Istation

Linking NWEA MAP Math to Istation Math

PREPARED BY
Matthew Jeans, PhD

DATE
January 2024

Executive Summary

This study provides the proficiency projection of the Istation Math formative assessment on the NWEA MAP Math assessments for kindergarten through fifth grades. Classification accuracy is also provided. Samples were kindergarten to fifth-grade students in two school districts in Texas and Idaho in the 2022–2023 school year. There were 1,269 students from District A and 3,755 from District B, accounting for 5,024 students. Students took Istation math at the beginning of the year (BOY), middle of the year (MOY), and end of the year (EOY) assessment months, and NWEA MAP during the fall, winter, and spring assessment months. Due to limited MOY data, fifth grade students were only included in EOY analyses.

The Pearson Product Moment correlations of Istation Math MOY and NWEA MAP Math at winter benchmarking range from 0.84 to 0.89 and 0.82 to 0.86 for Istation Math EOY and NWEA MAP Math at spring benchmarking. They indicate strong relationships between Istation Math and the NWEA MAP Math assessments.

The linking study between NWEA MAP and Istation Math is conducted using multinomial logistic regression. A low probability of attaining a level was ≤.330, a medium probability of attaining a level was .331–.660, and a high probability of attaining a level was set at ≥.661.

At MOY, to achieve a high probability of attaining the NWEA MAP *Average* category, students had to attain Istation Math scores at the following percentile ranks:

Kindergarten: 50th
First grade: 60th
Second grade: 45th
Third Grade: 35th
Fourth Grade: 35th

To achieve a high probability of attaining the NWEA MAP *High* category, students had to attain Istation Math scores at the following percentile ranks:

Kindergarten: 90th
First grade: 99th
Second grade: 85th
Third Grade: 75th
Fourth Grade: 85th

At EOY, students had to attain Istation Math scores at the following percentile ranks to have a high probability of attaining the NWEA MAP *Average* category:

Kindergarten: 55th
First grade: 70th
Second grade: 40th
Third Grade: 35th
Fourth Grade: 45th
Fifth Grade: 50th

To achieve a high probability of attaining the NWEA MAP *High* category, students had to attain Istation Math scores at the following percentile ranks:

Kindergarten: 90th
First grade: 99th
Second grade: 85th
Third Grade: 85th
Fourth Grade: 95th
Fifth Grade: 95th

Classification accuracy analyses were conducted. At MOY, the AUC ranged from 0.81 to 0.87, indicating that the percentage of students correctly classified on the Istation Math with respect to the NWEA MAP was approximately 85% across grades. Sensitivity ranged from 0.85 to 0.92, indicating that approximately 88% of students who performed below the cut point on Istation Math did not meet Average or above on the NWEA MAP assessment. Specificity ranged from 0.72 to 0.89, indicating that approximately 82% of students who performed above the cut point on Istation Math met the Average or above on the NWEA MAP. Istation Math accurately predicted meeting math proficiency on NWEA MAP about 85% of the time at the MOY.

At EOY, the AUC ranged from 0.85 to 0.89, indicating that approximately 87% of students were correctly classified on the Istation Math with respect to the NWEA MAP

assessment across grades. Sensitivity ranged from 0.80 to 0.92, indicating that approximately 87% of students who performed below the cut point on Istation Math did not meet the Average category or above on NWEA MAP. Specificity ranged from 0.83 to 0.95, indicating that approximately 87% of students who performed above the cut point on Istation Math met the Average or above on the NWEA MAP assessment. Istation Math accurately predicted meeting math proficiency on NWEA MAP about 87% of the time at EOY.

Table of Contents

Introduction

This study provides the proficiency projection of the Istation Math formative assessment observed scores on the NWEA MAP Math scores for kindergarten through fifth grades. Students took these two assessments during the same school year, and a correlational study and classification accuracy were also conducted.

In the context of the evolving educational landscape, particularly post-pandemic, the importance of consistent and accurate assessment in math proficiency has been highlighted. Significant learning losses occurred due to the COVID-19 pandemic, and recent research has shown slower recovery in math skills compared to reading skills among students since the onset of the pandemic (Patarapichayatham & Locke, 2023). Despite the slow rate of learning recovery, students have been making positive gains in the years following the pandemic (Patarapichayatham & Locke, 2023; Hampel, 2023). This trend, as evidenced by the Istation Math scores, underscores the significance of regular formative assessments in tracking and supporting student growth. Furthermore, Istation emphasizes the value of longitudinal data in understanding and enhancing student learning trajectories in math. These insights provide a backdrop for the current study, underscoring its contribution to the broader effort of improving math education and aiding in monitoring performance post-pandemic.

Regular administration of Istation formative assessments, either monthly or three times each year during benchmarking assessment months, and the administration of NWEA MAP three times per year under benchmarking assessment months, presents an opportunity to conduct a linking study between the Istation Math and NWEA MAP Math assessments. The results from this study can be helpful for teachers and school administrators to prepare students for NWEA MAP Math in the spring.

The Istation Math formative assessment has strong correlations with other state assessments, and linking studies with other assessments demonstrated that Istation

Math can be used to project student proficiency on end-of-year assessments such as the ACT Aspire (Patarapichayatham & Locke, 2020) and Ohio AIR (Patarapichayatham & Locke, 2020). All information can be found on our website (www.istation.com).

Background

Istation Math Assessment

The Istation Math assessment is a computerized adaptive test (CAT) using the two-parameter Item Response Theory. Istation assessments gather and report frequent information about student progress in critical domains throughout and across academic years. The assessments accomplish this by delivering monthly tests that target critical areas to inform instruction. With adequate computer resources, it is possible to administer Istation assessments to an entire classroom, school, or district in a single day. Student results are immediately available online for teachers and administrators, illustrating each student's past and present performance and skill growth. Teachers are alerted when students are not making adequate progress so that the instructional program can be modified before a pattern of failure becomes established (Ketterlin-Geller, 2021).

Istation Math measures students' abilities and identifies deficits in critical areas to provide continuous differentiated instruction. Istation Math is available for prekindergarten through eighth grade students and has a continuous vertical scale that assesses math ability across these grades. In addition to detailed reports, Istation provides teachers and other school personnel with links to teaching resources and targeted intervention strategies (Ketterlin-Geller, 2021). Scaled scores range between 100 and 900. There are five performance levels for Istation Math:

- Level 1: at or below the 20th percentile rank
- Level 2: between the 21st and 40th percentile rank
- Level 3: between the 41st and 60th percentile rank
- Level 4: between the 61st and 80th percentile rank

- Level 5: at or above the 81st percentile rank.

