

South Carolina Kindergarten Readiness Assessment (KRA)

Annual Technical Report
2024–25



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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 *Kindergarten Readiness Assessment 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.

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 KRA DESIGN

2.1 Early Learning Standards

The KRA is a criterion-referenced assessment based on prekindergarten standards and incorporates the essential domains of school readiness, as defined by the U.S. Department of Education. The KRA includes four domains: Language and Literacy; Mathematics; Physical Well-Being and Motor Development; and Social Foundations.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 early learning standards and that results in one recorded score. The KRA includes three item types: selected response, performance task, and observational rubric.

Selected-response (SR) items consist of a question or prompt and three possible answer options, of which there is only one correct answer. Students indicate a 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 (PT) 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 students to demonstrate their knowledge and, in some instances, to provide an explanation or reason. Some performance-task items can be administered via the KRA App.

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

² 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 1, outlines the distribution of selected-response items; performance-task items; observational-rubric items; total items; total points; and percentage of total points across the domains.

Table 1. 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%

3 PROFESSIONAL DEVELOPMENT TO SUPPORT KRA ADMINISTRATION

Led by the Johns Hopkins University School of Education Center for Technology in Education (JHU CTE), professional development (PD) to support KRA administration is one aspect of overall implementation that requires intentional design, customized development, and delivery of information around the assessment and technology systems. In addition, effective implementation includes careful attention to the needs of the state, along with technical requirements that result in personalized approaches to PD and in support for all stakeholders interacting directly with the KRA.

As part of its development of training content and implementation approach, JHU CTE

- learns about the state’s unique needs, policies, and processes in order to scale PD implementation effectively;
- participates in the gathering of PD requirements from stakeholders;
- selects the most appropriate modes of delivery to fit the needs of the state and the stakeholders involved;
- offers PD through a variety of formats to engage relevant audiences;
- uses online communities to support interaction among audience members and to promote resource sharing;
- provides flexibility for changing PD need requirements while remaining committed to meeting timelines;
- collaborates with assessment and technology teams to ensure that the PD effectively supports the system;
- enhances PD content after initial trainings in order to communicate updates to the assessment and policy information;
- provides ongoing consultation to the state, as well as support to local leaders and trainers, through online FAQs, communications, and meetings to address ongoing implementation questions and challenges as they arise; and

- implements a multilevel evaluation strategy—including simulation technology, surveys, and fidelity checklists—to promote training and assessment implementation fidelity.

For each administration of the KRA, the PD has been refined, enhanced, and expanded in collaboration with state leadership, along with ongoing evaluation and feedback from teachers, trainers, and local leaders. The PD acknowledges that users will have varying levels of knowledge and experience with the KRA and provides differentiated supports to accommodate that variation.

3.1 Professional Development Model

The PD to support KRA administration utilizes a Training-of-Trainers (ToT) model with a community of practice to prepare, certify, and support trainers to equip and coach teachers to administer the KRA with fidelity. Additionally, this model is used to effectively support the implementation and use of data by teachers who are experienced with the KRA. The ToT model provides trainers with access to PD content and online professional learning communities within the KReady online system.

The ToT model

- builds capacity for trainers to deliver training in a variety of formats: face-to-face, online, and blended (a mixture of online and face-to-face activities);
- engages trainers in an online community for ongoing support from JHU CTE and fellow trainers;
- models facilitation of online learning experiences;
- models research-based coaching techniques;
- incorporates time for reflection, planning, and practice;
- provides customizable training materials to meet local needs; and
- provides clear expectations and accountability measures to ensure that the assessment is administered with fidelity to a diverse population of students.

Trainers are typically recruited by the state department of education. Because trainers are at different stages in their knowledge and experience with the KRA, their training is differentiated.

New trainers complete the full KRA ToT training, which is offered in an on-site, two-day format or in a blended format of online and onsite training activities. During the ToT session, trainers become part of an online trainer community in which they access and share resources, communicate with other trainers and JHU CTE team members, and receive guidance and

coaching from JHU CTE as they implement teacher training and support teachers through the administration of the KRA.

Trainers who are experienced with the KRA can access to the posted PD materials; participate in face-to-face and/or online training sessions to update their knowledge; and engage with a community of learners through the KReady online system.

All trainers gain access to all teacher training materials for face-to-face, blended, and fully online formats as well as a fidelity checklist to ensure that core components are included in the teacher training.

