Achievement and Growth Norms for Course-Specific MAP® Growth™ Tests

Wei He

December 2022

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1. Introduction

1.1. Purpose of the Study

This report documents the procedure used to produce the achievement and growth user norms for a series of the course-specific MAP® Growth™ subject tests, including Algebra 1, Geometry, Algebra 2, Integrated Math I, Integrated Math II, Integrated Math III, and Biology/Life Science. Among these tests, Integrated Math I, Integrated Math II, Integrated Math III, and Biology/Life Science were the first time to have their norms available. The remaining tests, i.e., Algebra 1, Geometry, and Algebra 2, had their norms updated including receiving more between-term growth norms by using more recent test events. Procedure for norm sample selection and a model-based approach using the multivariate true score model (Thum & He, 2019) that factors out known imprecision of scores to generate the norms are also provided in detail, along with the snapshots of the achievement and growth norms for each test.

For both achievement and growth norms, the percentile ranks corresponding to a student's achievement and observed academic growth between terms relative to their academic peers were developed. The percentile rank is a normative statistic that indicates how well a student performed or grew in comparison to their peers in the norm group. The achievement norms cover three terms (fall, winter, and spring), and the growth norms cover fall-to-winter, winter-to-spring, and fall-to-spring growth.

1.2. Background

A series of course-specific MAP Growth Mathematics and Science subject tests, including Algebra 1, Geometry, Algebra 2, Integrated Math I, Integrated Math II, Integrated Math III, and Biology/Life Science, were released successively starting in August 2017 to replace the older NWEA End-of-Course (EOC) tests. Different from the prior NWEA EOC tests taken only at the end of a course, these course-specific tests can be administered multiple times throughout the school year, typically in the fall, winter, and spring, allowing for student growth to be evaluated in a content area over the duration of a course.

To help schools, teachers, and parents to interpret and understand how students perform relative to other students who take the same course-specific test, NWEA conducted a norming study for Algebra 1, Geometry, and Algebra 2 in the summer of 2019, using test events administered in the 2017/18 and 2018/19 school years, and published both achievement and growth user norms for these tests in the fall of 2020[1]. The achievement norms covered three terms (fall, winter, and spring), and the growth norms covered fall-to-spring growth only.

The educational ecosystem is constantly changing in nature. These changes can exert impacts on student achievements. To make sure norms reflect the change in student achievements in a timely manner to provide more recent and relevant information about student achievement, they need to be periodically updated, typically utilizing more recent test event data. The impact of the corona virus pandemic on student learning (e.g., "NAEP Long-Term Trend Assessment Results", 2022; Kuhfeld et al., 2022; Lewis et al., 2021) is an example of why norms should be periodically updated.

[1] The norms for Integrated Math I, Integrated Math II, Integrated Math III, and Biology/Life Science were not available in the fall of 2020 because their test volumes were not sufficient.

NWEA has established the goal of reporting three-year rolling user norms for the course-specific tests every two years. This means that we update user norms every other fall using data from the past three school years. For example, for the norms of a specific course-specific test to be released in the fall of 2023, the plan is to build the norms based on the test data from three years including 2019/20, 2020/21, and 2021/22. For the next norms that plan to be released in the fall of 2025, they will be based on the test data from 2021/22, 2022/23, and 2023/24 school years. This plan allows for the same one year's test data to contribute to the construction of the two norms published at successive times with a benefit to keep norm results for different times from drastic change.

Like other MAP Growth assessments, the course-specific MAP Growth tests are item-level variable-length computerized adaptive tests (CATs) with test length ranging from 41 to 43 items. The adaptive testing yields greater measurement precision for all examinees than a traditional linear test of similar length, making these course-specific tests well suited for measuring growth. These course-specific tests share the same scales as their regular MAP Growth counterparts. That is, the course-specific Mathematics and Biology/Life Science tests share the same scales as regular MAP Growth math and science tests, respectively. The course-specific scores are also expressed as Rasch Unit (RIT). However, a score of 220 on a course-specific mathematics test, for example, should not be used interchangeably with a score of 220 on MAP Growth Mathematics because they test different subject domains.

2. Methodology

This section describes the methods used in this study to select the norming sample and generate the achievement and growth norms.

2.1. Norming Sample Selection

Tests of a specific MAP Growth course-specific course can be aligned with different content standards. Therefore, there are more than one version of tests within each course. For the mathematics tests, they include the NWEA standards, the Common Core State Standards (CCSS; NGA Center for Best Practices & CCSSO, 2010), and state-specific standards. For the science tests, they include the Next Generation Science Standards (NGSS) and state-specific standards. Take Algebra 1 test as an example, there are Algebra 1 NWEA test, Algebra 1 CCSS test, Algebra 1 MO test, and Algebra 1 FL test, and the latter two tests are state specific. While different versions of course-specific tests of the same subject are organized with different instructional areas and subareas, they have significant overlap with each other in content. For example, the Algebra 1 content assessed in the NWEA version of test is similar to the content assessed in the CCSS- and state-specific versions of Algebra 1. Additionally, their underlying item pools have a large number of items in common that assess course pre-requisites to better measure specific course readiness. Therefore, we have decided to use test events from different versions of the tests of the same subject to develop the norms for a subject. Table 2.1 summarizes the course-specific MAP Growth tests this study included for each subject.

Most U.S. public high school students must earn at least three credits of Mathematics to meet graduation requirements. There are two pathways for Mathematics instructions in the U.S. secondary education. The traditional one follows the order of Algebra 1→Geometry→ Algebra 2, whereas the integrated one, which re-imagines these courses as Math 1, Math 2, and Math 3 and embeds algebraic, geometric, and statistical thinking throughout all three courses, follows the order of Integrated Math 1→ Integrated Math 2→Integrated Math 3. In both pathways, these courses are typically targeted at students in Grades 9, 10, and 11 consecutively. For Biology, it is targeted at students in Grade 9. The length of each course is typically a year. While the tests of interest in this study are typically targeted at students in a specific high-school grade, our cross-grade data indicate that the students in middle school or other high school grades than the target one also took these tests. In general, some middle school students, typically advanced students, often take these tests, and some high school students, typically low-performing students, take these courses in the upper grades of high school.

Given these observations, along with the consideration to report three-year rolling user norms every other year, a reasonable choice of the norming sample for each subject was using students in Grades 6–12 who took a course-specific test in either one of the school years (2019/20, 2020/21, 2021/22), except that the middle-school students in the norming sample for each course-specific test might come from different grades. This approach compares the results of a student to fellow students who have taken the same course, thus best preserving a consistent vertical scale interpretation of scores and the relative percentile comparisons among all students taking a test. If a student has a higher score than another student, they will also receive a higher percentile rank regardless of the grade in which the student is enrolled. For example, on the score scale, a RIT score of 210 always indicates higher relative performance than a RIT score of 200.

Table 2.1. Course-Specific MAP Growth Tests Included in the Study

Algebra 1	Geometry	Algebra 2	Biology/Life Science
Growth: Algebra 1 CCSS 2010	Growth: Geometry CCSS 2010	Growth: Algebra 2 CCSS 2010	Growth: Science 9-12 Life Science: for use with NGSS 2013
Growth: Algebra 1 NWEA 2017	Growth: Geometry NWEA 2017	Growth: Algebra 2 NWEA 2017	Growth: Science 9-12 Biology TX 2017
Growth: Algebra 1 FL 2014	Growth: Geometry FL 2014	Growth: Algebra 2 FL 2014	Growth: Science 9-12 Life Sciences OH 2018
Growth: Algebra 1 FL 2020	Growth: Geometry FL 2020	Growth: Algebra 2 FL 2020	Growth: Science 9-12 Life Science FL 2008
Growth: Algebra 1 MO 2016	Growth: Geometry NY 2017	Growth: Algebra 2 MO 2016	
Growth: Algebra 1 OH 2017	Growth: Geometry OH 2017	Growth: Algebra 2 TX 2012	
Growth: Algebra 1 SC 2015	Growth: Geometry TX 2012	Growth: Algebra 2 VA 2016	
Growth: Algebra 1 TX 2012	Growth: Geometry VA 2016	Growth: Algebra II NY 2017	
Growth: Algebra 1 VA 2016			
Growth: Algebra I IN 2020			
Growth: Algebra I NY 2017			
Integrated Math 1	**Integrated Math 2**	**Integrated Math 3**	
Growth: High School Integrated Math 1 CCSS 2010	Growth: High School Integrated Math 2 CCSS 2010	Growth: High School Integrated Math 3 CCSS 2010	
Growth: High School Integrated Math 1 NWEA 2020[2]	Growth: High School Integrated Math 2 NWEA 2020	Growth: High School Integrated Math 3 NWEA 2017	

[2] The NWEA-aligned Integrated math test series consisted of two tests: Integrated Math 1&2 (i.e., one test for both courses) and Integrated Math 3 when they were released in 2017. In 2020 Integrated Math 1&2 was split into Integrated Math 1 and Integrated Math 2 separately.

This norming sample selection approach resulted in 2,891,469 valid course-specific MAP Growth test events administered to 1,398,082 students from 50 states and District of Columbia between Fall 2019 and Spring 2022 (i.e., the most recent three years after the course-specific tests were released). As shown in Table 2.2, among these test events,

- 1,411,175 were from 710,206 students who took *Algebra 1*
- 773,868 were from 385,833 students who took *Geometry*
- 396,562 were from 205,850 students who took *Algebra 2*
- 71,229 were from 47,308 students who took *Integrated Math 1*
- 44,148 were from 29,103 students who took *Integrated Math 2*
- 28,215 were from 19,782 students who took *Integrated Math 3*
- 166,272 were from 87,274 students who took *Biology/Life Science*

Table 2.2 reports the number of test events in each subject across grades, terms, and school years, along with the percentages of test events in each term of a school year over the total number of test events from a term in three school years. This table reflects the course-taking sequence that most students took for both mathematics and biology in terms that, for example, Grades 9, 10, and 11 respectively have seen the largest test volumes no matter what the math pathway was—traditional or integrated. Additionally, this table indicates that the number of tests administered for all subjects unanimously dropped to remarkably low numbers in the spring of 2020 as schools shifted to remote instruction and student learning were disrupted due to the outbreak of coronavirus but resumed in the 2020/21 school year for most course-specific tests. We can also see that the test volumes in the 2021/22 school year have hit record high for all tests since they were published in 2017. As Table 2.2 indicates, at least 50% of test events in the norming samples were from the 2021/22 school years for all tests, and the test events administered in the 2020/21 and 2021/22 school years comprised of at least 70% of the test events in the norming samples for almost all subjects. In other words, the norms are more heavily weighted toward pandemic performance, although the norming samples consisted of the pre- and pandemic data.

Table 2.2. Number of Test Events from Fall 2019 to Spring 2022

Course-Specific Test	Grade	Number of Test Events												
		2019/20			2020/21			2021/22			2019/20+2020/21+2021/22			
		Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Total
Algebra 1	6	369	290	18	257	278	295	177	256	190	803	824	503	**2,130**
	7	10,664	9,814	1,228	10,546	10,255	10,791	11,311	10,855	10,247	32,521	30,924	22,266	**85,711**
	8	48,382	43,832	3,322	52,410	46,323	48,478	72,632	66,846	66,735	173,424	157,001	118,535	**448,960**
	9	95,478	83,802	6,080	79,342	67,700	63,649	141,256	123,493	115,879	316,076	274,995	185,608	**776,679**
	10	9,408	8,578	455	7,448	5,268	4,613	14,160	10,669	9,401	31,016	24,515	14,469	**70,000**
	11	2,685	2,056	94	2,274	1,721	1,372	4,458	2,853	2,176	9,417	6,630	3,642	**19,689**
	12	1,097	792	52	951	675	415	2,074	1,223	727	4,122	2,690	1,194	**8,006**
	Total	**168,083**	**149,164**	**11,249**	**153,228**	**132,220**	**129,613**	**246,068**	**216,195**	**205,355**	**567,379**	**497,579**	**346,217**	**1,411,175**
	%	**30**	**30**	**3**	**27**	**27**	**37**	**43**	**43**	**59**				
Geometry	7	308	243	6	277	285	319	273	229	261	858	757	586	**2,201**
	8	7,458	6,777	511	8,994	8,280	8,701	9,590	9,138	8,687	26,042	24,195	17,899	**68,136**
	9	20,984	15,849	1,168	25,378	22,468	20,065	35,883	33,514	33,273	82,245	71,831	54,506	**208,582**
	10	43,079	36,991	3,464	49,583	41,731	40,413	79,055	67,857	65,394	171,717	146,579	109,271	**427,567**
	11	6,940	5,390	371	6,759	5,710	4,158	11,577	9,783	8,031	25,276	20,883	12,560	**58,719**
	12	1,395	934	112	1,048	847	446	1,686	1,193	1,002	4,129	2,974	1,560	**8,663**
	Total	**80,164**	**66,184**	**5,632**	**92,039**	**79,321**	**74,102**	**138,064**	**121,714**	**116,648**	**310,267**	**267,219**	**196,382**	**773,868**
	%	**26**	**25**	**3**	**30**	**30**	**38**	**44**	**46**	**59**				
Algebra 2	8	468	369	41	464	393	478	500	377	364	1,432	1,139	883	**3,454**
	9	4,187	2,822	338	4,812	4,578	4,436	6,889	6,677	5,511	15,888	14,077	10,285	**40,250**
	10	14,779	11,724	1,028	17,564	16,008	13,404	28,078	25,737	23,494	60,421	53,469	37,926	**151,816**
	11	19,761	15,652	1,390	17,385	13,656	13,458	35,345	30,526	27,666	72,491	59,834	42,514	**174,839**
	12	2,984	1,967	198	2,350	2,017	916	6,189	5,158	4,424	11,523	9,142	5,538	**26,203**
	Total	**42,179**	**32,534**	**2,995**	**42,575**	**36,652**	**32,692**	**77,001**	**68,475**	**61,459**	**161,755**	**137,661**	**97,146**	**396,562**
	%	**26**	**24**	**3**	**26**	**27**	**34**	**48**	**50**	**63**				
Integrated Math 1	6	2	1	1	12	7	3	35	3	2	49	11	6	**66**
	7	26	17	2	83	63	87	85	71	85	194	151	174	**519**
	8	558	366	110	1,139	1,088	1,032	1,059	999	1,046	2,756	2,453	2,188	**7,397**

