97
90	207	208	Yes	0.96	90	215	208	Yes	0.99	
95	212	208	Yes	0.99	95	220	208	Yes	>0.99	

TABLE 12. (CONTINUED)

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

TABLE 12. (CONTINUED)

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



TABLE 12. (CONTINUED)

Grade	Start %ile	RIT Fall	Projected Proficiency			Start %ile	RIT Winter	Projected Proficiency		
			Cut-Score	Level 4	Prob.			Cut-Score	Level 4	Prob.
8	5	197	246	No	<0.01	5	199	246	No	<0.01
	10	203	246	No	<0.01	10	206	246	No	<0.01
	15	208	246	No	<0.01	15	210	246	No	<0.01
	20	211	246	No	<0.01	20	214	246	No	<0.01
	25	214	246	No	<0.01	25	217	246	No	<0.01
	30	217	246	No	<0.01	30	220	246	No	<0.01
	35	219	246	No	<0.01	35	222	246	No	<0.01
	40	222	246	No	0.01	40	225	246	No	<0.01
	45	224	246	No	0.01	45	227	246	No	<0.01
	50	226	246	No	0.02	50	229	246	No	<0.01
	55	229	246	No	0.06	55	231	246	No	<0.01
	60	231	246	No	0.10	60	234	246	No	0.02
	65	233	246	No	0.15	65	236	246	No	0.06
	70	236	246	No	0.22	70	239	246	No	0.16
	75	238	246	No	0.30	75	241	246	No	0.28
	80	241	246	No	0.45	80	245	246	Yes	0.58
	85	245	246	Yes	0.65	85	248	246	Yes	0.79
90	249	246	Yes	0.82	90	253	246	Yes	0.96	
95	256	246	Yes	0.97	95	259	246	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 2 to 8 that correspond to each PARCC performance level. By using matched score data from a sample of students from PARCC participating states, 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 393 schools in PARCC participating 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 concorded scores are used for a subpopulation. NWEA will continue to gather information about PARCC performance from other schools in PARCC participating states to enhance the quality and generalizability of the study.

## 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

### Data and Analysis

#### Data

Data used in this study were collected from 393 schools in Colorado, District of Columbia, Illinois, Maryland, New Jersey, New Mexico, and Rhode Island. The sample contained matched PARCC ELA and MAP reading scores from 267,290 students in Grades 3 to 8 and matched PARCC and MAP math scores from 264,583 students in Grades 3 to 8 who completed both PARCC and MAP in the spring of 2016.

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 0.76 to 0.80, and the correlation coefficients between MAP and PARCC math scores range from 0.82 to 0.85. 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	47463	0.80	735.53	41.28	650	850	198.53	16.57	137	251
	4	45045	0.79	737.22	35.18	650	850	206.57	16.00	139	263
	5	44093	0.79	735.11	32.85	650	850	213.03	15.70	140	272
	6	46123	0.78	736.12	32.20	650	850	217.03	14.95	143	273
	7	44179	0.77	737.04	37.03	650	850	221.66	14.69	145	272
	8	40387	0.76	737.15	36.48	650	850	225.19	14.43	142	279
Math	3	47534	0.84	739.39	36.52	650	850	203.37	14.17	137	283
	4	45129	0.85	731.84	33.65	650	850	213.42	15.39	136	295
	5	44138	0.85	734.68	31.77	650	850	222.09	17.36	137	301
	6	46184	0.85	731.80	31.93	650	850	225.64	16.99	135	310
	7	43899	0.84	733.30	29.46	650	850	231.55	17.63	145	309
	8	37699	0.82	729.86	39.04	650	850	235.98	18.60	143	318

### 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 concorded scores 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 “Met” 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 Negative
	At or Above MAP cut	False Positive	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 PARCC based on that student’s MAP scores in prior seasons (e.g. fall and winter). The probability of a student achieving Level 4 (Met) 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,  $\Phi$  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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