South Carolina
Kindergarten Readiness Assessment
(KRA)

Annual Technical Report
2022–2023

READY FOR
KINDERGARTEN

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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. This report supplements the *KRA 2.0 Development and Technical Report* (WestEd, 2018), which provides detailed descriptions of the design and development processes, scaling and equating methods, professional development to support administration, the Ready for Kindergarten Online (KReady) system, and South Carolina KRA annual technical reports from prior years.

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 2.0 Development and Technical Report* (WestEd, 2018). 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.

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[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. The benefits of selected-response items are that they require the least amount of time to administer and can be administered via the KRA App.

Performance-task items consist of an activity or action that the student completes 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	7	6	4	17	33	35%
Mathematics	2	11	0	13	22	23%
Physical Well-Being and Motor Development	0	0	9	9	18	19%
Social Foundations	0	0	11	11	22	23%
Total	9	17	24	50	95	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, which provides consistency in the interpretation of results and allows 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 for 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:

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

In this equation, b_i is item difficulty and θ is student ability. The expression $P(U_i = 1 \mid \theta)$ 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 category k or category $k–1$, is:

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

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) and the *KRA 2.0 Development and Technical Report* (WestEd, 2018).

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 Scale Score Range
Demonstrating Readiness	A student demonstrates foundational skills and behaviors that prepare him/her for a curriculum based on kindergarten standards.	270–298
Approaching Readiness	A student demonstrates some foundational skills and behaviors that prepare him/her for a curriculum based on kindergarten standards.	258–269
Emerging Readiness	A student demonstrates minimal foundational skills and behaviors that prepare him/her for a 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	202–293
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 overall score, including the associated conditional standard error of measurement, and the 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 student group.
- *Domain Data Export*: This report 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:

- *KRA ISR Report*: This report is a Microsoft Excel file that includes all student data (including demographic information), students' overall and domain scores, and students' item-level scores. This report also includes 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 KRA items that have been completed for each student in a school or district.
- *ISR ZIP File*: A ZIP file of all student ISRs.

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 et al., 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. The statistics presented throughout this section are based on data collected during the KRA administration in fall 2022.

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 et al., 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 a 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 2.0 Development and Technical Report* (WestEd, 2018), 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. In an effort to ensure maximum accessibility for English Learners, experts from the WIDA Consortium reviewed and provided feedback on every KRA 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 et al., 2014). The cognitive interviews described in the *KRA 2.0 Development and Technical Report* (WestEd, 2018) were conducted so that 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 2.0 Development and Technical Report* (WestEd, 2018), 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.

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[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/.

3.1.3   Evidence Based on Internal Structure

The KRA items were evaluated for their mean, standard deviation, difficulty (*p*-value), score-point distribution, and discrimination (item-total correlation). The *p*-value statistic is a measure of item difficulty (or item easiness) and falls between 0 and 1. For polytomous items, the *p*-value statistic is relative to the maximum item score and was calculated by dividing the mean by the maximum possible score for each item. The score-point distributions provide the percentages of students who received each score point on a specific item. 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.

Table 3.1.A provides a summary of the classical item statistics for the KRA in fall 2022. These statistics fall within acceptable ranges. The classical item statistics for all 50 KRA items administered in fall 2022 are provided in Appendix A.

Table 3.1.A
Summary of Classical Item Statistics for the KRA in Fall 2022

Domain	Number of Items	*p*-Value			Item-Total Correlation		
		M	*SD*	Range	*M*	*SD*	Range
All	50	0.73	0.14	0.33–0.94	0.52	0.13	0.27–0.71
Language and Literacy	17	0.66	0.13	0.34–0.89	0.49	0.16	0.27–0.69
Mathematics	13	0.68	0.16	0.33–0.83	0.45	0.11	0.29–0.64
Physical Well-Being and Motor Development	9	0.86	0.06	0.76–0.94	0.55	0.07	0.44–0.65
Social Foundations	11	0.77	0.07	0.66–0.87	0.61	0.08	0.50–0.71

The overall score and the domain scores for the KRA are also strongly correlated, as evidenced 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

Domain	Overall	LL	MA	PD	SF
Overall	1.00				
Language and Literacy (LL)	0.92	1.00			
Mathematics (MA)	0.84	0.79	1.00		
Physical Well-Being and Motor Development (PD)	0.77	0.59	0.49	1.00	
Social Foundations (SF)	0.81	0.62	0.51	0.80	1.00

Note. *N* = 53,737.