Course-Specific Test	Grade	Number of Test Events												
		2019/20			2020/21			2021/22			2019/20+2020/21+2021/22			
		Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Total
	9	7,393	3,313	630	5,196	3,202	2,632	12,272	4,597	8,322	24,861	11,112	11,584	**47,557**
	10	707	490	105	1,469	866	643	3,001	891	1,589	5,177	2,247	2,337	**9,761**
	11	362	129	12	548	265	221	1,180	393	330	2,090	787	563	**3,440**
	12	165	83	6	363	163	99	1,229	200	181	1,757	446	286	**2,489**
	Total	**9,213**	**4,399**	**866**	**8,810**	**5,654**	**4,717**	**18,861**	**7,154**	**11,555**	**36,884**	**17,207**	**17,138**	**71,229**
	%	**25**	**26**	**5**	**24**	**33**	**28**	**51**	**42**	**67**				
Integrated Math 2	**7**	2		1	4	2	2	2	1	2	8	3	5	**16**
	8	12	12	4	27	34	59	46	45	69	85	91	132	**308**
	9	840	446	103	458	626	469	1,145	771	1,197	2,443	1,843	1,769	**6,055**
	10	5,237	2,139	445	2,255	1,948	1,631	7,842	2,447	5,264	15,334	6,534	7,340	**29,208**
	11	996	337	75	725	435	453	2,280	960	876	4,001	1,732	1,404	**7,137**
	12	158	35	10	154	125	43	451	251	197	763	411	250	**1,424**
	Total	**7,245**	**2,969**	**638**	**3,623**	**3,170**	**2,657**	**11,766**	**4,475**	**7,605**	**22,634**	**10,614**	**10,900**	**44,148**
	%	**32**	**28**	**6**	**16**	**30**	**24**	**52**	**42**	**70**				
Integrated Math 3	**8**	37	6	1	11		11	5	4	1	53	10	13	**76**
	9	128	128	4	46	89	80	111	176	141	285	393	225	**903**
	10	364	257	17	572	495	422	1,308	602	1,071	2,244	1,354	1,510	**5,108**
	11	1,647	1,135	256	2,321	1,123	2,321	4,500	1,987	1,410	8,468	4,245	3,987	**16,700**
	12	501	393	6	1,127	358	395	1,986	430	232	3,614	1,181	633	**5,428**
	Total	**2,709**	**1,947**	**290**	**4,093**	**2,095**	**3,253**	**7,962**	**3,241**	**2,925**	**14,664**	**7,183**	**6,368**	**28,215**
	%	**18**	**27**	**4**	**28**	**29**	**51**	**54**	**45**	**45**				
Biology/ Life Science	**8**	4	2	6	475	1,380	1,066	1,767	1,960	1,761	2,246	3,342	2,833	**8,421**
	9	303	152	48	3,816	5,806	3,915	35,180	33,487	26,258	39,299	39,445	30,221	**108,965**
	10	375	129	215	2,870	4,135	3,236	11,403	9,867	8,629	14,648	14,131	12,080	**40,859**
	11	61	31	22	495	710	525	1,539	1,314	997	2,095	2,055	1,544	**5,694**
	12	16	3	9	252	330	234	646	576	267	914	909	510	**2,333**
	Total	**759**	**317**	**300**	**7,908**	**12,361**	**8,976**	**50,535**	**47,204**	**37,912**	**59,202**	**59,882**	**47,188**	**166,272**
	%	**1**	**1**	**1**	**13**	**21**	**19**	**85**	**79**	**80**				

2.2. Building Achievement and Growth Norms

The model-based approach described in Thum and He (2019) was used to develop both the achievement and growth user norms. Using a multivariate true score model that accounts for the known imprecision of scores from the fall, winter, and spring terms from students in the selected norming population, this approach provides student achievement norms in each term and growth norms between different terms, including fall to winter, winter to spring, and fall to spring. The true score model is expressed as follows:

$$y_{qi} = \mu_{qi} + e_{qi} \quad (1)$$

where y_{qi} is the observed score for student i in each of q term ($q = 1\ to\ 3$ for fall, winter, and spring, respectively); μ_{qi} is the true score for student i in each of q term; and e_{qi} is the error score for student i in each of q term. The imprecision of observed scores is considered in the analysis by introducing the standard error of measurement of each score (s_{qi}) into the model, such that:

$$Var(e_{qi}) = s_{qi}^2 \quad (2)$$

True scores of students are assumed to have a multivariate normal sampling distribution with means of $\boldsymbol{\gamma_i}$ and variances of $\boldsymbol{T}$ in the user population. Their parameter estimates $\hat{\gamma}$, $Var(\hat{\gamma})$, and $\hat{T}$, which can be obtained by standard statistics packages such as SAS via PROC MIXED, define the joint distribution of predicted fall, winter, and spring scores in Equation 3 in the user norming population:

$$\widehat{\boldsymbol{\mu_i}} \sim MVN[\hat{\gamma}, Var(\hat{\gamma}) + \hat{T}] \quad (3)$$

The joint distribution provides the basis to build achievement and growth norms. The achievement norms for the scores of each term can be derived from the predicted marginal distributions, as well as the marginal growth norms. The conditional growth for students on a given term can be obtained as the predicted distribution.

3. Results

3.1. Summary Statistics

Table 3.1 presents the mean, standard deviation (SD) of RIT test scores, and test volumes for students in Grades 6–12, along with the overall mean, SD of RIT scores, and test volumes for the norming samples in each subject. This table indicates that, with few exceptions, average test scores decreased as grades increased for each course-specific test. Lower-grade students (i.e., Grades 6–8 students) tend to perform better than the students of the grade at which a course is usually targeted, and the upper-grade high school students tend to perform worse than the students of the grade at which a course is usually targeted. In addition, lower-grade students tend to achieve more between-term growth for almost all grades compared with high school students. By and large, higher self-selection on ability or readiness in the earlier grade levels is quite evident from the cross-grade data.

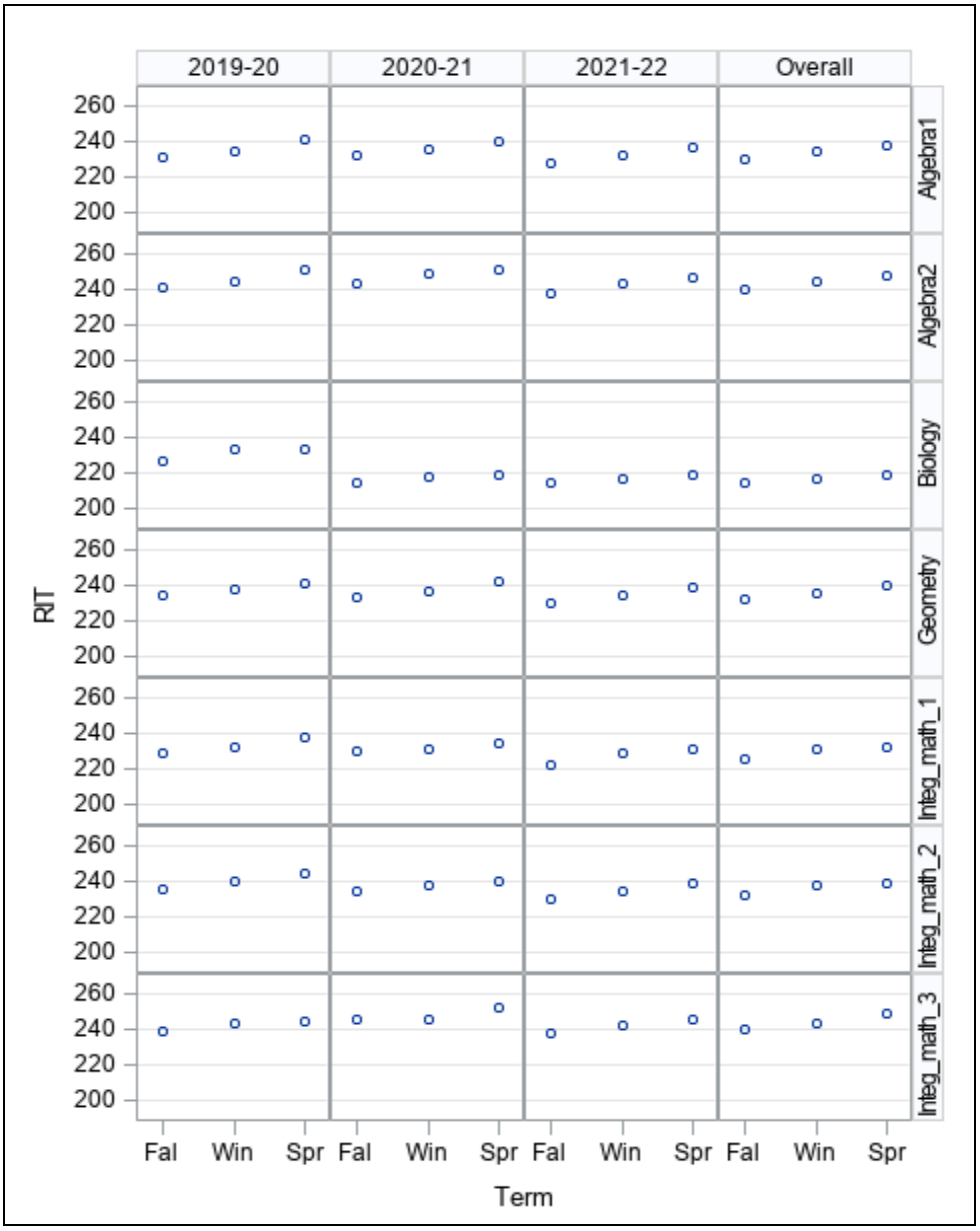
Table 3.1. Summary Descriptive Statistics of Sample Test Scores

Grade		Algebra 1			Geometry			Algebra 2		
		Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring
6	Mean	238.76	244.68	254.57						
	SD	26.91	27.87	25.58						
	N	803	824	503						
7	Mean	242.29	249.29	254.54	255.59	264.73	269.94			
	SD	12.93	13.49	15.66	21.05	19.88	22.93			
	N	32,521	30,924	22,266	858	757	586			
8	Mean	237.12	243.15	247.60	247.60	254.89	262.08	263.10	272.27	275.06
	SD	13.31	14.60	16.85	13.05	13.51	15.38	17.86	18.86	20.30
	N	173,424	157,001	118,535	26,042	24,195	17,899	1,432	1,139	883
9	Mean	225.44	228.16	230.88	239.13	243.57	248.20	250.31	255.60	259.26
	SD	15.75	16.60	17.73	14.28	15.28	16.85	17.00	17.88	18.57
	N	316,076	274,995	185,608	82,245	71,831	54,506	15,888	14,077	10,285
10	Mean	222.22	223.07	225.30	227.83	230.82	233.78	245.09	249.86	253.11
	SD	17.59	17.89	18.64	14.38	15.26	16.68	15.77	17.73	17.90
	N	31,016	24,515	14,469	171,717	146,579	109,271	60,421	53,469	37,926
11	Mean	223.98	224.20	226.29	222.61	225.21	226.95	234.63	238.41	241.38
	SD	18.86	18.88	19.91	13.86	14.62	15.73	15.59	16.53	16.89
	N	9,417	6,630	3,642	25,276	20,883	12,560	72,491	59,834	42,514
12	Mean	224.39	225.26	225.89	220.62	223.09	225.44	232.27	235.53	237.56
	SD	19.24	20.19	20.79	13.86	14.64	16.00	17.01	18.76	17.71
	N	4,122	2,690	1,194	4,129	2,974	1,560	11,523	9,142	5,538
Overall	**Mean**	**229.78**	**233.91**	**237.86**	**232.04**	**236.00**	**239.96**	**240.16**	**244.70**	**247.94**
	SD	**16.38**	**17.95**	**19.70**	**16.01**	**17.41**	**19.35**	**17.20**	**18.75**	**19.07**
	N	**567,379**	**497,579**	**346,217**	**310,267**	**267,219**	**196,382**	**161,755**	**137,661**	**97,146**