Trainers are expected to provide ongoing coaching to teachers to ensure that appropriate support is available during the three stages of the assessment process: KRA pre-administration (learning and planning); KRA administration (administering the KRA with reliability and ease); and KRA post-administration (using data and reports to inform instruction).

3.1.1 Technology-Supported Teacher Training

The two-part training for teachers is available in three formats: face-to-face, fully online, and blended. Each format is equivalent to approximately 12 hours of training. Regardless of the training format used, all teachers are given access to the fully online content to use as a resource throughout the KRA administration.

The teacher training

- provides flexible training formats to meet the varied needs of districts, schools, and teachers;
- gives teachers access to all of the training content all of the time;
- provides ongoing coaching and support with just-in-time resources;
- integrates PD content and professional communities within the online system;
- engages teachers in core training components with some customization by KRA trainers;
- establishes online community spaces for knowledge creation, knowledge sharing, and collaboration among teachers at the local level; and
- provides just-in-time technology training resources to help teachers use the online system.

Trainers who use the online and blended training formats can create Community Exchange sites within the KReady online system for their teachers to engage in ongoing discussions based on specific prompts presented in the training modules. Trainers who use fully face-to-face trainings are encouraged to use Community Exchange sites to extend the face-to-face discussions and to provide ongoing support and communication to teachers beyond the training and throughout the assessment administration window. Trainers have used these community spaces to post KRA-related tips or local updates and to respond to teachers' questions or needs.

3.1.2 Validation by Simulation and Content Assessment

Upon completion of the KRA training, all teachers who will administer the KRA are required to fulfill reliability qualifications through the successful completion of a simulation exercise and a content assessment. The multimedia-rich simulation exercise, accessed through the KReady online system, provides hands-on experience and practice for administering assessment items. Participants can navigate through a kindergarten classroom; can observe students engaging in classroom and outdoor activities or completing performance tasks; and can practice scoring students on these items.

The content assessment contains 20 multiple-choice questions that address key concepts from the training. Total scores are calculated for both the simulation and the content assessment; minimum satisfactory scores are required for successful completion. Follow-up coaching and the ability to retake the simulation and content assessment are provided to teachers, as needed, to ensure that they are ready to administer the KRA. The simulation technology produces a certificate of completion and produces detailed reports that are accessible by state staff and by specified trainers.

3.1.3 Evaluation Strategy

JHU CTE periodically reviews the simulation and content assessment results to determine the distribution of scores across each state. This process allows JHU CTE to provide direct follow-up and coaching to trainers in order to ensure that teachers have the appropriate knowledge and skills to administer the KRA. Trainers receive tips and resources to coach teachers based on the simulation items and the content assessment. Trainers also receive fidelity checklists that contain the core training components for the various training formats. Further, JHU CTE administers the following surveys to evaluate the training in each state and to ensure training fidelity:

- **ToT Training Survey:** This survey is administered to trainers upon completion of the ToT. The results inform enhancements to the subsequent ToT sessions and development of additional training resources.
- **Teacher Training Survey:** This survey is administered to teachers at the end of their KRA training. Among other items included in the survey are the core-training

components from the fidelity checklists. Teachers are asked to indicate whether these components were a part of their training and to rate their understanding of the components.

- **Trainer Survey:** Trainers are asked to complete this survey after delivering each training. Like the teacher survey, it includes the core-training components from the fidelity checklists. Responses to the teacher and trainer surveys are compared, ensuring that these components were present in the training.

3.2 Training Content

The PD activities for teachers are organized around the three stages of assessment:

- **KRA Pre-Administration:** This stage of PD focuses on ensuring that users understand the purpose of the KRA and are thoroughly knowledgeable about issues related to data security and integrity.
- **KRA Administration:** The activities in this stage involve
 - developing an understanding of the processes and procedures for the different KRA item types;
 - affording multiple and varied opportunities for hands-on practice with assessment items, including opportunities to learn about and practice observation items to enhance teachers' observation skills and ensure interrater reliability;
 - promoting understanding of Universally Designed Allowances for all students as well as allowable supports for diverse populations, including English learners and students with disabilities;
 - developing the skills required to reliably interpret and score students' responses to multiple item types;
 - introducing participants to the data collection and reporting system; and
 - offering opportunities for hands-on use of the system and online supports.
- **KRA Post-Administration:** A post-assessment component of the PD focuses on the analysis and use of the KRA results. The PD provides rich, varied, and in-depth resources and materials to support the KRA domains as well as each of the essential skills and knowledge.