NWEA MAP Math Assessment

NWEA MAP Math tests are vertically scaled interim assessments administered in CAT mode. NWEA MAP Math is constructed to measure student achievements in kindergarten to twelfth grade and is aligned with the Common Core State Standards (CCSS). NWEA MAP Math scores are reported with a Rasch Unit (RIT) scale ranging from 100 to 350. There are three benchmarking assessment months: fall, winter, and spring. Because we focus on the linking study during the winter and spring benchmarking assessment months, Table 1 shows cut scores for these two assessment months. Because NWEA MAP Math does not have performance levels like a state summative test, they conduct linking studies between NWEA MAP Math and individual state summative tests. In general, students are classified into three performance categories; "Low" if they are in percentile ranks 1st to 39th, "Average" if their ability falls into the 40th – 79th, and "High" if they obtain 80th percentile ranks or higher.

Table 1. *NWEA MAP Math Cut Scores*

Grade	Low (Winter)	Average (Winter)	High (Winter)	Low (Spring)	Average (Spring)	High (Spring)
Kindergarten	<147	147–159	>159	<154	154–166	>166
1	<167	167–180	>180	<173	173–187	>187
2	<181	181–194	>194	<186	186–200	>200
3	<193	193–207	>207	<198	198–212	>212
4	<202	202–218	>218	<207	207–223	>223
5	<211	211–227	>227	<215	215–232	>232

Methodology

Analytical Sample

The analytic sample consisted of students who were in kindergarten through fifth grade in two school districts in Idaho and Texas in the 2022-2023 school year. Only students who had valid Istation Math and NWEA MAP Math scores were included in the analyses.

Table 2 presents the analytic sample breakdown by school district and grade. There were 1,269 students from District A and 3,755 from District B, accounting for 5,024 students. The largest proportion of students in District A and B consisted of White/non-Hispanic students. A full description of demographic characteristics for each district is available in Table 3.

Table 2. *Sample Size by District and Grade*

Grade	A	B	Combined
K	215	656	871
1	197	776	973
2	203	750	953
3	202	782	984
4	225	758	983
5	227	33	260

Table 3. *Demographic Characteristics by District*

District	Demographic Characteristics	Percentage
A *N=1,269*	Gender: Female	47%
	Gender: Male	53%
	Race/Ethnicity: White/Non-Hispanic	77%
	Race/Ethnicity: Hispanic or Latino origin	18%
	Race/Ethnicity: Asian or Other	5%
B *N=3,755*	Gender: Female	49%
	Gender: Male	51%
	Race/Ethnicity: White/Non-Hispanic	35%
	Race/Ethnicity: African American or Black	15%
	Race/Ethnicity: Hispanic or Latino origin	30%
	Race/Ethnicity: Asian or Other	20%

Analytical Approach

To provide teachers and administrators with the information they need to determine whether a student is likely to reach the *Average* category or above on the NWEA MAP Math assessment, the analysis first examined Pearson product-moment correlations to confirm the correlation in performance between the two assessments. Next, multinomial logistic regression determined the probabilities of reaching *Average* (level 2) or *High* (level 3) on the NWEA MAP Math assessment. The analysis used the Istation Math score as the predictor and the NWEA MAP Math levels as outcome variables. Students with Istation Math scores ranging from the 1st to the 99th percentile ranks were part of the analysis. A selection of 20 Istation Math scaled scores in MOY and EOY, corresponding to the following percentile ranks, was made: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 99. The model was adapted for each grade individually. The study focused on performance levels 2 and 3.

The probability of achieving NWEA MAP Math performance level 2 (*Average*) or above is computed by adding the probabilities of levels 2 and 3. The probability of achieving NWEA MAP Math performance level 3 (*High*) is the probability only for level 3. The

analyses were computed using Stata 18.0 software. Finally, classification accuracy analyses determined Istation Math cut points that assist in differentiating students who will or will not achieve level 2 *Average* or higher on the NWEA MAP Math assessment.

Results

Istation Math and NWEA MAP Math Descriptive Statistics

Table 4 presents the descriptive statistics for Istation Math and NWEA MAP Math performance by district and grade.

Table 4. *Istation Math and NWEA MAP Math Mean Scores*

District	Grade	Istation BOY	Istation MOY	Istation EOY	MAP Fall	MAP Winter	MAP Spring
A	K	311.97	395.55	475.13	147.50	NA	167.06
	1	427.50	479.27	540.30	166.16	NA	182.29
	2	459.91	504.87	538.89	184.98	NA	201.71
	3	489.08	522.90	549.86	191.75	NA	205.99
	4	504.20	534.90	573.38	201.51	NA	212.99
	5	511.85	553.85	589.14	212.90	NA	224.85
B	K	302.48	380.79	430.26	144.81	153.45	162.45
	1	409.00	475.04	513.38	163.58	171.23	179.88
	2	460.11	494.86	517.07	175.79	184.20	191.30
	3	483.54	507.58	531.63	189.83	196.69	203.13
	4	509.08	532.64	555.72	202.07	207.02	213.38
	5	526.95	552.94	576.18	213.64	216.79	220.50
Combined	K	305.71	385.70	442.76	145.50	153.45	163.83
	1	412.97	476.59	520.11	164.13	171.23	180.32
	2	459.89	496.26	521.17	177.84	184.20	193.44
	3	484.41	511.31	536.37	190.24	196.69	203.75
	4	508.69	533.08	560.34	201.95	207.02	213.30
	5	516.58	553.72	587.68	213.00	216.79	224.28

Table 5 presents the proportion of students in each NWEA MAP Math level at MOY and EOY, respectfully, for the combined sample. At MOY, the largest proportion of students performed at the *Average* level for all grades except second grade, where the largest proportion performed at the *Low* level. At EOY, the largest proportion of students performed at the *Average* level for first through fifth grades. For kindergarten, the largest proportion of students performed at the *High* level.

