

# South Carolina Kindergarten Readiness Assessment

Annual Technical Report  
2020–2021

This report was prepared on behalf of the South Carolina Department of Education by:

WestEd  
Assessment Research and Innovation  
730 Harrison Street  
San Francisco, CA 94107

In conjunction with:

Johns Hopkins University  
Center for Technology in Education  
6740 Alexander Bell Drive, Suite 302  
Columbia, MD 21046

## CONTENTS

---

1	Overview .....	1
1.1	Purpose of the KRA .....	1
1.2	Purpose of This Report .....	1
1.3	Impact of COVID-19 on the Fall 2020 Administration.....	1
2	KRA Design .....	2
2.1	Common Language Standards .....	2
2.2	Item Types .....	2
2.3	Blueprint.....	3
2.4	Scale Scores .....	4
2.5	Reports .....	6
3	Validity and Reliability .....	7
3.1	Validity.....	7
3.1.1	Evidence Based on Test Content .....	7
3.1.2	Evidence Based on Response Processes .....	8
3.1.3	Evidence Based on Internal Structure .....	9
3.2	Reliability .....	10
4	Summary of Results for Fall 2020 Administration.....	11
4.1	Fall 2020 Cohort Demographics .....	11
4.2	Fall 2020 Cohort Results.....	12
	References .....	14
	Appendix A — Classical Item Statistics .....	15
	Appendix B — Descriptive and Reliability Statistics by Subgroup .....	17
	Appendix C — Frequency Distributions of Overall and Domain Scores .....	19

# 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.<sup>1</sup> 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 Technical Report* (WestEd, 2014), the *KRA Technical Report Addendum* (WestEd, 2015), and South Carolina KRA technical reports from prior years, all of which include additional validity evidence for the KRA.

## 1.3 IMPACT OF COVID-19 ON THE FALL 2020 ADMINISTRATION

Due to the extenuating circumstances of the COVID-19 pandemic, a modified version of the KRA was administered throughout South Carolina in fall 2020. The modified version of the KRA included fewer items, straying from the original KRA blueprint (see Section 2.3). These modifications were made so that teachers and students could follow appropriate social-distancing practices and protocols. The modified version of the KRA is statistically equated to the full version of the KRA; however, the differences between the modified version and the full version of the blueprints might portray an incongruent description of school readiness.

When reducing the number of items on an assessment, the trade-off is reliability. Fewer items generally result in less reliable scores and a corresponding increase in random measurement error. The increase in measurement error can subsequently compromise comparisons to cohorts of students who were assessed with the full version of the KRA, as small changes in scores might be the result of the decreased reliability (and increased measurement error) rather than differences in student performance. Sections 3 and 4 and the appendices include information related to the validity and reliability of the modified version of the KRA.

---

<sup>1</sup> 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 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.<sup>2</sup>

### 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.

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.

---

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

## 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.A  
*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%

As described in Section 1.3, the KRA was modified for the fall 2020 administration. The modified version of the KRA eliminated all 12 items (24 raw points) from the Social Foundations domain and reduced the Language and Literacy domain by 2 items (4 raw points) and the Physical Well-Being and Motor Development domain by 3 items (6 raw points). These modifications resulted in a different distribution of items and score points, as compared to the original KRA blueprint. Table 2.3.B summarizes the modified KRA Blueprint for 2020.

