

# Linking the Indiana ISTEP+ Assessments to the NWEA MAP Growth Tests

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## 1. Introduction

NWEA™ is committed to providing partners with useful tools to help make inferences from the MAP® Growth™ interim assessment scores. One important tool is the concordance table between MAP Growth 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 policymakers to evaluate and formulate academic standing and growth.

In February 2017, NWEA completed a concordance study to connect the scales of the Indiana Statewide Testing for Educational Progress–Plus (ISTEP+) English/Language Arts (ELA) and Mathematics tests with those of the MAP Growth Reading and Mathematics assessments. This report presents the grade 3–8 cut scores on the MAP Growth Reading and Mathematics scales that correspond to the benchmarks on the ISTEP+ ELA and Mathematics tests. Information about the consistency rate of classification based on the estimated MAP Growth cut scores is also provided, along with tables that predict the probability of receiving a Level 2 (i.e., “proficient”) or higher performance designation on the ISTEP+ based on the observed MAP Growth scores taken during the same school year. Appendix A provides a description of the data and analysis method used in this content area.

## 2. Assessment Overview

### 2.1. Indiana Statewide Testing for Educational Progress–Plus (ISTEP+)

ISTEP+ assessments include achievement tests aligned to the Indiana Academic Standards in ELA, Mathematics, Science, and Social Studies. ISTEP+ tests are delivered both online and in paper-pencil form. Each grade and content area has two cut scores that distinguish between performance levels: Level 1: Did Not Pass, Level 2: Pass, and Level 3: Pass+. The Level 2 cut score demarks the minimum level of performance considered to be “proficient” for accountability purposes.

### 2.2. MAP Growth

MAP Growth tests are adaptive interim assessments aligned to the Indiana State Standards. They are constructed to measure student achievement from grades K–12 in Mathematics, Reading, Language Usage, and Science. Like ISTEP+, MAP Growth assessments are vertically scaled across grades, a feature that supports direct measurement of academic growth and change. MAP Growth scores are reported on a Rasch Unit (RIT) scale with a range from 100–350. Each subject has its own RIT scale.

To aid interpretation of MAP Growth scores, NWEA periodically conducts norming studies of student and school performance on MAP Growth. For example, the 2015 RIT scale norming study by 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.

### 3. MAP Growth Cut Scores Associated with ISTEP+ Readiness Levels

Table 3.1 – Table 3.4 report the ISTEP+ scale scores associated with each ISTEP+ performance level, as well as the estimated score ranges on the MAP Growth tests associated with each performance level. Specifically, Table 3.1 and Table 3.2 apply to MAP Growth scores obtained during the spring testing season for Reading and Mathematics, respectively. Table 3.3 and Table 3.4 apply to MAP Growth tests taken in fall or winter prior to the testing season for Reading and Mathematics, respectively.

The tables also report the percentile rank (based on the 2015 NWEA MAP Growth norms) associated with each estimated MAP Growth cut score. The MAP Growth cut scores can be used to predict students' most probable ISTEP+ performance level based on their observed MAP Growth scores. For example, a grade 5 student who obtained a MAP Growth Mathematics score of 230 in the spring is likely to be at the high end of Level 2 (proficient) on the ISTEP+ taken during that same testing season (see Table 3.2). Similarly, a grade 3 student who obtained a MAP Growth Reading score of 210 in the fall is likely to be at Level 3 (Pass+) on the ISTEP+ taken in the spring of grade 3 (see Table 3.3).

**Table 3.1. Concordance of Performance Level Score Ranges between ISTEP+ and MAP Growth when MAP Growth is taken in Spring—ELA/Reading**

ISTEP+ ELA						
Grade	Level 1: Did Not Pass		Level 2: Pass*		Level 3: Pass+	
3	200–427		428–499		500–800	
4	210–455		456–528		529–850	
5	220–485		486–545		546–890	
6	230–501		502–571		572–900	
7	240–515		516–591		592–910	
8	250–536		537–616		617–940	

  

MAP Growth Reading						
Grade	Level 1: Did Not Pass		Level 2: Pass*		Level 3: Pass+	
	RIT	Percentile	RIT	Percentile	RIT	Percentile
2**	100–184	1–39	185–203	40–83	204–350	84–99
3	100–194	1–39	195–213	40–83	214–350	84–99
4	100–202	1–40	203–220	41–83	221–350	84–99
5	100–210	1–46	211–225	47–82	226–350	83–99
6	100–213	1–43	214–229	44–82	230–350	83–99
7	100–215	1–43	216–232	44–82	233–350	83–99
8	100–220	1–51	221–236	52–85	237–350	86–99

\*Bolted numbers indicate the cut scores to be at least “proficient” for accountability purposes.

\*\*Highlighted text denotes grade 2 benchmarks are extrapolated from grade 3 cut scores.

**Table 3.2. Concordance of Performance Level Score Ranges between ISTEP+ and MAP Growth when MAP Growth is taken in Spring—Mathematics**

ISTEP+ Mathematics						
Grade	Level 1: Did Not Pass		Level 2: Pass*		Level 3: Pass+	
3	185–424		<b>425–479</b>		480–690	
4	210–457		<b>458–507</b>		508–720	
5	240–479		<b>480–535</b>		536–750	
6	270–509		<b>510–559</b>		560–760	
7	305–532		<b>533–577</b>		578–790	
8	325–553		<b>554–594</b>		595–800	

  

MAP Growth Mathematics						
Grade	Level 1: Did Not Pass		Level 2: Pass		Level 3: Pass+	
	RIT	Percentile	RIT*	Percentile	RIT	Percentile
2**	100–189	1–42	<b>190–202</b>	43–77	203–350	78–99
3	100–201	1–44	<b>202–214</b>	45–78	215–350	79–99
4	100–211	1–44	<b>212–224</b>	45–76	225–350	77–99
5	100–217	1–40	<b>218–234</b>	41–79	235–350	80–99
6	100–225	1–50	<b>226–239</b>	51–80	240–350	81–99
7	100–232	1–58	<b>233–246</b>	59–84	247–350	85–99
8	100–235	1–59	<b>236–249</b>	60–83	250–350	84–99

\*Bolted numbers indicate the cut scores to be at least “proficient” for accountability purposes.

\*\*Highlighted text denotes grade 2 benchmarks are extrapolated from grade 3 cut scores.