Grade		Integrated Math 1			Integrated Math 2			Integrated Math 3			Biology/Life Science		
		Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring
6	Mean	211.45	226.91	214.37									
	SD	19.12	26.61	40.52									
	N	49	11	6									
7	Mean	241.08	247.12	252.51	208.24	225.58	233.54						
	SD	24.25	26.34	24.83	29.74	49.35	49.75						
	N	194	151	174	8	3	5						
8	Mean	244.62	250.00	254.03	249.21	248.97	263.76	237.72	259.51	240.13	221.39	225.38	229.27
	SD	14.45	15.96	15.86	21.91	21.04	20.49	22.11	33.49	32.98	10.35	11.09	12.42
	N	2,756	2,453	2,188	85	91	132	53	10	13	2,246	3,342	2,833
9	Mean	225.59	228.85	230.67	248.59	250.30	253.96	246.46	250.15	246.55	214.30	217.23	219.16
	SD	17.19	17.49	18.15	13.75	16.47	16.52	21.23	21.36	23.56	14.07	15.35	16.27
	N	24,861	11,112	11,584	2,443	1,843	1,769	285	393	225	39,299	39,445	30,221
10	Mean	219.74	221.42	222.70	231.84	235.85	236.70	246.55	256.02	257.00	212.96	214.64	216.61
	SD	17.98	17.63	18.62	15.95	16.69	17.06	23.56	16.42	16.65	14.10	14.37	15.10
	N	5,177	2,247	2,337	15,334	6,534	7,340	2,244	1,354	1,510	14,648	14,131	12,080
11	Mean	221.91	224.06	221.80	225.11	229.15	233.53	238.07	240.77	247.86	212.91	212.88	214.08
	SD	19.13	19.29	20.19	16.95	16.64	20.12	17.06	16.94	21.02	15.05	15.45	15.84
	N	2,090	787	563	4,001	1,732	1,404	8,468	4,245	3,987	2,095	2,055	1,544
12	Mean	222.96	224.14	225.66	224.71	231.97	228.15	236.63	236.65	236.71	215.99	214.91	215.35
	SD	18.35	17.41	20.90	17.91	17.03	17.94	17.69	18.29	18.45	15.39	15.35	16.86
	N	1,757	446	286	763	411	250	3,614	1,181	633	914	909	510
Overall	**Mean**	**225.92**	**230.71**	**232.41**	**232.27**	**237.23**	**239.22**	**240.21**	**243.51**	**248.85**	**214.22**	**216.89**	**218.91**
	SD	**18.30**	**19.44**	**20.32**	**17.25**	**17.97**	**18.96**	**18.12**	**18.60**	**20.72**	**14.10**	**15.12**	**16.04**
	N	**36,884**	**17,207**	**17,138**	**22,634**	**10,614**	**10,900**	**14,664**	**7,183**	**6,368**	**59,202**	**59,882**	**47,188**

Figure 3.1 portrays the average RIT scores across terms and subjects in each school year as well as in all three school years (i.e., “Overall”). While the test volumes in the 2021/22 school year hit record high for all subjects, student performance in that school year was worse compared with other two school years. Given that 50% of norm samples were from the 2021/22 school year, we would say that the norms of interest in this study were heavily weighted towards the 2021/22 pandemic performance.

Figure 3.1. Average RIT scores by School Year and Subject



Note. Fal=Fall Win=Winter Spr=Spring

3.2. Normality Assumption

Inferences based on the multivariate true score models relied on the reasonableness of the joint normality assumption of score components for their validity. For each course-specific subject test, normality was examined from different perspectives such as quantile-quantile (Q-Q) plots, cumulative distribution function (CDF) curves for RIT scores, and residuals from model estimation, and the results indicate normality assumptions of the model seemed reasonable for these tests. As an example, Figure 3.2, Figure 3.3, and Figure 3.4 present a series of graphs including histograms, Q-Q plots, and CDF curves based on RIT scores (left panel of the figure) and residuals from model estimation (right panel of the figure) for Integrated Math 2. The Q-Q plots indicate that most of the data fall close to the 45-degree reference line except at the very low and high ends, suggesting that normality was a reasonably good approximation. The two CDF curves also reasonably overlap with each other. These observations hold true for both RIT score and residuals for the true score model. In general, these graphs support the assumption of marginal normality for the Integrated Math 2 test. Normality assumptions of the model also seemed reasonable for Integrated Math 2 test upon examining the scatterplots in Figure 3.5 for each pair of RIT scores and residuals from model estimation.