The PD for teachers who are new to the KRA includes two modules, which are available in face-to-face, blended, and online formats within the comprehensive PD web portal. Table 2 summarizes the topics covered in each module.

Table 2. Teacher Training Module Topics

Module	Topics
Module 1	• General Overview • Introducing the KRA • Preparing for the KRA • Universally Designed Allowances for Diverse Learners • Supporting Children with Disabilities and English learners • Practicing the KRA
Module 2	• The KRA Technologies: The Ready for Kindergarten Online System and the KRA App • Exploring the KRA Domains • Using KRA Reports to Inform Instruction • Supporting the KRA Domains in Kindergarten Classrooms

3.2.1 Supporting Diverse Learners

All students—including students with disabilities and students who are English Learners—are required to participate in the KRA, and their results are a part of the summary reports. A fully accessible approach to assessment design and implementation is necessary to ensure that students with diverse learning characteristics have the opportunity to demonstrate their knowledge and skills. At the same time, the state needs to be confident in the reliability of results obtained from the KRA when conducting analyses and making policy decisions. In addition, school administrators, teachers, and parents need to be knowledgeable of where their students are functioning developmentally in order to identify focus areas for instruction that promote growth in individual students. 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](#).

Recognizing the need for practitioners to fully understand the importance of differentiation of administration in order to meet the needs of diverse learners, a specific portion of the PD training is devoted to instruction on these guidelines. These guidelines provide detailed information on the strategies and practices that support differentiated administration of the assessment. The KRA training ensures that trainers and teachers will 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 KRA items. These guidelines also provide an item-by-item decision-making process for providing supports to students with disabilities and to English Learners. This process is called Level the Field

supports. These supports provide equal access and opportunity 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. Through in-depth review, practice, demonstration, and reflection, the PD ensures that participants understand how to appropriately administer the KRA to diverse populations of students.

3.2.2 Content for Teachers Experienced with the KRA

In preparation for each administration of the KRA, JHU CTE has developed content for teachers who are experienced with the KRA to address any areas of need from evaluation results, along with providing an overview of any new technology enhancements. Content is presented in a web-based module format that is designed to be a quick refresher for the teachers. JHU CTE provides an option for the state to administer a content assessment with a certificate of completion and to track participation.

3.3 Professional Development for Key Stakeholders

In addition to teacher PD, training is provided to district data managers; district- and school-level administrators; and other local leaders, unique to the needs of the state. These training sessions are interactive, hands-on, and designed to provide participants with opportunities for practice and reflection.

The comprehensive PD approach for key stakeholders includes

- face-to-face and webinar sessions for district and other local leaders, as well as regional trainers, to prepare for the rollout of the KRA each year and to review the technology enhancements and PD updates;
- webinar trainings for district data managers, coupled with video resources, to provide a detailed walk-through of the KReady system and data manager functionality;
- face-to-face and webinar touchpoint sessions with trainers to ensure that they remain abreast of technology and PD updates and areas of support needed in the field; and
- webinar trainings for school and district administrators to understand the KRA, to support teachers, and to interpret and use KRA data.

JHU CTE utilizes a personalized approach to provide PD to teachers and additional stakeholders, including school and district administrators. The ongoing feedback loop through research and evaluation reflects JHU CTE’s commitment to the continual improvement and enhancement of the PD around the assessment and technology system in order to meet the varied and changing needs of the various stakeholders involved with the KRA.

4 READY FOR KINDERGARTEN ONLINE SYSTEM

The Ready for Kindergarten (KReady) online system was developed based on requirements gathered from key personnel in the state departments of education, JHU CTE, and WestEd.

The KReady online system supports

- administration and scoring of the KRA;
- transfer of data to and from state longitudinal data systems;
- generation of reports summarizing student-level results;
- generation of individual student reports (ISRs) for parents and families;
- generation of reports to monitor completion of the KRA for key personnel at the local, district, and state levels;
- management of teacher and student enrollment information;
- management of the assessment content and supporting materials;
- implementation of professional development; and
- administration of a subset of KRA items using child-friendly, touchscreen mobile devices.