The descriptions of the item calibration process and reporting scale in Section 2.4, the *KRA Technical Report* (WestEd, 2014), the *KRA 2.0 Development and Technical Report* (WestEd, 2018), and the descriptive and reliability statistics that are described in Section 3.2 provide additional validity evidence based on internal structure.

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. Cronbach's alpha was used to evaluate reliability. 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. Greater values of Cronbach's alpha (i.e., closer to 1) indicate that the items are closely related to one another and, additionally, 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 scores in fall 2022. Appendix B summarizes the descriptive and reliability statistics for each student group. Table 3.2 is based on the students who completed or partially completed the KRA in fall 2022. See Section 4.1 for a detailed description of the students who participated in the KRA in fall 2022.

Table 3.2
Summary of Descriptive and Reliability Statistics for the KRA in Fall 2022

Domain	Mean	SD	Range	Cronbach's Alpha	SEM
Overall	265.74	14.79	202–298	0.95	3.31
Language and Literacy	264.81	16.02	202–298	0.87	5.81
Mathematics	264.41	16.89	202–298	0.82	7.19
Physical Well-Being and Motor Development	272.90	19.90	202–293	0.88	6.99
Social Foundations	270.64	21.59	202–298	0.92	6.04

Note. N = 53,737.

To support the 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. Before any early childhood educator can administer the KRA, the educator must also pass a content assessment. A more detailed description of the professional development and training content is provided in the *KRA 2.0 Development and Technical Report* (WestEd, 2018).

4   SUMMARY OF RESULTS FOR FALL 2022 ADMINISTRATION

4.1   FALL 2022 COHORT DEMOGRAPHICS

Table 4.1 provides a demographic summary of the students who completed the KRA in fall 2022.

Table 4.1

Demographic Summary of Students for the KRA in Fall 2022

		N	*%*
Gender	Female	16,546	30.79
	Male	17,338	32.26
	Not Reported	19,853	36.94
Race/Ethnicity	American Indian or Alaska Native	166	0.31
	Asian	482	0.90
	Black or African American	10,217	19.01
	Hispanic or Latino	2,804	5.22
	Native Hawaiian or Other Pacific Islander	58	0.11
	Two or More Races	2,006	3.73
	White	13,198	24.56
	Not Reported	24,806	46.16
English Learner	No	51,544	95.92
	Yes	2,193	4.08
Special Education	No	51,948	96.67
	Yes	1,789	3.33
Total		53,737	100.0

Note. Percentages may not total 100 due to rounding.

4.2   FALL 2022 COHORT RESULTS

Table 4.2.A provides the percentage of students at each performance level for all groups of students who completed the KRA in fall 2022. The descriptive and reliability statistics for the overall score and domain scores for all students are provided in Appendix B.

Table 4.2.A
Percentage of Students at Each Performance Level

		Demonstrating Readiness	Approaching Readiness	Emerging Readiness
Gender	Female	43.45	35.24	21.31
	Male	33.69	34.42	31.89
	Not Reported	37.85	33.70	28.44
Race/Ethnicity	American Indian or Alaska Native	30.72	30.12	39.16
	Asian	52.90	31.54	15.56
	Black or African American	30.35	37.03	32.62
	Hispanic or Latino	25.89	35.06	39.05
	Native Hawaiian or Other Pacific Islander	27.59	29.31	43.10
	Two or More Races	37.14	35.74	27.12
	White	47.78	32.25	19.97
	Not Reported	37.68	34.38	27.94
English Learner	No	39.11	34.45	26.45
	Yes	17.78	33.42	48.79
Special Education	No	38.89	34.58	26.53
	Yes	19.34	29.35	51.31
Total		38.24	34.40	27.36

Note. Percentages may not total 100 due to rounding.

Table 4.2.B provides the overall and domain scores by decile, based on the results from all students who completed the KRA in fall 2022. Appendix C includes frequency distributions of the overall and domain scores.

Table 4.2.B
Overall and Domain Scores by Decile

Domain	Decile								
	10	20	30	40	50	60	70	80	90
Overall	248	254	258	263	266	269	273	277	285
Language and Literacy	246	254	258	261	265	269	271	277	286
Mathematics	245	251	257	259	264	267	271	277	286
Physical Well-Being and Motor Development	246	255	263	269	278	278	293	293	293
Social Foundations	244	254	259	265	268	278	287	298	298

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 2022.