Figure 3.2. Histograms and Q-Q Plots for Integrated Math 2 Fall Scores

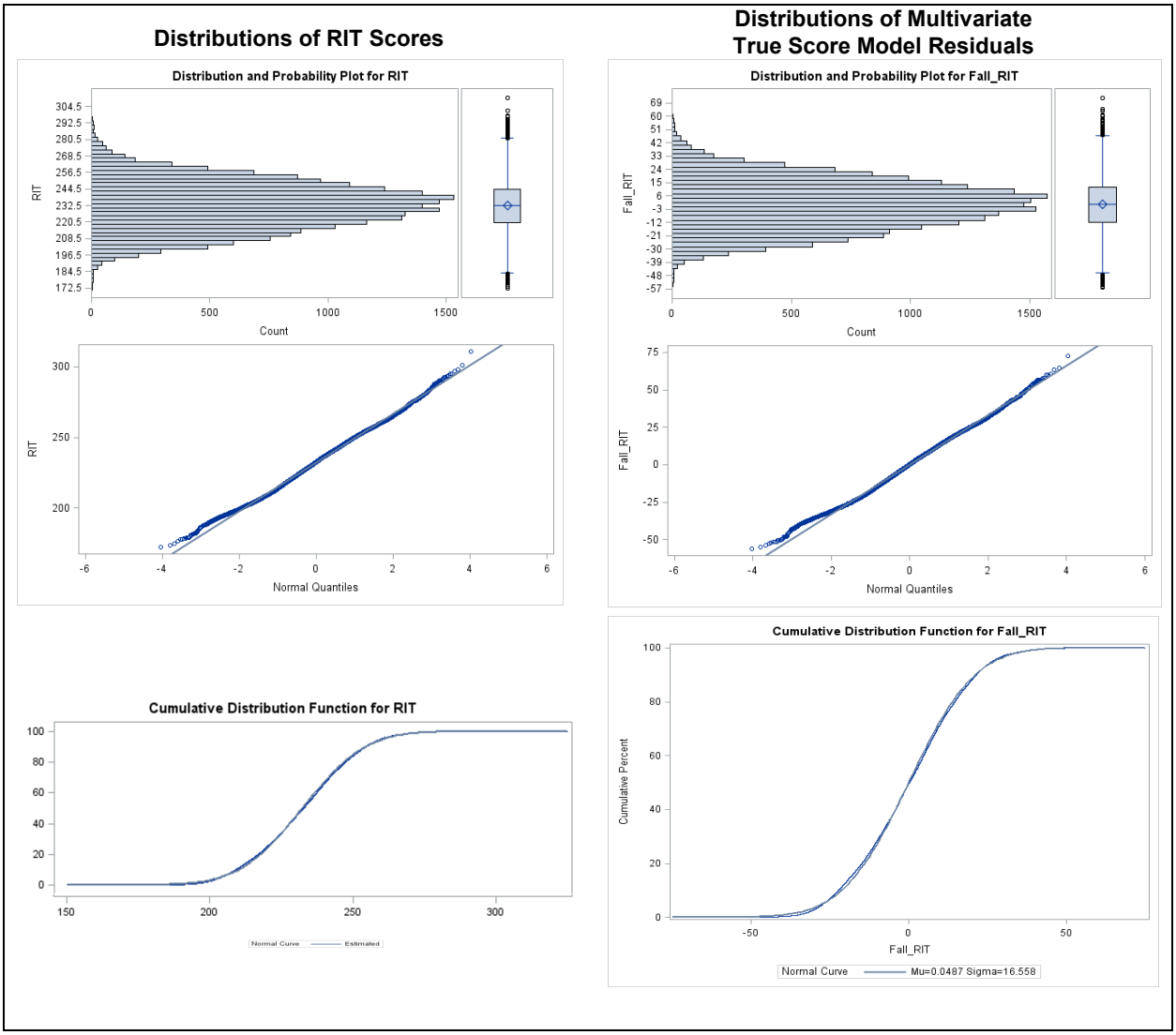


Figure 3.3. Histograms and Q-Q Plots for Integrated Math 2 Winter Scores

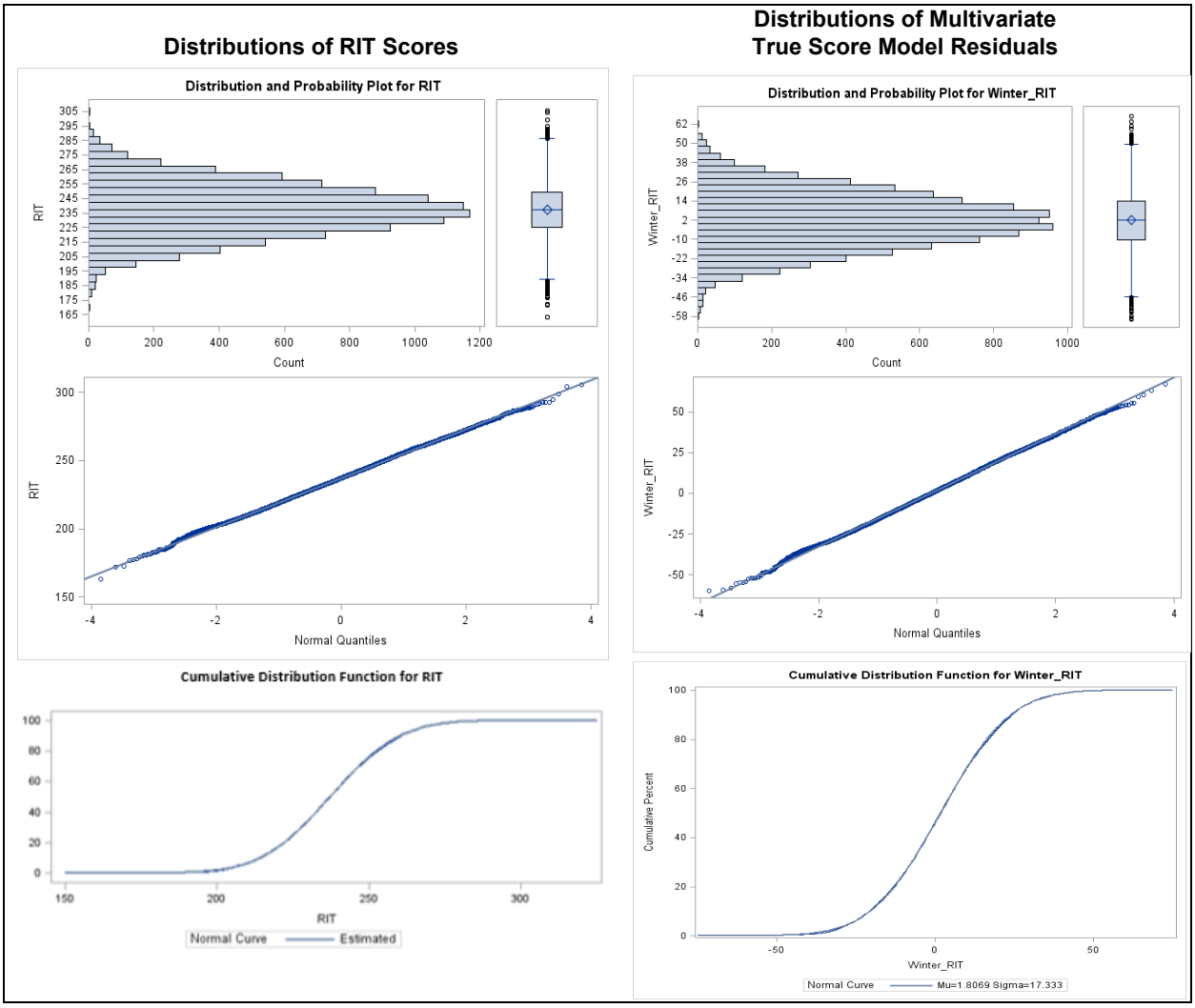


Figure 3.4. Histograms, Q-Q Plots, and CDFs for Integrated Math 2 Spring Scores

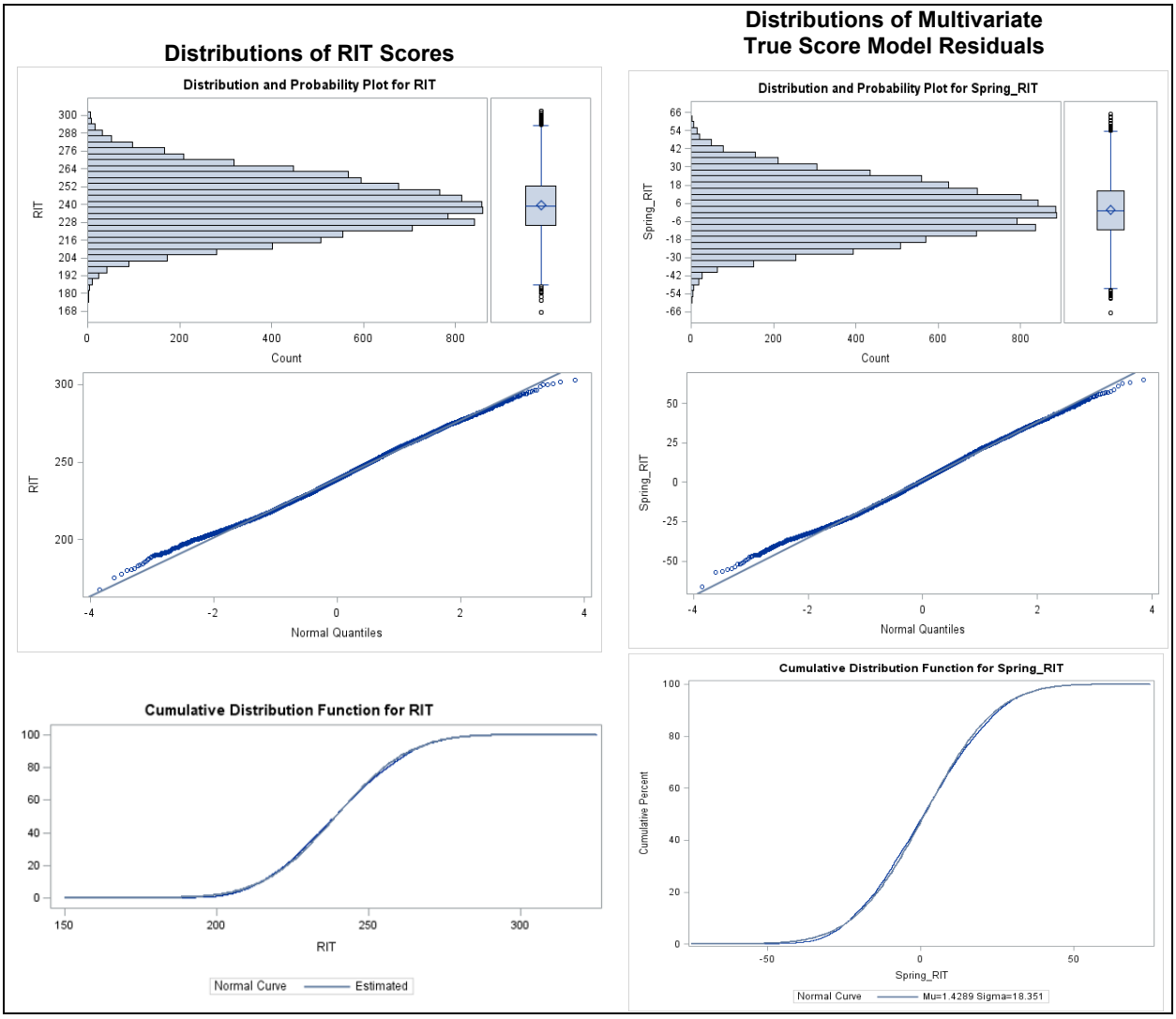
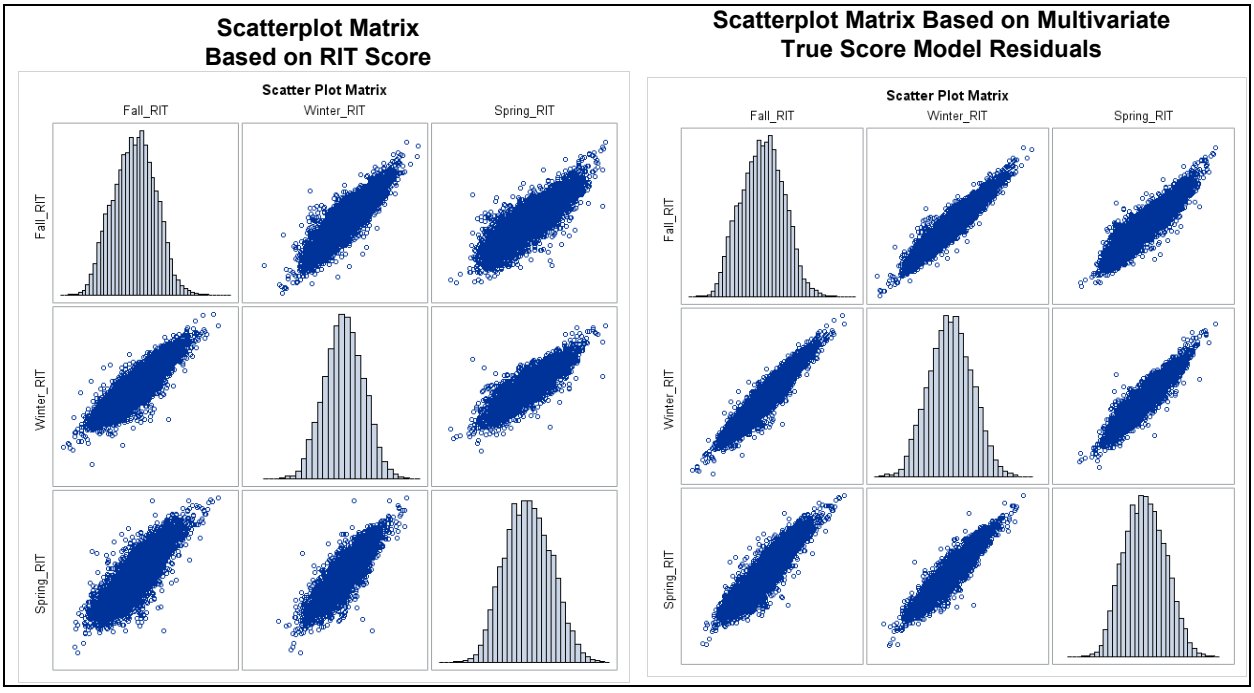


Figure 3.5. Scatterplot Matrix among Fall, Winter, and Spring Scores for Integrated Math 2



3.3. Pearson Correlation Coefficients

Table 3.2 presents the relationship of scores between administrations in the form of Pearson correlation coefficients (*r*) using observed RIT scores and estimates from the true score models (i.e., correlations between scores in fall vs. winter, fall vs. spring, and winter vs. spring). The bolded coefficients were computed based on the estimates from the true score models, whereas the non-bolded coefficients were computed based on the observed RIT scores. Specifically, correlations between true scores in the user population were given by the correlations between random effects estimated by the true score models. These coefficients are more appropriate than the observed bivariate correlation coefficients to be used to evaluate the magnitude of score relationship due to the missingness in the observed data and the imprecision of observed scores. As shown in the table, the Pearson correlation coefficients computed based on the estimates from the true score models are above 0.90 for almost all tests, suggesting that scores from each administration were strongly correlated. The correlation coefficients based on the estimates from the true score models are corrected for attenuation (e.g., Bock & Petersen, 1975) and are therefore higher than those from the observed scores.

Table 3.2. Pearson Correlation Coefficients (r) among Fall, Winter, and Spring Scores

Course-Specific Test	*r*		
	Fall, Winter	Fall, Spring	Winter, Spring
Algebra 1	**0.92**	**0.87**	**0.91**
	0.85	0.81	0.85
Geometry	**0.94**	**0.91**	**0.94**
	0.87	0.84	0.88
Algebra 2	**0.89**	**0.84**	**0.87**
	0.83	0.78	0.82
Integrated Math 1	**0.95**	**0.93**	**0.95**
	0.90	0.88	0.91
Integrated Math 2	**0.95**	**0.92**	**0.94**
	0.89	0.86	0.87
Integrated Math 3	**0.93**	**0.90**	**0.93**
	0.87	0.85	0.88
Biology/Life Science	**0.93**	**0.90**	**0.92**
	0.84	0.81	0.85

*Bolded coefficients are correlations corrected for attenuation.

3.4. Status and Growth Norms

Table 3.3 –Table 3.9 present snapshots of the achievement and growth norms for each subject. Panels A, B, and C in each table present the achievement and between-term growth norms in a subject. Here's how to interpret the charts:

- The grey columns indicate the percentile rank ranging from 5 to 95 at an interval of 5. For ease of presentation, only a selective group of percentiles are provided. Users should instead refer to their score reports for their unique normative-referenced performance information.
- The blue columns present the achievement norm scores for each term. These stay the same across panels in a table.
- The green columns present the expected between-term growth score (Mean) for a specific percentile rank score and the standard deviation (SD) of the between-term growth. These differ across panels for fall-to-winter (Panel A), winter-to-spring (Panel B), and fall-to-spring (Panel C) growth.
- The yellow and mixed-colored boxes permit a normative evaluation of the actual gain a student may have made between different terms.
    - The yellow boxes indicate the corresponding winter or spring achievement norms and the corresponding percentiles.
    - The mixed-colored boxes indicate the growth percentiles associated with the between-term growth scores.

Using a hypothetical student who scores 212, 218, and 227 in Algebra 1 for fall, winter, and spring, respectively, to illustrate how to interpret these tables, these scores place this student at the 15th, 20th, and 30th percentiles in fall, winter, and spring, respectively, based on the grey column in Table 3.3. In other words, this student performs better than 15%, 20%, and 30% of the other students who also took the same test in each term, respectively.

As mentioned above, the yellow and mixed-colored boxes permit a normative evaluation of the actual gain a student may have made between different terms. This hypothetical student has improved 6 points from fall to winter (i.e., 212 → 218). Locating the intersection between the row where the achievement norm score in fall is 212 (in blue) and the column where the winter score is 218 (in yellow) in Panel A, the 6 fall-to-winter gain puts this student at the 59th percentile in the fall-to-winter growth scale (in mixed-color). In other words, this student's progress is better than 59% of all other students in the norming sample who also scored 212 in the fall (i.e., students in the 15th percentile). We can also tell that this student's progress is above average based on the fall-to-winter expected growth for a student who scores 212 in the fall (i.e., the 15th percentile), according to the green columns in Panel A. The average gain is 4.1 points with an associated standard deviation of growth of 7.8, thus putting the student's gain of 6 points above average. Similar interpretations for winter-to-spring and fall-to-spring growth can be made based on Panel B and Panel C, respectively.

Table 3.3. Snapshot of Status and Growth Norms for Algebra 1

A

						Winter Percentile and Score																		
	Achievement Norm Score			Fall-Winter Cond. Growth		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Percentile	Fall	Winter	Spring	Mean	SD	204	210	214	218	221	224	226	228	231	233	235	238	240	242	245	248	252	256	263
5	202	204	204	4.1	7.8	37	69	86	94	97	99	99	99	99	99	99	99	99	99	99	99	99	99	99
10	208	210	212	4.1	7.8	14	40	62	77	87	93	96	98	99	99	99	99	99	99	99	99	99	99	99
15	212	214	216	4.1	7.8	5	22	42	59	73	83	90	94	97	99	99	99	99	99	99	99	99	99	99
20	215	218	220	4.1	7.8	2	12	28	44	59	72	82	89	93	96	98	99	99	99	99	99	99	99	99
25	218	221	224	4.1	7.8	1	6	16	30	44	58	70	79	87	92	95	98	99	99	99	99	99	99	99
30	220	224	227	4.1	7.8	1	4	11	22	34	48	60	71	80	87	92	96	98	99	99	99	99	99	99
35	223	226	229	4.1	7.8	1	1	5	12	22	33	45	57	68	78	85	91	95	98	99	99	99	99	99
40	225	228	232	4.1	7.8	1	1	3	8	15	24	35	47	59	69	79	86	92	96	98	99	99	99	99
45	227	231	234	4.1	7.8	1	1	2	5	10	17	26	37	48	60	70	80	87	93	96	99	99	99	99
50	229	233	237	4.1	7.8	1	1	1	3	6	11	19	28	38	50	61	72	81	88	94	97	99	99	99
55	231	235	239	4.1	7.8	1	1	1	1	4	7	13	20	29	40	51	63	73	83	90	95	98	99	99
60	233	238	242	4.1	7.8	1	1	1	1	2	4	8	14	21	30	41	53	64	75	85	92	97	99	99
65	235	240	245	4.1	7.8	1	1	1	1	1	2	5	9	14	22	31	42	54	67	78	88	95	99	99
70	237	242	247	4.1	7.8	1	1	1	1	1	1	3	5	9	15	23	33	44	57	70	82	91	97	99
75	240	245	250	4.1	7.8	1	1	1	1	1	1	1	2	4	8	13	20	30	42	55	70	83	94	99
80	243	248	254	4.1	7.8	1	1	1	1	1	1	1	1	2	4	7	11	18	28	40	55	72	87	98
85	246	252	257	4.1	7.8	1	1	1	1	1	1	1	1	1	1	3	6	10	16	26	40	58	78	95
90	250	256	262	4.1	7.8	1	1	1	1	1	1	1	1	1	1	1	2	4	7	13	22	38	60	86
95	256	263	269	4.1	7.8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	6	14	30	62

B

						Spring Percentile and Score																		
	Achievement Norm Score			Winter-Spring Cond. Growth		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Percentile	Fall	Winter	Spring	Mean	Sd	204	212	216	220	224	227	229	232	234	237	239	242	245	247	250	254	257	262	269
5	202	204	204	4.2	8.8	33	65	82	91	96	98	99	99	99	99	99	99	99	99	99	99	99	99	99
10	208	210	212	4.1	8.8	13	38	60	76	86	92	96	98	99	99	99	99	99	99	99	99	99	99	99
15	212	214	216	4.1	8.8	6	23	42	60	73	83	90	94	97	98	99	99	99	99	99	99	99	99	99
20	215	218	220	4.0	8.8	2	12	26	42	57	69	79	87	92	95	98	99	99	99	99	99	99	99	99
25	218	221	224	4.0	8.8	1	6	16	29	43	57	69	78	86	91	95	97	99	99	99	99	99	99	99
30	220	224	227	4.0	8.8	1	3	10	19	31	44	56	67	77	84	90	94	97	99	99	99	99	99	99
35	223	226	229	4.0	8.8	1	2	6	14	23	35	47	59	69	79	86	91	95	98	99	99	99	99	99
40	225	228	232	3.9	8.8	1	1	4	9	17	27	38	50	61	71	80	87	92	96	98	99	99	99	99
45	227	231	234	3.9	8.8	1	1	2	5	10	17	26	37	48	59	70	79	86	92	96	98	99	99	99
50	229	233	237	3.9	8.8	1	1	1	3	7	12	20	29	39	50	61	72	81	88	94	97	99	99	99
55	231	235	239	3.8	8.8	1	1	1	2	4	8	14	22	31	41	53	64	74	83	90	95	98	99	99
60	233	238	242	3.8	8.8	1	1	1	1	2	4	8	13	20	29	39	51	62	73	83	91	96	99	99
65	235	240	245	3.8	8.8	1	1	1	1	1	3	5	9	15	22	31	42	53	66	77	87	94	98	99
70	237	242	247	3.8	8.8	1	1	1	1	1	2	3	6	10	16	24	33	45	57	70	81	91	97	99
75	240	245	250	3.7	8.8	1	1	1	1	1	1	1	3	5	9	15	22	32	44	57	71	84	94	99
80	243	248	254	3.7	8.8	1	1	1	1	1	1	1	1	3	5	8	14	21	31	44	59	74	89	98
85	246	252	257	3.6	8.8	1	1	1	1	1	1	1	1	1	2	3	6	11	17	27	41	58	78	94
90	250	256	262	3.6	8.8	1	1	1	1	1	1	1	1	1	1	1	2	4	8	15	25	40	62	87
95	256	263	269	3.5	8.8	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	7	15	32	63

