



KINDERGARTEN READINESS ASSESSMENT

SOUTH CAROLINA

Technical Report

2019–2020

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CONTENTS

1	Overview.....	1
1.1	Purpose of the KRA.....	1
1.2	Purpose of This Report	1
2	KRA Design.....	1
2.1	Common Language Standards	1
2.2	Item Types	1
2.3	Blueprint.....	2
2.4	Scale Scores	3
2.5	Reports	5
3	Validity and Reliability	6
3.1	Validity.....	6
3.2	Reliability	9
4	Summary of Results for Fall 2019 Administration.....	10
4.1	Demographics of Fall 2019 Cohort	10
4.2	Results for Fall 2019 Cohort	11
	References	13
	Appendix A — Classical Item Statistics.....	14
	Appendix B — Descriptive and Reliability Statistics by Subgroups.....	16
	Appendix C — Frequency Distributions of Overall and Domain Scores.....	18

1 OVERVIEW

1.1 PURPOSE OF THE KRA

The Kindergarten Readiness Assessment (KRA) provides valid and reliable information on children’s learning and development across the essential domains of school readiness.¹ This information can be used by stakeholders at the local, regional, and state levels to better understand children’s preparedness for kindergarten. Detailed score reports at the individual, classroom, school, district, and state levels inform policy, research, and programmatic decisions, and families can learn about each child’s skills, knowledge, and developmental needs.

1.2 PURPOSE OF THIS REPORT

The purpose of this report is to provide evidence of the technical qualities of the KRA, including its reliability and validity for use as a measure of children’s preparedness for kindergarten. Further, this report supplements the *KRA Technical Report* (WestEd, 2014) and the *KRA Technical Report Addendum* (WestEd, 2015), which provide detailed descriptions of the design and development processes, scaling and standard-setting methods, professional development to support administration, and the Ready for Kindergarten Online (KReady) system.

2 KRA DESIGN

2.1 COMMON LANGUAGE STANDARDS

The KRA is a criterion-referenced assessment based on the Common Language Standards, which are described in the *KRA Technical Report* (WestEd, 2014). The Common Language Standards are based on prekindergarten standards and incorporate the essential domains of school readiness as defined by the U.S. Department of Education.²

2.2 ITEM TYPES

A KRA item is one question or observation that aligns to a specific essential skill and knowledge statement from within the Common Language Standards and that results in one recorded score. The KRA includes three item types: selected response, performance task, and observational rubric.

¹ The U.S. Department of Education defines the essential domains of school readiness as language and literacy development, cognition and general knowledge (including early mathematics and early scientific development), approaches toward learning, physical well-being and motor development, and social and emotional development.

² The Social Foundations domain for the KRA incorporates the essential domains of social and emotional development and approaches toward learning.

Selected-response items consist of a question or prompt and three possible answer options, of which there is only one correct answer. A student indicates his or her response by touching one of the three answer options. Selected-response items are worth one score point. Benefits of selected-response items are that they require the least amount of time to administer and that they can be administered via the KRA App.

Performance-task items consist of an activity or action that is completed by the student in response to a prompt. In some instances, manipulatives are provided with performance tasks, which allow the student to demonstrate the skill being assessed. Performance-task items are scored with a rubric that is based on the proficiency of the student’s performance, and are worth one, two, or three score points. The benefit of performance-task items is that they allow a student to demonstrate his or her knowledge and, in some instances, to provide an explanation or reason. Some performance-task items can be administered via the KRA App.

Observational-rubric items describe specific behaviors or skills that a student should demonstrate during typical classroom activities. The teacher evaluates and scores each student’s behaviors or skills, using a rubric that describes the quality for each criterion. Observational-rubric items do not require the teacher and the student to directly interact (i.e., the student is unaware of the teacher’s intention to assess) and, therefore, provide the advantage of assessing the student in a natural classroom environment.

2.3 BLUEPRINT

The KRA Blueprint, shown in Table 2.3, outlines the distribution of selected-response (SR) items, performance-task (PT) items, observational-rubric (OR) items, total items, total points, and percentage of total points across the domains, as defined in the Common Language Standards.

Table 2.3
KRA Blueprint

Domain	SR	PT	OR	Total Items	Total Points	Percentage of Total Points
Language and Literacy	6	9	2	17	34	35%
Mathematics	3	11	0	14	25	26%
Physical Well-Being and Motor Development	0	0	7	7	14	14%
Social Foundations	0	0	12	12	24	25%
Total	9	20	21	50	97	100%

2.4 SCALE SCORES

Given that the KRA includes a sample of items that can be used to measure readiness for kindergarten, percent-correct scores would not provide a complete explanation of a student’s readiness for kindergarten. Instead, raw scores (i.e., the total score points obtained across all items) on the KRA are converted to scale scores. Scale scores account for the difficulty of individual items and forms, providing consistency in the interpretation of results and allowing for comparison of results across cohorts and forms.

The KRA utilizes the Rasch model to define the relationship between the assumed latent trait (readiness for kindergarten) and the probability of a student correctly answering a given KRA item. This model assumes that responses are a function of a student’s knowledge about the assessment content and of the difficulty of the item. This model allows the student score and the difficulty of the item to be placed on the same scale, known as theta (θ), which represents the latent trait being measured. This θ scale allows direct interpretation of the difficulty of an item and the probability of a student answering an item correctly. The probability that a student will answer a question at a given level is determined by whether the student’s score is below, at, or above the difficulty threshold for the level.