**Table 3.3. Concordance of Performance Level Score Ranges between ISTEP+ and MAP Growth when MAP Growth is taken in Fall or Winter—ELA/Reading**

ISTEP+ ELA						
Grade	Level 1: Did Not Pass		Level 2: Pass*		Level 3: Pass+	
3	200–427		<b>428–499</b>		500–800	
4	210–455		<b>456–528</b>		529–850	
5	220–485		<b>486–545</b>		546–890	
6	230–501		<b>502–571</b>		572–900	
7	240–515		<b>516–591</b>		592–910	
8	250–536		<b>537–616</b>		617–940	

  

MAP Growth Reading (Fall)						
Grade	Level 1: Did Not Pass		Level 2: Pass		Level 3: Pass+	
	RIT	Percentile	RIT*	Percentile	RIT	Percentile
2**	100–169	1–36	<b>170–192</b>	37–87	193–350	88–99
3	100–183	1–38	<b>184–206</b>	39–87	207–350	88–99
4	100–194	1–40	<b>195–215</b>	41–86	216–350	87–99
5	100–204	1–46	<b>205–221</b>	47–85	222–350	86–99
6	100–208	1–43	<b>209–226</b>	44–85	227–350	86–99
7	100–211	1–42	<b>212–230</b>	43–85	231–350	86–99
8	100–217	1–50	<b>218–234</b>	51–86	235–350	87–99

MAP Growth Reading (Winter)						
Grade	Level 1: Did Not Pass		Level 2: Pass		Level 3: Pass+	
	RIT	Percentile	RIT*	Percentile	RIT	Percentile
2**	100–179	1–37	<b>180–199</b>	38–84	200–350	85–99
3	100–191	1–39	<b>192–211</b>	40–85	212–350	86–99
4	100–199	1–39	<b>200–219</b>	40–85	220–350	86–99
5	100–208	1–46	<b>209–224</b>	47–84	225–350	85–99
6	100–211	1–42	<b>212–228</b>	43–83	229–350	84–99
7	100–214	1–43	<b>215–231</b>	44–83	232–350	84–99
8	100–219	1–51	<b>220–235</b>	52–85	236–350	86–99

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

\*\*Highlighted text denotes grade 2 benchmarks are extrapolated from grade 3 cut scores.

**Table 3.4. Concordance of Performance Level Score Ranges between ISTEP+ and MAP Growth when MAP Growth is taken in Fall or Winter—Mathematics**

ISTEP+ Mathematics			
Grade	Level 1: Did Not Pass		Level 2: Pass*
3	185–424		<b>425–479</b>
4	210–457		<b>458–507</b>
5	240–479		<b>480–535</b>
6	270–509		<b>510–559</b>
7	305–532		<b>533–577</b>
8	325–553		<b>554–594</b>

MAP Growth Mathematics (Fall)						
Grade	Level 1: Did Not Pass		Level 2: Pass		Level 3: Pass+	
	RIT	Percentile	RIT*	Percentile	RIT	Percentile
2**	100–173	1–39	<b>174–188</b>	40–80	189–350	81–99
3	100–188	1–44	<b>189–202</b>	45–82	203–350	83–99
4	100–199	1–42	<b>200–213</b>	43–79	214–350	80–99
5	100–207	1–39	<b>208–224</b>	40–81	225–350	82–99
6	100–217	1–49	<b>218–232</b>	50–83	233–350	84–99
7	100–226	1–59	<b>227–240</b>	60–85	241–350	86–99
8	100–230	1–59	<b>231–245</b>	60–85	246–350	86–99

MAP Growth Mathematics (Winter)						
Grade	Level 1: Did Not Pass		Level 2: Pass		Level 3: Pass+	
	RIT	Percentile	RIT*	Percentile	RIT	Percentile
2**	100–183	1–41	<b>184–197</b>	42–80	198–350	81–99
3	100–196	1–44	<b>197–209</b>	45–80	210–350	81–99
4	100–206	1–43	<b>207–219</b>	44–77	220–350	78–99
5	100–213	1–40	<b>214–230</b>	41–80	231–350	81–99
6	100–222	1–51	<b>223–236</b>	52–81	237–350	82–99
7	100–230	1–60	<b>231–244</b>	61–85	245–350	86–99
8	100–233	1–59	<b>234–247</b>	60–84	248–350	85–99

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

\*\*Highlighted text denotes grade 2 benchmarks are extrapolated from grade 3 cut scores.

#### 4. Consistency Rate of Classification

Consistency rate of classification (Pommerich, Hanson, Harris, & Sconing, 2004), expressed in the form of a rate between 0 and 1, provides a means to measure the departure from equity for concordances (Hanson et al., 2001). This index can also be used as an indicator for the predictive validity of the MAP Growth tests (i.e., how accurately the MAP Growth scores can predict a student’s proficiency status on the ISTEP+ 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 decision making. 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 ISTEP+ and MAP Growth scores. The results in Table 4.1 demonstrate that MAP Growth Reading scores can consistently classify students’ proficiency (Level 2 or higher) status on the ISTEP+ ELA test 82–87% of the time, and MAP Growth Mathematics scores can consistently classify students on the ISTEP+ Mathematics test 86–89% of the time. Those numbers are high, suggesting that both MAP Growth Reading and Mathematics tests are great predictors of the students’ proficiency status on the ISTEP+ tests.

**Table 4.1. Consistency Rate of Classification for MAP Growth and ISTEP+ Level 2 Equipercentile Concordances**

Grade	ELA/Reading			Mathematics		
	Consistency Rate	False		Consistency Rate	False	
		Positives	Negatives		Positives	Negatives
3	0.87	0.08	0.05	0.89	0.08	0.03
4	0.87	0.07	0.06	0.87	0.07	0.06
5	0.87	0.07	0.06	0.89	0.06	0.05
6	0.85	0.08	0.07	0.88	0.06	0.06
7	0.86	0.08	0.06	0.87	0.07	0.06
8	0.82	0.10	0.08	0.86	0.07	0.07

#### 5. Proficiency Projection

Proficiency projection tells how likely a student is classified as “proficient” on ISTEP+ tests based on his or her observed MAP Growth scores. The conditional growth norms provided in the 2015 MAP Growth norms report were used by Thum & Hauser (2015) to calculate this information. The results of proficiency projection and corresponding probability of achieving “proficient” on the ISTEP+ tests are presented in Table 5.1, Table 5.2, and Table 5.3. These tables estimate the probability of scoring at Level 2 or above on ISTEP+ in the spring and the prior fall or winter testing season. For example, if a grade 3 student obtained a MAP Growth Mathematics score of 190 in the fall, the probability of obtaining a Level 2 or higher ISTEP+ score in the spring of grade 3 is 76%. Table 5.1 presents the estimated probability of meeting Level 2 benchmark when MAP Growth is taken in the spring for ELA/Reading and Mathematics, whereas Table 5.2 and Table 5.3 present the estimated probability of meeting Level 2 benchmark when MAP Growth is taken in the fall or winter prior to taking the ISTEP+ ELA tests.