Table 4.2.C
Descriptive Statistics by Performance Level

Domain	Performance Level	*N*	Mean	*SD*
Overall	Demonstrating Readiness	20,547	280.04	8.32
	Approaching Readiness	18,488	263.80	3.41
	Emerging Readiness	14,702	248.18	9.46
Language and Literacy	Demonstrating Readiness	20,547	279.02	10.05
	Approaching Readiness	18,488	262.99	6.37
	Emerging Readiness	14,702	247.22	12.22
Mathematics	Demonstrating Readiness	20,547	278.03	11.96
	Approaching Readiness	18,488	262.85	9.18
	Emerging Readiness	14,702	247.34	13.51
Physical Well-Being and Motor Development	Demonstrating Readiness	20,547	287.34	9.62
	Approaching Readiness	18,488	273.82	14.46
	Emerging Readiness	14,702	251.57	17.55
Social Foundations	Demonstrating Readiness	20,547	287.71	12.38
	Approaching Readiness	18,488	270.00	14.38
	Emerging Readiness	14,702	247.56	16.98

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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
A322	LL	53,627	1	0.53	0.50	0.53	0.31	46.83	53.17		
A323	LL	53,624	1	0.64	0.48	0.64	0.31	35.53	64.47		
A326	LL	53,629	1	0.65	0.48	0.65	0.30	34.81	65.19		
A327	LL	53,626	1	0.60	0.49	0.60	0.33	39.84	60.16		
A331	LL	53,525	3	1.73	1.14	0.58	0.63	21.83	17.49	26.96	33.72
A333	LL	53,529	3	1.93	1.15	0.64	0.61	18.40	15.06	21.49	45.05
A334	LL	53,516	3	1.93	1.06	0.64	0.63	13.59	19.35	27.95	39.10
A336	LL	53,644	1	0.34	0.47	0.34	0.27	66.12	33.88		
A343	LL	53,544	3	2.67	0.75	0.89	0.50	4.16	4.35	11.59	79.91
A345	LL	53,645	3	2.35	0.86	0.78	0.52	4.39	12.16	27.81	55.64
B317	LL	53,611	1	0.81	0.40	0.81	0.38	19.42	80.58		
B320	LL	53,615	3	1.70	1.29	0.57	0.52	30.19	12.25	14.89	42.67
B385	LL	53,616	1	0.64	0.48	0.64	0.32	36.48	63.52		
R340	LL	53,406	2	1.51	0.67	0.76	0.66	9.94	28.80	61.26	
R341	LL	53,494	2	1.61	0.67	0.80	0.67	10.25	18.66	71.08	
R346	LL	53,404	2	1.32	0.72	0.66	0.69	14.91	38.51	46.58	
R401	LL	53,413	2	1.30	0.75	0.65	0.67	17.43	34.97	47.60	
A348	MA	53,606	3	2.19	1.05	0.73	0.64	9.12	20.56	12.89	57.43
A349	MA	53,607	1	0.80	0.40	0.80	0.42	20.12	79.88		
A351	MA	53,604	3	2.49	0.88	0.83	0.64	6.14	7.51	17.16	69.18
A354	MA	53,677	3	2.01	1.20	0.67	0.57	19.19	13.68	14.54	52.58
A355	MA	53,603	1	0.71	0.45	0.71	0.44	28.61	71.39		
A358	MA	53,674	1	0.33	0.47	0.33	0.35	66.64	33.36		
A359	MA	53,669	1	0.81	0.39	0.81	0.37	18.75	81.25		
A362	MA	53,680	1	0.43	0.50	0.43	0.29	57.00	43.00		