Table 2.3.B  
*KRA Blueprint (Modified for 2020)*

Domain	SR	PT	OR	Total Items	Total Points	Percentage of Total Points
Language and Literacy	6	9	0	15	30	48%
Mathematics	3	11	0	14	25	40%
Physical Well-Being and Motor Development	0	0	4	4	8	13%
Social Foundations	0	0	0	0	0	0%
Total	9	20	4	33	63	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 ( $\theta$ ), which represents the latent trait being measured. This  $\theta$  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,  $b_i$  is item difficulty and  $\theta$  is student ability. The expression  $P(U_i = 1 | \theta)$  represents the probability of a student of ability  $\theta$  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  $\theta$  will reach response  $k$ , given that the response is in either category  $k$  or category  $k-1$ , 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  $\theta$  scale is centered at 0 and extends in both positive and negative directions. Applying a linear transformation to the  $\theta$  scale is desirable because it allows for a scale that is more easily understood by stakeholders and that does not include negative values. The  $\theta$  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  $\theta$  scores of  $\pm 4$ , 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 of being prepared for kindergarten.	270–298
Approaching Readiness	The child demonstrates some skills and behaviors of being prepared for kindergarten.	258–269
Emerging Readiness	The child demonstrates minimal skills and behaviors of being prepared for kindergarten.	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.<sup>3</sup> 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.

<sup>3</sup> Due to the modified blueprint for fall 2020, domain scores are reported only for the Language and Literacy and Mathematics domains.



## 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
- Domain scores and associated conditional standard errors of measurement for the Language and Literacy and Mathematics domains

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 KRA items that have been completed for each student in a school or district.

### 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 2020.

#### 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 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 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*.<sup>4</sup> 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.

---

<sup>4</sup> 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 2020. These statistics fall within acceptable ranges. The classical item statistics for all 33 KRA items administered in fall 2020 are provided in Appendix A.

Table 3.1.A

*Summary of Classical Item Statistics for the KRA in Fall 2020*

Domain	Number of Items	$p$ -Value			Item-Total Correlation		
		$M$	$SD$	Range	$M$	$SD$	Range
All	33	0.69	0.15	0.38–0.90	0.48	0.11	0.30–0.63
Language and Literacy	15	0.70	0.15	0.49–0.90	0.48	0.12	0.32–0.62
Mathematics	14	0.65	0.16	0.38–0.88	0.47	0.12	0.30–0.63
Physical Well-Being and Motor Development	4	0.77	0.07	0.68–0.84	0.49	0.04	0.44–0.53

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*

	Overall	LL	MA
Overall	1		
Language and Literacy (LL)	0.94	1	
Mathematics (MA)	0.92	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. 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 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 2020. Appendix B summarizes the descriptive and reliability statistics for each subgroup.

Table 3.2

*Summary of Descriptive and Reliability Statistics for the KRA in Fall 2020*

Domain	Mean	SD	Range	Cronbach's Alpha	SEM
Overall	262.48	13.91	202–298	0.91	4.10
Language and Literacy	262.56	15.27	202–298	0.83	6.27
Mathematics	263.04	15.29	202–298	0.82	6.54

*Note.*  $N = 48,521$

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. 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 2020 ADMINISTRATION

Given the circumstances of COVID-19 and the potential impact of the modifications that were made to the KRA, results from the fall 2020 administration of the KRA should be interpreted with caution, especially comparisons to previous cohorts who were assessed with the full version. Furthermore, any differences in results between the 2020 cohort and previous cohorts might *not* be due solely to the impact of the COVID-19 pandemic.

### 4.1 FALL 2020 COHORT DEMOGRAPHICS

Table 4.1 provides a demographic summary of the students who completed the KRA in fall 2020.

Table 4.1

*Demographic Summary of Students for the KRA in Fall 2020*

Group		N	Percent
Gender	Female	19,691	40.6
	Male	20,690	42.6
	Not Reported	8,140	16.8
Race/Ethnicity	American Indian or Alaska Native	111	0.2
	Asian	656	1.4
	Black or African American	12,594	26.0
	Hispanic or Latino	3,494	7.2
	Native Hawaiian or Other Pacific Islander	53	0.1
	Two or More Races	2,332	4.8
	White	18,076	37.3
	Not Reported	11,205	23.1
English Learner	No	45,539	93.9
	Yes	2,982	6.1
Special Education	No	46,127	95.1
	Yes	2,394	4.9
Total		48,521	100.0

*Note.* Percentages may not total 100 due to rounding.