C

						Spring Percentile and Score																		
	Achievement Norm Score			Fall-Spring Cond. Growth		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Percentile	Fall	Winter	Spring	Mean	SD	204	212	216	220	224	227	229	232	234	237	239	242	245	247	250	254	257	262	269
5	202	204	204	6.6	10.2	34	61	78	87	93	96	98	99	99	99	99	99	99	99	99	99	99	99	99
10	208	210	212	6.9	10.2	15	37	56	70	80	87	92	95	97	99	99	99	99	99	99	99	99	99	99
15	212	214	216	7.1	10.2	7	23	40	54	67	77	84	90	93	96	98	99	99	99	99	99	99	99	99
20	215	218	220	7.3	10.2	4	15	28	42	55	66	76	83	88	93	95	97	99	99	99	99	99	99	99
25	218	221	224	7.4	10.2	2	9	19	31	43	54	65	74	81	87	92	95	97	98	99	99	99	99	99
30	220	224	227	7.5	10.2	1	6	14	24	35	46	57	67	75	82	88	92	95	97	99	99	99	99	99
35	223	226	229	7.7	10.2	1	3	8	15	24	34	45	55	64	73	80	87	91	95	97	99	99	99	99
40	225	228	232	7.8	10.2	1	2	5	11	18	27	37	47	56	66	74	82	88	92	96	98	99	99	99
45	227	231	234	7.9	10.2	1	1	4	8	13	21	29	39	48	58	67	76	83	89	94	97	99	99	99
50	229	233	237	8.0	10.2	1	1	2	5	9	15	23	31	40	50	59	69	77	85	90	95	98	99	99
55	231	235	239	8.1	10.2	1	1	1	3	6	11	17	24	32	42	51	61	70	79	86	92	96	99	99
60	233	238	242	8.2	10.2	1	1	1	2	4	8	12	18	25	34	43	53	63	73	81	89	95	98	99
65	235	240	245	8.3	10.2	1	1	1	1	3	5	8	13	19	27	35	45	55	65	75	84	92	97	99
70	237	242	247	8.4	10.2	1	1	1	1	2	3	6	9	14	20	28	37	47	57	68	79	88	95	99
75	240	245	250	8.5	10.2	1	1	1	1	1	2	3	5	8	13	19	26	35	45	57	69	81	91	98
80	243	248	254	8.7	10.2	1	1	1	1	1	1	1	3	5	7	11	17	24	33	44	57	71	85	96
85	246	252	257	8.8	10.2	1	1	1	1	1	1	1	1	2	4	7	10	16	23	33	45	60	77	93
90	250	256	262	9.1	10.2	1	1	1	1	1	1	1	1	1	2	3	5	8	12	19	30	44	63	85
95	256	263	269	9.4	10.2	1	1	1	1	1	1	1	1	1	1	1	1	2	4	7	12	22	38	66

Table 3.4. Snapshot of Status and Growth Norms for Geometry

A

	Achievement Norm Score			Fall-Winter Cond. Growth		Winter Percentile and Score																		
Percentile	Fall	Winter	Spring	Mean	SD	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
						207	213	218	221	224	226	229	231	233	235	238	240	242	244	247	250	253	257	264
5	205	207	208	4.0	7.0	39	73	89	96	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99
10	211	213	215	4.0	7.0	12	40	64	80	89	95	98	99	99	99	99	99	99	99	99	99	99	99	99
15	215	218	219	4.1	7.0	4	20	41	60	75	85	92	96	98	99	99	99	99	99	99	99	99	99	99
20	218	221	223	4.1	7.0	2	10	26	43	60	73	83	90	95	97	99	99	99	99	99	99	99	99	99
25	221	224	226	4.1	7.0	1	5	14	27	42	57	70	80	88	93	96	98	99	99	99	99	99	99	99
30	223	226	229	4.1	7.0	1	2	8	19	32	46	59	71	81	88	93	97	98	99	99	99	99	99	99
35	225	229	232	4.1	7.0	1	1	5	12	22	35	48	61	72	82	89	94	97	99	99	99	99	99	99
40	227	231	234	4.1	7.0	1	1	3	7	15	25	37	50	62	73	82	89	94	97	99	99	99	99	99
45	229	233	237	4.1	7.0	1	1	1	4	9	17	27	38	51	63	74	83	90	95	98	99	99	99	99
50	231	235	239	4.1	7.0	1	1	1	2	5	10	18	28	39	52	64	75	84	91	96	98	99	99	99
55	233	238	242	4.1	7.0	1	1	1	1	3	6	11	19	29	40	53	65	76	85	92	97	99	99	99
60	235	240	244	4.1	7.0	1	1	1	1	1	3	7	12	20	30	41	54	66	78	87	94	98	99	99
65	237	242	247	4.1	7.0	1	1	1	1	1	2	4	7	13	21	30	42	55	68	80	90	96	99	99
70	240	244	249	4.1	7.0	1	1	1	1	1	1	1	3	6	10	17	27	38	52	66	80	91	97	99
75	242	247	252	4.1	7.0	1	1	1	1	1	1	1	2	3	6	11	18	28	40	55	71	85	95	99
80	245	250	256	4.1	7.0	1	1	1	1	1	1	1	1	1	2	5	9	15	25	38	54	72	89	98
85	248	253	259	4.1	7.0	1	1	1	1	1	1	1	1	1	1	2	4	7	13	23	37	56	78	95
90	251	257	264	4.2	7.0	1	1	1	1	1	1	1	1	1	1	1	1	3	6	12	23	39	63	89
95	257	264	271	4.2	7.0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	5	13	30	65

B

	Achievement Norm Score			Winter-Spring Cond. Growth		Spring Percentile and Score																		
Percentile	Fall	Winter	Spring	Mean	SD	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
						208	215	219	223	226	229	232	234	237	239	242	244	247	249	252	256	259	264	271
5	205	207	208	3.2	7.7	37	72	88	95	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99
10	211	213	215	3.4	7.7	13	41	65	81	90	95	98	99	99	99	99	99	99	99	99	99	99	99	99
15	215	218	219	3.5	7.7	4	19	39	58	74	84	91	95	98	99	99	99	99	99	99	99	99	99	99
20	218	221	223	3.6	7.7	1	10	25	42	59	73	83	90	95	97	99	99	99	99	99	99	99	99	99
25	221	224	226	3.7	7.7	1	5	14	28	43	58	71	81	89	94	97	98	99	99	99	99	99	99	99
30	223	226	229	3.7	7.7	1	3	9	20	33	47	61	73	83	90	94	97	99	99	99	99	99	99	99
35	225	229	232	3.8	7.7	1	1	4	10	20	32	45	59	70	80	88	93	97	99	99	99	99	99	99
40	227	231	234	3.8	7.7	1	1	2	6	13	23	35	48	61	72	82	89	94	97	99	99	99	99	99
45	229	233	237	3.9	7.7	1	1	1	4	8	16	26	38	50	63	74	83	90	95	98	99	99	99	99
50	231	235	239	3.9	7.7	1	1	1	2	5	10	18	28	40	52	64	75	85	91	96	99	99	99	99
55	233	238	242	4.0	7.7	1	1	1	1	2	5	9	16	25	36	49	61	73	83	91	96	99	99	99
60	235	240	244	4.1	7.7	1	1	1	1	1	3	6	11	18	27	38	51	64	76	86	93	98	99	99
65	237	242	247	4.1	7.7	1	1	1	1	1	1	3	6	12	19	29	40	53	67	79	89	96	99	99
70	240	244	249	4.2	7.7	1	1	1	1	1	1	2	4	7	13	20	30	43	57	71	83	93	98	99
75	242	247	252	4.3	7.7	1	1	1	1	1	1	1	1	3	6	11	18	28	41	56	71	85	95	99
80	245	250	256	4.3	7.7	1	1	1	1	1	1	1	1	1	3	5	9	16	26	40	56	74	90	99
85	248	253	259	4.4	7.7	1	1	1	1	1	1	1	1	1	1	2	4	8	15	26	41	60	81	96
90	251	257	264	4.5	7.7	1	1	1	1	1	1	1	1	1	1	1	1	3	6	12	22	39	63	89
95	257	264	271	4.7	7.7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	4	11	27	62

C

	Achievement Norm Score			Fall-Spring Cond. Growth		Spring Percentile and Score																		
Percentile	Fall	Winter	Spring	Mean	SD	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
						208	215	219	223	226	229	232	234	237	239	242	244	247	249	252	256	259	264	271
5	205	207	208	5.9	9.0	36	66	83	91	96	98	99	99	99	99	99	99	99	99	99	99	99	99	99
10	211	213	215	6.4	9.0	14	38	59	74	84	91	95	97	99	99	99	99	99	99	99	99	99	99	99
15	215	218	219	6.7	9.0	6	22	40	56	70	80	87	92	95	98	99	99	99	99	99	99	99	99	99
20	218	221	223	6.9	9.0	3	13	27	42	56	68	78	85	91	95	97	98	99	99	99	99	99	99	99
25	221	224	226	7.2	9.0	1	7	16	29	42	55	66	76	83	89	93	96	98	99	99	99	99	99	99
30	223	226	229	7.4	9.0	1	4	11	21	33	45	57	68	77	84	90	94	97	98	99	99	99	99	99
35	225	229	232	7.5	9.0	1	2	7	15	25	36	47	58	69	78	85	90	94	97	99	99	99	99	99
40	227	231	234	7.7	9.0	1	1	4	10	18	27	38	49	60	70	78	86	91	95	98	99	99	99	99
45	229	233	237	7.9	9.0	1	1	3	6	12	20	29	39	50	61	71	79	86	92	96	98	99	99	99
50	231	235	239	8.0	9.0	1	1	1	4	8	14	21	31	41	51	62	72	80	88	93	97	99	99	99
55	233	238	242	8.2	9.0	1	1	1	2	5	9	15	23	32	42	53	63	73	82	89	95	98	99	99
60	235	240	244	8.4	9.0	1	1	1	1	3	6	10	16	24	33	43	54	65	75	84	91	96	99	99
65	237	242	247	8.5	9.0	1	1	1	1	2	4	7	11	17	25	34	44	55	67	78	87	94	98	99
70	240	244	249	8.8	9.0	1	1	1	1	1	2	3	6	9	15	22	31	41	53	65	77	88	96	99
75	242	247	252	9.0	9.0	1	1	1	1	1	1	2	3	6	10	15	23	32	43	56	70	82	93	99
80	245	250	256	9.2	9.0	1	1	1	1	1	1	1	1	3	5	8	13	21	30	42	56	72	86	97
85	248	253	259	9.5	9.0	1	1	1	1	1	1	1	1	1	2	4	7	12	19	29	42	58	77	93
90	251	257	264	9.7	9.0	1	1	1	1	1	1	1	1	1	1	2	3	6	11	18	29	44	65	88
95	257	264	271	10.2	9.0	1	1	1	1	1	1	1	1	1	1	1	1	1	2	5	10	19	36	67

Table 3.5. Snapshot of Status and Growth Norms for Algebra 2

A

						Winter Percentile and Score																		
	Achievement Norm Score			Fall-Winter Cond. Growth		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Percentile	Fall	Winter	Spring	Mean	SD	213	220	225	228	232	234	237	239	242	244	247	249	251	254	257	260	264	268	275
5	212	213	215	5.3	9.0	33	62	80	89	94	97	99	99	99	99	99	99	99	99	99	99	99	99	99
10	218	220	222	5.1	9.0	14	37	57	72	83	90	94	97	98	99	99	99	99	99	99	99	99	99	99
15	222	225	227	5.0	9.0	6	22	40	56	69	79	87	92	95	97	99	99	99	99	99	99	99	99	99
20	225	228	231	4.9	9.0	3	14	28	43	57	69	79	86	91	95	97	98	99	99	99	99	99	99	99
25	228	232	234	4.8	9.0	2	8	18	31	44	57	68	77	84	90	94	96	98	99	99	99	99	99	99
30	231	234	237	4.7	9.0	1	4	11	21	32	44	56	66	75	83	89	93	96	98	99	99	99	99	99
35	233	237	240	4.7	9.0	1	3	7	15	25	36	47	58	68	77	84	90	94	97	98	99	99	99	99
40	235	239	242	4.6	9.0	1	2	5	11	18	28	38	49	60	70	78	85	91	95	97	99	99	99	99
45	238	242	245	4.5	9.0	1	1	2	6	11	18	27	37	47	58	68	77	84	90	95	98	99	99	99
50	240	244	247	4.4	9.0	1	1	1	4	8	13	20	29	39	49	59	69	78	86	92	96	98	99	99
55	242	247	249	4.4	9.0	1	1	1	2	5	9	15	22	31	40	51	61	71	80	88	94	97	99	99
60	244	249	252	4.3	9.0	1	1	1	1	3	6	10	16	24	32	42	53	64	74	83	90	96	99	99
65	246	251	254	4.2	9.0	1	1	1	1	2	4	7	11	17	25	34	44	55	66	77	86	93	98	99
70	249	254	257	4.2	9.0	1	1	1	1	1	2	4	6	10	16	23	32	42	54	66	78	88	95	99
75	251	257	260	4.1	9.0	1	1	1	1	1	1	2	4	7	11	17	25	34	45	58	71	83	93	99
80	254	260	263	4.0	9.0	1	1	1	1	1	1	1	2	4	6	10	16	23	33	45	59	74	88	97
85	257	264	267	3.9	9.0	1	1	1	1	1	1	1	1	2	3	6	9	15	22	33	46	62	80	94
90	262	268	272	3.7	9.0	1	1	1	1	1	1	1	1	1	1	2	3	6	10	16	26	41	61	85
95	268	275	279	3.6	9.0	1	1	1	1	1	1	1	1	1	1	1	1	1	3	5	10	19	36	65