Item	Domain	*N*	Max	Mean	SD	Difficulty (*p*-value)	Item-Total Correlation	Percent at Score Point			
								0	1	2	3
A363	MA	53,678	1	0.72	0.45	0.72	0.42	28.32	71.68		
A366	MA	53,664	2	1.39	0.75	0.70	0.50	16.01	28.77	55.23	
A367	MA	53,665	1	0.50	0.50	0.50	0.41	50.22	49.78		
A370	MA	53,666	2	1.66	0.66	0.83	0.32	10.60	12.65	76.75	
A372	MA	53,582	2	1.62	0.60	0.81	0.53	6.21	25.61	68.18	
R373	PD	53,362	2	1.73	0.53	0.86	0.53	4.04	19.38	76.58	
R378	PD	53,448	2	1.52	0.66	0.76	0.61	9.61	28.76	61.63	
R380	PD	53,363	2	1.64	0.61	0.82	0.60	7.00	22.02	70.98	
R381	PD	53,355	2	1.73	0.53	0.87	0.57	4.03	18.66	77.31	
R382	PD	53,411	2	1.55	0.65	0.78	0.65	8.93	26.99	64.09	
R383	PD	53,355	2	1.81	0.45	0.90	0.54	2.57	13.93	83.50	
R384	PD	53,349	2	1.72	0.52	0.86	0.55	3.35	21.26	75.38	
R397	PD	53,449	2	1.87	0.38	0.93	0.45	1.50	10.45	88.05	
R398	PD	53,376	2	1.89	0.35	0.94	0.44	1.31	8.63	90.06	
R300	SF	53,388	2	1.63	0.60	0.81	0.59	6.41	24.26	69.33	
R302	SF	53,452	2	1.65	0.60	0.82	0.62	6.44	22.34	71.22	
R306	SF	53,366	2	1.64	0.59	0.82	0.50	5.80	24.04	70.16	
R307	SF	53,371	2	1.36	0.69	0.68	0.62	12.28	39.09	48.64	
R309	SF	53,378	2	1.35	0.71	0.68	0.71	13.80	37.01	49.19	
R310	SF	53,373	2	1.33	0.69	0.66	0.70	12.57	41.89	45.53	
R312	SF	53,383	2	1.56	0.61	0.78	0.66	6.53	30.64	62.83	
R313	SF	53,378	2	1.74	0.52	0.87	0.57	4.21	17.21	78.58	
R314	SF	53,376	2	1.72	0.53	0.86	0.52	4.04	20.01	75.95	
R315	SF	53,363	2	1.52	0.68	0.76	0.70	10.54	26.91	62.55	
R400	SF	53,379	2	1.47	0.67	0.73	0.52	9.87	33.26	56.86	

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

APPENDIX B   DESCRIPTIVE AND RELIABILITY STATISTICS BY STUDENT GROUP

Overall Score

		N	Mean	SD	Alpha	SEM
Gender	Female	16,546	267.93	14.26	0.94	3.35
	Male	17,338	263.98	15.14	0.95	3.28
	Not Reported	19,853	265.44	14.69	0.95	3.30
Race/Ethnicity	American Indian or Alaska Native	166	261.25	14.86	0.95	3.17
	Asian	482	270.96	15.30	0.95	3.39
	Black or African American	10,217	263.18	14.29	0.95	3.23
	Hispanic or Latino	2,804	261.55	14.07	0.95	3.20
	Native Hawaiian or Other Pacific Islander	58	257.95	18.17	0.97	3.10
	Two or More Races	2,006	265.70	14.37	0.95	3.30
	White	13,198	269.10	15.00	0.95	3.36
	Not Reported	24,806	265.42	14.58	0.95	3.29
English Learner	No	51,544	266.07	14.74	0.95	3.31
	Yes	2,193	257.90	13.80	0.95	3.15
Special Education	No	51,948	266.08	14.55	0.95	3.31
	Yes	1,789	255.70	17.81	0.96	3.35
Total		53,737	265.74	14.79	0.95	3.31

Language and Literacy Domain Score

		N	Mean	SD	Alpha	SEM
Gender	Female	16,546	266.25	15.41	0.86	5.76
	Male	17,338	263.53	16.40	0.87	5.88
	Not Reported	19,853	264.72	16.07	0.87	5.79
Race/Ethnicity	American Indian or Alaska Native	166	259.61	16.62	0.88	5.75
	Asian	482	269.61	16.41	0.87	5.88
	Black or African American	10,217	262.73	15.25	0.86	5.73
	Hispanic or Latino	2,804	258.75	16.76	0.88	5.76
	Native Hawaiian or Other Pacific Islander	58	255.59	20.00	0.92	5.78
	Two or More Races	2,006	264.80	15.22	0.86	5.75
	White	13,198	267.94	15.96	0.87	5.85
	Not Reported	24,806	264.64	15.94	0.87	5.79
English Learner	No	51,544	265.23	15.84	0.87	5.80
	Yes	2,193	254.83	16.87	0.88	5.91
Special Education	No	51,948	265.12	15.79	0.87	5.78
	Yes	1,789	255.60	19.56	0.89	6.46
Total		53,737	264.81	16.02	0.87	5.81