## 4.2 FALL 2020 COHORT RESULTS

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 2020. 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	247	253	256	260	262	266	269	272	278
Language and Literacy	246	251	257	261	263	267	270	273	283
Mathematics	246	252	257	259	263	266	268	276	281

Table 4.2.B provides the descriptive statistics for the overall score and percentage of students at each performance level for all students and subgroups of students who completed the KRA in fall 2020. 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*

Subgroup	N	M	SD	Demonstrating Readiness	Approaching Readiness	Emerging Readiness
All Students	48,521	262.48	13.91	26.8%	40.4%	32.9%
Female	19,691	263.84	13.32	29.5%	41.8%	28.6%
Male	20,690	261.46	14.37	24.9%	38.9%	36.2%
Gender Not Reported	8,140	261.77	13.87	25.1%	40.3%	34.6%
American Indian or Alaska Native	111	259.41	15.70	27.0%	29.7%	43.2%
Asian	656	266.43	15.24	42.5%	35.4%	22.1%
Black or African American	12,594	259.70	13.18	17.9%	41.6%	40.6%
Hispanic or Latino	3,494	257.07	13.89	14.4%	35.7%	49.9%
Native Hawaiian or Other Pacific Islander	53	258.49	11.59	15.1%	37.7%	47.2%
Two or More Races	2,332	263.02	13.32	27.2%	41.3%	31.4%
White	18,076	265.45	13.73	35.2%	40.2%	24.5%
Race/Ethnicity Not Reported	11,205	262.21	13.86	26.1%	40.8%	33.0%
English Learner	2,982	256.03	13.84	13.1%	32.8%	54.1%
Special Education	2,394	252.76	17.19	11.5%	31.0%	57.5%

*Note.* Percentages may not total 100 due to rounding.

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 2020.

Table 4.2.C

*Descriptive Statistics by Performance Level*

<b>Domain</b>	<b>Performance Level</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>
Overall	Demonstrating Readiness	13,004	278.47	7.31
	Approaching Readiness	19,576	263.72	3.44
	Emerging Readiness	15,941	247.91	10.42
Language and Literacy	Demonstrating Readiness	13,004	278.61	9.24
	Approaching Readiness	19,576	264.28	5.87
	Emerging Readiness	15,941	247.35	12.37
Mathematics	Demonstrating Readiness	13,004	279.62	9.94
	Approaching Readiness	19,576	264.00	6.41
	Emerging Readiness	15,941	248.34	11.79



## 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*.

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 ( <i>p</i> -value)	Item-Total Correlation	Percent at Score Point			
								0	1	2	3
A127	LL	48,401	1	0.55	0.50	0.55	0.46	45.2	54.8		
A130	LL	48,323	2	1.07	0.82	0.53	0.59	30.4	32.2	37.4	
A132	LL	48,328	3	1.93	1.11	0.64	0.62	15.9	17.8	24.1	42.3
A134	LL	48,351	2	1.62	0.65	0.81	0.62	9.5	18.5	71.9	
A136	LL	48,331	2	1.74	0.57	0.87	0.57	6.6	12.4	81.0	
A155	LL	48,352	3	2.54	0.76	0.85	0.59	3.4	6.2	23.8	66.7
A160	LL	48,404	3	2.47	0.85	0.82	0.59	4.3	10.5	18.8	66.4
A163	LL	48,396	1	0.56	0.50	0.56	0.32	44.3	55.7		
A164	LL	48,329	3	1.48	1.09	0.49	0.38	26.7	19.4	33.4	20.4
A180	LL	48,400	1	0.59	0.49	0.59	0.33	41.2	58.8		
A195	LL	48,351	3	2.40	0.79	0.80	0.55	3.9	7.4	33.3	55.3
H101	LL	48,394	1	0.90	0.31	0.90	0.35	10.5	89.5		
H103	LL	48,392	1	0.61	0.49	0.61	0.34	38.9	61.1		
H104	LL	48,391	1	0.90	0.30	0.90	0.40	9.7	90.3		
H106	LL	48,339	3	1.64	1.08	0.55	0.54	19.8	23.3	29.7	27.2
A101	MA	48,402	3	2.15	1.06	0.72	0.63	9.6	20.8	14.5	55.2
A104	MA	48,374	3	1.89	0.94	0.63	0.62	10.1	20.5	39.9	29.5
A115	MA	48,393	1	0.79	0.41	0.79	0.46	21.4	78.6		
A117	MA	48,148	3	1.89	1.18	0.63	0.63	19.8	15.5	20.1	44.5
A121	MA	48,397	2	1.77	0.55	0.88	0.51	6.3	10.8	82.9	
A123	MA	48,409	2	1.65	0.72	0.83	0.35	14.4	5.9	79.7	
A138	MA	48,408	1	0.40	0.49	0.40	0.40	60.3	39.7		
A143	MA	48,407	1	0.79	0.40	0.79	0.40	20.6	79.4		
A147	MA	48,407	1	0.44	0.50	0.44	0.46	55.7	44.3		
A149	MA	48,406	1	0.49	0.50	0.49	0.31	50.8	49.2		