**Table 5.1. Proficiency Projection and Probability for Passing ISTEP+ Level 2 (Proficient) when MAP Growth is taken in the Spring**

Grade	ELA/Reading					Mathematics				
	Start Percentile	RIT Spring	Projected Proficiency			Start Percentile	RIT Spring	Projected Proficiency		
			Cut Score	Level 2	Prob.*			Cut Score	Level 2	Prob.*
2	5	164	185	No	<0.01	5	170	190	No	<0.01
	10	169	185	No	<0.01	10	175	190	No	<0.01
	15	173	185	No	<0.01	15	178	190	No	<0.01
	20	176	185	No	<0.01	20	181	190	No	<0.01
	25	178	185	No	0.01	25	183	190	No	0.01
	30	181	185	No	0.11	30	185	190	No	0.04
	35	183	185	No	0.27	35	187	190	No	0.15
	40	185	185	Yes	0.50	40	189	190	No	0.37
	45	187	185	Yes	0.73	45	190	190	Yes	0.50
	50	189	185	Yes	0.89	50	192	190	Yes	0.75
	55	191	185	Yes	0.97	55	194	190	Yes	0.92
	60	193	185	Yes	0.99	60	196	190	Yes	0.98
	65	195	185	Yes	>0.99	65	197	190	Yes	0.99
	70	197	185	Yes	>0.99	70	199	190	Yes	>0.99
	75	199	185	Yes	>0.99	75	201	190	Yes	>0.99
	80	201	185	Yes	>0.99	80	204	190	Yes	>0.99
	85	204	185	Yes	>0.99	85	206	190	Yes	>0.99
90	208	185	Yes	>0.99	90	209	190	Yes	>0.99	
95	214	185	Yes	>0.99	95	214	190	Yes	>0.99	
3	5	174	195	No	<0.01	5	181	202	No	<0.01
	10	179	195	No	<0.01	10	186	202	No	<0.01
	15	183	195	No	<0.01	15	189	202	No	<0.01
	20	186	195	No	<0.01	20	192	202	No	<0.01
	25	188	195	No	0.01	25	194	202	No	<0.01
	30	191	195	No	0.11	30	196	202	No	0.02
	35	193	195	No	0.27	35	198	202	No	0.08
	40	195	195	Yes	0.50	40	200	202	No	0.25
	45	197	195	Yes	0.73	45	202	202	Yes	0.50
	50	199	195	Yes	0.89	50	203	202	Yes	0.63
	55	201	195	Yes	0.97	55	205	202	Yes	0.85
	60	202	195	Yes	0.99	60	207	202	Yes	0.96
	65	204	195	Yes	>0.99	65	209	202	Yes	0.99
	70	207	195	Yes	>0.99	70	211	202	Yes	>0.99
	75	209	195	Yes	>0.99	75	213	202	Yes	>0.99
	80	211	195	Yes	>0.99	80	215	202	Yes	>0.99
	85	214	195	Yes	>0.99	85	218	202	Yes	>0.99
90	218	195	Yes	>0.99	90	221	202	Yes	>0.99	
95	223	195	Yes	>0.99	95	226	202	Yes	>0.99	

Grade	ELA/Reading					Mathematics				
	Start Percentile	RIT Spring	Projected Proficiency			Start Percentile	RIT Spring	Projected Proficiency		
			Cut Score	Level 2	Prob.*			Cut Score	Level 2	Prob.*
4	5	181	203	No	<0.01	5	189	212	No	<0.01
	10	187	203	No	<0.01	10	194	212	No	<0.01
	15	190	203	No	<0.01	15	198	212	No	<0.01
	20	193	203	No	<0.01	20	201	212	No	<0.01
	25	196	203	No	0.01	25	203	212	No	<0.01
	30	198	203	No	0.06	30	206	212	No	0.02
	35	200	203	No	0.17	35	208	212	No	0.08
	40	202	203	No	0.38	40	210	212	No	0.25
	45	204	203	Yes	0.62	45	212	212	Yes	0.50
	50	206	203	Yes	0.83	50	213	212	Yes	0.63
	55	208	203	Yes	0.94	55	215	212	Yes	0.85
	60	210	203	Yes	0.99	60	217	212	Yes	0.96
	65	212	203	Yes	>0.99	65	219	212	Yes	0.99
	70	214	203	Yes	>0.99	70	221	212	Yes	>0.99
	75	216	203	Yes	>0.99	75	224	212	Yes	>0.99
	80	218	203	Yes	>0.99	80	226	212	Yes	>0.99
	85	221	203	Yes	>0.99	85	229	212	Yes	>0.99
90	225	203	Yes	>0.99	90	233	212	Yes	>0.99	
95	230	203	Yes	>0.99	95	238	212	Yes	>0.99	
5	5	188	211	No	<0.01	5	195	218	No	<0.01
	10	193	211	No	<0.01	10	201	218	No	<0.01
	15	197	211	No	<0.01	15	205	218	No	<0.01
	20	199	211	No	<0.01	20	208	218	No	<0.01
	25	202	211	No	<0.01	25	210	218	No	<0.01
	30	204	211	No	0.01	30	213	218	No	0.04
	35	206	211	No	0.06	35	215	218	No	0.15
	40	208	211	No	0.17	40	217	218	No	0.37
	45	210	211	No	0.38	45	219	218	Yes	0.63
	50	212	211	Yes	0.62	50	221	218	Yes	0.85
	55	214	211	Yes	0.83	55	223	218	Yes	0.96
	60	216	211	Yes	0.94	60	225	218	Yes	0.99
	65	217	211	Yes	0.97	65	228	218	Yes	>0.99
	70	220	211	Yes	>0.99	70	230	218	Yes	>0.99
	75	222	211	Yes	>0.99	75	232	218	Yes	>0.99
	80	224	211	Yes	>0.99	80	235	218	Yes	>0.99
	85	227	211	Yes	>0.99	85	238	218	Yes	>0.99
90	231	211	Yes	>0.99	90	242	218	Yes	>0.99	
95	236	211	Yes	>0.99	95	248	218	Yes	>0.99	