Mathematics Domain Score

		N	Mean	SD	Alpha	SEM
Gender	Female	16,546	265.17	16.18	0.81	7.13
	Male	17,338	263.57	17.29	0.82	7.25
	Not Reported	19,853	264.52	17.07	0.82	7.17
Race/Ethnicity	American Indian or Alaska Native	166	259.49	15.91	0.83	6.63
	Asian	482	270.44	17.01	0.81	7.32
	Black or African American	10,217	261.35	16.04	0.81	7.07
	Hispanic or Latino	2,804	258.99	17.24	0.83	7.16
	Native Hawaiian or Other Pacific Islander	58	256.34	23.37	0.90	7.35
	Two or More Races	2,006	264.63	15.98	0.80	7.13
	White	13,198	268.30	16.79	0.81	7.26
	Not Reported	24,806	264.14	16.81	0.82	7.17
English Learner	No	51,544	264.79	16.75	0.82	7.18
	Yes	2,193	255.50	17.56	0.83	7.25
Special Education	No	51,948	264.72	16.68	0.82	7.17
	Yes	1,789	255.40	20.01	0.86	7.61
Total		53,737	264.41	16.89	0.82	7.19

Physical Well-Being and Motor Development Domain Score

		N	Mean	SD	Alpha	SEM
Gender	Female	16,546	277.11	18.25	0.87	6.59
	Male	17,338	269.90	20.39	0.88	6.98
	Not Reported	19,853	272.01	20.21	0.87	7.29
Race/Ethnicity	American Indian or Alaska Native	166	269.80	22.67	0.90	7.12
	Asian	482	278.47	18.35	0.87	6.61
	Black or African American	10,217	270.40	20.18	0.88	6.91
	Hispanic or Latino	2,804	271.16	18.74	0.85	7.29
	Native Hawaiian or Other Pacific Islander	58	266.78	25.05	0.92	7.15
	Two or More Races	2,006	272.55	19.66	0.88	6.67
	White	13,198	275.91	19.28	0.88	6.57
	Not Reported	24,806	272.48	20.04	0.87	7.19
English Learner	No	51,544	273.14	19.88	0.88	6.97
	Yes	2,193	267.37	19.65	0.87	6.95
Special Education	No	51,948	273.35	19.62	0.87	7.05
	Yes	1,789	259.83	23.34	0.92	6.65
Total		53,737	272.90	19.90	0.88	6.99

Social Foundations Domain Score

		N	Mean	SD	Alpha	SEM
Gender	Female	16,546	275.45	20.30	0.91	5.97
	Male	17,338	267.09	22.05	0.93	5.98
	Not Reported	19,853	269.72	21.50	0.92	6.19
Race/Ethnicity	American Indian or Alaska Native	166	266.10	23.69	0.92	6.58
	Asian	482	275.62	21.20	0.92	6.09
	Black or African American	10,217	267.66	21.80	0.93	5.96
	Hispanic or Latino	2,804	268.29	20.79	0.91	6.11
	Native Hawaiian or Other Pacific Islander	58	263.72	25.14	0.94	6.23
	Two or More Races	2,006	270.87	21.58	0.92	5.93
	White	13,198	274.34	21.27	0.92	5.86
	Not Reported	24,806	270.09	21.45	0.92	6.15
English Learner	No	51,544	270.95	21.56	0.92	6.03
	Yes	2,193	263.27	20.83	0.91	6.07
Special Education	No	51,948	271.13	21.33	0.92	6.07
	Yes	1,789	256.34	24.06	0.94	5.91
Total		53,737	270.64	21.59	0.92	6.04