Item	Domain	N	Max	Mean	SD	Difficulty ( <i>p</i> -value)	Item-Total Correlation	Percent at Score Point			
								0	1	2	3
A152	MA	48,412	2	1.43	0.71	0.72	0.51	13.3	30.4	56.4	
A174	MA	48,407	1	0.38	0.49	0.38	0.36	61.7	38.3		
A177	MA	48,406	2	1.44	0.64	0.72	0.30	7.9	40.0	52.1	
A191	MA	48,373	2	1.35	0.71	0.68	0.58	13.4	37.9	48.7	
OR05	PD	47,460	2	1.67	0.61	0.84	0.44	7.9	17.2	75.0	
OR06	PD	47,474	2	1.52	0.67	0.76	0.50	10.2	27.6	62.2	
OR08	PD	47,461	2	1.65	0.61	0.82	0.49	7.1	21.0	71.9	
OR09	PD	47,322	2	1.36	0.77	0.68	0.53	18.0	28.1	53.9	

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

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 SUBGROUP

Domain	Subgroup	N	Mean	SD	Alpha	SEM
Overall	All Students	48,521	262.48	13.91	0.91	4.10
	Female	19,691	263.84	13.32	0.91	4.09
	Male	20,690	261.46	14.37	0.92	4.14
	Gender Not Reported	8,140	261.77	13.87	0.92	4.04
	American Indian or Alaska Native	111	259.41	15.70	0.94	3.93
	Asian	656	266.43	15.24	0.93	4.11
	Black or African American	12,594	259.70	13.18	0.91	4.04
	Hispanic or Latino	3,494	257.07	13.89	0.92	4.04
	Native Hawaiian or Other Pacific Islander	53	258.49	11.59	0.91	3.45
	Two or More Races	2,332	263.02	13.32	0.91	4.06
	White	18,076	265.45	13.73	0.91	4.14
	Race/Ethnicity Not Reported	11,205	262.21	13.86	0.92	4.04
	English Learner	2,982	256.03	13.84	0.92	4.01
	Special Education	2,394	252.76	17.19	0.94	4.38
Domain	Subgroup	N	Mean	SD	Alpha	SEM
Language and Literacy	All Students	48,521	262.56	15.27	0.83	6.27
	Female	19,691	263.97	14.69	0.82	6.25
	Male	20,690	261.61	15.71	0.84	6.33
	Gender Not Reported	8,140	261.54	15.29	0.84	6.19
	American Indian or Alaska Native	111	258.39	18.40	0.88	6.32
	Asian	656	265.22	16.66	0.86	6.34
	Black or African American	12,594	260.40	14.78	0.82	6.24
	Hispanic or Latino	3,494	256.11	16.14	0.85	6.35
	Native Hawaiian or Other Pacific Islander	53	258.96	13.31	0.84	5.40
	Two or More Races	2,332	263.29	14.34	0.81	6.22
	White	18,076	265.46	14.77	0.82	6.29
	Race/Ethnicity Not Reported	11,205	262.06	15.35	0.84	6.20
	English Learner	2,982	254.44	16.13	0.85	6.33
	Special Education	2,394	252.54	18.91	0.87	6.69