Table 5. *Percentage of Students by NWEA MAP Math Performance Level at MOY*

Benchmark Period	Grade	Low MAP Level	Average MAP Level	High MAP Level
MOY	K	25%	43%	32%
	1	33%	45%	22%
	2	39%	38%	23%
	3	34%	44%	21%
	4	31%	47%	22%
EOY	K	18%	39%	43%
	1	27%	41%	32%
	2	27%	40%	33%
	3	29%	43%	28%
	4	31%	40%	29%
	5	28%	41%	32%

Correlational Study: Istation Math and NWEA MAP Math

Table 6 shows the Pearson product-moment correlation coefficients between Istation Math scores and NWEA MAP Math scores for MOY and EOY for both districts combined. The coefficients for grades K through 5 range from .82 to .89, indicating a strong relationship between Istation Math and the NWEA MAP Math assessment. If a student does well on Istation Math, then it is likely that the student will do well on the NWEA MAP Math assessment, particularly for grades K through 5. Figures 1a and 1b show the correlations between Istation Math and NWEA Map Math scores by grade at MOY and EOY benchmark periods. We did not run correlations for grade 5 at the winter benchmark due to insufficient observations that had both Istation Math and NWEA MAP scores.

Table 6. *Pearson Product-Moment Correlation Coefficients between Istation and NWEA MAP*

Grade	Istation MOY & NWEA MAP Winter	Istation EOY & NWEA MAP Spring
K	0.84*	0.82*
1	0.89*	0.85*
2	0.87*	0.85*
3	0.86*	0.86*
4	0.85*	0.85*
5	NA	0.85*

*$p < 0.001$

Figure 1a. *Pearson Product-Moment Correlations between Istation and NWEA MAP by Grade*

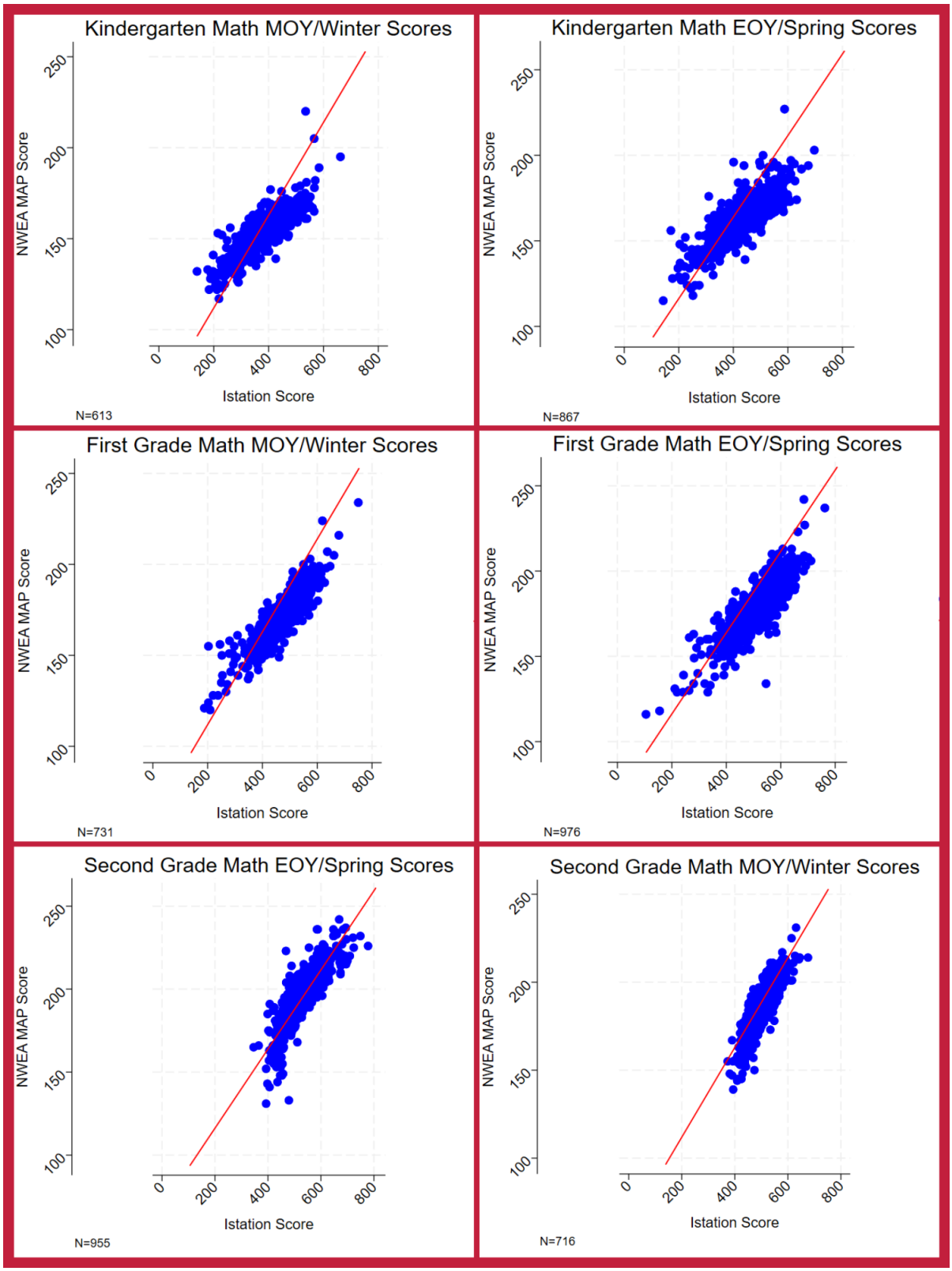
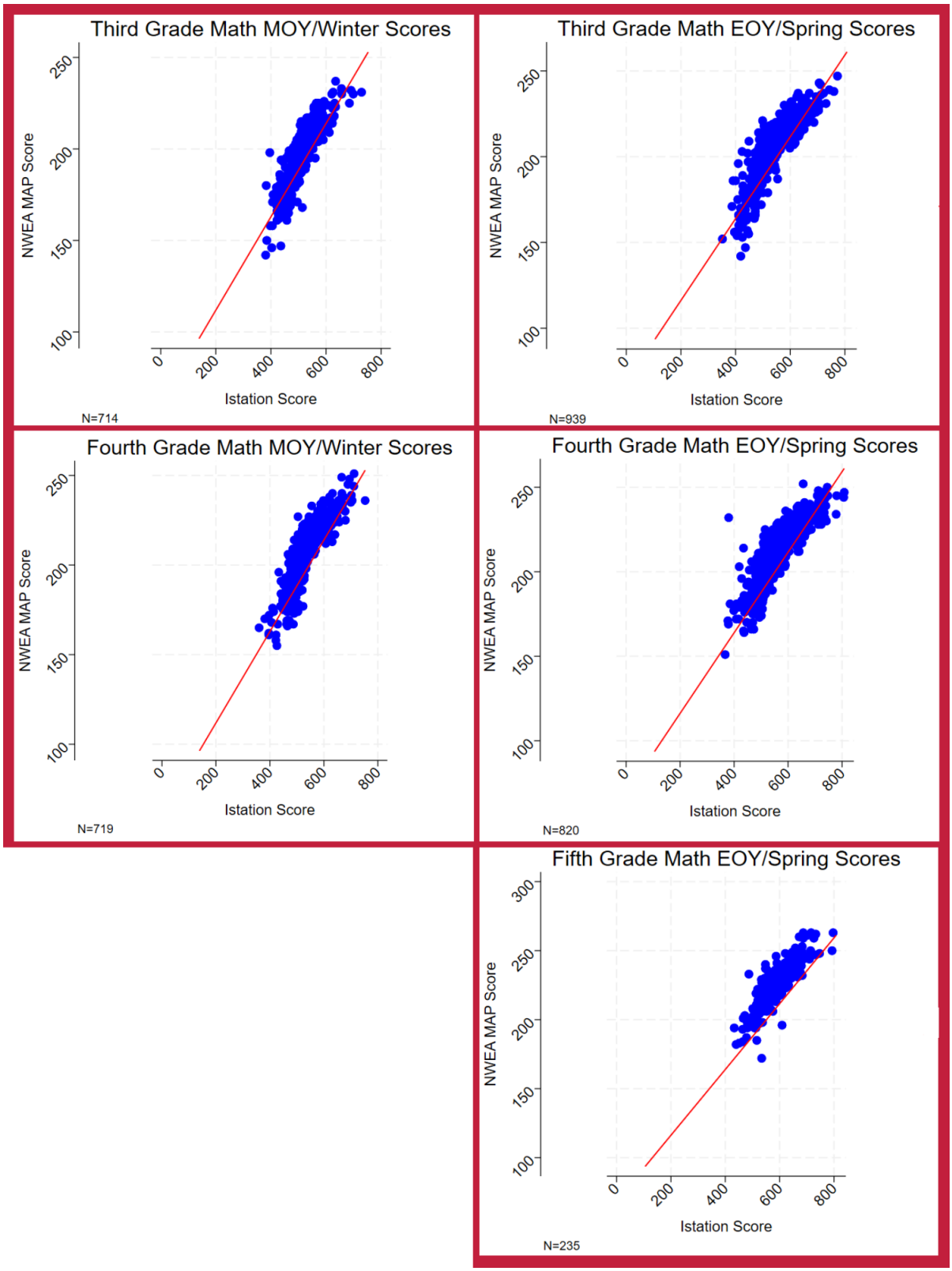