4.1 Data Entry

Multiple access points for entering or collecting data are available to teachers during the KRA administration. Data can be entered through a standard web browser via a Windows or Mac desktop or tablet device. Multiple methods for data entry have been designed to suit the preferences of different teacher workflows or comfort with technology:

- **By Student:** Teachers can select a student's name from the overview page to enter item scores for each item for that student. This option is helpful when teachers are administering multiple items to an individual student.
- **By Item:** Teachers can enter item scores for each item for their entire class roster or for a group of students. This option is helpful when teachers are administering the same item to multiple students.

- **By Spreadsheet:** Teachers can enter all item scores using a quick-entry on-screen spreadsheet. This method displays all assessment items and all student names on one screen. This option is helpful when teachers use a printed scoresheet to record item scores and need to transfer the scores into the system.
- **By Scanned Scoresheet:** Teachers can use their tablets to scan or take a photo of a printed, paper scoresheet, and the item scores will transfer into the KReady online system. This method is similar to the method for depositing a check using a mobile app.

In addition, teachers have the option of using the KRA App to administer a subset of the KRA items directly to the student with a tablet, eliminating the need for data entry altogether for those items. Through the app, each item is read aloud to the student, and the student independently works through the item. The score for each item is automatically incorporated into the KReady online system, thereby saving teacher administration time.

For security reasons, no student data are saved locally on any device running the KRA App. Further, the KRA App utilizes a PIN feature to prevent students from accessing any teacher functions. The KRA App can be used on a variety of devices and tablets and is compatible with Android, iOS, and web browsers. The web version can run on all desktop and laptop computers (Windows and Mac), including Chromebooks.

Several features of the KRA App focus on the efficiency of data entry. Each score entered into the system is automatically saved. When appropriate, multiple teachers can be assigned to one student, removing the burden on a single teacher. Student transfers are easily handled in the KReady online system, as the data follow the individual student from teacher to teacher, or from district to district, within the data collection window.

4.2 Reports

Each student receives an individual student report (ISR) that is generated by the teacher upon completion of the assessment with the student. The ISR provides the student's overall score and associated conditional standard error of measurement; performance level, based on the overall score; and completion status.

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 for all students in a class.
- **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:** This ZIP file contains all student ISRs.

JHU CTE also provides the state department with a state-level export at the end of each KRA administration after all data have been entered.

The state file includes

- student demographic information (provided by the districts);
- individual item scores by student;
- overall scores, performance levels, and domain scores by student; and
- conditional standard errors of measurement for the overall and domain scores.

4.3 Deployment and Maintenance

Development, deployment, and support of the KReady online system are carried out by JHU CTE. The deployment takes advantage of powerful maintenance tools provided by Amazon Web Services (AWS), including automatic full backups; point-in-time transactional logging; and industry-standard vulnerability scanning. Other key areas of focus related to KReady online system maintenance and deployment include:

- *Security:* The KReady online system is designed with granular role permissions to limit access to data, in accordance with Family Educational Rights and Privacy Act (FERPA) requirements. All connections to KReady online are secured by Secure Socket Layer (SSL) to ensure that all data are encrypted in transit. The KReady online code and server environment is constantly monitored using Nessus Vulnerability Scanner to ensure that any hacking vulnerability is identified quickly for repair. The KReady online system is configured using both public and private subnets, so that only certain components are exposed to the internet. Access Control Lists limit inbound and outbound data. All data are stored in the KReady online database, not on individual computers or mobile devices. In addition to technical approaches, JHU CTE contracts with third-party security consultants for auditing and intrusion prevention.
- *Scalability:* The KReady online system utilizes multiple AWS servers in tandem to ensure consistently strong system performance during periods of peak load. Separate AWS servers handle the front-end website for browsing and data entry; onboarding and exporting of data; running of reports; and serving of the child-friendly mobile app items. This specialized server configuration has been refined based on four years of KRA administration. KReady online is preset to scale up additional servers based on known times of higher load and also to respond to unexpected increases in load within minutes to ensure consistent scalability.
- *Disaster Recovery:* Performance metrics are monitored to identify and anticipate any potential areas of hardware degradation or failure. The KReady online system's AWS configuration is designed for automatic creation of new KReady online instances immediately upon server failure. Recovery via point-in-time snapshot is available within 30 days in the unlikely case of database corruption. Full nightly backups are carried out for all data and files. The last 50 versions of the KReady online application instance are kept ready for deployment at any time in the unlikely event of system software corruption or regression bugs caused by system updates.