<b>Domain</b>	<b>Subgroup</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>Alpha</b>	<b>SEM</b>
Mathematics	All Students	48,521	263.04	15.29	0.82	6.54
	Female	19,691	263.98	14.68	0.81	6.48
	Male	20,690	262.36	15.73	0.82	6.60
	Gender Not Reported	8,140	262.51	15.47	0.82	6.53
	American Indian or Alaska Native	111	259.96	15.97	0.85	6.24
	Asian	656	268.77	16.58	0.84	6.58
	Black or African American	12,594	259.67	14.13	0.80	6.38
	Hispanic or Latino	3,494	257.61	15.12	0.82	6.50
	Native Hawaiian or Other Pacific Islander	53	257.49	13.33	0.80	5.94
	Two or More Races	2,332	263.60	14.89	0.81	6.45
	White	18,076	266.38	15.28	0.81	6.62
	Race/Ethnicity Not Reported	11,205	262.74	15.24	0.82	6.50
	English Learner	2,982	256.80	15.40	0.82	6.51
	Special Education	2,394	253.96	18.31	0.85	7.07

## APPENDIX C — FREQUENCY DISTRIBUTIONS OF OVERALL AND DOMAIN SCORES

### Overall Score Distribution

Scale Score	SEM	Performance Level	Frequency	Percent	Cumulative Frequency	Cumulative Percent
202	9	Emerging	330	0.7	330	0.7
209	9	Emerging	53	0.1	383	0.8
214	7	Emerging	44	0.1	427	0.9
217	6	Emerging	45	0.1	472	1.0
220	6	Emerging	53	0.1	525	1.1
223	5	Emerging	62	0.1	587	1.2
225	5	Emerging	79	0.2	666	1.4
226	5	Emerging	76	0.2	742	1.5
228	4	Emerging	84	0.2	826	1.7
229	4	Emerging	97	0.2	923	1.9
231	4	Emerging	84	0.2	1,007	2.1
232	4	Emerging	105	0.2	1,112	2.3
233	4	Emerging	138	0.3	1,250	2.6
235	4	Emerging	144	0.3	1,394	2.9
236	4	Emerging	163	0.3	1,557	3.2
237	4	Emerging	172	0.4	1,729	3.6
238	3	Emerging	172	0.4	1,901	3.9
239	3	Emerging	207	0.4	2,108	4.3
240	3	Emerging	232	0.5	2,340	4.8
241	3	Emerging	271	0.6	2,611	5.4
242	3	Emerging	547	1.1	3,158	6.5
243	3	Emerging	303	0.6	3,461	7.1
244	3	Emerging	347	0.7	3,808	7.9
245	3	Emerging	390	0.8	4,198	8.7
246	3	Emerging	437	0.9	4,635	9.6
247	3	Emerging	469	1.0	5,104	10.5
248	3	Emerging	1,105	2.3	6,209	12.8
249	3	Emerging	611	1.3	6,820	14.1
250	3	Emerging	627	1.3	7,447	15.4
251	3	Emerging	719	1.5	8,166	16.8
252	3	Emerging	1,523	3.1	9,689	20.0
253	3	Emerging	868	1.8	10,557	21.8
254	3	Emerging	962	2.0	11,519	23.7
255	3	Emerging	1,033	2.1	12,552	25.9