APPENDIX C   FREQUENCY DISTRIBUTIONS OF OVERALL AND DOMAIN SCORES

Overall Score Distribution

Scale Score	Performance Level	Frequency	Percent	Cumulative Frequency	Cumulative Percent
202	Emerging Readiness	133	0.25	133	0.25
203	Emerging Readiness	23	0.04	156	0.29
208	Emerging Readiness	18	0.03	174	0.32
211	Emerging Readiness	40	0.07	214	0.40
214	Emerging Readiness	31	0.06	245	0.46
217	Emerging Readiness	48	0.09	293	0.55
219	Emerging Readiness	35	0.07	328	0.61
220	Emerging Readiness	41	0.08	369	0.69
222	Emerging Readiness	40	0.07	409	0.76
224	Emerging Readiness	35	0.07	444	0.83
225	Emerging Readiness	51	0.09	495	0.92
226	Emerging Readiness	40	0.07	535	1.00
227	Emerging Readiness	53	0.10	588	1.09
228	Emerging Readiness	68	0.13	656	1.22
229	Emerging Readiness	47	0.09	703	1.31
230	Emerging Readiness	63	0.12	766	1.43
231	Emerging Readiness	64	0.12	830	1.54
232	Emerging Readiness	71	0.13	901	1.68
233	Emerging Readiness	78	0.15	979	1.82
234	Emerging Readiness	92	0.17	1,071	1.99
235	Emerging Readiness	187	0.35	1,258	2.34
236	Emerging Readiness	81	0.15	1,339	2.49
237	Emerging Readiness	219	0.41	1,558	2.90
238	Emerging Readiness	131	0.24	1,689	3.14
239	Emerging Readiness	273	0.51	1,962	3.65
240	Emerging Readiness	143	0.27	2,105	3.92
241	Emerging Readiness	311	0.58	2,416	4.50
242	Emerging Readiness	390	0.73	2,806	5.22
243	Emerging Readiness	195	0.36	3,001	5.58
244	Emerging Readiness	427	0.79	3,428	6.38
245	Emerging Readiness	511	0.95	3,939	7.33
246	Emerging Readiness	512	0.95	4,451	8.28
247	Emerging Readiness	647	1.20	5,098	9.49
248	Emerging Readiness	625	1.16	5,723	10.65

Scale Score	Performance Level	Frequency	Percent	Cumulative Frequency	Cumulative Percent
249	Emerging Readiness	764	1.42	6,487	12.07
250	Emerging Readiness	420	0.78	6,907	12.85
251	Emerging Readiness	866	1.61	7,773	14.46
252	Emerging Readiness	927	1.73	8,700	16.19
253	Emerging Readiness	980	1.82	9,680	18.01
254	Emerging Readiness	1,106	2.06	10,786	20.07
255	Emerging Readiness	1,211	2.25	11,997	22.33
256	Emerging Readiness	1,278	2.38	13,275	24.70
257	Emerging Readiness	1,427	2.66	14,702	27.36
258	Approaching Readiness	1,457	2.71	16,159	30.07
259	Approaching Readiness	819	1.52	16,978	31.59
260	Approaching Readiness	1,739	3.24	18,717	34.83
261	Approaching Readiness	1,805	3.36	20,522	38.19
262	Approaching Readiness	935	1.74	21,457	39.93
263	Approaching Readiness	1,974	3.67	23,431	43.60
264	Approaching Readiness	1,100	2.05	24,531	45.65
265	Approaching Readiness	2,302	4.28	26,833	49.93
266	Approaching Readiness	1,196	2.23	28,029	52.16
267	Approaching Readiness	1,265	2.35	29,294	54.51
268	Approaching Readiness	2,569	4.78	31,863	59.29
269	Approaching Readiness	1,327	2.47	33,190	61.76
270	Demonstrating Readiness	1,434	2.67	34,624	64.43
271	Demonstrating Readiness	1,463	2.72	36,087	67.15
272	Demonstrating Readiness	1,417	2.64	37,504	69.79
273	Demonstrating Readiness	1,461	2.72	38,965	72.51
274	Demonstrating Readiness	1,415	2.63	40,380	75.14
276	Demonstrating Readiness	1,481	2.76	41,861	77.90
277	Demonstrating Readiness	1,453	2.70	43,314	80.60
279	Demonstrating Readiness	1,537	2.86	44,851	83.46
280	Demonstrating Readiness	1,505	2.80	46,356	86.26
282	Demonstrating Readiness	1,442	2.68	47,798	88.95
285	Demonstrating Readiness	1,319	2.45	49,117	91.40
288	Demonstrating Readiness	1,246	2.32	50,363	93.72
291	Demonstrating Readiness	1,151	2.14	51,514	95.86
296	Demonstrating Readiness	994	1.85	52,508	97.71
298	Demonstrating Readiness	1,229	2.29	53,737	100.00