In mathematical terms, the Rasch model is a logistic regression model based on a single parameter known as the item difficulty parameter (b). The formula for this model is a logistic equation:

$$P(U_i = 1 | \theta) = P(\theta_i) = \frac{e^{(\theta - b_i)}}{1 + e^{(\theta - b_i)}}$$

In this equation, b_i = item difficulty and θ = student ability. The expression $P(U_i = 1 | \theta)$ represents the probability of a student of ability θ answering item i correctly.

For polytomous items, the partial credit model dichotomizes responses by making binary comparisons between adjacent score categories (k and $k-1$). The probability that a person of ability θ will reach response k given that the response is in either k or $k-1$ is:

$$P_{ik|k,k-1}(\theta) = \frac{P_{ik}(\theta)}{P_{i,k-1}(\theta) + P_{ik}(\theta)} = \frac{1}{1 + e^{(b_{ik} - \theta)}} = \frac{e^{(\theta - b_{ik})}}{1 + e^{(\theta - b_{ik})}}$$

The KRA items were calibrated using WINSTEPS measurement software. A more detailed description of the KRA scaling process, including the item parameters and fit statistics, can be found in the *KRA Technical Report* (WestEd, 2014).

The θ scale is centered at 0 and extends in both positive and negative directions. Applying a linear transformation to the θ scale is desirable because it allows for a scale that is more easily understood by stakeholders and that does not include negative values. The θ scores determined by IRT scaling are converted using a linear transformation such that the *scale score* = $12 * \theta + 250$. The KRA scale is

truncated at θ scores of ± 4 , which results in minimum and maximum scale scores of 202 and 298, respectively.

The KRA overall scale score determines each student’s performance level: Demonstrating Readiness, Approaching Readiness, or Emerging Readiness. Table 2.4.A shows the performance levels and their descriptions, including their associated overall score ranges.

Table 2.4.A

Performance Levels and Overall Scale Score Ranges for the KRA

Performance Level	Description	Overall Score Range
Demonstrating Readiness	The child demonstrates foundational skills and behaviors that prepare him/her for curriculum based on kindergarten standards.	270–298
Approaching Readiness	The child demonstrates some foundational skills and behaviors that prepare him/her for curriculum based on kindergarten standards.	258–269
Emerging Readiness	The child demonstrates minimal foundational skills and behaviors that prepare him/her for curriculum based on kindergarten standards.	202–257

To show relative strengths in each student’s performance, domain scale scores are also reported for each student, with each based on the subset of KRA items that are aligned to each domain. The domain scale scores are reported using the same scale as the overall score. Caution must be taken when interpreting domain scores, as these scores are determined by a subset of the items that compose the entire KRA, meaning that they provide a less-precise measure of ability. Table 2.4.B shows the ranges of possible scale scores for each domain.

Table 2.4.B

Domain Scale Score Ranges for the KRA

Domain	Scale Score Range
Language and Literacy	202–298
Mathematics	202–298
Physical Well-Being and Motor Development	202–289
Social Foundations	202–298

Note. The Physical Well-Being and Motor Development domain has a lower maximum score due to limited numbers of items and score points within the domain.

2.5 REPORTS

Upon completion of the KRA, each student receives an individual student report (ISR), which is generated by the teacher upon completion of the assessment with the student. The ISR provides the following information:

- Overall score and associated conditional standard error of measurement
- Performance level, based on the overall score

In addition to the ISR, multiple reports are available to teachers via the KReady system. The following reports can be generated by teachers throughout and after the administration window:

- *Interactive Data Displays*: The Interactive Data Displays are interactive charts and graphs that present the KRA data in multiple ways, including the option to filter by subgroups.
- *Domain Data Export*: The Domain Data Export is a Microsoft Excel file of a teacher's class roster, organized by domain, showing total raw points earned by each student.
- *Data Results Export*: This report is similar to the Domain Data Export but is organized by item. The spreadsheet can be sorted and filtered to meet the teacher's needs.
- *Class Item Results*: This report is a PDF with scoring rubrics, showing student performance by item.
- *Individual Student Item Results*: This report is a PDF of student scores by item, including scoring rubrics. This report can be printed separately for each student, showing the student's scores for all items or only for selected items.

The KReady system also offers a variety of reports for school and district administrators. Having access to the KRA data and results allows school and district administrators to provide targeted supports or interventions. In addition to the previously described Interactive Data Displays and Domain Data Export reports, the following reports can be generated by school and/or district administrators throughout and after the administration window:

- *KRA ISR Report*: The KRA ISR report is a Microsoft Excel file that includes all student data (including demographic information), teacher data, students' overall and item-level scores, and links to view students' ISRs.
- *KRA Percentage Completion Report*: This report provides the percentage of students in a school or district who have completed the KRA.
- *KRA Completion by Item Report*: This report provides the percentage of students in a school or district who have completed each KRA item.

3 VALIDITY AND RELIABILITY

The *Standards for Educational and Psychological Testing*, published by the American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education (AERA, APA, & NCME, 2014), provide detailed explanations of validity and reliability. These standards were used to guide the entire design, development, scoring, administration, and reporting processes for the KRA. Statistics presented throughout this section are based on data collected during the KRA administration in fall 2019.

3.1 VALIDITY

According to the *Standards for Educational and Psychological Testing*, “validity refers to the degree to which evidence and theory support the interpretation of test scores for proposed uses of tests.” Further, “the process of validation involves accumulating relevant evidence to provide a sound scientific basis for the proposed score interpretations”; therefore, “statements about validity should refer to particular interpretations for specified uses” (AERA, APA, & NCME, 2014, p. 11).