Scale Score	SEM	Performance Level	Frequency	Percent	Cumulative Frequency	Cumulative Percent
256	3	Emerging	2,197	4.5	14,749	30.4
257	3	Emerging	1,192	2.5	15,941	32.9
258	3	Approaching	1,311	2.7	17,252	35.6
259	3	Approaching	1,322	2.7	18,574	38.3
260	3	Approaching	1,440	3.0	20,014	41.3
261	3	Approaching	1,524	3.1	21,538	44.4
262	3	Approaching	3,300	6.8	24,838	51.2
263	3	Approaching	1,594	3.3	26,432	54.5
265	4	Approaching	1,754	3.6	28,186	58.1
266	4	Approaching	1,830	3.8	30,016	61.9
267	4	Approaching	1,811	3.7	31,827	65.6
268	4	Approaching	1,854	3.8	33,681	69.4
269	4	Approaching	1,836	3.8	35,517	73.2
271	4	Demonstrating	1,827	3.8	37,344	77.0
272	4	Demonstrating	1,766	3.6	39,110	80.6
274	5	Demonstrating	1,664	3.4	40,774	84.0
276	5	Demonstrating	1,581	3.3	42,355	87.3
278	5	Demonstrating	1,439	3.0	43,794	90.3
280	6	Demonstrating	1,350	2.8	45,144	93.0
283	6	Demonstrating	1,158	2.4	46,302	95.4
287	7	Demonstrating	879	1.8	47,181	97.2
292	9	Demonstrating	639	1.3	47,820	98.6
298	9	Demonstrating	701	1.4	48,521	100.0

**Language and Literacy Score Distribution**

<b>Scale Score</b>	<b>SEM</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Frequency</b>	<b>Cumulative Percent</b>
202	12	494	1.0	494	1.0
208	12	87	0.2	581	1.2
217	9	113	0.2	694	1.4
222	7	146	0.3	840	1.7
226	6	187	0.4	1,027	2.1
229	6	229	0.5	1,256	2.6
232	6	256	0.5	1,512	3.1
234	5	312	0.6	1,824	3.8
236	5	368	0.8	2,192	4.5
238	5	446	0.9	2,638	5.4
240	5	556	1.2	3,194	6.6
242	5	687	1.4	3,881	8.0
244	5	791	1.6	4,672	9.6
246	5	968	2.0	5,640	11.6
248	5	1,182	2.4	6,822	14.1
250	5	1,387	2.9	8,209	16.9
251	5	1,594	3.3	9,803	20.2
253	5	1,962	4.0	11,765	24.3
255	5	2,209	4.6	13,974	28.8
257	5	2,495	5.1	16,469	33.9
259	5	2,732	5.6	19,201	39.6
261	5	3,060	6.3	22,261	45.9
263	5	3,339	6.9	25,600	52.8
265	5	3,474	7.2	29,074	59.9
267	6	3,747	7.7	32,821	67.6
270	6	3,793	7.8	36,614	75.5
273	6	3,639	7.5	40,253	83.0
277	7	3,127	6.4	43,380	89.4
283	9	2,559	5.3	45,939	94.7
292	12	1,645	3.4	47,584	98.1
298	12	937	1.9	48,521	100.0



**Mathematics Score Distribution**

<b>Scale Score</b>	<b>SEM</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Frequency</b>	<b>Cumulative Percent</b>
202	12	457	0.9	457	0.9
214	12	118	0.2	575	1.2
223	9	163	0.3	738	1.5
228	7	260	0.5	998	2.1
232	7	352	0.7	1,350	2.8
236	6	476	1.0	1,826	3.8
239	6	563	1.2	2,389	4.9
241	5	781	1.6	3,170	6.5
244	5	928	1.9	4,098	8.5
246	5	1,106	2.3	5,204	10.7
248	5	1,353	2.8	6,557	13.5
250	5	1,523	3.1	8,080	16.7
252	5	1,831	3.8	9,911	20.4
254	5	2,043	4.2	11,954	24.6
255	5	2,421	5.0	14,375	29.6
257	5	2,612	5.4	16,987	35.0
259	5	3,033	6.3	20,020	41.3
261	5	3,416	7.0	23,436	48.3
263	5	3,701	7.6	27,137	55.9
266	6	3,846	7.9	30,983	63.9
268	6	3,821	7.9	34,804	71.7
272	7	3,634	7.5	38,438	79.2
276	7	3,312	6.8	41,750	86.1
281	9	2,940	6.1	44,690	92.1
290	12	2,324	4.8	47,014	96.9
298	12	1,507	3.1	48,521	100.0