Massachusetts
LINKING STUDY

A Study of the Alignment of the NWEA RIT Scale with the Massachusetts Comprehensive Assessment System

February 2011

A STUDY OF THE ALIGNMENT OF THE NWEA RIT SCALE WITH THE MASSACHUSETTS COMPREHENSIVE ASSESSEMENT SYSTEM

FEBRUARY 2011

Recently, NWEA completed a project to connect the scale of Massachusetts Comprehensive Assessment System used for Massachusetts mathematics and English language arts assessments with NWEA's RIT scale. Information from the state assessments was used in a study to establish performance-level scores on the RIT scale that would indicate a good chance of success on these tests.

To perform the analysis, we linked together state test and NWEA test results for a sample over 13,500 students from 77 schools who completed both exams in the spring of 2010. The Massachusetts Comprehensive Assessment System state test is administered in the spring. For the spring season (labeled "current season"), an Equipercentile method was used to estimate the RIT score equivalent to each state performance level. For fall (labeled "prior season"), we determined the percentage of the population within the selected study group that performed at each level on the state test and found the equivalent percentile ranges within the NWEA dataset to estimate the cut scores. For example, if 40% of the study group population in grade 3 mathematics performed below the proficient level on the state test, we would find the RIT score that would be equivalent to the 40th percentile for the study population (this would not be the same as the 40th percentile in the NWEA norms). This RIT score would be the estimated point on the NWEA RIT scale that would be equivalent to the minimum score for proficiency on the state test. Documentation about this method can be found on our website.

Tables 1 through 4 show the best estimate of the minimum RIT equivalent to each state performance level for same-season (spring) and prior-season (fall) RIT scores. These tables can be used to identify students who may need additional help to perform well on these tests.

Tables 5 through 8 show the estimated probability of a student receiving a proficient score on the state assessment, based on that student's RIT score. These tables can be used to assist in identifying students who are not likely to pass these assessments and also for identifying target RIT-score objectives likely to correspond to a student's successful level of performance on the state test.

Table 9 shows the correlation coefficients between MAP and the state test for reading and mathematics in each grade. These statistics show the degree to which MAP and the state test are linearly related, with values at or near 1.0 suggesting a perfect linear relationship, and values near 0.0 indicating no linear relationship. Table 10 shows the percentages of students at each grade and within each subject whose status on the state test (i.e., whether or not the student "met standards") was accurately predicted by their MAP performance and using the estimated cut scores within the current study. This table can be used to understand the predictive validity of MAP with respect to the Massachusetts Comprehensive Assessment System.

TABLE 1 – MINIMUM ESTIMATED SAME-SEASON (SPRING) RIT CUT SCORES CORRESPONDING TO STATE PERFORMANCE LEVELS – MATHEMATICS

MATH-Current Season							
Cut Scores and Percentiles for each State Performance Level							
Grade	Warning	Needs Improvement		Proficient		Advanced	
	Cut Score	Cut Score	Percen-tile	Cut Score	Percen-tile	Cut Score	Percen-tile
2	<181	181	20	194	59	205	89
3	<192	192	20	205	59	217	89
4	<202	202	24	221	76	232	94
5	<212	212	32	226	66	238	90
6	<216	216	30	230	63	242	89
7	<222	222	34	237	68	252	93
8	<228	228	37	242	69	252	88

*Note: the cut scores shown in this table are the **minimum** estimated scores. Meeting the minimum MAP cut score corresponds to a 50% probability of achieving that performance level. Use the probabilities in Tables 5-8 to determine the appropriate 'target' scores for a desired level of certainty. Italics represent extrapolated data.

TABLE 2 – MINIMUM ESTIMATED SAME-SEASON (SPRING) RIT CUT SCORES CORRESPONDING TO STATE PERFORMANCE LEVELS – READING

Reading-Current Season							
Cut Scores and Percentiles for each State Performance Level							
Grade	Warning	Needs Improvement		Proficient		Advanced	
	Cut Score	Cut Score	Percen-tile	Cut Score	Percen-tile	Cut Score	Percen-tile
2	<171	171	9	191	51	209	94
3	<180	180	9	200	51	218	94
4	<193	193	17	210	60	227	96
5	<196	196	13	213	53	227	90
6	<196	196	9	213	41	231	90
7	<194	194	6	214	35	238	95
8	<197	197	6	215	29	238	91

*Note: the cut scores shown in this table are the **minimum** estimated scores. Meeting the minimum MAP cut score corresponds to a 50% probability of achieving that performance level. Use the probabilities in Tables 5-8 to determine the appropriate 'target' scores for a desired level of certainty. Italics represent extrapolated data.