Grade	ELA/Reading					Mathematics				
	Start Percentile	RIT Spring	Projected Proficiency			Start Percentile	RIT Spring	Projected Proficiency		
			Cut Score	Level 2	Prob.*			Cut Score	Level 2	Prob.*
6	5	192	214	No	<0.01	5	198	226	No	<0.01
	10	197	214	No	<0.01	10	204	226	No	<0.01
	15	201	214	No	<0.01	15	208	226	No	<0.01
	20	203	214	No	<0.01	20	211	226	No	<0.01
	25	206	214	No	0.01	25	214	226	No	<0.01
	30	208	214	No	0.03	30	217	226	No	<0.01
	35	210	214	No	0.11	35	219	226	No	0.01
	40	212	214	No	0.27	40	221	226	No	0.04
	45	214	214	Yes	0.50	45	223	226	No	0.15
	50	216	214	Yes	0.73	50	225	226	No	0.37
	55	218	214	Yes	0.89	55	227	226	Yes	0.63
	60	219	214	Yes	0.94	60	230	226	Yes	0.92
	65	221	214	Yes	0.99	65	232	226	Yes	0.98
	70	223	214	Yes	>0.99	70	234	226	Yes	>0.99
	75	226	214	Yes	>0.99	75	237	226	Yes	>0.99
	80	228	214	Yes	>0.99	80	239	226	Yes	>0.99
	85	231	214	Yes	>0.99	85	243	226	Yes	>0.99
90	235	214	Yes	>0.99	90	247	226	Yes	>0.99	
95	240	214	Yes	>0.99	95	253	226	Yes	>0.99	
7	5	193	216	No	<0.01	5	199	233	No	<0.01
	10	199	216	No	<0.01	10	206	233	No	<0.01
	15	202	216	No	<0.01	15	210	233	No	<0.01
	20	205	216	No	<0.01	20	214	233	No	<0.01
	25	208	216	No	0.01	25	217	233	No	<0.01
	30	210	216	No	0.03	30	219	233	No	<0.01
	35	212	216	No	0.11	35	222	233	No	<0.01
	40	214	216	No	0.27	40	224	233	No	<0.01
	45	216	216	Yes	0.50	45	226	233	No	0.01
	50	218	216	Yes	0.73	50	229	233	No	0.08
	55	220	216	Yes	0.89	55	231	233	No	0.25
	60	222	216	Yes	0.97	60	233	233	Yes	0.50
	65	224	216	Yes	0.99	65	235	233	Yes	0.75
	70	226	216	Yes	>0.99	70	238	233	Yes	0.96
	75	228	216	Yes	>0.99	75	241	233	Yes	>0.99
	80	231	216	Yes	>0.99	80	244	233	Yes	>0.99
	85	234	216	Yes	>0.99	85	247	233	Yes	>0.99
90	238	216	Yes	>0.99	90	251	233	Yes	>0.99	
95	243	216	Yes	>0.99	95	258	233	Yes	>0.99	

Grade	ELA/Reading					Mathematics				
	Start Percentile	RIT Spring	Projected Proficiency			Start Percentile	RIT Spring	Projected Proficiency		
			Cut Score	Level 2	Prob.*			Cut Score	Level 2	Prob.*
8	5	194	221	No	<0.01	5	199	236	No	<0.01
	10	200	221	No	<0.01	10	206	236	No	<0.01
	15	204	221	No	<0.01	15	211	236	No	<0.01
	20	207	221	No	<0.01	20	215	236	No	<0.01
	25	209	221	No	<0.01	25	218	236	No	<0.01
	30	212	221	No	<0.01	30	221	236	No	<0.01
	35	214	221	No	0.01	35	224	236	No	<0.01
	40	216	221	No	0.06	40	226	236	No	<0.01
	45	218	221	No	0.17	45	229	236	No	0.01
	50	220	221	No	0.38	50	231	236	No	0.04
	55	222	221	Yes	0.62	55	233	236	No	0.15
	60	224	221	Yes	0.83	60	236	236	Yes	0.50
	65	226	221	Yes	0.94	65	238	236	Yes	0.75
	70	228	221	Yes	0.99	70	241	236	Yes	0.96
	75	231	221	Yes	>0.99	75	244	236	Yes	>0.99
	80	233	221	Yes	>0.99	80	247	236	Yes	>0.99
	85	236	221	Yes	>0.99	85	251	236	Yes	>0.99
	90	240	221	Yes	>0.99	90	255	236	Yes	>0.99
95	246	221	Yes	>0.99	95	262	236	Yes	>0.99	

\*Prob. = the probability of scoring at Level 2 or above on ISTEP+

**Table 5.2. Proficiency Projection and Probability for Passing ISTEP+ Level 2 (Proficient) when MAP Growth is taken in the Fall or Winter prior to Spring ISTEP+ Tests—ELA/Reading**

Grade	ELA/Reading (Fall)					ELA/Reading (Winter)				
	Start Percentile	RIT Fall	Projected Proficiency			Start Percentile	RIT Winter	Projected Proficiency		
			Cut Score	Level 2	Prob.*			Cut Score	Level 2	Prob.*
2	5	149	185	No	0.01	5	160	185	No	<0.01
	10	155	185	No	0.05	10	165	185	No	0.01
	15	159	185	No	0.10	15	169	185	No	0.02
	20	162	185	No	0.19	20	172	185	No	0.07
	25	164	185	No	0.26	25	174	185	No	0.14
	30	167	185	No	0.35	30	176	185	No	0.23
	35	169	185	No	0.45	35	178	185	No	0.36
	40	171	185	Yes	0.55	40	180	185	Yes	0.50
	45	173	185	Yes	0.60	45	182	185	Yes	0.64
	50	175	185	Yes	0.70	50	184	185	Yes	0.77
	55	177	185	Yes	0.78	55	186	185	Yes	0.82
	60	179	185	Yes	0.81	60	188	185	Yes	0.90
	65	181	185	Yes	0.88	65	190	185	Yes	0.95
	70	183	185	Yes	0.92	70	192	185	Yes	0.98
	75	185	185	Yes	0.94	75	194	185	Yes	0.99
	80	188	185	Yes	0.97	80	197	185	Yes	>0.99
	85	191	185	Yes	0.99	85	200	185	Yes	>0.99
	90	195	185	Yes	>0.99	90	203	185	Yes	>0.99
95	200	185	Yes	>0.99	95	209	185	Yes	>0.99	

