

# VIRGINIA LINKING STUDY

A Study of the Alignment of the NWEA RIT Scale  
with the Virginia State Standards of Learning (SOL) Testing  
Program

September 2014

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# A STUDY OF THE ALIGNMENT OF THE NWEA RIT SCALE WITH THE VIRGINIA STATE STANDARDS OF LEARNING (SOL) TESTING PROGRAM

SEPTEMBER 2014

Recently, NWEA completed a study to connect the scale of the Virginia State Standards of Learning (SOL) Testing Program used for Virginia’s mathematics and reading 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 of 7,882 Virginia students who completed both exams in the spring of 2014, the term in which the SOL is administered. 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 40<sup>th</sup> percentile for the study population (this would not be the same as the 40<sup>th</sup> 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.

Table Sets 1 and 2 show the best estimate of the minimum RIT equivalent to each state performance level for current-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.

Table Sets 3 and 4 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, thereby increasing the probability that intervention strategies will be planned and implemented. These tables can also be useful for identifying target RIT-score objectives likely to correspond to successful or “proficient” performance on the state test.

Table 5 shows the correlation coefficients between MAP and the state test 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 6 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 SOL.

TABLE SET 1 – MINIMUM ESTIMATED CURRENT SEASON (**SPRING**) RIT CUT SCORES  
CORRESPONDING TO STATE PERFORMANCE LEVELS

MATH - Current Season					
Cut Scores and Percentiles for each State Performance Level					
Grade	Basic	Proficient		Advanced	
	Cut Score	Cut Score	%tile	Cut Score	%tile
2	<191	191	50	205	86
3	<203	203	50	217	86
4	<208	208	37	223	77
5	<217	217	39	234	81
6	<219	219	34	247	91
7	<228	228	44	251	88
8	<228	228	36	257	90
READING - Current Season					
Cut Scores and Percentiles for each State Performance Level					
Grade	Basic	Proficient		Advanced	
	Cut Score	Cut Score	%tile	Cut Score	%tile
2	<188	188	47	206	86
3	<198	198	47	215	86
4	<206	206	48	222	86
5	<209	209	41	227	85
6	<214	214	43	231	84
7	<217	217	43	236	87
8	<222	222	49	242	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 Table Set 3 to determine the appropriate ‘target’ scores for a desired level of certainty. Italics represent extrapolated data. **Due to low n-size, Grade 8 Reading estimates should be treated with caution.**

TABLE SET 2 – MINIMUM ESTIMATED PRIOR SEASON (**FALL**) RIT CUT SCORES  
CORRESPONDING TO STATE PERFORMANCE LEVELS

MATH - Prior Season					
Cut Scores and Percentiles for each State Performance Level					
Grade	Basic	Proficient		Advanced	
	Cut Score	Cut Score	%tile	Cut Score	%tile
2	<178	178	49	192	86
3	<192	192	50	205	85
4	<199	199	36	213	76
5	<209	209	39	225	80
6	<213	213	33	240	91
7	<223	223	44	245	88
8	<224	224	36	252	90
READING - Prior Season					
Cut Scores and Percentiles for each State Performance Level					
Grade	Basic	Proficient		Advanced	
	Cut Score	Cut Score	%tile	Cut Score	%tile
2	<174	174	45	192	85
3	<188	188	45	206	86
4	<199	199	48	215	86
5	<204	204	41	222	85
6	<209	209	41	226	83
7	<213	213	41	232	87
<b>8</b>	<b>&lt;219</b>	<b>219</b>	<b>49</b>	<b>239</b>	<b>91</b>

\* 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 Table Set 4 to determine the appropriate ‘target’ scores for a desired level of certainty. Italics represent extrapolated data.

TABLE SET 3 –ESTIMATED PROBABILITY OF SCORING AS PROFICIENT OR HIGHER ON THE STATE TEST IN THE CURRENT SEASON (**SPRING**), BY STUDENT GRADE AND RIT SCORE RANGE ON MAP ASSESSMENT