B

						Spring Percentile and Score																		
	Achievement Norm Score			Winter-Spring Cond. Growth		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Percentile	Fall	Winter	Spring	Mean	SD	215	222	227	231	234	237	240	242	245	247	249	252	254	257	260	263	267	272	279
5	212	213	215	6.2	9.7	34	62	79	88	94	97	98	99	99	99	99	99	99	99	99	99	99	99	99
10	218	220	222	5.4	9.7	15	37	56	71	81	88	93	96	98	99	99	99	99	99	99	99	99	99	99
15	222	225	227	4.9	9.7	6	21	38	53	66	76	84	90	94	96	98	99	99	99	99	99	99	99	99
20	225	228	231	4.6	9.7	4	14	28	43	56	67	77	84	89	93	96	98	99	99	99	99	99	99	99
25	228	232	234	4.1	9.7	2	8	17	29	41	53	64	73	81	87	92	95	97	99	99	99	99	99	99
30	231	234	237	3.9	9.7	1	5	13	23	34	46	57	67	75	83	88	93	96	98	99	99	99	99	99
35	233	237	240	3.6	9.7	1	3	8	15	25	35	46	56	66	75	82	88	92	96	98	99	99	99	99
40	235	239	242	3.4	9.7	1	2	6	12	19	29	39	49	59	68	77	84	89	94	97	99	99	99	99
45	238	242	245	3.1	9.7	1	1	3	7	13	20	29	38	48	58	68	76	84	89	94	97	99	99	99
50	240	244	247	2.8	9.7	1	1	2	5	9	15	23	31	41	51	61	70	79	86	91	96	98	99	99
55	242	247	249	2.5	9.7	1	1	1	3	5	10	15	22	31	40	50	60	70	79	86	92	97	99	99
60	244	249	252	2.3	9.7	1	1	1	2	4	7	11	17	24	33	42	53	63	73	82	89	95	98	99
65	246	251	254	2.1	9.7	1	1	1	1	2	5	8	13	19	27	35	45	56	66	77	85	93	97	99
70	249	254	257	1.8	9.7	1	1	1	1	1	3	5	8	12	18	26	35	45	56	67	78	88	95	99
75	251	257	260	1.4	9.7	1	1	1	1	1	1	3	5	8	12	18	25	34	45	57	69	81	92	98
80	254	260	263	1.1	9.7	1	1	1	1	1	1	1	3	4	7	11	17	25	34	46	59	73	87	97
85	257	264	267	1.0	9.7	1	1	1	1	1	1	1	1	2	3	6	9	15	22	32	44	60	77	93
90	262	268	272	1.0	9.7	1	1	1	1	1	1	1	1	1	1	3	5	8	13	20	31	45	64	86
95	268	275	279	1.0	9.7	1	1	1	1	1	1	1	1	1	1	1	1	2	4	7	12	22	39	67

C

						Spring Percentile and Score																		
	Achievement Norm Score			Fall-Spring Cond. Growth		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Percentile	Fall	Winter	Spring	Mean	SD	215	222	227	231	234	237	240	242	245	247	249	252	254	257	260	263	267	272	279
5	212	213	215	8.8	10.8	30	55	72	82	89	93	96	98	99	99	99	99	99	99	99	99	99	99	99
10	218	220	222	8.5	10.8	15	35	52	65	76	83	89	93	95	97	98	99	99	99	99	99	99	99	99
15	222	225	227	8.3	10.8	8	23	38	52	63	73	81	86	91	94	96	98	99	99	99	99	99	99	99
20	225	228	231	8.1	10.8	5	16	28	41	53	64	73	80	86	90	94	96	98	99	99	99	99	99	99
25	228	232	234	7.9	10.8	3	10	20	31	43	54	63	72	79	85	90	93	96	98	99	99	99	99	99
30	231	234	237	7.8	10.8	1	6	14	23	33	43	53	62	71	78	84	89	93	96	98	99	99	99	99
35	233	237	240	7.6	10.8	1	4	10	18	27	36	46	55	64	72	79	85	90	94	96	98	99	99	99
40	235	239	242	7.5	10.8	1	3	7	14	21	30	39	48	58	66	74	81	87	91	95	97	99	99	99
45	238	242	245	7.4	10.8	1	2	4	9	15	22	30	38	47	56	65	73	80	86	91	95	98	99	99
50	240	244	247	7.2	10.8	1	1	3	6	11	17	24	32	40	49	58	67	75	82	88	93	97	99	99
55	242	247	249	7.1	10.8	1	1	2	4	8	13	19	26	34	42	51	60	69	77	85	91	95	98	99
60	244	249	252	7.0	10.8	1	1	1	3	6	9	14	20	28	36	44	53	63	72	80	87	93	97	99
65	246	251	254	6.9	10.8	1	1	1	2	4	7	11	16	22	29	37	46	56	65	75	83	91	96	99
70	249	254	257	6.7	10.8	1	1	1	1	2	4	7	10	15	21	28	36	45	55	66	76	85	93	98
75	251	257	260	6.6	10.8	1	1	1	1	1	3	5	8	11	16	22	30	39	48	59	70	81	91	98
80	254	260	263	6.5	10.8	1	1	1	1	1	1	3	4	7	11	15	21	29	38	49	60	73	85	96
85	257	264	267	6.3	10.8	1	1	1	1	1	1	1	3	4	7	10	15	21	29	38	50	64	79	93
90	262	268	272	6.0	10.8	1	1	1	1	1	1	1	1	2	3	4	7	11	16	23	33	47	64	84
95	268	275	279	5.7	10.8	1	1	1	1	1	1	1	1	1	1	1	2	4	6	10	17	27	43	69

Table 3.6. Snapshot of Status and Growth Norms for Integrated Math 1

A

						Winter Percentile and Score																		
	Achievement Norm Score			Fall-Winter Cond. Growth		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Percentile	Fall	Winter	Spring	Mean	SD	197	204	209	212	216	218	221	224	226	228	231	233	236	238	241	244	248	253	260
5	196	197	198	3.5	7.0	36	74	90	97	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
10	202	204	205	3.5	7.0	12	42	68	84	93	97	99	99	99	99	99	99	99	99	99	99	99	99	99
15	207	209	210	3.4	7.0	3	18	40	61	77	87	94	97	99	99	99	99	99	99	99	99	99	99	99
20	210	212	214	3.4	7.0	1	9	25	44	62	77	87	93	97	98	99	99	99	99	99	99	99	99	99
25	213	216	217	3.3	7.0	1	4	14	29	46	62	75	85	92	96	98	99	99	99	99	99	99	99	99
30	216	218	220	3.3	7.0	1	1	7	16	30	45	60	73	83	90	95	98	99	99	99	99	99	99	99
35	218	221	223	3.3	7.0	1	1	4	10	21	34	49	63	75	85	91	96	98	99	99	99	99	99	99
40	221	224	226	3.2	7.0	1	1	1	5	11	20	33	46	60	73	83	90	95	98	99	99	99	99	99
45	223	226	228	3.2	7.0	1	1	1	2	6	13	23	35	49	62	74	84	91	96	98	99	99	99	99
50	225	228	231	3.2	7.0	1	1	1	1	4	8	16	26	38	51	65	77	86	93	97	99	99	99	99
55	227	231	233	3.1	7.0	1	1	1	1	2	5	10	17	28	40	54	67	79	88	94	98	99	99	99
60	230	233	236	3.1	7.0	1	1	1	1	1	2	4	9	16	25	37	51	65	78	88	95	98	99	99
65	232	236	238	3.1	7.0	1	1	1	1	1	1	2	5	10	17	27	40	54	68	81	91	97	99	99
70	235	238	241	3.0	7.0	1	1	1	1	1	1	1	2	4	8	15	25	37	52	68	82	93	98	99
75	237	241	244	3.0	7.0	1	1	1	1	1	1	1	1	2	5	9	17	27	41	57	74	88	97	99
80	240	244	247	3.0	7.0	1	1	1	1	1	1	1	1	1	2	4	8	15	26	40	58	77	92	99
85	244	248	251	2.9	7.0	1	1	1	1	1	1	1	1	1	1	1	3	6	11	21	36	57	80	97
90	248	253	256	2.9	7.0	1	1	1	1	1	1	1	1	1	1	1	1	2	4	8	18	35	61	90
95	255	260	263	2.8	7.0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	8	24	61

B

						Spring Percentile and Score																		
	Achievement Norm Score			Winter-Spring Cond. Growth		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Percentile	Fall	Winter	Spring	Mean	SD	198	205	210	214	217	220	223	226	228	231	233	236	238	241	244	247	251	256	263
5	196	197	198	3.2	7.2	38	76	92	97	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
10	202	204	205	3.0	7.2	11	41	67	84	93	97	99	99	99	99	99	99	99	99	99	99	99	99	99
15	207	209	210	2.8	7.2	3	18	41	62	78	88	94	97	99	99	99	99	99	99	99	99	99	99	99
20	210	212	214	2.7	7.2	1	9	26	46	64	78	88	94	97	99	99	99	99	99	99	99	99	99	99
25	213	216	217	2.6	7.2	1	3	12	26	43	59	73	84	91	95	98	99	99	99	99	99	99	99	99
30	216	218	220	2.6	7.2	1	2	7	18	32	48	63	76	86	92	96	98	99	99	99	99	99	99	99
35	218	221	223	2.5	7.2	1	1	3	9	19	33	47	62	74	84	91	96	98	99	99	99	99	99	99
40	221	224	226	2.4	7.2	1	1	1	4	10	20	32	46	60	72	83	90	95	98	99	99	99	99	99
45	223	226	228	2.3	7.2	1	1	1	2	6	13	23	35	49	63	75	85	92	96	99	99	99	99	99
50	225	228	231	2.3	7.2	1	1	1	1	4	8	16	26	38	52	66	77	87	93	97	99	99	99	99
55	227	231	233	2.2	7.2	1	1	1	1	1	4	8	15	24	36	50	64	76	86	94	98	99	99	99
60	230	233	236	2.1	7.2	1	1	1	1	1	2	5	9	17	27	39	53	67	80	89	96	99	99	99
65	232	236	238	2.0	7.2	1	1	1	1	1	1	2	4	8	15	25	37	51	66	80	90	97	99	99
70	235	238	241	2.0	7.2	1	1	1	1	1	1	1	2	5	10	17	27	41	56	71	85	94	99	99
75	237	241	244	1.9	7.2	1	1	1	1	1	1	1	1	2	4	9	16	26	40	56	73	88	97	99
80	240	244	247	1.8	7.2	1	1	1	1	1	1	1	1	1	2	4	8	15	25	40	59	77	92	99
85	244	248	251	1.7	7.2	1	1	1	1	1	1	1	1	1	1	1	3	6	11	22	37	58	81	97
90	248	253	256	1.5	7.2	1	1	1	1	1	1	1	1	1	1	1	1	1	3	7	16	32	58	89
95	255	260	263	1.3	7.2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	8	23	61

C

						Spring Percentile and Score																		
	Achievement Norm Score			Fall-Spring Cond. Growth		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Percentile	Fall	Winter	Spring	Mean	SD	198	205	210	214	217	220	223	226	228	231	233	236	238	241	244	247	251	256	263
5	196	197	198	5.3	8.3	35	68	86	94	97	99	99	99	99	99	99	99	99	99	99	99	99	99	99
10	202	204	205	5.3	8.3	13	40	63	79	89	94	97	99	99	99	99	99	99	99	99	99	99	99	99
15	207	209	210	5.3	8.3	4	20	39	58	72	83	90	95	97	99	99	99	99	99	99	99	99	99	99
20	210	212	214	5.4	8.3	2	11	26	43	59	72	82	89	94	97	98	99	99	99	99	99	99	99	99
25	213	216	217	5.4	8.3	1	6	16	30	45	59	71	81	88	93	96	98	99	99	99	99	99	99	99
30	216	218	220	5.4	8.3	1	3	9	19	31	45	58	70	79	87	92	96	98	99	99	99	99	99	99
35	218	221	223	5.4	8.3	1	1	6	13	23	35	48	61	72	81	88	93	96	98	99	99	99	99	99
40	221	224	226	5.4	8.3	1	1	3	7	14	23	34	46	58	70	79	87	92	96	98	99	99	99	99
45	223	226	228	5.4	8.3	1	1	1	4	9	16	26	37	49	61	72	81	88	94	97	99	99	99	99
50	225	228	231	5.4	8.3	1	1	1	2	6	11	19	28	39	51	63	74	83	90	95	98	99	99	99
55	227	231	233	5.4	8.3	1	1	1	1	3	7	13	21	30	42	53	65	76	85	92	96	99	99	99
60	230	233	236	5.4	8.3	1	1	1	1	1	3	7	12	19	28	39	51	63	75	85	92	97	99	99
65	232	236	238	5.4	8.3	1	1	1	1	1	2	4	8	13	21	30	42	54	67	79	88	95	99	99
70	235	238	241	5.5	8.3	1	1	1	1	1	1	2	4	7	12	19	28	40	53	67	80	90	97	99
75	237	241	244	5.5	8.3	1	1	1	1	1	1	1	2	4	8	13	21	31	43	57	72	85	95	99
80	240	244	247	5.5	8.3	1	1	1	1	1	1	1	1	2	4	7	12	19	30	43	59	75	90	98
85	244	248	251	5.5	8.3	1	1	1	1	1	1	1	1	1	1	2	5	9	15	25	40	58	79	95
90	248	253	256	5.5	8.3	1	1	1	1	1	1	1	1	1	1	1	2	3	7	13	23	39	62	88
95	255	260	263	5.5	8.3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	6	13	29	63