4.4 Data Management

For each KRA administration, JHU CTE provides tools and guidance for local district data managers to ensure that all necessary data are configured within the system for efficient implementation. For data onboarding, data guidelines outline the validated fields for the templates used by districts to upload teacher, student, and enrollment data. Fields are customized by each state to ensure that the resulting data are in alignment with state and local reporting requirements.

All district names, school names, and ID numbers are loaded prior to the beginning of the administration window. District data-manager accounts and credentials are also created prior to the administration window and are provided to local districts. A district data manager has access to all teacher, student, and enrollment information and is responsible for uploading data into the KReady online system. The data manager is also responsible for maintaining accurate and up-to-date teacher and enrollment data throughout the KRA administration window.

The KReady online system supports multiple options for district data managers, including manual entry, bulk uploading, and a scripted, automated process using the KReady File Watcher App. Standardized templates are provided, so that all data enter the system in the same format. Any data that do not pass validation rules are shown as rejected records, and an error message in text is provided to help the data manager correct any validation errors.

After the administration window has ended, districts can export all data from the KReady online system for use in any local longitudinal or student information system.

The data onboarding process, as well as the ability to export data, can be managed throughout the administration window in conjunction with continued improvements and enhancements in content, data, and functionality.

4.5 Help Desk

The purpose of the KRA Help Desk is to provide timely support to teachers and data managers, thus increasing the speed and efficiency of implementation. Each call or email to the KRA Help Desk is tagged with a general support category. Table 3 summarizes the KRA Help Desk general support tiers.

Table 3. Summary of KRA Help Desk General Support Tiers

Tier	Supports
Tier 1—Basic Questions About the System	• Username and password issues • Additions and deletions to student roster • How to download and install the app
Tier 2—Questions That Require Some Degree of Troubleshooting	• Minor glitches with the website or app • Data problems (e.g., duplicates, transfers, incorrect IDs)
Tier 3—Problems That Require Escalation to JHU CTE for Resolution	• Bugs that can be replicated by the Tiers 1 and 2 Help Desk • Any problem that the Tiers 1 and 2 Help Desk cannot solve after troubleshooting • Systemwide failure, downtime, or performance degradation

5 ITEM ANALYSES, SCALING, AND EQUATING

5.1 Classical Item Analyses

Classical item analyses—mean; standard deviation; difficulty (p -value); discrimination (item-total correlation); and score-point distribution—are conducted on all KRA items on an annual basis. KRA items are expected to be easier (i.e., have slightly higher p -values) relative to other state- or grade-level assessments because the KRA Blueprint is based on prekindergarten early learning standards.

The classical item statistics for the fall 2024 administration are summarized in Section 6.1 and provided in detail in Appendix A.

5.2 Item Response Theory (IRT) Calibration

Given that the KRA includes a sample of items that can be used to measure readiness for kindergarten, percentage-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 the 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. The 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 that level. For polytomous items, the partial credit model is utilized.

5.3 Equating

To produce forms of equivalent difficulty, all the KRA items were first placed on the same scale. Next, pre-equating produced scoring tables specific to the KRA forms, based on the equated item parameter estimates. This section describes the calibration process and scoring table generation and compares scoring tables and conditional standard errors of measurement for all KRA forms.

5.3.1 Concurrent Calibration With Fixed Anchor Items

To maintain the existing scoring scale from the prior version of the KRA (i.e., KRA 1.5), after field-testing in 2017, the 78 KRA 2.0 items were scaled concurrently with the 50 operational KRA 1.5 items. This method of equating is known as concurrent calibration with fixed anchor items. Specifically, the parameters for the 50 KRA 1.5 items were fixed, and parameters for the 78 KRA 2.0 items were estimated freely. The KRA 2.0 item parameters were estimated using WINSTEPS Rasch measurement software.

The concurrent calibration process included inspection of the KRA 2.0 items’ estimated parameters and fit statistics. Small values for infit and outfit statistics indicate “overfit”—that is, the responses are too predictable based on the Rasch model. Large values for infit and outfit statistics indicate “underfit”—that is, unexpected responses or random noise are not predicted by the Rasch model. Items with fit statistics that fall between 0.5 and 1.5 are considered productive for measurement (Linacre, 2015). Infit statistics are inlier-weighted, while outfit statistics are outlier-weighted. Therefore, infit statistics below 0.5 or above 1.5 require close inspection, while outfit statistics that exceed these bounds may simply indicate a few examinees with unexpected item score patterns. No KRA 2.0 items had infit statistics below 0.5 or above 1.5. Therefore, all KRA 2.0 items were retained for measurement. Table 4 summarizes the infit and outfit statistics for the KRA 2.0 items.