MATH - Current Season							
Estimated Probability of Passing the State Test Based on Observed MAP Score							
RIT Range	2	3	4	5	6	7	8
120	<b>0%</b>	0%	0%	0%	0%	0%	0%
125	<b>0%</b>	0%	0%	0%	0%	0%	0%
130	<b>0%</b>	0%	0%	0%	0%	0%	0%
135	<b>0%</b>	0%	0%	0%	0%	0%	0%
140	<b>1%</b>	0%	0%	0%	0%	0%	0%
145	<b>1%</b>	0%	0%	0%	0%	0%	0%
150	<b>2%</b>	0%	0%	0%	0%	0%	0%
155	<b>3%</b>	1%	0%	0%	0%	0%	0%
160	<b>4%</b>	1%	1%	0%	0%	0%	0%
165	<b>7%</b>	2%	1%	1%	0%	0%	0%
170	<b>11%</b>	4%	2%	1%	1%	0%	0%
175	<b>17%</b>	6%	4%	1%	1%	0%	0%
180	<b>25%</b>	9%	6%	2%	2%	1%	1%
185	<b>35%</b>	14%	9%	4%	3%	1%	1%
190	<b>48%</b>	21%	14%	6%	5%	2%	2%
195	<b>60%</b>	31%	21%	10%	8%	4%	4%
200	<b>71%</b>	43%	31%	15%	13%	6%	6%
205	<b>80%</b>	55%	43%	23%	20%	9%	9%
210	<b>87%</b>	67%	55%	33%	29%	14%	14%
215	<b>92%</b>	77%	67%	45%	40%	21%	21%
220	<b>95%</b>	85%	77%	57%	52%	31%	31%
225	<b>97%</b>	90%	85%	69%	65%	43%	43%
230	<b>98%</b>	94%	90%	79%	75%	55%	55%
235	<b>99%</b>	96%	94%	86%	83%	67%	67%
240	<b>99%</b>	98%	96%	91%	89%	77%	77%
245	<b>100%</b>	99%	98%	94%	93%	85%	85%
250	<b>100%</b>	99%	99%	96%	96%	90%	90%
255	<b>100%</b>	99%	99%	98%	97%	94%	94%
260	<b>100%</b>	100%	99%	99%	98%	96%	96%
265	<b>100%</b>	100%	100%	99%	99%	98%	98%
270	<b>100%</b>	100%	100%	100%	99%	99%	99%
275	<b>100%</b>	100%	100%	100%	100%	99%	99%
280	<b>100%</b>	100%	100%	100%	100%	99%	99%
285	<b>100%</b>	100%	100%	100%	100%	100%	100%
290	<b>100%</b>	100%	100%	100%	100%	100%	100%
295	<b>100%</b>	100%	100%	100%	100%	100%	100%
300	<b>100%</b>	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 current (**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 15%.

Italics represent extrapolated data.

READING - Current Season							
Estimated Probability of Passing the State Test Based on Observed MAP Score							
RIT Range	2	3	4	5	6	7	8
120	<b>0%</b>	0%	0%	0%	0%	0%	0%
125	<b>0%</b>	0%	0%	0%	0%	0%	0%
130	<b>0%</b>	0%	0%	0%	0%	0%	0%
135	<b>0%</b>	0%	0%	0%	0%	0%	0%
140	<b>1%</b>	0%	0%	0%	0%	0%	0%
145	<b>1%</b>	0%	0%	0%	0%	0%	0%
150	<b>2%</b>	1%	0%	0%	0%	0%	0%
155	<b>4%</b>	1%	1%	0%	0%	0%	0%
160	<b>6%</b>	2%	1%	1%	0%	0%	0%
165	<b>9%</b>	4%	2%	1%	1%	1%	0%
170	<b>14%</b>	6%	3%	2%	1%	1%	1%
175	<b>21%</b>	9%	4%	3%	2%	1%	1%
180	<b>31%</b>	14%	7%	5%	3%	2%	1%
185	<b>43%</b>	21%	11%	8%	5%	4%	2%
190	<b>55%</b>	31%	17%	13%	8%	6%	4%
195	<b>67%</b>	43%	25%	20%	13%	10%	6%
200	<b>77%</b>	55%	35%	29%	20%	15%	10%
205	<b>85%</b>	67%	48%	40%	29%	23%	15%
210	<b>90%</b>	77%	60%	52%	40%	33%	23%
215	<b>94%</b>	85%	71%	65%	52%	45%	33%
220	<b>96%</b>	90%	80%	75%	65%	57%	45%
225	<b>98%</b>	94%	87%	83%	75%	69%	57%
230	<b>99%</b>	96%	92%	89%	83%	79%	69%
235	<b>99%</b>	98%	95%	93%	89%	86%	79%
240	<b>99%</b>	99%	97%	96%	93%	91%	86%
245	<b>100%</b>	99%	98%	97%	96%	94%	91%
250	<b>100%</b>	99%	99%	98%	97%	96%	94%
255	<b>100%</b>	100%	99%	99%	98%	98%	96%
260	<b>100%</b>	100%	100%	99%	99%	99%	98%
265	<b>100%</b>	100%	100%	100%	99%	99%	99%
270	<b>100%</b>	100%	100%	100%	100%	100%	99%
275	<b>100%</b>	100%	100%	100%	100%	100%	100%
280	<b>100%</b>	100%	100%	100%	100%	100%	100%
285	<b>100%</b>	100%	100%	100%	100%	100%	100%
290	<b>100%</b>	100%	100%	100%	100%	100%	100%
295	<b>100%</b>	100%	100%	100%	100%	100%	100%
300	<b>100%</b>	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 current (**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 29%.  
  