Grade	ELA/Reading (Fall)					ELA/Reading (Winter)				
	Start Percentile	RIT Fall	Projected Proficiency			Start Percentile	RIT Winter	Projected Proficiency		
			Cut Score	Level 2	Prob.*			Cut Score	Level 2	Prob.*
3	5	162	195	No	0.01	5	171	195	No	<0.01
	10	168	195	No	0.03	10	176	195	No	<0.01
	15	172	195	No	0.08	15	180	195	No	0.02
	20	175	195	No	0.13	20	183	195	No	0.06
	25	178	195	No	0.24	25	185	195	No	0.13
	30	180	195	No	0.34	30	188	195	No	0.28
	35	182	195	No	0.39	35	190	195	No	0.35
	40	184	195	Yes	0.50	40	192	195	Yes	0.50
	45	186	195	Yes	0.61	45	194	195	Yes	0.65
	50	188	195	Yes	0.66	50	196	195	Yes	0.78
	55	190	195	Yes	0.76	55	198	195	Yes	0.87
	60	192	195	Yes	0.84	60	199	195	Yes	0.91
	65	194	195	Yes	0.87	65	201	195	Yes	0.96
	70	197	195	Yes	0.94	70	204	195	Yes	0.99
	75	199	195	Yes	0.97	75	206	195	Yes	0.99
	80	202	195	Yes	0.98	80	208	195	Yes	>0.99
	85	205	195	Yes	0.99	85	211	195	Yes	>0.99
90	209	195	Yes	>0.99	90	215	195	Yes	>0.99	
95	214	195	Yes	>0.99	95	221	195	Yes	>0.99	
4	5	173	203	No	<0.01	5	179	203	No	<0.01
	10	178	203	No	0.02	10	184	203	No	<0.01
	15	182	203	No	0.05	15	188	203	No	0.01
	20	185	203	No	0.12	20	191	203	No	0.04
	25	188	203	No	0.18	25	194	203	No	0.12
	30	190	203	No	0.27	30	196	203	No	0.22
	35	192	203	No	0.38	35	198	203	No	0.35
	40	194	203	No	0.44	40	200	203	Yes	0.50
	45	196	203	Yes	0.56	45	202	203	Yes	0.58
	50	198	203	Yes	0.67	50	204	203	Yes	0.72
	55	200	203	Yes	0.73	55	205	203	Yes	0.78
	60	202	203	Yes	0.82	60	207	203	Yes	0.88
	65	204	203	Yes	0.88	65	209	203	Yes	0.94
	70	206	203	Yes	0.93	70	211	203	Yes	0.98
	75	209	203	Yes	0.96	75	214	203	Yes	0.99
	80	211	203	Yes	0.98	80	216	203	Yes	>0.99
	85	214	203	Yes	0.99	85	219	203	Yes	>0.99
90	218	203	Yes	>0.99	90	223	203	Yes	>0.99	
95	224	203	Yes	>0.99	95	228	203	Yes	>0.99	

Grade	ELA/Reading (Fall)					ELA/Reading (Winter)				
	Start Percentile	RIT Fall	Projected Proficiency			Start Percentile	RIT Winter	Projected Proficiency		
			Cut Score	Level 2	Prob.*			Cut Score	Level 2	Prob.*
5	5	181	211	No	<0.01	5	186	211	No	<0.01
	10	186	211	No	0.01	10	191	211	No	<0.01
	15	190	211	No	0.03	15	195	211	No	0.01
	20	193	211	No	0.07	20	197	211	No	0.02
	25	195	211	No	0.12	25	200	211	No	0.06
	30	198	211	No	0.19	30	202	211	No	0.09
	35	200	211	No	0.28	35	204	211	No	0.17
	40	202	211	No	0.38	40	206	211	No	0.28
	45	204	211	No	0.44	45	208	211	No	0.42
	50	206	211	Yes	0.56	50	210	211	Yes	0.58
	55	208	211	Yes	0.67	55	212	211	Yes	0.72
	60	210	211	Yes	0.77	60	214	211	Yes	0.83
	65	212	211	Yes	0.81	65	215	211	Yes	0.88
	70	214	211	Yes	0.88	70	218	211	Yes	0.96
	75	216	211	Yes	0.93	75	220	211	Yes	0.97
	80	218	211	Yes	0.95	80	222	211	Yes	0.99
	85	221	211	Yes	0.98	85	225	211	Yes	>0.99
90	225	211	Yes	0.99	90	229	211	Yes	>0.99	
95	231	211	Yes	>0.99	95	234	211	Yes	>0.99	
6	5	186	214	No	<0.01	5	190	214	No	<0.01
	10	192	214	No	0.01	10	196	214	No	<0.01
	15	196	214	No	0.06	15	199	214	No	0.01
	20	198	214	No	0.07	20	202	214	No	0.03
	25	201	214	No	0.16	25	204	214	No	0.06
	30	203	214	No	0.23	30	207	214	No	0.17
	35	205	214	No	0.33	35	209	214	No	0.28
	40	207	214	No	0.39	40	211	214	No	0.42
	45	209	214	Yes	0.50	45	212	214	Yes	0.50
	50	211	214	Yes	0.61	50	214	214	Yes	0.65
	55	213	214	Yes	0.72	55	216	214	Yes	0.72
	60	215	214	Yes	0.77	60	218	214	Yes	0.83
	65	217	214	Yes	0.84	65	220	214	Yes	0.91
	70	219	214	Yes	0.90	70	222	214	Yes	0.96
	75	221	214	Yes	0.93	75	224	214	Yes	0.98
	80	224	214	Yes	0.97	80	226	214	Yes	0.99
	85	226	214	Yes	0.99	85	229	214	Yes	>0.99
90	230	214	Yes	>0.99	90	233	214	Yes	>0.99	
95	236	214	Yes	>0.99	95	238	214	Yes	>0.99	