TABLE 3 – MINIMUM ESTIMATED PRIOR-SEASON (FALL) RIT CUT SCORES CORRESPONDING TO STATE PERFORMANCE LEVELS – MATHEMATICS

MATH-Prior Season Cut Scores and Percentiles for each State Performance Level							
Grade	Warning	Needs Improvement		Proficient		Advanced	
	Cut Score	Cut Score	Percen-tile	Cut Score	Percen-tile	Cut Score	Percen-tile
2	<170	170	20	181	60	193	90
3	<182	182	21	195	60	206	90
4	<195	195	25	211	76	222	94
5	<206	206	34	217	66	229	90
6	<211	211	31	224	65	236	89
7	<218	218	34	232	68	247	93
8	<225	225	38	239	71	249	89

*Note: the cut scores shown in this table are the **minimum** estimated scores. Meeting the minimum MAP cut score corresponds to a 50% probability of achieving that performance level. Use the probabilities in Tables 5-8 to determine the appropriate 'target' scores for a desired level of certainty. Italics represent extrapolated data.

TABLE 4 – MINIMUM ESTIMATED PRIOR-SEASON (FALL) RIT CUT SCORES CORRESPONDING TO STATE PERFORMANCE LEVELS – READING

Reading-Prior Season Cut Scores and Percentiles for each State Performance Level							
Grade	Warning	Needs Improvement		Proficient		Advanced	
	Cut Score	Cut Score	Percen-tile	Cut Score	Percen-tile	Cut Score	Percen-tile
2	<162	162	9	180	53	200	94
3	<173	173	9	192	51	211	94
4	<187	187	17	204	60	222	96
5	<191	191	13	209	54	223	91
6	<192	192	9	210	42	228	90
7	<191	191	6	212	37	236	95
8	<195	195	6	213	30	236	91

*Note: the cut scores shown in this table are the **minimum** estimated scores. Meeting the minimum MAP cut score corresponds to a 50% probability of achieving that performance level. Use the probabilities in Tables 5-8 to determine the appropriate 'target' scores for a desired level of certainty. Italics represent extrapolated data.

TABLE 5 –ESTIMATED PROBABILITY OF SCORING AS PROFICIENT OR HIGHER ON THE STATE MATHEMATICS TEST IN SAME SEASON (SPRING), BY STUDENT GRADE AND RIT SCORE RANGE ON MAP MATHEMATICS

MATH-Current Season							
Estimated Probability of Passing State Test Based on Observed MAP Score							
RIT Range	2	3	4	5	6	7	8
120	***0%***	0%	0%	0%	0%	0%	0%
125	***0%***	0%	0%	0%	0%	0%	0%
130	***0%***	0%	0%	0%	0%	0%	0%
135	***0%***	0%	0%	0%	0%	0%	0%
140	***0%***	0%	0%	0%	0%	0%	0%
145	***1%***	0%	0%	0%	0%	0%	0%
150	***1%***	0%	0%	0%	0%	0%	0%
155	***2%***	1%	0%	0%	0%	0%	0%
160	***3%***	1%	0%	0%	0%	0%	0%
165	***5%***	2%	0%	0%	0%	0%	0%
170	***8%***	3%	1%	0%	0%	0%	0%
175	***13%***	5%	1%	1%	0%	0%	0%
180	***20%***	8%	2%	1%	1%	0%	0%
185	***29%***	12%	3%	2%	1%	1%	0%
190	***40%***	18%	4%	3%	2%	1%	1%
195	***52%***	27%	7%	4%	3%	1%	1%
200	***65%***	38%	11%	7%	5%	2%	1%
205	***75%***	50%	17%	11%	8%	4%	2%
210	***83%***	62%	25%	17%	12%	6%	4%
215	***89%***	73%	35%	25%	18%	10%	6%
220	***93%***	82%	48%	35%	27%	15%	10%
225	***96%***	88%	60%	48%	38%	23%	15%
230	***97%***	92%	71%	60%	50%	33%	23%
235	***98%***	95%	80%	71%	62%	45%	33%
240	***99%***	97%	87%	80%	73%	57%	45%
245	***99%***	98%	92%	87%	82%	69%	57%
250	***100%***	99%	95%	92%	88%	79%	69%
255	***100%***	99%	97%	95%	92%	86%	79%
260	***100%***	100%	98%	97%	95%	91%	86%
265	***100%***	100%	99%	98%	97%	94%	91%
270	***100%***	100%	99%	99%	98%	96%	94%
275	***100%***	100%	100%	99%	99%	98%	96%
280	***100%***	100%	100%	100%	99%	99%	98%
285	***100%***	100%	100%	100%	100%	99%	99%
290	***100%***	100%	100%	100%	100%	100%	99%
295	***100%***	100%	100%	100%	100%	100%	100%
300	***100%***	100%	100%	100%	100%	100%	100%