Italics represent extrapolated data.

TABLE SET 4 –ESTIMATED PROBABILITY OF SCORING PROFICIENT OR HIGHER ON THE STATE TEST IN PRIOR SEASON (**FALL**), BY STUDENT GRADE AND RIT SCORE RANGE ON MAP

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

Italics represent extrapolated data.

READING - Prior Season							
Estimated Probability of Passing the State Test Based on Observed MAP Score							
RIT Range	2	3	4	5	6	7	8
120	<b>0%</b>	0%	0%	0%	0%	0%	0%
125	<b>1%</b>	0%	0%	0%	0%	0%	0%
130	<b>1%</b>	0%	0%	0%	0%	0%	0%
135	<b>2%</b>	0%	0%	0%	0%	0%	0%
140	<b>3%</b>	1%	0%	0%	0%	0%	0%
145	<b>5%</b>	1%	0%	0%	0%	0%	0%
150	<b>8%</b>	2%	1%	0%	0%	0%	0%
155	<b>13%</b>	4%	1%	1%	0%	0%	0%
160	<b>20%</b>	6%	2%	1%	1%	0%	0%
165	<b>29%</b>	9%	3%	2%	1%	1%	0%
170	<b>40%</b>	14%	5%	3%	2%	1%	1%
175	<b>52%</b>	21%	8%	5%	3%	2%	1%
180	<b>65%</b>	31%	13%	8%	5%	4%	2%
185	<b>75%</b>	43%	20%	13%	8%	6%	3%
190	<b>83%</b>	55%	29%	20%	13%	9%	5%
195	<b>89%</b>	67%	40%	29%	20%	14%	8%
200	<b>93%</b>	77%	52%	40%	29%	21%	13%
205	<b>96%</b>	85%	65%	52%	40%	31%	20%
210	<b>97%</b>	90%	75%	65%	52%	43%	29%
215	<b>98%</b>	94%	83%	75%	65%	55%	40%
220	<b>99%</b>	96%	89%	83%	75%	67%	52%
225	<b>99%</b>	98%	93%	89%	83%	77%	65%
230	<b>100%</b>	99%	96%	93%	89%	85%	75%
235	<b>100%</b>	99%	97%	96%	93%	90%	83%
240	<b>100%</b>	99%	98%	97%	96%	94%	89%
245	<b>100%</b>	100%	99%	98%	97%	96%	93%
250	<b>100%</b>	100%	99%	99%	98%	98%	96%
255	<b>100%</b>	100%	100%	99%	99%	99%	97%
260	<b>100%</b>	100%	100%	100%	99%	99%	98%
265	<b>100%</b>	100%	100%	100%	100%	99%	99%
270	<b>100%</b>	100%	100%	100%	100%	100%	99%
275	<b>100%</b>	100%	100%	100%	100%	100%	100%
280	<b>100%</b>	100%	100%	100%	100%	100%	100%
285	<b>100%</b>	100%	100%	100%	100%	100%	100%
290	<b>100%</b>	100%	100%	100%	100%	100%	100%
295	<b>100%</b>	100%	100%	100%	100%	100%	100%
300	<b>100%</b>	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 40%.

Italics represent extrapolated data.



TABLE 5 – CORRELATION COEFFICIENTS BETWEEN MAP AND STATE TEST FOR EACH GRADE AND TEST SUBJECT

Grade	Math Correlation Pearson's r	Reading Correlation Pearson's r
3	0.794	0.764
4	0.802	0.758
5	0.793	0.754
6	0.757	0.752
7	0.771	0.755
8	0.787	0.813

\* 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 6 – 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
<b>Mathematics</b>				
3	1550	82.80%	9.10%	8.10%
4	1551	86.30%	7.50%	6.10%
5	1522	83.60%	8.00%	8.30%
6	1229	84.80%	8.10%	7.10%
7	1052	82.60%	8.00%	9.40%
8	722	80.50%	9.60%	10.00%
<b>Reading</b>				
3	1573	83.90%	7.50%	8.60%
4	1574	82.40%	8.40%	9.10%
5	1556	83.20%	8.00%	8.70%
6	1250	82.30%	9.00%	8.70%
7	1179	83.70%	8.50%	7.80%
8	258	85.70%	7.00%	7.40%

\* 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%.