Every aspect of an assessment, including design, content specifications, item development, psychometric characteristics, and administration procedures, provides evidence in support of its validity (or evidence of lack of validity). Therefore, every section of this report provides evidence of validity for the use of the KRA to describe children’s preparedness for kindergarten curriculum.

3.1.1 Evidence Based on Test Content

The KRA Blueprint, item specifications, and item development process provide evidence for test content validity.

As described in Section 2 of this report, the KRA is aligned to the Common Language Standards, which are based on the KRA states’ early learning standards and incorporate the essential domains of school readiness as defined by the U.S. Department of Education. The KRA Blueprint emphasizes all domains of school readiness and utilizes multiple item types to best assess the skills and behaviors within each domain.

Prior to item development, detailed item specifications aligned to the Common Language Standards were created by WestEd content experts and reviewed by content experts from the KRA states’ departments of education. The item specifications ensure alignment to the Common Language Standards and describe the parameters for item development.

As described in detail in the *KRA Technical Report* (WestEd, 2014), cognitive interviews, a pilot, and a field test were conducted. Each step of these processes further contributed to the validity and reliability of the KRA and provided opportunities for expert and stakeholder review and feedback, in addition to statistical analyses. Prior to field testing, every KRA item went through a bias and content review. The bias and content review committees consisted of early childhood educators from the KRA states. Staff from the state departments of education also reviewed and approved each item prior to

field testing. The extensive rounds of review and feedback ensure fidelity to the standards and appropriateness for use with children entering kindergarten.

All students, including students with disabilities and students who are English learners, are required to be assessed. A fully accessible approach to assessment design and implementation was necessary to ensure that students with diverse learning characteristics had the opportunity to demonstrate their knowledge and skills. The guidance document for administering the KRA to diverse populations of students is referred to as the *Guidelines on Allowable Supports for the Kindergarten Readiness Assessment*.³ These guidelines provide detailed information on the strategies and practices that support differentiated administration of the assessment. Training on the KRA ensures that teachers learn about the Universally Designed Allowances that are available for all students, including materials presentations, procedures, and settings that can be used to ensure that all students can access the items. These guidelines also provide an item-by-item decision-making process for providing supports to students with disabilities and to English learners. These supports, called Level the Field supports, provide equal access and opportunities for all students to participate in the KRA without substantially altering what a student is expected to do. They are intended to reduce or even eliminate the effects of a student’s disability or limited English proficiency.

3.1.2 Evidence Based on Response Processes

Response processes of test takers can provide evidence supporting the fit between the construct and the nature of the performance or response that test takers engaged in (AERA, APA, & NCME, 2014). The cognitive interviews described in the *KRA Technical Report* (WestEd, 2014) were conducted so the assessment developers could better understand new item types and formats and to confirm hypotheses about access to the aligned content. The cognitive interviews allowed the developers to test assumptions about the intent of an item or task, including the reasoning processes that students used to respond to the item.

In addition to the cognitive interviews, the teacher surveys that were conducted during the pilot and the field test included questions designed to provide evidence that the students were engaging with and responding to items as intended. As described in the *KRA Technical Report* (WestEd, 2014), the results from the teacher surveys include strong evidence to confirm that the response processes of students were consistent with the intended designs of the items.

3.1.3 Evidence Based on Internal Structure

Classical item statistics (mean, standard deviation, difficulty [p -value], score-point distribution, and discrimination [item-total correlation]) were computed for each KRA item administered in fall 2019.

The p -value statistic is a measure of item difficulty (or item easiness) and falls between 0 and 1. The higher the value, the easier the item. For dichotomous items, the p -value represents the proportion

³ These guidelines are available at: <https://ed.sc.gov/tests/tests-files/pre-k-and-kindergarten-readiness-assessments/guidelines-for-allowable-supports-for-the-kindergarten-readiness-assessment/>.

(i.e., percentage) of students who correctly answered the item. For polytomous items, the p -value is relative to the maximum item score and is calculated by dividing the mean by the maximum possible score for each item. Therefore, the p -value for polytomous items does not correspond directly to the percentage of students who received the maximum item score. The p -values are expected to be slightly higher than is typically observed in other state- or grade-level assessments because the KRA Blueprint is based on prekindergarten early learning standards. The score-point distributions provide the percentages of students who received each score point on a specific item. Together, p -values and score-point distributions provide valuable information when determining the difficulty of items.

The item-total correlation is a measure of item discrimination. It is expected that students who achieve higher overall (or total) scores on the assessment will achieve higher scores on individual items, and that students who achieve lower overall (or total) scores on the assessment will achieve lower individual item scores. The item-total correlation is used to evaluate item discrimination by determining an individual item’s relationship to the overall (or total) score, excluding the item of interest. Item-total correlations are values between -1.00 and 1.00 , where 0 represents no correlation. Item-total correlations are expected to be positive values because students who perform better overall are expected to perform better on the individual items, leading to a positive correlation between performance on an individual item and the overall assessment.

Table 3.1.A provides a summary of the classical item statistics for the KRA in fall 2019. These statistics fall within acceptable ranges. The classical item statistics for all 50 KRA items administered in fall 2019 are provided in Appendix A.