Note: This table provides the estimated probability of passing the state test based on a MAP test score taken during that same (spring) season. Example: if a fifth grade student scored 200 on a MAP test taken during the spring season, her/his estimated probability of passing the state test is 7%.

Bold italics represent extrapolated data.

TABLE 6 –ESTIMATED PROBABILITY OF SCORING AS PROFICIENT OR HIGHER ON THE STATE READING TEST IN SAME SEASON (SPRING), BY STUDENT GRADE AND RIT SCORE RANGE ON MAP READING

READING-Current Season							
Estimated Probability of Passing State Test Based on Observed MAP Score							
RIT Range	2	3	4	5	6	7	8
120	***0%***	0%	0%	0%	0%	0%	0%
125	***0%***	0%	0%	0%	0%	0%	0%
130	***0%***	0%	0%	0%	0%	0%	0%
135	***0%***	0%	0%	0%	0%	0%	0%
140	***1%***	0%	0%	0%	0%	0%	0%
145	***1%***	0%	0%	0%	0%	0%	0%
150	***2%***	1%	0%	0%	0%	0%	0%
155	***3%***	1%	0%	0%	0%	0%	0%
160	***4%***	2%	1%	0%	0%	0%	0%
165	***7%***	3%	1%	1%	1%	1%	1%
170	***11%***	5%	2%	1%	1%	1%	1%
175	***17%***	8%	3%	2%	2%	2%	2%
180	***25%***	12%	5%	4%	4%	3%	3%
185	***35%***	18%	8%	6%	6%	5%	5%
190	***48%***	27%	12%	9%	9%	8%	8%
195	***60%***	38%	18%	14%	14%	13%	12%
200	***71%***	50%	27%	21%	21%	20%	18%
205	***80%***	62%	38%	31%	31%	29%	27%
210	***87%***	73%	50%	43%	43%	40%	38%
215	***92%***	82%	62%	55%	55%	52%	50%
220	***95%***	88%	73%	67%	67%	65%	62%
225	***97%***	92%	82%	77%	77%	75%	73%
230	***98%***	95%	88%	85%	85%	83%	82%
235	***99%***	97%	92%	90%	90%	89%	88%
240	***99%***	98%	95%	94%	94%	93%	92%
245	***100%***	99%	97%	96%	96%	96%	95%
250	***100%***	99%	98%	98%	98%	97%	97%
255	***100%***	100%	99%	99%	99%	98%	98%
260	***100%***	100%	99%	99%	99%	99%	99%
265	***100%***	100%	100%	99%	99%	99%	99%
270	***100%***	100%	100%	100%	100%	100%	100%
275	***100%***	100%	100%	100%	100%	100%	100%
280	***100%***	100%	100%	100%	100%	100%	100%
285	***100%***	100%	100%	100%	100%	100%	100%
290	***100%***	100%	100%	100%	100%	100%	100%
295	***100%***	100%	100%	100%	100%	100%	100%
300	***100%***	100%	100%	100%	100%	100%	100%

Note: This table provides the estimated probability of passing the state test based on a MAP test score taken during that same (spring) season. Example: if a fifth grade student scored 200 on a MAP test taken during the spring season, her/his estimated probability of passing the state test is 21%.