Figure 1b. *Pearson Product-Moment Correlations between Istation and NWEA MAP by Grade*



Linking Study: Istation Math and NWEA MAP Math

Tables 7 through 12 are concordance tables derived from statistical linking procedures that directly link Istation Math scores and NWEA MAP Math assessment levels. Concordance tables serve as valuable tools for various stakeholders, including educators, parents, administrators, researchers, and policymakers, by offering essential information to assess students' academic performance. These tables provide a more comprehensive understanding of students' abilities and progress. Moreover, concordance tables aid in identifying strengths and weaknesses in specific subject areas, assisting in developing targeted interventions and support programs. Furthermore, these tables contribute to the establishment of consistent academic standards and expectations, promoting a unified approach to evaluating and enhancing educational outcomes. Fifth grade students at MOY are not included in the linking study due to insufficient observations with NWEA MAP scores.

The probabilities of meeting a NWEA MAP Math performance level were divided into low, medium, and high. Students with a probability of ≤.330 had a *low* probability of achieving a level. Those with a probability of .331–.660 had a *medium* probability, and students with a probability of greater than ≥.661 had a *high* probability of achieving *Average* or higher.

Probabilities for the Middle of the Year

The MOY tables show that students in Kindergarten need to be at the 50th percentile or above to have a high probability of reaching Average or higher; students in first grade need to be at the 60th percentile. The upper grades (2-4) have lower percentiles at 35 and 40, yielding a high probability of reaching Average or higher. These percentiles align with the NWEA MAP, where the range for Average is 40–79.

Table 7. *Kindergarten and First Grade Proficiency Projection for Istation Math at MOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
K	224	5	0.034	Low	0.000	Low
	247	10	0.073	Low	0.000	Low
	265	15	0.128	Low	0.001	Low
	279	20	0.193	Low	0.003	Low
	291	25	0.268	Low	0.005	Low
	303	30	0.359	Medium	0.010	Low
	314	35	0.453	Medium	0.017	Low
	325	40	0.552	Medium	0.028	Low
	336	45	0.648	Medium	0.045	Low
	346	50	0.727	High	0.067	Low
	357	55	0.802	High	0.099	Low
	368	60	0.861	High	0.141	Low
	380	65	0.910	High	0.199	Low
	393	70	0.946	High	0.277	Low
	406	75	0.969	High	0.367	Medium
	422	80	0.985	High	0.489	Medium
	440	85	0.994	High	0.624	Medium
	463	90	0.998	High	0.770	High
	497	95	1.000	High	0.903	High
	560	99	1.000	High	0.984	High
1	339	5	0.006	Low	0.000	Low
	361	10	0.017	Low	0.000	Low
	376	15	0.034	Low	0.000	Low
	388	20	0.060	Low	0.000	Low
	399	25	0.099	Low	0.000	Low
	408	30	0.146	Low	0.000	Low
	417	35	0.211	Low	0.001	Low
	426	40	0.295	Low	0.001	Low
	434	45	0.383	Medium	0.002	Low
	443	50	0.493	Medium	0.004	Low
	451	55	0.592	Medium	0.008	Low
	459	60	0.684	High	0.013	Low
	468	65	0.774	High	0.023	Low
	477	70	0.844	High	0.037	Low
	488	75	0.906	High	0.066	Low
	499	80	0.946	High	0.111	Low
	512	85	0.973	High	0.194	Low
	528	90	0.990	High	0.345	Medium
	552	95	0.998	High	0.628	Medium
	596	99	1.000	High	0.934	High