Table 3.1.A

Summary of Classical Item Statistics for the KRA in Fall 2019

Domain	Number of Items	p -Value			Item-Total Correlation		
		M	SD	Range	M	SD	Range
All	50	0.73	0.14	0.35–0.91	0.50	0.13	0.25–0.69
Language and Literacy	17	0.73	0.14	0.53–0.91	0.47	0.13	0.28–0.68
Mathematics	14	0.66	0.17	0.35–0.90	0.42	0.12	0.25–0.60
Physical Well-Being and Motor Development	7	0.85	0.05	0.78–0.91	0.54	0.06	0.48–0.65
Social Foundations	12	0.77	0.07	0.63–0.86	0.61	0.07	0.46–0.69

The overall score and the domain scores for the KRA are also strongly correlated, as evident by the Pearson correlation coefficients shown in Table 3.1.B.

Table 3.1.B

Pearson Correlation Coefficients between the Overall Score and the Domain Scores

	Overall	LL	MA	PD	SF
Overall	1				
Language and Literacy (LL)	0.91	1			
Mathematics (MA)	0.85	0.76	1		
Physical Well-Being and Motor Development (PD)	0.76	0.58	0.50	1	
Social Foundations (SF)	0.83	0.63	0.53	0.78	1

The descriptions of the item calibration process and reporting scale in Section 2.4 and in the *KRA Technical Report* (WestEd, 2014) provide additional validity evidence based on internal structure. Additional validity evidence based on internal structure (i.e., the descriptive and reliability statistics) is described in Section 3.2.

3.2 RELIABILITY

In its simplest form, reliability measures the consistency of students' scores if the assessment were given multiple times or via multiple forms. There are several ways to measure reliability. The most common measures of reliability are internal consistency (typically Cronbach's alpha), separation reliability under Rasch IRT, test-retest, split-half, parallel forms, and interrater.

Cronbach's alpha was used to evaluate the reliability of the Reduced KRA. Cronbach's alpha is a function of the number of items, the sum of all of the item variances, and the variance of the total scores. The maximum value for Cronbach's alpha is 1, indicating perfect reliability. Greater values of Cronbach's alpha indicate that the items are closely related to one another and that students score consistently across the items. The standard error of measurement is a function of the reliability measure (Cronbach's alpha) and is defined as the standard deviation of error scores for a student under repeated independent testings with the same test (Allen & Yen, 1979).

Table 3.2 summarizes the descriptive statistics and reliability statistics for the KRA overall and domain scales in fall 2019. Appendix B summarizes the descriptive and reliability statistics by subgroups.

Table 3.2

Summary of Descriptive and Reliability Statistics for the KRA in Fall 2019

Domain	Number of Students	Mean	SD	Range	Cronbach's Alpha	SEM
Overall	55,694	266.04	13.69	202–298	0.94	3.21
Language and Literacy	55,694	265.11	14.51	202–298	0.85	5.71
Mathematics	55,694	263.82	14.59	202–298	0.80	6.48
Physical Well-Being and Motor Development	55,694	271.05	18.07	202–289	0.83	7.46
Social Foundations	55,694	272.61	20.79	202–298	0.92	5.76

To support reliability of item scores, all early childhood educators who administer the KRA must complete training activities, including a simulator that models proper administration and scoring processes. Further, before any early childhood educator can administer the KRA, he or she must also pass a content assessment. A more detailed description of the professional development and training content is provided in the *KRA Technical Report* (WestEd, 2014) and the *KRA Technical Report Addendum* (WestEd, 2015).

4 SUMMARY OF RESULTS FOR FALL 2019 ADMINISTRATION

4.1 DEMOGRAPHICS OF FALL 2019 COHORT

Table 4.1 provides a demographic summary of the students who completed the KRA in fall 2019.

Table 4.1

Demographic Summary of Students for the KRA in Fall 2019

	Group	N	Percent
Gender	Female	20,668	37.1
	Male	21,961	39.4
	Not Reported	13,065	23.5
Race/Ethnicity	African American	13,863	24.9
	American Indian	113	0.2
	Asian	628	1.1
	Hispanic/Latino	4,100	7.4
	Native Hawaiian/Pacific Islander	59	0.1
	Two or More	2,509	4.5
	White	20,855	37.4
English Learner	No	53,477	96.0
	Yes	2,217	4.0
Special Education	No	53,570	96.2
	Yes	2,124	3.8
Total		55,694	100.0

4.2 RESULTS FOR FALL 2019 COHORT

Table 4.2.A provides the overall and domain scores by decile, based on the results from all students who completed the KRA in fall 2019. The frequency distributions of the overall and domain scores are provided in Appendix C.

Table 4.2.A

Overall and Domain Scores by Decile

Domain	Decile								
	10	20	30	40	50	60	70	80	90
Overall	250	256	260	263	266	269	273	277	282
Language and Literacy	248	254	259	263	265	269	272	275	284
Mathematics	248	254	257	261	263	266	268	276	281
Physical Well-Being and Motor Development	248	255	260	266	275	275	289	289	289
Social Foundations	246	255	260	266	273	277	292	298	298

Table 4.2.B provides the descriptive statistics for the overall score and percentages of students at each performance level for all students and subgroups of students who completed the KRA in fall 2019. The descriptive statistics for the domain scores for all students are provided in Appendix B.