Grade	ELA/Reading (Fall)					ELA/Reading (Winter)				
	Start Percentile	RIT Fall	Projected Proficiency			Start Percentile	RIT Winter	Projected Proficiency		
			Cut Score	Level 2	Prob.*			Cut Score	Level 2	Prob.*
7	5	189	216	No	<0.01	5	192	216	No	<0.01
	10	195	216	No	0.01	10	198	216	No	<0.01
	15	199	216	No	0.05	15	201	216	No	0.01
	20	202	216	No	0.10	20	204	216	No	0.03
	25	204	216	No	0.15	25	207	216	No	0.09
	30	206	216	No	0.23	30	209	216	No	0.17
	35	209	216	No	0.33	35	211	216	No	0.28
	40	211	216	No	0.44	40	213	216	No	0.35
	45	213	216	Yes	0.56	45	215	216	Yes	0.50
	50	214	216	Yes	0.61	50	217	216	Yes	0.65
	55	216	216	Yes	0.67	55	219	216	Yes	0.78
	60	218	216	Yes	0.77	60	221	216	Yes	0.88
	65	220	216	Yes	0.85	65	223	216	Yes	0.94
	70	222	216	Yes	0.90	70	225	216	Yes	0.97
	75	225	216	Yes	0.95	75	227	216	Yes	0.99
	80	227	216	Yes	0.97	80	230	216	Yes	>0.99
	85	230	216	Yes	0.99	85	232	216	Yes	>0.99
90	234	216	Yes	>0.99	90	236	216	Yes	>0.99	
95	240	216	Yes	>0.99	95	242	216	Yes	>0.99	
8	5	191	221	No	<0.01	5	194	221	No	<0.01
	10	197	221	No	0.01	10	199	221	No	<0.01
	15	201	221	No	0.03	15	203	221	No	<0.01
	20	204	221	No	0.06	20	206	221	No	0.01
	25	207	221	No	0.10	25	209	221	No	0.02
	30	209	221	No	0.16	30	211	221	No	0.05
	35	211	221	No	0.22	35	213	221	No	0.10
	40	213	221	No	0.26	40	215	221	No	0.18
	45	215	221	No	0.35	45	217	221	No	0.29
	50	217	221	No	0.45	50	219	221	No	0.43
	55	219	221	Yes	0.55	55	221	221	Yes	0.57
	60	221	221	Yes	0.60	60	223	221	Yes	0.71
	65	223	221	Yes	0.69	65	225	221	Yes	0.82
	70	225	221	Yes	0.78	70	227	221	Yes	0.90
	75	228	221	Yes	0.84	75	229	221	Yes	0.95
	80	230	221	Yes	0.90	80	232	221	Yes	0.98
	85	234	221	Yes	0.96	85	235	221	Yes	0.99
90	237	221	Yes	0.98	90	239	221	Yes	>0.99	
95	243	221	Yes	>0.99	95	244	221	Yes	>0.99	

\*Prob. = the probability of scoring at Level 2 or above on ISTEP+

**Table 5.3. Proficiency Projection and Probability for Passing ISTEP+ Level 2 (Proficient) when MAP Growth is taken in the Fall or Winter prior to Spring ISTEP+ Tests—Mathematics**

Grade	Mathematics (Fall)					Mathematics (Winter)				
	Start Percentile	RIT Fall	Projected Proficiency			Start Percentile	RIT Winter	Projected Proficiency		
			Cut Score	Level 2	Prob.*			Cut Score	Level 2	Prob.*
2	5	155	190	No	0.01	5	165	190	No	<0.01
	10	160	190	No	0.03	10	170	190	No	<0.01
	15	163	190	No	0.07	15	173	190	No	0.01
	20	166	190	No	0.16	20	175	190	No	0.03
	25	168	190	No	0.19	25	178	190	No	0.11
	30	170	190	No	0.28	30	180	190	No	0.21
	35	172	190	No	0.39	35	181	190	No	0.27
	40	174	190	Yes	0.50	40	183	190	No	0.42
	45	175	190	Yes	0.50	45	185	190	Yes	0.58
	50	177	190	Yes	0.61	50	186	190	Yes	0.66
	55	179	190	Yes	0.72	55	188	190	Yes	0.79
	60	180	190	Yes	0.76	60	190	190	Yes	0.89
	65	182	190	Yes	0.84	65	191	190	Yes	0.92
	70	184	190	Yes	0.88	70	193	190	Yes	0.95
	75	186	190	Yes	0.93	75	195	190	Yes	0.98
	80	188	190	Yes	0.96	80	197	190	Yes	0.99
	85	191	190	Yes	0.98	85	200	190	Yes	>0.99
90	194	190	Yes	0.99	90	203	190	Yes	>0.99	
95	199	190	Yes	>0.99	95	208	190	Yes	>0.99	
3	5	169	202	No	<0.01	5	176	202	No	<0.01
	10	174	202	No	0.01	10	181	202	No	<0.01
	15	177	202	No	0.04	15	184	202	No	0.01
	20	179	202	No	0.08	20	187	202	No	0.02
	25	182	202	No	0.17	25	189	202	No	0.05
	30	184	202	No	0.22	30	191	202	No	0.10
	35	185	202	No	0.27	35	193	202	No	0.20
	40	187	202	No	0.38	40	195	202	No	0.34
	45	189	202	Yes	0.50	45	197	202	Yes	0.50
	50	190	202	Yes	0.56	50	198	202	Yes	0.58
	55	192	202	Yes	0.68	55	200	202	Yes	0.74
	60	194	202	Yes	0.78	60	202	202	Yes	0.86
	65	195	202	Yes	0.83	65	203	202	Yes	0.90
	70	197	202	Yes	0.89	70	205	202	Yes	0.95
	75	199	202	Yes	0.92	75	207	202	Yes	0.98
	80	201	202	Yes	0.96	80	209	202	Yes	0.99
	85	204	202	Yes	0.99	85	212	202	Yes	>0.99
90	207	202	Yes	>0.99	90	215	202	Yes	>0.99	
95	212	202	Yes	>0.99	95	220	202	Yes	>0.99	