Table 4. Summary of Infit and Outfit Statistics for the KRA 2.0 Items

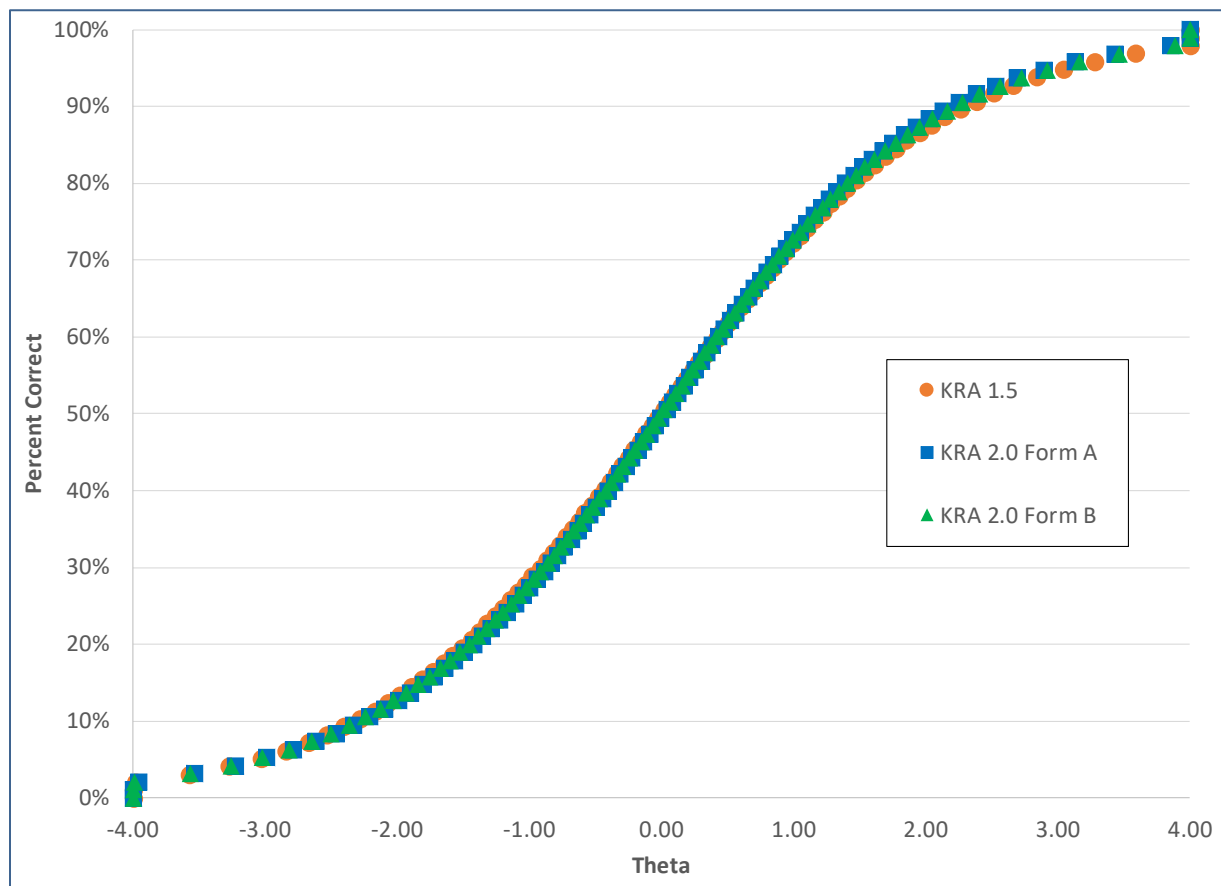
Fit Statistic	Number of Items Below 0.5	Number of Items Between 0.5 and 1.5	Number of Items Above 1.5
Infit	0	78	0
Outfit	0	75	3

5.3.2 Creating Scoring Tables via Pre-Equating

With all KRA 2.0 item parameters equated to the KRA 1.5 scale, the next step was to produce two KRA 2.0 forms, Forms A and B, with scales comparable to the KRA 1.5. This process is known as pre-equating. WINSTEPS Rasch measurement software was used to create two scoring tables via the fixed item parameters estimated during concurrent calibration. Scoring tables relate raw scores to Rasch theta estimates and are commonly called raw-score-to-theta (RST) tables.