Bold italics represent extrapolated data.

TABLE 7 –ESTIMATED PROBABILITY OF SCORING AS PROFICIENT OR HIGHER ON THE STATE MATHEMATICS TEST IN PRIOR SEASON (FALL), BY STUDENT GRADE AND RIT SCORE RANGE ON MAP MATHEMATICS

MATH-Prior Season Estimated Probability of Passing State Test Based on Observed MAP Score							
RIT Range	2	3	4	5	6	7	8
120	***0%***	0%	0%	0%	0%	0%	0%
125	***0%***	0%	0%	0%	0%	0%	0%
130	***1%***	0%	0%	0%	0%	0%	0%
135	***1%***	0%	0%	0%	0%	0%	0%
140	***2%***	0%	0%	0%	0%	0%	0%
145	***3%***	1%	0%	0%	0%	0%	0%
150	***4%***	1%	0%	0%	0%	0%	0%
155	***7%***	2%	0%	0%	0%	0%	0%
160	***11%***	3%	1%	0%	0%	0%	0%
165	***17%***	5%	1%	1%	0%	0%	0%
170	***25%***	8%	2%	1%	0%	0%	0%
175	***35%***	12%	3%	1%	1%	0%	0%
180	***48%***	18%	4%	2%	1%	1%	0%
185	***60%***	27%	7%	4%	2%	1%	0%
190	***71%***	38%	11%	6%	3%	1%	1%
195	***80%***	50%	17%	10%	5%	2%	1%
200	***87%***	62%	25%	15%	8%	4%	2%
205	***92%***	73%	35%	23%	13%	6%	3%
210	***95%***	82%	48%	33%	20%	10%	5%
215	***97%***	88%	60%	45%	29%	15%	8%
220	***98%***	92%	71%	57%	40%	23%	13%
225	***99%***	95%	80%	69%	52%	33%	20%
230	***99%***	97%	87%	79%	65%	45%	29%
235	***100%***	98%	92%	86%	75%	57%	40%
240	***100%***	99%	95%	91%	83%	69%	52%
245	***100%***	99%	97%	94%	89%	79%	65%
250	***100%***	100%	98%	96%	93%	86%	75%
255	***100%***	100%	99%	98%	96%	91%	83%
260	***100%***	100%	99%	99%	97%	94%	89%
265	***100%***	100%	100%	99%	98%	96%	93%
270	***100%***	100%	100%	100%	99%	98%	96%
275	***100%***	100%	100%	100%	99%	99%	97%
280	***100%***	100%	100%	100%	100%	99%	98%
285	***100%***	100%	100%	100%	100%	100%	99%
290	***100%***	100%	100%	100%	100%	100%	99%
295	***100%***	100%	100%	100%	100%	100%	100%
300	***100%***	100%	100%	100%	100%	100%	100%

*Note: This table provides the estimated probability of passing the state test based on a MAP test score taken during that prior (fall) season. Example: if a fifth grade student scored 200 on a MAP test taken during the fall season, her/his estimated probability of passing the state test is 15%.

Bold italics represent extrapolated data.

TABLE 8 –ESTIMATED PROBABILITY OF SCORING AS PROFICIENT OR HIGHER ON THE STATE READING TEST IN PRIOR SEASON (FALL), BY STUDENT GRADE AND RIT SCORE RANGE ON MAP READING