Grade	Mathematics (Fall)					Mathematics (Winter)				
	Start Percentile	RIT Fall	Projected Proficiency			Start Percentile	RIT Winter	Projected Proficiency		
			Cut Score	Level 2	Prob.*			Cut Score	Level 2	Prob.*
4	5	179	212	No	<0.01	5	185	212	No	<0.01
	10	184	212	No	0.01	10	190	212	No	<0.01
	15	188	212	No	0.03	15	194	212	No	<0.01
	20	190	212	No	0.06	20	197	212	No	0.02
	25	193	212	No	0.14	25	199	212	No	0.05
	30	195	212	No	0.22	30	201	212	No	0.10
	35	197	212	No	0.32	35	203	212	No	0.20
	40	198	212	No	0.38	40	205	212	No	0.34
	45	200	212	Yes	0.50	45	207	212	Yes	0.50
	50	202	212	Yes	0.62	50	209	212	Yes	0.66
	55	204	212	Yes	0.73	55	211	212	Yes	0.80
	60	205	212	Yes	0.73	60	212	212	Yes	0.86
	65	207	212	Yes	0.83	65	214	212	Yes	0.93
	70	209	212	Yes	0.89	70	216	212	Yes	0.97
	75	211	212	Yes	0.94	75	218	212	Yes	0.99
	80	214	212	Yes	0.98	80	221	212	Yes	>0.99
	85	216	212	Yes	0.99	85	223	212	Yes	>0.99
90	220	212	Yes	>0.99	90	227	212	Yes	>0.99	
95	225	212	Yes	>0.99	95	232	212	Yes	>0.99	
5	5	187	218	No	<0.01	5	192	218	No	<0.01
	10	193	218	No	0.01	10	198	218	No	<0.01
	15	196	218	No	0.04	15	201	218	No	<0.01
	20	199	218	No	0.09	20	204	218	No	0.02
	25	202	218	No	0.19	25	207	218	No	0.07
	30	204	218	No	0.28	30	209	218	No	0.15
	35	206	218	No	0.38	35	211	218	No	0.27
	40	208	218	Yes	0.50	40	213	218	No	0.42
	45	210	218	Yes	0.62	45	215	218	Yes	0.58
	50	211	218	Yes	0.67	50	217	218	Yes	0.73
	55	213	218	Yes	0.77	55	219	218	Yes	0.85
	60	215	218	Yes	0.85	60	221	218	Yes	0.93
	65	217	218	Yes	0.91	65	223	218	Yes	0.97
	70	219	218	Yes	0.95	70	225	218	Yes	0.99
	75	221	218	Yes	0.97	75	228	218	Yes	>0.99
	80	224	218	Yes	0.99	80	230	218	Yes	>0.99
	85	227	218	Yes	>0.99	85	233	218	Yes	>0.99
90	230	218	Yes	>0.99	90	237	218	Yes	>0.99	
95	236	218	Yes	>0.99	95	242	218	Yes	>0.99	

Grade	Mathematics (Fall)					Mathematics (Winter)				
	Start Percentile	RIT Fall	Projected Proficiency			Start Percentile	RIT Winter	Projected Proficiency		
			Cut Score	Level 2	Prob.*			Cut Score	Level 2	Prob.*
6	5	192	226	No	<0.01	5	196	226	No	<0.01
	10	198	226	No	<0.01	10	202	226	No	<0.01
	15	202	226	No	0.01	15	205	226	No	<0.01
	20	205	226	No	0.03	20	209	226	No	<0.01
	25	207	226	No	0.05	25	211	226	No	0.01
	30	209	226	No	0.09	30	214	226	No	0.03
	35	212	226	No	0.19	35	216	226	No	0.07
	40	214	226	No	0.28	40	218	226	No	0.15
	45	216	226	No	0.38	45	220	226	No	0.27
	50	218	226	Yes	0.50	50	222	226	No	0.42
	55	220	226	Yes	0.62	55	224	226	Yes	0.58
	60	222	226	Yes	0.72	60	226	226	Yes	0.73
	65	224	226	Yes	0.81	65	228	226	Yes	0.85
	70	226	226	Yes	0.88	70	230	226	Yes	0.93
	75	228	226	Yes	0.93	75	233	226	Yes	0.98
	80	231	226	Yes	0.97	80	236	226	Yes	>0.99
	85	234	226	Yes	0.99	85	239	226	Yes	>0.99
90	238	226	Yes	>0.99	90	243	226	Yes	>0.99	
95	243	226	Yes	>0.99	95	248	226	Yes	>0.99	
7	5	195	233	No	<0.01	5	198	233	No	<0.01
	10	201	233	No	<0.01	10	204	233	No	<0.01
	15	205	233	No	<0.01	15	208	233	No	<0.01
	20	209	233	No	<0.01	20	212	233	No	<0.01
	25	211	233	No	0.01	25	215	233	No	<0.01
	30	214	233	No	0.02	30	217	233	No	<0.01
	35	216	233	No	0.05	35	220	233	No	0.01
	40	218	233	No	0.08	40	222	233	No	0.03
	45	221	233	No	0.18	45	224	233	No	0.07
	50	223	233	No	0.27	50	226	233	No	0.15
	55	225	233	No	0.38	55	228	233	No	0.26
	60	227	233	Yes	0.50	60	230	233	No	0.42
	65	229	233	Yes	0.62	65	233	233	Yes	0.66
	70	231	233	Yes	0.73	70	235	233	Yes	0.80
	75	234	233	Yes	0.86	75	238	233	Yes	0.93
	80	237	233	Yes	0.94	80	240	233	Yes	0.97
	85	240	233	Yes	0.98	85	244	233	Yes	>0.99
90	244	233	Yes	>0.99	90	248	233	Yes	>0.99	
95	250	233	Yes	>0.99	95	254	233	Yes	>0.99	

Grade	Mathematics (Fall)					Mathematics (Winter)				
	Start Percentile	RIT Fall	Projected Proficiency			Start Percentile	RIT Winter	Projected Proficiency		
			Cut Score	Level 2	Prob.*			Cut Score	Level 2	Prob.*
8	5	197	236	No	<0.01	5	199	236	No	<0.01
	10	203	236	No	<0.01	10	206	236	No	<0.01
	15	208	236	No	<0.01	15	210	236	No	<0.01
	20	211	236	No	<0.01	20	214	236	No	<0.01
	25	214	236	No	0.01	25	217	236	No	<0.01
	30	217	236	No	0.03	30	220	236	No	<0.01
	35	219	236	No	0.06	35	222	236	No	0.01
	40	222	236	No	0.12	40	225	236	No	0.04
	45	224	236	No	0.18	45	227	236	No	0.08
	50	226	236	No	0.26	50	229	236	No	0.16
	55	229	236	No	0.40	55	231	236	No	0.28
	60	231	236	Yes	0.50	60	234	236	Yes	0.50
	65	233	236	Yes	0.60	65	236	236	Yes	0.65
	70	236	236	Yes	0.70	70	239	236	Yes	0.84
	75	238	236	Yes	0.78	75	241	236	Yes	0.92
	80	241	236	Yes	0.88	80	245	236	Yes	0.99
	85	245	236	Yes	0.96	85	248	236	Yes	>0.99
90	249	236	Yes	0.99	90	253	236	Yes	>0.99	
95	256	236	Yes	>0.99	95	259	236	Yes	>0.99	

\*Prob. = the probability of scoring at Level 2 or above on ISTEP+

## 6. Summary and Discussion

This study produced a set of cut scores on MAP Growth Reading and Mathematics tests for grades 3–8 that correspond to each ISTEP+ performance level. By using matched score data from a sample of students from Indiana, the study demonstrates that MAP Growth scores can accurately predict whether a student could be proficient or above based on his or her MAP Growth scores. This study also used the 2015 NWEA norming study results to project a student's probability to meet proficiency based on that student's prior MAP Growth scores in fall and winter. These results will help educators predict student performance in ISTEP+ tests as early as possible and identify students who are at risk of failing to meet required standards so they can receive necessary resources and assistance to meet their goals.