Table 8. *Second and Third Grade Proficiency Projection for Istation Math at MOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
2	418	5	0.009	Low	0.000	Low
	435	10	0.034	Low	0.000	Low
	447	15	0.082	Low	0.000	Low
	456	20	0.153	Low	0.002	Low
	464	25	0.253	Low	0.004	Low
	471	30	0.371	Medium	0.009	Low
	478	35	0.508	Medium	0.019	Low
	484	40	0.626	Medium	0.033	Low
	490	45	0.732	High	0.055	Low
	496	50	0.818	High	0.085	Low
	502	55	0.883	High	0.127	Low
	508	60	0.927	High	0.181	Low
	515	65	0.961	High	0.260	Low
	521	70	0.978	High	0.341	Medium
	529	75	0.990	High	0.462	Medium
	537	80	0.996	High	0.586	Medium
	546	85	0.999	High	0.712	High
	558	90	1.000	High	0.838	High
	575	95	1.000	High	0.936	High
	606	99	1.000	High	0.990	High
3	440	5	0.007	Low	0.000	Low
	457	10	0.039	Low	0.000	Low
	469	15	0.118	Low	0.001	Low
	478	20	0.247	Low	0.002	Low
	485	25	0.399	Medium	0.006	Low
	493	30	0.599	Medium	0.017	Low
	499	35	0.734	High	0.032	Low
	505	40	0.837	High	0.057	Low
	511	45	0.907	High	0.093	Low
	517	50	0.949	High	0.146	Low
	523	55	0.974	High	0.216	Low
	529	60	0.987	High	0.306	Low
	535	65	0.994	High	0.412	Medium
	542	70	0.998	High	0.545	Medium
	549	75	0.999	High	0.671	High
	557	80	1.000	High	0.789	High
	566	85	1.000	High	0.881	High
	577	90	1.000	High	0.945	High
	593	95	1.000	High	0.983	High
	624	99	1.000	High	0.998	High

Table 9. *Fourth Grade Proficiency Projection for Istation Math at MOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
4	457	5	0.013	Low	0.000	Low
	474	10	0.058	Low	0.000	Low
	486	15	0.150	Low	0.002	Low
	495	20	0.283	Low	0.006	Low
	503	25	0.447	Medium	0.013	Low
	510	30	0.602	Medium	0.026	Low
	516	35	0.723	High	0.042	Low
	523	40	0.832	High	0.067	Low
	529	45	0.897	High	0.097	Low
	535	50	0.939	High	0.134	Low
	541	55	0.965	High	0.179	Low
	547	60	0.980	High	0.233	Low
	553	65	0.989	High	0.297	Low
	559	70	0.994	High	0.368	Medium
	566	75	0.997	High	0.458	Medium
	574	80	0.999	High	0.564	Medium
	583	85	1.000	High	0.675	High
	594	90	1.000	High	0.788	High
	611	95	1.000	High	0.901	High
	641	99	1.000	High	0.978	High

MOY Istation and NWEA MAP Math at Winter Benchmarking

Figure 2 represents the MOY Istation Math percentiles associated with the probabilities of attaining the NWEA MAP Math *Average* performance level by grade.

Kindergarten students with an Istation Math score around 303–336 (30th to 45th percentile ranks) had a medium probability of achieving the NWEA MAP Math *Average* level or higher. Students who attained a score of 346 (50th percentile rank) or higher are projected to achieve the NWEA MAP Math *Average* level or higher. Students with an Istation Math score of around 463 (90th percentile rank) are projected to achieve the NWEA MAP Math *High* level.

First grade students with an Istation Math score around 434–451 (45th to 55th percentile ranks) had a medium probability of achieving the NWEA MAP Math *Average* level or higher. Students with a score higher than 459 had a high probability of reaching the *Average* level or higher. Students who attained an Istation Math score around 596 (99th percentile) have a high probability of reaching the NWEA MAP Math *High* level.

Second grade students who attained an Istation Math score around 471–484 (30th to 40th percentile ranks) had a medium probability of achieving the NWEA MAP Math *Average* level or higher. Students with scores higher than 490 had a high probability of reaching the *Average* level or higher. Students who attained an Istation Math score around 546 (85th percentile) have a high probability of reaching the NWEA MAP Math *High* level.

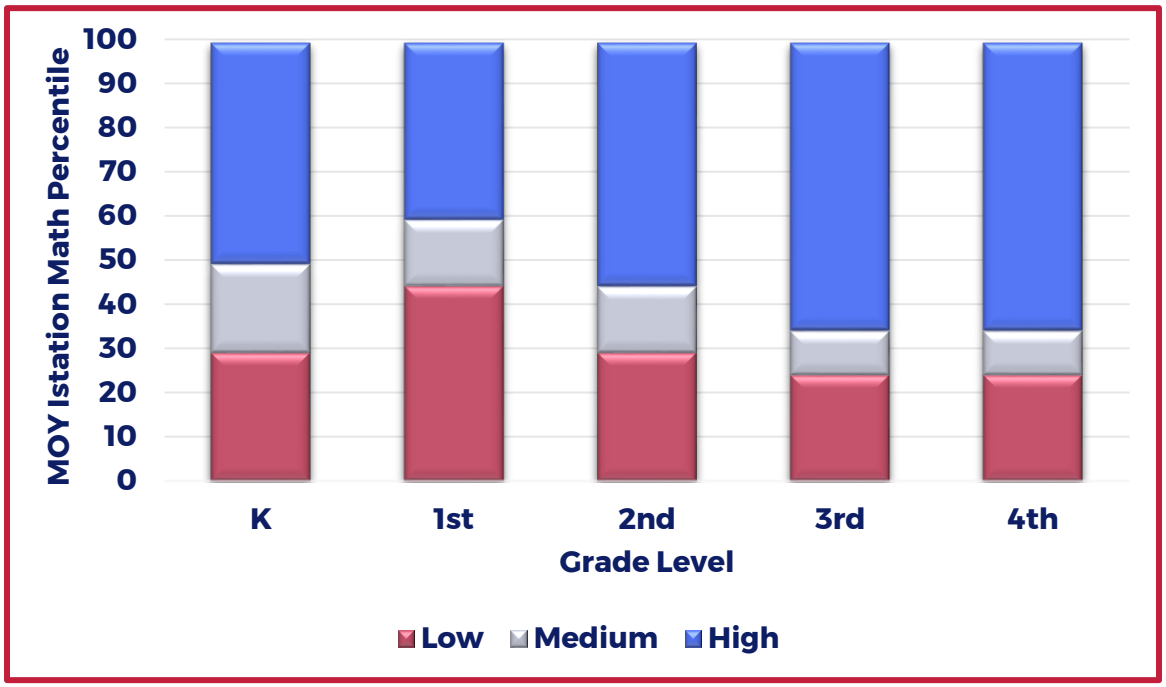
Third grade students who attained an Istation Math score around 485–493 (25th to 30th percentile ranks) had a medium probability of achieving the NWEA MAP Math *Average* level or higher. Students with a score higher than 499 had a high probability of reaching the *Average* level or higher. Students who attained an Istation Math score