Table 4.2.B

Descriptive Statistics for the Overall Score and Percentage of Students at Each Performance Level

	<i>N</i>	<i>M</i>	<i>SD</i>	Demonstrating Readiness	Approaching Readiness	Emerging Readiness
All Students	55,694	266.04	13.69	39.2%	37.0%	23.8%
Female	20,668	267.71	13.16	43.9%	36.9%	19.2%
Male	21,961	264.41	13.82	34.0%	38.2%	27.8%
Gender Not Reported	13,065	266.16	13.98	40.5%	35.2%	24.3%
African American	13,863	263.16	12.75	29.1%	41.2%	29.7%
American Indian	113	262.27	14.52	30.1%	38.9%	31.0%
Asian	628	268.10	13.38	46.2%	36.0%	17.8%
Hispanic/Latino	4,100	261.35	13.01	24.5%	40.1%	35.4%
Native Hawaiian/Pacific Islander	59	260.92	14.75	20.3%	45.8%	33.9%
Two or More	2,509	265.69	12.96	37.5%	38.9%	23.6%
White	20,855	268.98	13.59	48.4%	34.7%	16.9%
Race/Ethnicity Not Reported	13,567	265.91	14.06	39.9%	35.1%	25.0%
English Learner	2,217	259.71	12.84	20.9%	38.6%	40.5%
Special Education	2,124	255.54	16.90	16.5%	34.1%	49.4%

Table 4.2.C provides a summary of the descriptive statistics for the overall and domain scores by performance level. The results include all students who completed the KRA in fall 2019.

Table 4.2.C

Descriptive Statistics by Performance Level

Domain	Performance Level	N	Mean	SD
Overall	Demonstrating Readiness	21,817	278.85	7.48
	Approaching Readiness	20,627	263.86	3.46
	Emerging Readiness	13,250	248.35	9.33
Language and Literacy	Demonstrating Readiness	21,817	277.05	9.28
	Approaching Readiness	20,627	263.52	6.38
	Emerging Readiness	13,250	247.91	12.05
Mathematics	Demonstrating Readiness	21,817	275.24	10.64
	Approaching Readiness	20,627	261.77	7.70
	Emerging Readiness	13,250	248.20	12.27
Physical Well-Being and Motor Development	Demonstrating Readiness	21,817	283.68	9.06
	Approaching Readiness	20,627	271.03	13.57
	Emerging Readiness	13,250	250.28	16.01
Social Foundations	Demonstrating Readiness	21,817	289.35	10.81
	Approaching Readiness	20,627	270.96	13.86
	Emerging Readiness	13,250	247.59	15.26

REFERENCES

Allen, M. J., & Yen, W. M. (1979). *Introduction to measurement theory*. Brooks/Cole.

American Educational Research Association (AERA), American Psychological Association (APA), National Council on Measurement in Education (NCME). (2014). *Standards for educational and psychological testing*. AERA.

WestEd. (2014). *Ready for kindergarten: Kindergarten readiness assessment technical report*.

WestEd. (2015). *Ready for kindergarten: Kindergarten readiness assessment technical report addendum*.

APPENDIX A — CLASSICAL ITEM STATISTICS

Item	Domain	N	Max	Mean	SD	Difficulty (p-value)	Item-Total Correlation	Percent at Score Point			
								0	1	2	3
A127	LL	55,652	1	0.57	0.50	0.57	0.43	43.1	56.9		
A130	LL	55,590	2	1.24	0.79	0.62	0.56	21.7	32.3	46.0	
A132	LL	55,593	3	2.09	1.07	0.70	0.57	12.4	15.3	22.9	49.3
A134	LL	55,587	2	1.71	0.58	0.86	0.60	6.5	15.8	77.7	
A136	LL	55,577	2	1.79	0.52	0.90	0.54	5.1	11.0	83.9	
A155	LL	55,593	3	2.64	0.68	0.88	0.55	2.5	4.4	19.5	73.6
A160	LL	55,652	3	2.51	0.81	0.84	0.54	3.4	9.7	19.4	67.5
A163	LL	55,649	1	0.56	0.50	0.56	0.30	43.7	56.3		
A164	LL	55,591	3	1.58	1.08	0.53	0.35	22.9	19.3	35.0	22.8
A180	LL	55,653	1	0.61	0.49	0.61	0.28	38.9	61.1		
A195	LL	55,593	3	2.43	0.76	0.81	0.52	3.3	7.0	33.1	56.6
H101	LL	55,645	1	0.90	0.30	0.90	0.31	9.7	90.3		
H103	LL	55,644	1	0.60	0.49	0.60	0.29	40.5	59.5		
H104	LL	55,646	1	0.91	0.29	0.91	0.35	9.2	90.8		
H106	LL	55,636	3	1.67	1.06	0.56	0.51	18.5	23.5	31.1	27.0
OR19	LL	55,556	2	1.55	0.65	0.78	0.65	8.8	27.3	63.9	
OR20	LL	55,553	2	1.57	0.66	0.79	0.68	9.2	25.0	65.8	
A101	MA	55,599	3	2.29	1.02	0.76	0.60	7.9	17.8	11.9	62.4
A104	MA	55,586	3	1.98	0.91	0.66	0.58	8.0	18.8	40.5	32.7
A115	MA	55,588	1	0.81	0.39	0.81	0.42	19.2	80.8		
A117	MA	55,503	3	1.96	1.15	0.65	0.57	17.9	14.7	20.5	46.9
A121	MA	55,591	2	1.79	0.52	0.90	0.47	5.2	10.4	84.4	
A123	MA	55,659	2	1.61	0.75	0.81	0.33	16.5	5.5	77.9	
A138	MA	55,659	1	0.41	0.49	0.41	0.33	59.1	40.9		
A143	MA	55,659	1	0.78	0.41	0.78	0.36	21.8	78.2		