However, while concordance tables can be helpful and informative, they have some limitations:

1. The concordance tables provide information about score comparability on different tests, but the scores cannot be assumed to be interchangeable. In the case for ISTEP+ and MAP Growth tests, as they are not parallel in content, scores from these two tests should not be directly compared.
2. The sample data used in this study were collected from 174 schools in Indiana, which may limit the generalizability of the results to test takers who differ significantly from this

sample. Caution should be exercised when generalizing the results to test takers who differ significantly from this sample.

3. Caution should be exercised if the concorded scores are used for a subpopulation. NWEA will continue to gather information about ISTEP+ performance from other schools in Indiana to enhance the quality and generalizability of the study.

## 7. References

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## Appendix A: Data and Analysis

### A.1. Data

Data used in this study were collected from 174 schools in Indiana. The sample contained matched ISTEP+ and MAP Growth ELA/Reading scores of 56,647 students in grades 3–8 and matched ISTEP+ and MAP Growth Mathematics scores of 56,876 students in grades 3–8 who completed both MAP Growth and ISTEP+ tests in Spring 2016.

To understand the statistical characteristics of the test scores, descriptive statistics are provided in Table A.1. As Table A.1 indicates, the correlation coefficients between MAP Growth Reading and ISTEP+ ELA scores range from 0.75 to 0.81, and the correlation coefficients between MAP Growth and ISTEP+ Mathematics scores range from 0.76 to 0.81. In general, all these correlations indicate a strong relationship between MAP Growth and ISTEP+ test scores.

**Table A.1. Descriptive Statistics of the Sample Data**

Subject	Grade	N	<i>r</i>	ISTEP+				MAP Growth			
				Mean	SD	Min	Max	Mean	SD	Min	Max
ELA/ Reading	3	8,969	0.85	463.29	56.12	235	762	203.34	15.97	133	259
	4	8,684	0.82	488.84	55.25	235	720	210.41	15.1	139	253
	5	15,069	0.81	521.11	58.31	270	825	218.47	14.75	139	268
	6	8,797	0.80	526.21	58.44	299	755	218.97	14.78	144	261
	7	7,877	0.80	545.53	58.64	240	772	222.08	14.99	147	262
	8	7,251	0.79	559.89	65.63	311	833	224.44	15.08	146	268
Math	3	9,010	0.89	447.89	65.61	185	690	207.85	15.76	124	291
	4	8,721	0.89	480.92	56.41	210	720	217.39	15.24	145	293
	5	15,135	0.90	519.36	60.36	240	750	229.58	17.96	146	296
	6	8,877	0.89	525.16	53.54	283	760	229.08	16.04	151	292
	7	7,870	0.87	541.93	49.04	305	790	234.11	17.50	138	287
	8	7,263	0.88	561.48	48.17	325	800	237.48	18.07	148	308

### A.2. Equipercentile Linking Procedure

The equipercentile procedure (e.g., Kolen & Brennan, 2004) was used to establish the concordance relationship between ISTEP+ and MAP Growth scores for grades 3–8 in ELA/Reading and Mathematics. This procedure matches scores on the two scales that have the same percentile rank (i.e., the proportion of scores at or below each score).

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

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

where  $e_y(x)$  is the equipercentile equivalent of scores on ISTEP+ on the scale of MAP Growth,  $P(x)$  is the percentile rank of a given score on Test  $X$ .  $G^{-1}$  is the inverse of the percentile rank function for scores on Test  $Y$ , which indicates the scores on Test  $Y$  corresponding to a given

percentile. Polynomial loglinear pre-smoothing was applied to reduce irregularities of the frequency distributions as well as equipercentile linking curve.

**A.3. Consistency Rate of Classification**

Consistency rate of classification accuracy, expressed in the form of a rate between 0 and 1, measures the extent to which MAP Growth scores (and the estimated MAP Growth cut scores) accurately predicted whether students in the sample would pass (i.e., Level 2 or higher) on ISTEP+ tests.

To calculate consistency rate of classification, sample students were designated “Below ISTEP+ cut” or “At or Above ISTEP+ cut” based on their actual ISTEP+ scores. Similarly, they were also designated as “Below MAP cut” or “At or Above MAP Growth cut” based on their actual MAP Growth scores. A two-way contingency table was then tabulated (see Table A.2), classifying students as “proficient” based on the ISTEP+ cut score and concordant MAP Growth cut score. Students were classified as true positive (TP), true negative (TN), false positive (FP), or false negative (FN). The overall consistency rate of classification was computed as the proportion of correct classifications among the entire sample by  $(TP + TN) / (TP + TN + FP + FN)$ .

- Students classified in the true positive (TP) category were those predicted to be proficient based on both the MAP Growth cut scores and ISTEP+ cut scores.
- Students classified in the true negative (TN) category were those predicted to be not proficient based on both the MAP Growth cut scores and ISTEP+ cut scores.
- Students classified in the false positive (FP) category were those predicted to be proficient based on the MAP Growth cut scores but were classified as not proficient based on the ISTEP+ 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 ISTEP+ cut scores.

**Table A.2. Definition of Consistency Rate for ISTEP+ to MAP Concordance**

	Below ISTEP+ Cut	At or Above ISTEP+ Cut
Below MAP Growth Cut	True Negative	False Negative
At or Above MAP Growth Cut	False Positive	True Positive

Shaded cells are summed to compute the consistency rate.

**A.4. Proficiency Projection**

MAP Growth conditional growth norms provide students’ expected gain scores across testing seasons (Thum & Hauser, 2015). This information is used to predict a student’s performance on the ISTEP+ based on that student’s MAP Growth scores in prior seasons (e.g., fall and winter). The probability of a student achieving Level 2 (proficient) on ISTEP+ based on his or her fall or winter MAP Growth score is given in Equation A2:

$$Pr(\text{Achieving Level 2 in spring} | a \text{ RIT score of } x) = \Phi \left( \frac{x+g-c}{SD} \right) \tag{A2}$$

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

Growth cut-score for spring, and  $SD$  is the conditional standard deviation of growth from fall or winter to spring.

The probability of a student achieving Level 2 on the ISTEP+ tests based on his or her spring score  $s$  can be calculated by Equation A3:

$$Pr(\text{Achieving Level 2 in spring} | \text{a RIT score of } s \text{ in spring}) = \Phi\left(\frac{s-c}{SE}\right) \quad (\text{A3})$$

where  $SE$  is the standard error of measurement for MAP Growth.