Language and Literacy Score Distribution

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
202	428	0.80	428	0.80
213	167	0.31	595	1.11
222	202	0.38	797	1.48
227	217	0.40	1,014	1.89
231	275	0.51	1,289	2.40
234	333	0.62	1,622	3.02
236	388	0.72	2,010	3.74
239	465	0.87	2,475	4.61
241	594	1.11	3,069	5.71
242	708	1.32	3,777	7.03
244	807	1.50	4,584	8.53
246	953	1.77	5,537	10.30
248	1,053	1.96	6,590	12.26
249	1,219	2.27	7,809	14.53
251	1,324	2.46	9,133	17.00
252	1,429	2.66	10,562	19.65
254	1,528	2.84	12,090	22.50
255	1,652	3.07	13,742	25.57
256	1,851	3.44	15,593	29.02
258	1,975	3.68	17,568	32.69
259	2,035	3.79	19,603	36.48
261	2,243	4.17	21,846	40.65
262	2,354	4.38	24,200	45.03
264	2,519	4.69	26,719	49.72
265	2,768	5.15	29,487	54.87
267	2,755	5.13	32,242	60.00
269	2,894	5.39	35,136	65.39
271	2,995	5.57	38,131	70.96
274	2,957	5.50	41,088	76.46
277	3,027	5.63	44,115	82.09
280	3,008	5.60	47,123	87.69
286	2,720	5.06	49,843	92.75
294	2,220	4.13	52,063	96.88
298	1,674	3.12	53,737	100.00

Mathematics Score Distribution

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
202	500	0.93	500	0.93
216	180	0.33	680	1.27
225	279	0.52	959	1.78
230	374	0.70	1,333	2.48
234	554	1.03	1,887	3.51
237	674	1.25	2,561	4.77
240	882	1.64	3,443	6.41
243	1,071	1.99	4,514	8.40
245	1,249	2.32	5,763	10.72
247	1,470	2.74	7,233	13.46
249	1,716	3.19	8,949	16.65
251	1,908	3.55	10,857	20.20
253	2,123	3.95	12,980	24.15
255	2,439	4.54	15,419	28.69
257	2,854	5.31	18,273	34.00
259	3,391	6.31	21,664	40.31
262	3,745	6.97	25,409	47.28
264	4,513	8.40	29,922	55.68
267	4,911	9.14	34,833	64.82
271	5,122	9.53	39,955	74.35
277	5,128	9.54	45,083	83.90
286	4,875	9.07	49,958	92.97
298	3,779	7.03	53,737	100.00

Physical Well-Being and Motor Development Score Distribution

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
202	525	0.98	525	0.98
206	73	0.14	598	1.11
216	147	0.27	745	1.39
222	187	0.35	932	1.73
226	250	0.47	1,182	2.20
230	297	0.55	1,479	2.75
234	475	0.88	1,954	3.64
237	520	0.97	2,474	4.60
240	685	1.27	3,159	5.88
243	1,238	2.30	4,397	8.18
246	1,160	2.16	5,557	10.34
248	1,488	2.77	7,045	13.11
251	1,861	3.46	8,906	16.57
255	2,403	4.47	11,309	21.05
258	3,285	6.11	14,594	27.16
263	4,231	7.87	18,825	35.03
269	6,256	11.64	25,081	46.67
278	8,504	15.83	33,585	62.50
293	20,152	37.50	53,737	100.00

Social Foundations Score Distribution

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
202	674	1.25	674	1.25
211	260	0.48	934	1.74
220	354	0.66	1,288	2.40
226	345	0.64	1,633	3.04
230	411	0.76	2,044	3.80
234	533	0.99	2,577	4.80
237	665	1.24	3,242	6.03
239	759	1.41	4,001	7.45
242	802	1.49	4,803	8.94
244	939	1.75	5,742	10.69
247	1,170	2.18	6,912	12.86
249	1,790	3.33	8,702	16.19
251	1,654	3.08	10,356	19.27
254	1,889	3.52	12,245	22.79
256	2,261	4.21	14,506	26.99
259	2,593	4.83	17,099	31.82
262	3,065	5.70	20,164	37.52
265	3,364	6.26	23,528	43.78
268	3,706	6.90	27,234	50.68
272	4,038	7.51	31,272	58.19
278	4,528	8.43	35,800	66.62
287	5,025	9.35	40,825	75.97
298	12,912	24.03	53,737	100.00