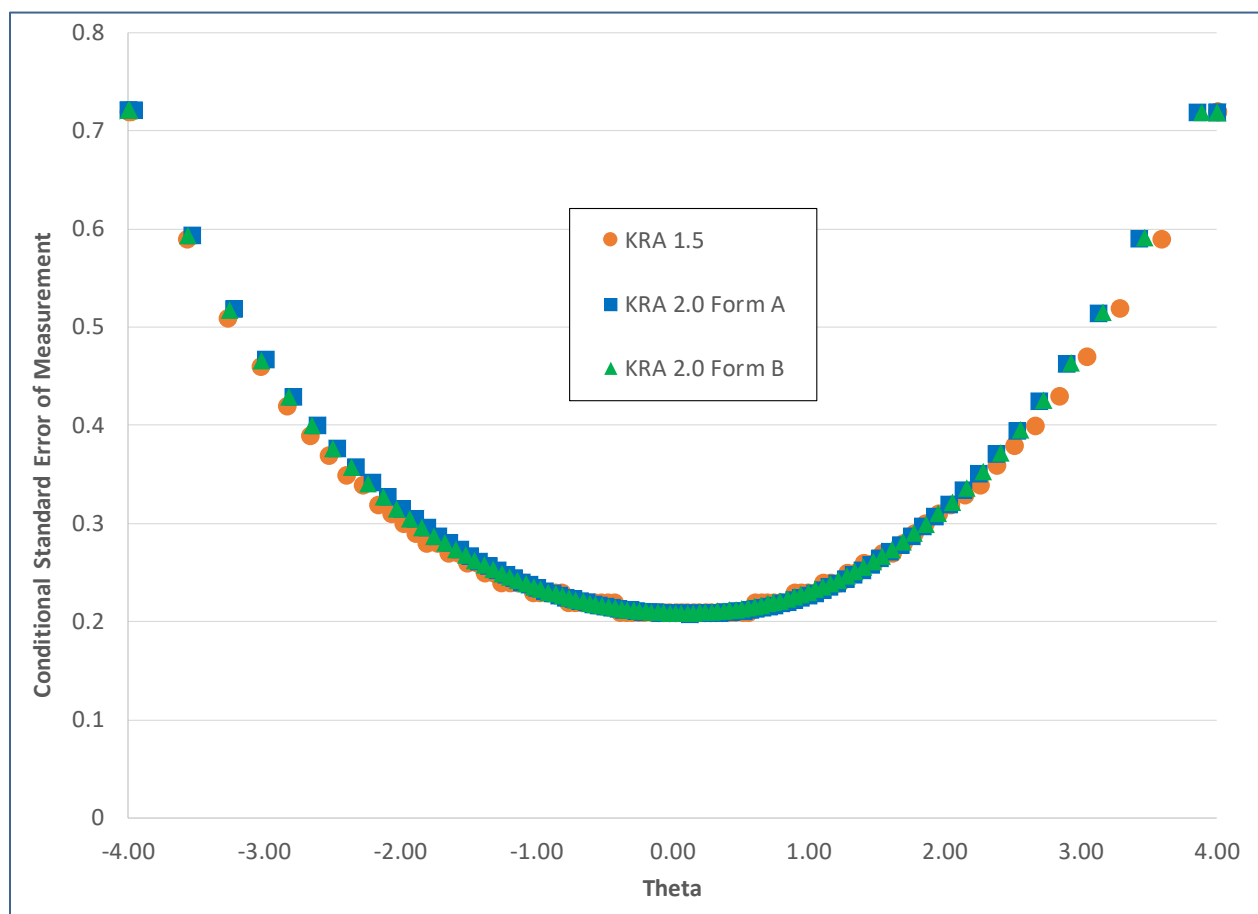
Although it is not required for IRT equating, it is often desirable for new forms and previous forms to share similar RST relationships, so that the raw score cuts that separate performance categories will not change dramatically across forms. Figure 1 presents the RST relationships for the KRA 1.5 form and the KRA 2.0 Forms A and B. The maximum raw score for the KRA 2.0 forms is 95, and the maximum raw score for the KRA 1.5 form is 97. Therefore, for the purposes of comparability across forms, raw scores have been converted to a percent-correct metric (obtained score divided by maximum obtainable score). Figure 1 shows that the RST relationships for KRA 1.5, KRA 2.0 Form A, and KRA 2.0 Form B are nearly identical.