READING-Prior Season Estimated Probability of Passing State Test Based on Observed MAP Score							
RIT Range	2	3	4	5	6	7	8
120	***0%***	0%	0%	0%	0%	0%	0%
125	***0%***	0%	0%	0%	0%	0%	0%
130	***1%***	0%	0%	0%	0%	0%	0%
135	***1%***	0%	0%	0%	0%	0%	0%
140	***2%***	1%	0%	0%	0%	0%	0%
145	***3%***	1%	0%	0%	0%	0%	0%
150	***5%***	1%	0%	0%	0%	0%	0%
155	***8%***	2%	1%	0%	0%	0%	0%
160	***12%***	4%	1%	1%	1%	1%	0%
165	***18%***	6%	2%	1%	1%	1%	1%
170	***27%***	10%	3%	2%	2%	1%	1%
175	***38%***	15%	5%	3%	3%	2%	2%
180	***50%***	23%	8%	5%	5%	4%	4%
185	***62%***	33%	13%	8%	8%	6%	6%
190	***73%***	45%	20%	13%	12%	10%	9%
195	***82%***	57%	29%	20%	18%	15%	14%
200	***88%***	69%	40%	29%	27%	23%	21%
205	***92%***	79%	52%	40%	38%	33%	31%
210	***95%***	86%	65%	52%	50%	45%	43%
215	***97%***	91%	75%	65%	62%	57%	55%
220	***98%***	94%	83%	75%	73%	69%	67%
225	***99%***	96%	89%	83%	82%	79%	77%
230	***99%***	98%	93%	89%	88%	86%	85%
235	***100%***	99%	96%	93%	92%	91%	90%
240	***100%***	99%	97%	96%	95%	94%	94%
245	***100%***	100%	98%	97%	97%	96%	96%
250	***100%***	100%	99%	98%	98%	98%	98%
255	***100%***	100%	99%	99%	99%	99%	99%
260	***100%***	100%	100%	99%	99%	99%	99%
265	***100%***	100%	100%	100%	100%	100%	99%
270	***100%***	100%	100%	100%	100%	100%	100%
275	***100%***	100%	100%	100%	100%	100%	100%
280	***100%***	100%	100%	100%	100%	100%	100%
285	***100%***	100%	100%	100%	100%	100%	100%
290	***100%***	100%	100%	100%	100%	100%	100%
295	***100%***	100%	100%	100%	100%	100%	100%
300	***100%***	100%	100%	100%	100%	100%	100%

*Note: This table provides the estimated probability of passing the state test based on a MAP test score taken during the prior (fall) season. Example: if a fifth grade student scored 200 on a MAP test taken during the fall season, her/his estimated probability of passing the state test is 29%.

Bold italics represent extrapolated data.

TABLE 9 – CORRELATION COEFFICIENTS BETWEEN MAP AND STATE TEST FOR EACH GRADE AND TEST SUBJECT

Grade	Math Correlation Pearson's *r*	English Correlation Pearson's *r*
3	0.771	0.747
4	0.771	0.726
5	0.816	0.734
6	0.807	0.742
7	0.808	0.744
8	0.815	0.777

* Note: Correlations range from 0 (indicating no correlation between the state test score and the NWEA test score) to 1 (indicating complete correlation between the state test score and the NWEA test score).

TABLE 10 – PERCENTAGE OF STUDENTS WHOSE PASS STATUS WAS ACCURATELY PREDICTED BY THEIR MAP PERFORMANCE USING REPORTED CUT SCORES

Grade	Sample Size	MAP Accurately Predicted State Performance	MAP Underestimated State Performance	MAP Overestimated State Performance
Mathematics				
3	2779	81.8%	9.5%	8.7%
4	2854	82.9%	8.8%	8.2%
5	2733	86.3%	6.5%	7.1%
6	2467	86.3%	6.5%	7.2%
7	2493	86.8%	6.4%	6.8%
8	1762	87.7%	6.8%	5.5%
English				
3	2727	80.0%	10.8%	9.2%
4	2839	78.9%	10.3%	10.8%
5	2720	80.7%	9.8%	9.4%
6	2441	78.9%	11.9%	9.1%
7	2463	79.9%	10.6%	9.4%
8	1771	83.4%	9.0%	7.6%

*Note: The third column of this table shows the percentage of students whose Pass/NotPass status was predicted accurately when their state test score was linked to their MAP score based on this linking study. The fourth column shows the percentage of students whose MAP score predicted they would not pass the state benchmark but they did pass. The last column shows the percentage of students whose MAP score predicted they would pass the state benchmark but they did not pass.

Due to rounding, percentages may not add to 100%.