around 549 (75th percentile) have a high probability of reaching the NWEA MAP Math *High* level.

Fourth grade students who attained an Istation Math score around 503–510 (25th to 30th percentile ranks) had a medium probability of achieving the NWEA MAP Math *Average* level or higher. Students with a score higher than 516 had a high probability of reaching the *Average* level or higher. Students who attained an Istation Math score around 583 (85th percentile) have a high probability of reaching the NWEA MAP Math *High* level.

These results show that attaining the *Average* level or above on the NWEA MAP Math assessment varies by grade, with kindergarten and first grade students needing to score higher than the 50th–60th percentiles and second through fourth grade students needing to score higher than the 35th–45th percentiles, to have a high probability of attaining *Average* or higher.

Figure 2. *MOY ISIP Reading Percentiles and NWEA MAP Math Average Probabilities by Grade*



Probabilities for the End of the Year

The following tables show the results from the linking study at EOY. Fifth grade is included in this study. While the number of observations in fifth grade is less than in the other grades, there was sufficient variability in the data to conduct a linking study at EOY. Results are similar to the MOY results.

Table 10. *Kindergarten and First Grade Proficiency Projection for Istation Math at EOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
K	229	5	0.015	Low	0.000	Low
	256	10	0.035	Low	0.000	Low
	276	15	0.066	Low	0.000	Low
	292	20	0.108	Low	0.001	Low
	307	25	0.166	Low	0.002	Low
	321	30	0.242	Low	0.005	Low
	334	35	0.332	Medium	0.009	Low
	346	40	0.428	Medium	0.016	Low
	359	45	0.539	Medium	0.029	Low
	371	50	0.641	Medium	0.047	Low
	384	55	0.739	High	0.076	Low
	397	60	0.820	High	0.116	Low
	410	65	0.882	High	0.170	Low
	425	70	0.931	High	0.248	Low
	441	75	0.964	High	0.349	Medium
	458	80	0.983	High	0.470	Medium
	479	85	0.994	High	0.620	Medium
	505	90	0.998	High	0.774	High
	544	95	1.000	High	0.911	High
	614	99	1.000	High	0.987	High
1	342	5	0.014	Low	0.000	Low
	366	10	0.030	Low	0.000	Low
	382	15	0.050	Low	0.000	Low
	396	20	0.077	Low	0.000	Low
	407	25	0.107	Low	0.000	Low
	418	30	0.148	Low	0.001	Low
	427	35	0.190	Low	0.001	Low
	437	40	0.246	Low	0.002	Low
	446	45	0.306	Low	0.003	Low
	455	50	0.374	Medium	0.006	Low
	464	55	0.448	Medium	0.009	Low
	473	60	0.525	Medium	0.016	Low
	483	65	0.609	Medium	0.027	Low
	493	70	0.689	High	0.044	Low
	504	75	0.768	High	0.073	Low
	516	80	0.839	High	0.121	Low
	532	85	0.909	High	0.219	Low
	547	90	0.952	High	0.347	Medium
	573	95	0.987	High	0.609	Medium
	620	99	0.999	High	0.911	High

Table 11. *Second and Third Grade Proficiency Projection for Istation Math at EOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
2	421	5	0.010	Low	0.000	Low
	440	10	0.038	Low	0.000	Low
	452	15	0.088	Low	0.001	Low
	462	20	0.169	Low	0.003	Low
	471	25	0.285	Low	0.007	Low
	479	30	0.421	Medium	0.015	Low
	486	35	0.553	Medium	0.028	Low
	493	40	0.680	High	0.048	Low
	500	45	0.786	High	0.076	Low
	506	50	0.855	High	0.108	Low
	513	55	0.912	High	0.156	Low
	520	60	0.949	High	0.215	Low
	527	65	0.972	High	0.286	Low
	534	70	0.985	High	0.367	Medium
	542	75	0.993	High	0.466	Medium
	550	80	0.997	High	0.568	Medium
	560	85	0.999	High	0.686	High
	573	90	1.000	High	0.808	High
	591	95	1.000	High	0.912	High
	625	99	1.000	High	0.983	High
3	443	5	0.008	Low	0.000	Low
	462	10	0.041	Low	0.000	Low
	474	15	0.105	Low	0.001	Low
	484	20	0.215	Low	0.003	Low
	493	25	0.372	Medium	0.008	Low
	501	30	0.540	Medium	0.017	Low
	508	35	0.683	High	0.032	Low
	515	40	0.798	High	0.053	Low
	521	45	0.871	High	0.077	Low
	528	50	0.927	High	0.114	Low
	534	55	0.956	High	0.155	Low
	541	60	0.977	High	0.215	Low
	547	65	0.987	High	0.276	Low
	554	70	0.994	High	0.358	Medium
	562	75	0.997	High	0.462	Medium
	571	80	0.999	High	0.582	Medium
	580	85	1.000	High	0.692	High
	593	90	1.000	High	0.818	High
	610	95	1.000	High	0.918	High
	643	99	1.000	High	0.985	High

Table 12. *Fourth and Fifth Grade Proficiency Projection for Istation Math at EOY*