Table 3.7. Snapshot of Status and Growth Norms for Integrated Math 2

A

	Achievement Norm Score			Fall-Winter Cond. Growth		Winter Percentile and Score																		
Percentile	Fall	Winter	Spring	Mean	SD	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
						206	212	217	220	223	226	229	231	233	235	238	240	242	245	248	251	254	258	265
5	204	206	206	3.5	6.4	40	78	93	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
10	211	212	213	3.5	6.4	9	38	65	82	92	97	99	99	99	99	99	99	99	99	99	99	99	99	99
15	215	217	218	3.4	6.4	3	18	40	62	78	89	95	98	99	99	99	99	99	99	99	99	99	99	99
20	218	220	222	3.4	6.4	1	8	24	44	62	77	87	93	97	99	99	99	99	99	99	99	99	99	99
25	221	223	225	3.3	6.4	1	3	12	27	44	61	75	85	92	96	98	99	99	99	99	99	99	99	99
30	223	226	228	3.3	6.4	1	2	7	18	32	48	64	77	86	93	96	98	99	99	99	99	99	99	99
35	226	229	230	3.3	6.4	1	1	3	8	18	31	45	60	73	83	91	95	98	99	99	99	99	99	99
40	228	231	233	3.2	6.4	1	1	1	4	11	21	34	48	62	75	85	92	96	98	99	99	99	99	99
45	230	233	235	3.2	6.4	1	1	1	2	6	13	23	36	50	64	76	86	93	97	99	99	99	99	99
50	232	235	238	3.2	6.4	1	1	1	1	3	8	15	25	38	52	65	77	87	94	97	99	99	99	99
55	234	238	240	3.2	6.4	1	1	1	1	2	4	9	16	27	39	53	67	79	89	95	98	99	99	99
60	237	240	243	3.1	6.4	1	1	1	1	1	1	3	7	14	23	35	49	64	77	88	95	99	99	99
65	239	242	245	3.1	6.4	1	1	1	1	1	1	2	4	8	15	24	37	52	67	80	91	97	99	99
70	241	245	248	3.1	6.4	1	1	1	1	1	1	1	2	4	9	16	26	39	55	71	85	94	99	99
75	244	248	251	3.0	6.4	1	1	1	1	1	1	1	1	2	3	7	13	23	36	53	71	86	96	99
80	247	251	254	3.0	6.4	1	1	1	1	1	1	1	1	1	1	3	6	11	21	35	53	74	91	99
85	250	254	258	3.0	6.4	1	1	1	1	1	1	1	1	1	1	1	2	5	10	20	35	57	80	97
90	254	258	262	2.9	6.4	1	1	1	1	1	1	1	1	1	1	1	1	1	3	7	16	32	59	90
95	260	265	269	2.8	6.4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	8	24	63	

B

	Achievement Norm Score			Winter-Spring Cond. Growth		Spring Percentile and Score																		
Percentile	Fall	Winter	Spring	Mean	SD	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
						206	213	218	222	225	228	230	233	235	238	240	243	245	248	251	254	258	262	269
5	204	206	206	2.5	7.3	37	74	90	96	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
10	211	212	213	2.5	7.3	13	43	68	84	92	97	99	99	99	99	99	99	99	99	99	99	99	99	99
15	215	217	218	2.5	7.3	3	19	41	62	77	87	93	97	99	99	99	99	99	99	99	99	99	99	99
20	218	220	222	2.4	7.3	1	10	26	45	63	77	86	93	96	98	99	99	99	99	99	99	99	99	99
25	221	223	225	2.4	7.3	1	5	15	30	47	62	75	85	91	96	98	99	99	99	99	99	99	99	99
30	223	226	228	2.4	7.3	1	2	7	18	31	46	61	73	83	90	95	98	99	99	99	99	99	99	99
35	226	229	230	2.4	7.3	1	1	3	9	18	31	45	58	71	81	89	94	97	99	99	99	99	99	99
40	228	231	233	2.4	7.3	1	1	2	5	12	22	34	48	61	73	83	90	95	98	99	99	99	99	99
45	230	233	235	2.4	7.3	1	1	1	3	7	15	25	37	50	63	75	84	91	96	98	99	99	99	99
50	232	235	238	2.4	7.3	1	1	1	2	4	9	17	27	39	52	65	77	86	93	97	99	99	99	99
55	234	238	240	2.4	7.3	1	1	1	1	2	4	9	15	25	36	49	63	75	85	92	97	99	99	99
60	237	240	243	2.4	7.3	1	1	1	1	1	2	5	10	17	27	39	52	65	78	88	95	98	99	99
65	239	242	245	2.3	7.3	1	1	1	1	1	1	3	6	11	19	29	41	55	69	81	91	97	99	99
70	241	245	248	2.3	7.3	1	1	1	1	1	1	1	2	5	10	17	26	39	53	68	82	92	98	99
75	244	248	251	2.3	7.3	1	1	1	1	1	1	1	1	2	4	8	15	24	37	53	69	85	95	99
80	247	251	254	2.3	7.3	1	1	1	1	1	1	1	1	1	2	4	7	13	23	37	54	73	90	99
85	250	254	258	2.3	7.3	1	1	1	1	1	1	1	1	1	1	1	3	7	13	23	38	58	80	97
90	254	258	262	2.3	7.3	1	1	1	1	1	1	1	1	1	1	1	1	2	5	10	20	37	62	90
95	260	265	269	2.2	7.3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	10	26	62

C

	Achievement Norm Score			Fall-Spring Cond. Growth		Spring Percentile and Score																		
Percentile	Fall	Winter	Spring	Mean	SD	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
						206	213	218	222	225	228	230	233	235	238	240	243	245	248	251	254	258	262	269
5	204	206	206	4.7	8.0	38	71	87	95	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99
10	211	212	213	4.9	8.0	11	37	60	76	87	93	97	98	99	99	99	99	99	99	99	99	99	99	99
15	215	217	218	5.0	8.0	4	20	39	58	73	83	90	95	97	99	99	99	99	99	99	99	99	99	99
20	218	220	222	5.1	8.0	2	11	26	43	59	72	82	89	94	97	98	99	99	99	99	99	99	99	99
25	221	223	225	5.2	8.0	1	5	15	28	43	58	70	80	87	93	96	98	99	99	99	99	99	99	99
30	223	226	228	5.3	8.0	1	3	10	20	33	47	60	72	81	88	93	96	98	99	99	99	99	99	99
35	226	229	230	5.4	8.0	1	1	5	11	21	33	45	58	69	79	87	92	96	98	99	99	99	99	99
40	228	231	233	5.4	8.0	1	1	3	7	14	24	35	48	60	71	80	88	93	97	99	99	99	99	99
45	230	233	235	5.5	8.0	1	1	1	4	9	17	26	38	50	61	72	82	89	94	97	99	99	99	99
50	232	235	238	5.6	8.0	1	1	1	2	6	11	19	28	39	51	63	74	83	90	95	98	99	99	99
55	234	238	240	5.6	8.0	1	1	1	1	3	7	13	20	30	41	53	65	76	85	92	96	99	99	99
60	237	240	243	5.7	8.0	1	1	1	1	1	3	6	11	18	27	38	50	62	74	84	92	97	99	99
65	239	242	245	5.8	8.0	1	1	1	1	1	2	4	7	12	19	29	40	52	65	77	88	95	99	99
70	241	245	248	5.8	8.0	1	1	1	1	1	1	2	4	8	13	21	30	42	55	69	82	91	97	99
75	244	248	251	5.9	8.0	1	1	1	1	1	1	1	2	4	7	11	18	28	40	54	70	84	94	99
80	247	251	254	6.0	8.0	1	1	1	1	1	1	1	1	1	3	6	10	17	26	39	55	72	88	98
85	250	254	258	6.1	8.0	1	1	1	1	1	1	1	1	1	1	2	5	9	15	25	40	58	79	95
90	254	258	262	6.3	8.0	1	1	1	1	1	1	1	1	1	1	1	1	3	6	12	22	38	61	88
95	260	265	269	6.5	8.0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	6	14	31	65

Table 3.8. Snapshot of Status and Growth Norms for Integrated Math 3

A

	Achievement Norm Score			Fall-Winter Cond. Growth		Winter Percentile and Score																		
Percentile	Fall	Winter	Spring	Mean	SD	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
						212	219	224	227	231	233	236	239	241	243	246	248	251	253	256	259	263	267	274
5	211	212	211	3.7	7.3	38	73	89	96	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
10	218	219	218	3.4	7.3	11	38	63	80	90	95	98	99	99	99	99	99	99	99	99	99	99	99	99
15	222	224	223	3.2	7.3	4	21	43	62	77	87	93	97	98	99	99	99	99	99	99	99	99	99	99
20	226	227	227	3.0	7.3	1	9	24	42	59	73	83	90	95	97	99	99	99	99	99	99	99	99	99
25	229	231	231	2.9	7.3	1	4	14	27	43	58	71	82	89	94	97	99	99	99	99	99	99	99	99
30	231	233	234	2.8	7.3	1	2	9	19	33	48	62	74	83	90	95	97	99	99	99	99	99	99	99
35	234	236	237	2.7	7.3	1	1	4	10	20	33	47	60	72	82	89	94	97	99	99	99	99	99	99
40	236	239	239	2.6	7.3	1	1	2	6	14	24	36	50	62	74	83	90	95	98	99	99	99	99	99
45	239	241	242	2.5	7.3	1	1	1	3	7	14	23	34	47	60	72	82	89	94	98	99	99	99	99
50	241	243	245	2.4	7.3	1	1	1	2	4	9	16	25	37	49	62	74	84	91	96	98	99	99	99
55	243	246	247	2.3	7.3	1	1	1	1	2	5	10	18	28	39	52	65	76	86	93	97	99	99	99
60	245	248	250	2.2	7.3	1	1	1	1	1	3	6	12	20	30	42	55	67	79	88	95	98	99	99
65	248	251	252	2.1	7.3	1	1	1	1	1	1	3	6	11	18	27	39	52	66	79	89	96	99	99
70	250	253	255	2.0	7.3	1	1	1	1	1	1	2	3	7	12	19	29	42	56	71	83	93	98	99
75	253	256	258	1.9	7.3	1	1	1	1	1	1	1	1	3	6	10	18	28	41	56	72	86	96	99
80	256	259	262	1.7	7.3	1	1	1	1	1	1	1	1	1	2	5	9	16	27	40	57	75	91	99
85	260	263	266	1.6	7.3	1	1	1	1	1	1	1	1	1	1	2	3	7	13	22	37	56	79	96
90	264	267	271	1.4	7.3	1	1	1	1	1	1	1	1	1	1	1	1	2	5	10	20	36	61	89
95	271	274	278	1.1	7.3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	10	26	61

B

	Achievement Norm Score			Winter-Spring Cond. Growth		Spring Percentile and Score																		
Percentile	Fall	Winter	Spring	Mean	SD	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
						211	218	223	227	231	234	237	239	242	245	247	250	252	255	258	262	266	271	278
5	211	212	211	1.2	7.9	39	75	90	96	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
10	218	219	218	1.2	7.9	12	41	66	82	91	96	98	99	99	99	99	99	99	99	99	99	99	99	99
15	222	224	223	1.3	7.9	4	19	41	61	76	86	93	96	98	99	99	99	99	99	99	99	99	99	99
20	226	227	227	1.3	7.9	2	11	27	46	63	76	86	92	96	98	99	99	99	99	99	99	99	99	99
25	229	231	231	1.3	7.9	1	4	13	27	43	58	71	82	89	94	97	99	99	99	99	99	99	99	99
30	231	233	234	1.3	7.9	1	2	9	19	33	48	62	74	84	90	95	98	99	99	99	99	99	99	99
35	234	236	237	1.3	7.9	1	1	4	11	21	33	47	61	73	82	89	94	97	99	99	99	99	99	99
40	236	239	239	1.3	7.9	1	1	2	5	12	21	33	46	59	71	81	88	94	97	99	99	99	99	99
45	239	241	242	1.3	7.9	1	1	1	3	7	14	24	36	49	61	73	83	90	95	98	99	99	99	99
50	241	243	245	1.3	7.9	1	1	1	2	4	9	17	27	39	51	64	76	85	92	96	99	99	99	99
55	243	246	247	1.3	7.9	1	1	1	1	2	5	9	16	25	37	49	62	74	84	92	97	99	99	99
60	245	248	250	1.3	7.9	1	1	1	1	1	3	6	11	18	28	39	52	65	78	87	94	98	99	99
65	248	251	252	1.4	7.9	1	1	1	1	1	1	2	5	10	16	26	37	51	65	78	88	96	99	99
70	250	253	255	1.4	7.9	1	1	1	1	1	1	1	3	6	11	18	28	41	55	70	83	93	98	99
75	253	256	258	1.4	7.9	1	1	1	1	1	1	1	1	3	5	10	17	27	40	55	71	86	96	99
80	256	259	262	1.4	7.9	1	1	1	1	1	1	1	1	1	2	5	9	16	26	40	57	75	91	99
85	260	263	266	1.4	7.9	1	1	1	1	1	1	1	1	1	1	2	3	7	13	22	37	57	79	96
90	264	267	271	1.4	7.9	1	1	1	1	1	1	1	1	1	1	1	1	2	5	10	20	37	62	89
95	271	274	278	1.4	7.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	4	11	28	64