Item	Domain	N	Max	Mean	SD	Difficulty (p-value)	Item-Total Correlation	Percent at Score Point			
								0	1	2	3
A147	MA	55,657	1	0.45	0.50	0.45	0.41	55.2	44.8		
A149	MA	55,656	1	0.51	0.50	0.51	0.25	49.2	50.8		
A152	MA	55,661	2	1.43	0.71	0.72	0.48	13.2	31.0	55.8	
A174	MA	55,662	1	0.35	0.48	0.35	0.33	64.9	35.1		
A177	MA	55,665	2	1.37	0.65	0.69	0.26	9.7	43.3	47.0	
A191	MA	55,586	2	1.43	0.69	0.72	0.52	11.2	34.9	53.8	
OR01	PD	55,552	2	1.77	0.50	0.89	0.48	3.8	15.8	80.5	
OR05	PD	55,549	2	1.73	0.55	0.87	0.48	5.4	16.6	78.1	
OR06	PD	55,571	2	1.56	0.65	0.78	0.58	8.8	26.3	64.9	
OR08	PD	55,553	2	1.68	0.58	0.84	0.55	6.0	20.1	73.9	
OR09	PD	55,537	2	1.57	0.64	0.79	0.65	8.1	26.4	65.5	
OR10	PD	55,551	2	1.72	0.53	0.86	0.50	4.0	20.4	75.6	
OR15	PD	55,551	2	1.81	0.44	0.91	0.52	2.1	14.6	83.3	
OR12	SF	55,550	2	1.35	0.72	0.68	0.66	14.2	36.5	49.3	
OR25	SF	55,552	2	1.59	0.61	0.80	0.62	6.3	28.5	65.2	
OR32	SF	55,570	2	1.59	0.63	0.80	0.69	7.9	25.1	67.0	
OR35	SF	55,553	2	1.60	0.62	0.80	0.62	7.4	25.6	66.9	
OR42	SF	55,553	2	1.53	0.64	0.77	0.64	8.3	30.2	61.5	
OR43	SF	55,554	2	1.65	0.59	0.83	0.63	6.0	23.2	70.8	
OR49	SF	55,554	2	1.65	0.59	0.83	0.46	5.9	23.5	70.6	
OR55	SF	55,552	2	1.26	0.72	0.63	0.59	16.2	42.0	41.8	
OR58	SF	55,553	2	1.33	0.71	0.67	0.69	14.3	38.0	47.7	
OR64	SF	55,552	2	1.48	0.66	0.74	0.65	9.2	33.6	57.3	
OR68	SF	55,553	2	1.69	0.55	0.85	0.56	4.3	22.5	73.2	
OR69	SF	55,552	2	1.71	0.54	0.86	0.49	4.2	20.4	75.4	

LL = Language and Literacy, MA = Mathematics, PD = Physical Well-Being and Motor Development, SF = Social Foundations

The values of *N* for the item-total correlations may be smaller than the reported *N* due to listwise deletion (i.e., removal of students with no total score).

APPENDIX B — DESCRIPTIVE AND RELIABILITY STATISTICS BY SUBGROUPS

Domain	Subgroup	<i>n</i>	Mean	SD	Alpha	SEM
Overall	All Students	55,694	266.04	13.69	0.94	3.21
	Female	20,668	267.71	13.16	0.94	3.23
	Male	21,961	264.41	13.82	0.95	3.21
	Gender Not Reported	13,065	266.16	13.98	0.95	3.21
	African American	13,863	263.16	12.75	0.94	3.11
	American Indian	113	262.27	14.52	0.95	3.12
	Asian	628	268.10	13.38	0.94	3.17
	Hispanic/Latino	4,100	261.35	13.01	0.94	3.09
	Native Hawaiian/Pacific Islander	59	260.92	14.75	0.95	3.23
	Two or More	2,509	265.69	12.96	0.94	3.20
	White	20,855	268.98	13.59	0.94	3.29
	Race/Ethnicity Not Reported	13,567	265.91	14.06	0.95	3.20
	English Learner	2,217	259.71	12.84	0.95	3.00
	Special Education	2,124	255.54	16.90	0.96	3.30
	Language and Literacy	All Students	55,694	265.11	14.51	0.85
Female		20,668	266.25	13.98	0.83	5.70
Male		21,961	264.12	14.69	0.85	5.73
Gender Not Reported		13,065	264.96	14.91	0.85	5.73
African American		13,863	263.03	13.74	0.83	5.62
American Indian		113	259.99	16.95	0.88	5.90
Asian		628	265.06	14.47	0.85	5.53
Hispanic/Latino		4,100	258.86	15.04	0.86	5.63
Native Hawaiian/Pacific Islander		59	259.41	17.22	0.87	6.25
Two or More		2,509	264.77	13.71	0.83	5.65
White		20,855	268.07	13.93	0.83	5.80
Race/Ethnicity Not Reported		13,567	264.68	15.06	0.86	5.73
English Learner		2,217	256.29	15.01	0.86	5.53
Special Education		2,124	255.25	18.48	0.89	6.02
Mathematics		All Students	55,694	263.82	14.59	0.80
	Female	20,668	264.42	14.18	0.79	6.45
	Male	21,961	263.16	14.72	0.81	6.48
	Gender Not Reported	13,065	263.98	14.94	0.81	6.52
	African American	13,863	260.53	13.32	0.78	6.25
	American Indian	113	259.44	15.85	0.82	6.79
	Asian	628	266.41	14.03	0.79	6.46