Grade	Overall Score	Percentile	Average Probability	Average	High Probability	High
4	460	5	0.011	Low	0.000	Low
	479	10	0.040	Low	0.000	Low
	491	15	0.085	Low	0.000	Low
	501	20	0.155	Low	0.001	Low
	510	25	0.252	Low	0.003	Low
	518	30	0.367	Medium	0.007	Low
	525	35	0.483	Medium	0.012	Low
	532	40	0.602	Medium	0.021	Low
	539	45	0.711	High	0.034	Low
	545	50	0.789	High	0.049	Low
	552	55	0.860	High	0.073	Low
	558	60	0.904	High	0.099	Low
	565	65	0.940	High	0.136	Low
	572	70	0.964	High	0.183	Low
	580	75	0.980	High	0.250	Low
	588	80	0.990	High	0.328	Medium
	598	85	0.995	High	0.440	Medium
	610	90	0.998	High	0.580	Medium
	628	95	1.000	High	0.762	High
	660	99	1.000	High	0.935	High
5	471	5	0.021	Low	0.000	Low
	491	10	0.058	Low	0.001	Low
	504	15	0.109	Low	0.002	Low
	515	20	0.178	Low	0.004	Low
	524	25	0.259	Low	0.008	Low
	532	30	0.348	Medium	0.014	Low
	540	35	0.451	Medium	0.024	Low
	547	40	0.545	Medium	0.037	Low
	554	45	0.637	Medium	0.055	Low
	560	50	0.710	High	0.074	Low
	567	55	0.784	High	0.103	Low
	574	60	0.844	High	0.138	Low
	581	65	0.891	High	0.179	Low
	588	70	0.925	High	0.227	Low
	596	75	0.953	High	0.288	Low
	605	80	0.973	High	0.366	Medium
	615	85	0.986	High	0.458	Medium
	627	90	0.994	High	0.569	Medium
	645	95	0.998	High	0.720	High
	678	99	1.000	High	0.896	High

EOY Istation and NWEA MAP Math at Spring Benchmarking

Figure 3 represents the EOY Istation Math percentiles associated with the probabilities of attaining the NWEA MAP Math *Average* performance level by grade.

Kindergarten students with an Istation Math score around 334–371 (35th to 50th percentile ranks) had a medium probability of achieving the NWEA MAP Math *Average* level or higher. Students who attained a 384 (55th percentile rank) or higher are projected to achieve the NWEA MAP Math *Average* level or higher. Students with an Istation Math score of around 505 (90th percentile rank) are projected to achieve the NWEA MAP Math *High* level.

First grade students who attained an Istation Math score around 455–483 (50th to 65th percentile ranks) had a medium probability of achieving the NWEA MAP Math *Average* level or higher. Students with a score higher than 493 had a high probability of reaching the *Average* level or higher. Students who attained an Istation Math score around 620 (99th percentile) have a high probability of reaching the NWEA MAP Math *High* level.

Second grade students who attained an Istation Math score around 479–486 (30th to 35th percentile ranks) had a medium probability of achieving the NWEA MAP Math *Average* level or higher. Students with a score higher than 493 had a high probability of reaching the *Average* level or higher. Students who attained an Istation Math score around 560 (85th percentile) have a high probability of reaching the NWEA MAP Math *High* level.

Third grade students who attained an Istation Math score around 493–501 (25th to 30th percentile ranks) had a medium probability of achieving the NWEA MAP Math *Average* level or higher. Students with scores higher than 508 had a high probability of reaching the *Average* level or higher. Students who attained an Istation Math score

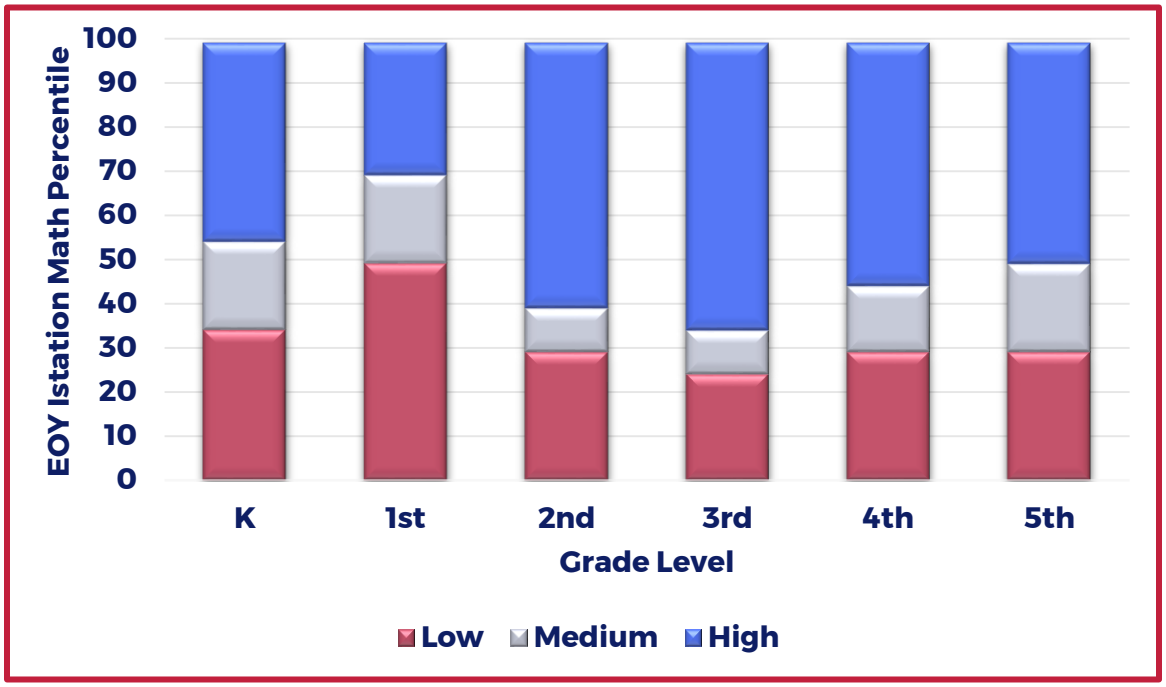
around 580 (85th percentile) have a high probability of reaching the NWEA MAP Math *High* level.