C

	Achievement Norm Score			Fall-Spring Cond. Growth		Spring Percentile and Score																		
Percentile	Fall	Winter	Spring	Mean	SD	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
						211	218	223	227	231	234	237	239	242	245	247	250	252	255	258	262	266	271	278
5	211	212	211	3.6	9.4	35	66	83	92	96	98	99	99	99	99	99	99	99	99	99	99	99	99	99
10	218	219	218	3.6	9.4	13	37	58	73	84	91	95	97	99	99	99	99	99	99	99	99	99	99	99
15	222	224	223	3.6	9.4	6	22	41	58	71	81	88	93	96	98	99	99	99	99	99	99	99	99	99
20	226	227	227	3.7	9.4	2	12	25	41	55	68	78	85	91	95	97	98	99	99	99	99	99	99	99
25	229	231	231	3.7	9.4	1	6	16	29	42	55	67	77	84	90	94	97	98	99	99	99	99	99	99
30	231	233	234	3.7	9.4	1	4	12	22	34	47	59	69	78	86	91	95	97	99	99	99	99	99	99
35	234	236	237	3.7	9.4	1	2	6	14	23	34	46	57	68	77	84	90	94	97	99	99	99	99	99
40	236	239	239	3.7	9.4	1	1	4	10	17	27	38	49	60	70	79	86	91	95	98	99	99	99	99
45	239	241	242	3.7	9.4	1	1	2	5	10	17	26	36	47	58	68	78	85	91	95	98	99	99	99
50	241	243	245	3.7	9.4	1	1	1	3	7	12	20	29	39	50	60	71	80	87	93	97	99	99	99
55	243	246	247	3.7	9.4	1	1	1	2	5	9	14	22	31	41	52	63	73	82	89	95	98	99	99
60	245	248	250	3.7	9.4	1	1	1	1	3	6	10	16	24	33	43	54	66	76	85	92	97	99	99
65	248	251	252	3.8	9.4	1	1	1	1	1	3	5	9	15	22	31	42	53	65	76	86	93	98	99
70	250	253	255	3.8	9.4	1	1	1	1	1	2	4	6	11	16	24	34	45	57	69	81	90	97	99
75	253	256	258	3.8	9.4	1	1	1	1	1	1	2	3	6	10	15	23	32	44	57	70	83	93	99
80	256	259	262	3.8	9.4	1	1	1	1	1	1	1	2	3	5	9	14	22	32	44	59	74	88	98
85	260	263	266	3.8	9.4	1	1	1	1	1	1	1	1	1	2	4	7	11	18	28	42	58	77	94
90	264	267	271	3.8	9.4	1	1	1	1	1	1	1	1	1	1	1	3	5	9	16	26	41	62	87
95	271	274	278	3.9	9.4	1	1	1	1	1	1	1	1	1	1	1	1	1	2	4	8	17	33	64

Table 3.9. Snapshot of Status and Growth Norms for Biology/Life Science

A

	Achievement Norm Score			Fall-Winter Cond. Growth		Winter Percentile and Score																	
						5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Percentile	Fall	Winter	Spring	Mean	SD	192	197	201	203	206	208	210	212	214	216	218	220	222	224	226	228	231	235	240
5	191	192	192	2.7	6.6	37	69	85	93	97	99	99	99	99	99	99	99	99	99	99	99	99	99	99
10	196	197	197	2.6	6.6	14	40	62	77	87	93	96	98	99	99	99	99	99	99	99	99	99	99	99
15	200	201	201	2.5	6.6	5	20	38	55	70	80	88	93	96	98	99	99	99	99	99	99	99	99	99
20	202	203	204	2.5	6.6	2	13	27	44	59	71	81	88	93	96	98	99	99	99	99	99	99	99	99
25	205	206	207	2.4	6.6	1	6	15	27	41	54	66	76	84	90	94	97	98	99	99	99	99	99	99
30	207	208	209	2.4	6.6	1	3	9	18	30	42	55	66	76	84	90	94	97	99	99	99	99	99	99
35	208	210	212	2.4	6.6	1	2	7	15	25	37	49	61	71	80	87	92	96	98	99	99	99	99	99
40	210	212	214	2.4	6.6	1	1	4	9	16	26	37	49	60	71	80	87	92	96	98	99	99	99	99
45	212	214	216	2.3	6.6	1	1	2	5	10	17	27	37	49	60	70	79	87	92	96	98	99	99	99
50	214	216	218	2.3	6.6	1	1	1	3	6	11	18	27	37	48	59	70	79	87	93	97	99	99	99
55	215	218	220	2.3	6.6	1	1	1	2	4	8	14	22	31	42	53	64	75	84	91	96	98	99	99
60	217	220	222	2.2	6.6	1	1	1	1	2	5	9	14	22	31	41	53	64	75	85	92	97	99	99
65	219	222	224	2.2	6.6	1	1	1	1	1	2	5	9	14	21	30	41	53	65	76	86	94	98	99
70	221	224	226	2.1	6.6	1	1	1	1	1	1	3	5	8	14	21	30	41	53	66	79	89	96	99
75	223	226	228	2.1	6.6	1	1	1	1	1	1	1	3	5	8	13	21	30	42	55	69	83	93	99
80	225	228	231	2.1	6.6	1	1	1	1	1	1	1	1	2	5	8	13	21	30	43	58	74	88	98
85	228	231	234	2.0	6.6	1	1	1	1	1	1	1	1	1	2	3	6	10	17	27	40	58	77	94
90	231	235	238	2.0	6.6	1	1	1	1	1	1	1	1	1	1	1	2	4	8	14	25	40	62	87
95	236	240	244	1.9	6.6	1	1	1	1	1	1	1	1	1	1	1	1	1	2	4	8	16	33	65

B

	Achievement Norm Score			Winter-Spring Cond. Growth		Spring Percentile and Score																	
						5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Percentile	Fall	Winter	Spring	Mean	SD	192	197	201	204	207	209	212	214	216	218	220	222	224	226	228	231	234	238	244
5	191	192	192	2.8	7.0	33	65	83	92	96	98	99	99	99	99	99	99	99	99	99	99	99	99	99
10	196	197	197	2.6	7.0	13	38	60	76	86	92	96	98	99	99	99	99	99	99	99	99	99	99	99
15	200	201	201	2.4	7.0	5	20	38	56	70	81	88	93	96	98	99	99	99	99	99	99	99	99	99
20	202	203	204	2.3	7.0	3	13	28	45	60	72	82	89	93	96	98	99	99	99	99	99	99	99	99
25	205	206	207	2.2	7.0	1	6	16	29	43	57	69	79	86	91	95	97	99	99	99	99	99	99	99
30	207	208	209	2.1	7.0	1	3	10	21	33	46	59	70	79	86	92	95	98	99	99	99	99	99	99
35	208	210	212	2.1	7.0	1	2	6	14	24	35	48	59	70	79	86	92	96	98	99	99	99	99	99
40	210	212	214	2.0	7.0	1	1	4	9	16	26	37	49	60	71	80	87	92	96	98	99	99	99	99
45	212	214	216	1.9	7.0	1	1	2	5	10	18	27	38	49	60	71	80	87	93	96	99	99	99	99
50	214	216	218	1.8	7.0	1	1	1	3	6	12	19	28	38	50	61	71	81	88	94	97	99	99	99
55	215	218	220	1.7	7.0	1	1	1	1	3	7	12	19	28	39	50	61	72	82	89	95	98	99	99
60	217	220	222	1.7	7.0	1	1	1	1	2	4	8	13	20	29	39	51	62	74	83	91	96	99	99
65	219	222	224	1.6	7.0	1	1	1	1	1	2	4	8	13	20	29	40	52	64	76	86	94	98	99
70	221	224	226	1.5	7.0	1	1	1	1	1	1	2	5	8	13	20	30	41	53	66	79	89	96	99
75	223	226	228	1.4	7.0	1	1	1	1	1	1	1	3	5	8	14	21	31	42	56	70	83	94	99
80	225	228	231	1.4	7.0	1	1	1	1	1	1	1	1	3	5	8	14	22	32	45	60	76	90	98
85	228	231	234	1.2	7.0	1	1	1	1	1	1	1	1	1	2	4	7	12	19	29	44	61	80	95
90	231	235	238	1.1	7.0	1	1	1	1	1	1	1	1	1	1	1	2	4	8	14	24	39	61	87
95	236	240	244	1.0	7.0	1	1	1	1	1	1	1	1	1	1	1	1	1	2	4	8	17	35	67

C

	Achievement Norm Score			Fall-Spring Cond. Growth		Spring Percentile and Score																	
						5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Percentile	Fall	Winter	Spring	Mean	SD	192	197	201	204	207	209	212	214	216	218	220	222	224	226	228	231	234	238	244
5	191	192	192	3.7	7.9	35	63	80	89	94	97	98	99	99	99	99	99	99	99	99	99	99	99	99
10	196	197	197	3.8	7.9	15	38	57	72	82	89	93	96	98	99	99	99	99	99	99	99	99	99	99
15	200	201	201	3.9	7.9	6	21	37	53	66	76	84	89	93	96	98	99	99	99	99	99	99	99	99
20	202	203	204	3.9	7.9	4	14	28	42	56	67	77	84	89	93	96	98	99	99	99	99	99	99	99
25	205	206	207	4.0	7.9	1	7	17	28	40	52	63	73	81	87	91	95	97	99	99	99	99	99	99
30	207	208	209	4.0	7.9	1	4	11	20	31	42	53	64	73	80	87	91	95	97	99	99	99	99	99
35	208	210	212	4.0	7.9	1	3	9	17	27	37	48	59	68	77	84	89	93	96	98	99	99	99	99
40	210	212	214	4.1	7.9	1	2	5	11	19	28	38	48	59	68	76	84	89	94	97	99	99	99	99
45	212	214	216	4.1	7.9	1	1	3	7	13	20	29	38	48	58	68	76	84	90	94	97	99	99	99
50	214	216	218	4.1	7.9	1	1	2	4	8	14	21	29	38	48	58	68	77	84	91	95	98	99	99
55	215	218	220	4.1	7.9	1	1	1	3	6	11	17	25	34	43	53	63	73	81	88	94	97	99	99
60	217	220	222	4.2	7.9	1	1	1	2	4	7	11	17	25	33	43	53	63	73	82	90	95	98	99
65	219	222	224	4.2	7.9	1	1	1	1	2	4	7	12	17	25	33	43	53	64	75	84	92	97	99
70	221	224	226	4.2	7.9	1	1	1	1	1	2	4	7	12	17	24	33	43	54	66	77	87	95	99
75	223	226	228	4.3	7.9	1	1	1	1	1	1	2	4	7	11	17	24	33	44	56	69	81	92	98
80	225	228	231	4.3	7.9	1	1	1	1	1	1	1	2	4	7	11	17	25	34	46	59	73	87	97
85	228	231	234	4.3	7.9	1	1	1	1	1	1	1	1	2	3	6	9	14	21	31	44	59	77	93
90	231	235	238	4.4	7.9	1	1	1	1	1	1	1	1	1	1	2	4	7	12	19	29	44	63	86
95	236	240	244	4.5	7.9	1	1	1	1	1	1	1	1	1	1	1	1	2	3	6	12	21	38	67

4. Conclusion and Discussion

This report describes the norming procedure used to develop the achievement and growth user norms for a series of MAP Growth course-specific subject tests. This report also provides snapshots of the norms and explains how to interpret them. These norms offer a useful context to schools, teachers, and parents to interpret and understand how students are performing at a point in time and growing over time in measures assessed by these tests relative to other students in the norming sample, thus permitting evaluation of their performance with reference to other students. These norms are scheduled to be released in Summer 2023.

Norms will be of limited use if the characteristics of the norming groups fail to be accurately captured in the norming study. The covid pandemic has been found to be disruptive to student's learning in many ways. For example, aside from the general finding of the deteriorated student performance, which is also revealed in the test data used in this study, students who struggle the most were also found to have fallen further behind their peers. Thus, we updated these norms to reflect these changes using more recent test events. While we used a mix of pre- and pandemic data in the study, the updated norms were more heavily weighted toward the pandemic performance, which was that the performance of the updated norm group was slightly lower than that of the norming group used in the previous study. As a result, the same score is likely to be associated with a slightly higher percentile using the updated norms. We believe this lower performance is a more accurate reflection of current learning achievement, providing more recent and relevant contextual information to aid in score interpretation. However, we also want to caution the users about the limited generalizability of the inferences that are supported by the results in this report. For example, placement or instructional decisions that solely rely on the normative performance of students are likely to be less accurate. The normative information may need to be combined with other evidence about student performance or growth in making placement decisions or other major instructional decisions.

Test scores, by themselves, are of little meaning without tools such as norms to interpret scores within a meaningful context. NWEA is committed to delivering this context with rich comparative data provided by our frequently updated achievement and growth norms. As such, we will continue to monitor student achievements in these course-specific tests as schools and students are recovering from learning loss due to the pandemic disruption and update these norms accordingly.

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