Domain	Subgroup	<i>n</i>	Mean	SD	Alpha	SEM
Mathematics (Continued)	Hispanic/Latino	4,100	258.42	13.97	0.80	6.30
	Native Hawaiian/Pacific Islander	59	257.76	16.19	0.81	6.97
	Two or More	2,509	263.21	14.02	0.79	6.45
	White	20,855	267.16	14.44	0.79	6.57
	Race/Ethnicity Not Reported	13,567	263.74	15.05	0.81	6.52
	English Learner	2,217	256.93	14.05	0.80	6.31
	Special Education	2,124	254.97	17.51	0.84	7.04
Physical Well-Being and Motor Development	All Students	55,694	271.05	18.07	0.83	7.46
	Female	20,668	274.52	16.72	0.82	7.17
	Male	21,961	267.81	18.62	0.83	7.72
	Gender Not Reported	13,065	270.98	18.16	0.83	7.48
	African American	13,863	268.86	18.07	0.83	7.51
	American Indian	113	268.73	19.61	0.85	7.55
	Asian	628	275.36	16.58	0.82	6.97
	Hispanic/Latino	4,100	269.61	17.61	0.81	7.62
	Native Hawaiian/Pacific Islander	59	267.78	18.70	0.85	7.19
	Two or More	2,509	271.32	17.60	0.81	7.63
	White	20,855	272.84	17.93	0.83	7.30
	Race/Ethnicity Not Reported	13,567	270.74	18.22	0.83	7.50
	English Learner	2,217	268.94	17.63	0.81	7.60
	Special Education	2,124	258.07	22.82	0.89	7.60
Social Foundations	All Students	55,694	272.61	20.79	0.92	5.76
	Female	20,668	276.02	19.73	0.92	5.72
	Male	21,961	269.24	21.01	0.92	5.80
	Gender Not Reported	13,065	272.88	21.13	0.93	5.75
	African American	13,863	268.92	20.66	0.92	5.80
	American Indian	113	270.56	22.78	0.93	5.81
	Asian	628	276.44	20.74	0.92	5.85
	Hispanic/Latino	4,100	269.51	20.67	0.92	5.88
	Native Hawaiian/Pacific Islander	59	268.07	21.39	0.94	5.28
	Two or More	2,509	272.38	20.22	0.92	5.88
	White	20,855	275.62	20.14	0.92	5.68
	Race/Ethnicity Not Reported	13,567	272.58	21.24	0.93	5.74
	English Learner	2,217	268.15	21.17	0.92	5.88
	Special Education	2,124	258.44	23.65	0.94	5.90

APPENDIX C — FREQUENCY DISTRIBUTIONS OF OVERALL AND DOMAIN SCORES

Overall Score Distribution

Scale Score	SEM	Performance Level	Frequency	Percent	Cumulative Percent
202	9	Emerging	134	0.2	0.2
207	7	Emerging	23	0.0	0.3
211	6	Emerging	36	0.1	0.3
214	6	Emerging	23	0.0	0.4
216	5	Emerging	27	0.0	0.4
218	5	Emerging	20	0.0	0.5
220	4	Emerging	18	0.0	0.5
221	4	Emerging	29	0.1	0.6
223	4	Emerging	33	0.1	0.6
224	4	Emerging	34	0.1	0.7
225	4	Emerging	42	0.1	0.8
226	4	Emerging	52	0.1	0.8
227	3	Emerging	30	0.1	0.9
228	3	Emerging	51	0.1	1.0
229	3	Emerging	49	0.1	1.1
230	3	Emerging	53	0.1	1.2
231	3	Emerging	61	0.1	1.3
232	3	Emerging	61	0.1	1.4
233	3	Emerging	124	0.2	1.6
234	3	Emerging	82	0.1	1.8
235	3	Emerging	81	0.1	1.9
236	3	Emerging	161	0.3	2.2
237	3	Emerging	79	0.1	2.3
238	3	Emerging	208	0.4	2.7
239	3	Emerging	103	0.2	2.9
240	3	Emerging	241	0.4	3.3
241	3	Emerging	264	0.5	3.8
242	3	Emerging	140	0.3	4.1
243	3	Emerging	348	0.6	4.7
244	3	Emerging	402	0.7	5.4
245	3	Emerging	430	0.8	6.2
246	3	Emerging	486	0.9	7.0
247	3	Emerging	551	1.0	8.0
248	3	Emerging	300	0.5	8.6