Fourth grade students who attained an Istation Math score around 518–532 (30th to 40th percentile ranks) had a medium probability of achieving the NWEA MAP Math *Average* level or higher. Students with a score higher than 539 had a high probability of reaching the *Average* level or higher. Students who attained an Istation Math score around 628 (95th percentile) have a high probability of reaching the NWEA MAP Math *High* level.

Fifth grade students who attained an Istation Math score around 532–554 (30th to 45th percentile ranks) had a medium probability of achieving the NWEA MAP Math *Average* level or higher. Students with a score higher than 560 had a high probability of reaching the *Average* level or higher. Students who attained an Istation Math score around 645 (95th percentile) have a high probability of reaching the NWEA MAP Math *High* level.

These results show that attaining the *Average* level or above on the NWEA MAP Math assessment varies by grade, with kindergarten and fifth grade students needing to score higher than the 50th–55th percentiles, second through fourth grade students needing to score higher than the 35th–45th percentiles, and first grade students needing to score higher than the 70th percentile, to have a high probability of attaining *Average* or higher.

Figure 3. *EOY ISIP Reading Percentiles and NWEA MAP Math Average Probabilities by Grade*



Classification Accuracy: Istation Math and NWEA MAP Math

Classification accuracy was conducted to predict whether students in the sample would achieve *Average* level or higher on the NWEA MAP Math assessment. A higher classification accuracy rate indicates stronger congruence between Istation Math and NWEA MAP Math assessments. Classification accuracy was conducted for kindergarten through fifth grade Istation Math at MOY, Istation Math at EOY, and NWEA MAP Math assessment of *Average* level or higher. Classification accuracy analyses were performed to determine Istation Math cut points that could help differentiate students who would or would not attain *Average* or higher on the NWEA MAP Math assessment.

Classification accuracy of Istation cut scores were performed at the 30th, 35th, 40th, 45th, 50th, 55th, 60th, 65th, 70th, 75th, and 80th percentiles and NWEA MAP *Average* level or higher. The area under the curve (AUC), sensitivity, specificity, positive

predictive power, negative predictive power, and the overall rate were computed and compared to determine the best Istation Math cut point to identify students who would most likely meet the *Average* level or higher on the NWEA MAP Math assessment. Results in Table 13 show that the best cut scores vary by grade on Istation Math at MOY and EOY.

MOY Classification Accuracy: Istation Math and NWEA MAP Math

The AUC ranged from 0.81 to 0.87, indicating that the percentage of students correctly classified on the Istation Math with respect to the NWEA MAP was approximately 85% across grades. Sensitivity ranged from 0.85 to 0.92, indicating that approximately 88% of students who performed below the cut point on Istation Math did not meet Average or above on NWEA MAP. Specificity ranged from 0.72 to 0.89, indicating that approximately 82% of students who performed above the cut point on Istation Math met the Average or above on the NWEA MAP assessment. Istation Math accurately predicted meeting math proficiency on NWEA MAP about 85% of the time. This analysis did not include fifth grade students due to an insufficient sample size.

EOY Classification Accuracy: Istation Math and NWEA MAP Math

The AUC ranged from 0.85 to 0.89, indicating that approximately 87% of students were correctly classified on the Istation Math with respect to the NWEA MAP across grades. Sensitivity ranged from 0.80 to 0.92, indicating that approximately 87% of students who performed below the cut point on Istation Math did not meet the Average category or above on NWEA MAP. Specificity ranged from 0.83 to 0.95, indicating that approximately 87% of students who performed above the cut point on Istation Math met the Average or above on the NWEA MAP assessment. Istation Math accurately predicted meeting math proficiency on NWEA MAP about 87% of the time.

Table 13. *Classification Accuracy Indices by Benchmark and Grade*

Grade	Cut Point	Benchmark	AUC	Sensitivity	Specificity
K	35th	Winter	.86	.89	.83
	30th	Spring	.89	.88	.91
1	40th	Winter	.87	.85	.89
	30th	Spring	.88	.80	.95
2	30th	Winter	.86	.86	.87
	30th	Spring	.86	.89	.83
3	30th	Winter	.85	.92	.78
	30th	Spring	.87	.92	.83
4	30th	Winter	.81	.90	.72
	30th	Spring	.86	.86	.87
5	35th	Spring	.85	.87	.83

Conclusion

This research establishes a significant positive link between students' scores in Istation Math and their NWEA MAP Math outcomes, particularly from kindergarten through fifth grade. Both MOY and EOY scores on Istation Math are reliable indicators for predicting NWEA MAP Math assessment performance. These correlations are particularly strong in the mentioned grades, with Pearson product-moment correlation coefficients ranging from 0.82 to 0.89.

Furthermore, the findings reveal a consistent trend: as students achieve higher scores in Istation Math, their chances of reaching or surpassing the *Average* level on the NWEA MAP Math assessment increase. This pattern is evident across different grade levels, though the exact scores required for reaching the *Average* level vary. The classification accuracy analysis supports this, showing that about 85–87% of students' performance can be accurately predicted based on their Istation Math scores.

These results highlight the utility of Istation Math as a tool for monitoring student progress and predicting their performance in key assessments like NWEA MAP Math. For educators and school administrators, these insights are invaluable for designing targeted interventions and enhancing learning outcomes. This study reinforces the role of Istation Math assessments in educational settings, proving their effectiveness in guiding instructional strategies and fostering student achievement.

References

Hampel, J. (2023). *Students Demonstrate Post-Pandemic ISIP Math Growth: A Cohort Study*. https://www.istation.com/hubfs/__Research/2023/ISIP%20Math%20Cohort%20Growth%20May%202023.pdf

Ketterlin-Geller, L. (2021). *Istation's Indicators of Progress (ISIP) Math Technical Report*. Istation.

Patarapichayatham, C. & Locke, V. (2023). *COVID-19 Learning Recovery Signal*. Istation. https://www.istation.com/hubfs/__Research/2023/COVID%20Learning%20Recovery%20Brief.pdf

Patarapichayatham, C. & Locke, V. (2020). *Linking the ACT Aspire Assessments to ISIP Reading and Math*. Istation. https://www.istation.com/Content/downloads/studies/ACT_Aspire.pdf

Patarapichayatham, C. & Locke, V. (2020). *Linking the Ohio AIR to ISIP*. Istation. https://www.istation.com/Content/downloads/studies/Ohio_AIR_Linking_Study.pdf