Scale Score	SEM	Performance Level	Frequency	Percent	Cumulative Percent
249	3	Emerging	658	1.2	9.8
250	3	Emerging	704	1.3	11.0
251	3	Emerging	819	1.5	12.5
252	3	Emerging	929	1.7	14.2
253	3	Emerging	1,035	1.9	16.0
254	3	Emerging	1,120	2.0	18.0
255	3	Emerging	579	1.0	19.1
256	3	Emerging	1,287	2.3	21.4
257	3	Emerging	1,343	2.4	23.8
258	3	Approaching	1,575	2.8	26.6
259	3	Approaching	1,713	3.1	29.7
260	3	Approaching	950	1.7	31.4
261	3	Approaching	2,017	3.6	35.0
262	3	Approaching	1,063	1.9	36.9
263	3	Approaching	2,226	4.0	40.9
264	3	Approaching	1,161	2.1	43.0
265	3	Approaching	2,585	4.6	47.7
266	3	Approaching	1,352	2.4	50.1
267	3	Approaching	1,436	2.6	52.7
268	3	Approaching	2,990	5.4	58.0
269	3	Approaching	1,559	2.8	60.8
270	3	Demonstrating	1,629	2.9	63.8
271	3	Demonstrating	1,656	3.0	66.7
272	4	Demonstrating	1,702	3.1	69.8
273	4	Demonstrating	1,653	3.0	72.7
274	4	Demonstrating	1,745	3.1	75.9
276	4	Demonstrating	1,733	3.1	79.0
277	4	Demonstrating	1,648	3.0	82.0
279	4	Demonstrating	1,613	2.9	84.8
280	5	Demonstrating	1,520	2.7	87.6
282	5	Demonstrating	1,421	2.6	90.1
284	5	Demonstrating	1,384	2.5	92.6
286	6	Demonstrating	1,165	2.1	94.7
289	6	Demonstrating	1,031	1.9	96.6
293	7	Demonstrating	774	1.4	97.9
298	9	Demonstrating	1,143	2.1	100.0

Language and Literacy Score Distribution

Scale Score	SEM	Frequency	Percent	Cumulative Percent
202	12	264	0.5	0.5
207	12	108	0.2	0.7
215	9	107	0.2	0.9
220	7	94	0.2	1.0
224	6	144	0.3	1.3
227	6	148	0.3	1.6
230	5	183	0.3	1.9
232	5	183	0.3	2.2
234	5	230	0.4	2.6
236	5	243	0.4	3.1
238	5	341	0.6	3.7
240	5	416	0.7	4.4
242	4	506	0.9	5.3
243	4	574	1.0	6.4
245	4	661	1.2	7.5
247	4	814	1.5	9.0
248	4	914	1.6	10.6
250	4	1,070	1.9	12.6
251	4	1,259	2.3	14.8
253	4	1,458	2.6	17.4
254	4	1,720	3.1	20.5
256	4	2,033	3.7	24.2
258	4	2,353	4.2	28.4
259	5	2,696	4.8	33.3
261	5	2,973	5.3	38.6
263	5	3,327	6.0	44.6
265	5	3,787	6.8	51.4
267	5	4,027	7.2	58.6
269	5	4,371	7.8	66.4
272	6	4,401	7.9	74.3
275	6	4,385	7.9	82.2
279	7	3,797	6.8	89.0
284	9	2,964	5.3	94.4
293	12	1,995	3.6	97.9
298	12	1,148	2.1	100.0

Mathematics Score Distribution

Scale Score	SEM	Frequency	Percent	Cumulative Percent
202	12	324	0.6	0.6
214	12	142	0.3	0.8
223	9	202	0.4	1.2
228	7	244	0.4	1.6
232	7	333	0.6	2.2
236	6	464	0.8	3.1
239	6	587	1.1	4.1
241	5	738	1.3	5.4
244	5	924	1.7	7.1
246	5	1,105	2.0	9.1
248	5	1,344	2.4	11.5
250	5	1,663	3.0	14.5
252	5	1,893	3.4	17.9
254	5	2,217	4.0	21.9
255	5	2,688	4.8	26.7
257	5	3,130	5.6	32.3
259	5	3,606	6.5	38.8
261	5	4,130	7.4	46.2
263	5	4,331	7.8	54.0
266	6	4,643	8.3	62.3
268	6	4,630	8.3	70.6
272	7	4,496	8.1	78.7
276	7	4,023	7.2	85.9
281	9	3,479	6.2	92.2
290	12	2,629	4.7	96.9
298	12	1,729	3.1	100.0

Physical Well-Being and Motor Development Score Distribution

Scale Score	SEM	Frequency	Percent	Cumulative Percent
202	12	375	0.7	0.7
213	12	182	0.3	1.0
223	9	261	0.5	1.5
229	8	333	0.6	2.1
233	7	522	0.9	3.0
237	7	669	1.2	4.2
241	6	1,035	1.9	6.1
244	6	1,623	2.9	9.0
248	6	1,951	3.5	12.5
251	7	2,743	4.9	17.4
255	7	3,549	6.4	23.8
260	8	4,808	8.6	32.4
266	9	6,808	12.2	44.6
275	12	9,184	16.5	61.1
289	21	21,651	38.9	100.0

Social Foundations Score Distribution

Scale Score	SEM	Frequency	Percent	Cumulative Percent
202	12	372	0.7	0.7
211	12	186	0.3	1.0
220	9	244	0.4	1.4
225	8	326	0.6	2.0
229	7	397	0.7	2.7
233	6	472	0.8	3.6
236	6	602	1.1	4.7
239	6	732	1.3	6.0
241	5	786	1.4	7.4
244	5	935	1.7	9.1
246	5	1,103	2.0	11.1
248	5	1,179	2.1	13.2
251	5	1,703	3.1	16.2
253	5	1,734	3.1	19.3
255	5	2,024	3.6	23.0
258	5	2,092	3.8	26.7
260	6	2,369	4.3	31.0
263	6	2,695	4.8	35.8
266	6	2,904	5.2	41.0
269	6	3,182	5.7	46.8
273	7	3,655	6.6	53.3
277	8	3,997	7.2	60.5
283	9	4,454	8.0	68.5
292	12	4,813	8.6	77.1
298	12	12,738	22.9	100.0