Figure 1. Relationship Between Theta and Percent Correct for KRA Forms



It is also desirable for new forms and previous forms to exhibit similar levels of measurement error, so that inferences drawn from either form are similarly precise. Under the Rasch model, measurement error is conditional on the estimated θ levels. More error is expected at the upper and lower ends of the scale, at which relatively few examinees are available to provide information. Figure 2 presents the conditional standard error of measurement as a function of θ for KRA 1.5, KRA 2.0 Form A, and KRA 2.0 Form B. The figure shows that conditional measurement error is nearly identical across the three forms.

Figure 2. Relationship Between Theta and Conditional Standard Error of Measurement for KRA Forms



5.4 Scale Scores

Scale scores are preferred over raw scores because they allow for comparison of scores across test administrations, independent of cohort or form. The Rasch 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 = $12 * \text{theta} + 250$. The KRA scale is truncated at theta scores of ± 4 , which results in minimum and maximum scale scores of 202 and 298, respectively. The linear transformation also maintains the established cut scores, which translate to scale scores of 258 and 270. The overall scale score determines each student’s performance level.

The KRA overall scale score determines each student’s performance level: Demonstrating Readiness, Approaching Readiness, or Emerging Readiness. Table 5 shows the performance levels and their descriptions, including their associated overall score ranges.

Table 5. 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. Each domain scale score is 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, they provide a less precise measure of ability. Table 6 shows the ranges of possible scale scores for each domain.

Table 6. 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.

6 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 2024.

6.1 Validity

AERA et al. (2014) refers to validity as “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.”

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.

6.1.1 Evidence Based on Test Content

The KRA Blueprint, item specifications, and item-development process provide validity evidence based on test content.

As described in Section 2 of this report, the KRA is aligned to the state’s early learning standards and incorporates 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 that align to the early learning 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 early learning 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*](#). 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.

6.1.2 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.

6.1.3 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 7 provides a summary of the classical item statistics for the KRA in fall 2024. These statistics fall within acceptable ranges. The classical item statistics for all 50 KRA items administered in fall 2024 are provided in Appendix A.

The overall score and the domain scores for the KRA are also strongly correlated, as evidenced by the Pearson correlation coefficients shown in Table 8.

The item calibration process and reporting scale described throughout Section 5, along with the descriptive and reliability statistics that are described in Section 6.2, provide additional validity evidence based on internal structure.

Table 7. Summary of Classical Item Statistics for the KRA in Fall 2024

Domain	Number of Items	<i>p</i> -Value Mean	<i>p</i> -Value SD	<i>p</i> -Value Range	ITC Mean	ITC SD	ITC Range
Language and Literacy	17	0.65	0.12	0.35–0.87	0.51	0.15	0.27–0.70
Mathematics	13	0.67	0.16	0.30–0.83	0.47	0.12	0.30–0.66
Physical Well-Being and Motor Development	9	0.86	0.07	0.77–0.95	0.56	0.08	0.43–0.67
Social Foundations	11	0.78	0.07	0.67–0.88	0.62	0.07	0.52–0.71
Overall	50	0.72	0.14	0.30–0.95	0.53	0.13	0.27–0.71

Note. ITC = Item-total correlation.

Table 8. Pearson Correlation Coefficients Between the Overall and Domain Scores in Fall 2024

Domain	Overall	LL	MA	PD	SF
Overall	1.00	0.93	0.85	0.77	0.81
Language and Literacy (LL)	0.93	1.00	0.81	0.61	0.63
Mathematics (MA)	0.85	0.81	1.00	0.51	0.53
Physical Well-Being and Motor Development (PD)	0.77	0.61	0.51	1.00	0.80
Social Foundations (SF)	0.81	0.63	0.53	0.80	1.00

Note. *N* = 53,611.

6.1.4 Interpretations of KRA Scores

The KRA is designed to provide an overall score; a performance level (based on the overall score); and domain scores for each student. The overall score reflects the student’s readiness for kindergarten instruction, which determines the performance level, as described in Table 5.

The domain scores for each student are included on the KRA reports to indicate relative strengths and areas of growth for the student. For this reason, the domain scores are provided on 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.

KRA scores should be used only to support the intended purposes of the KRA, as described in Section 1 of this report, and should not be used for any other purposes, including, but not limited to, denying entry to kindergarten.

6.2 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 9 summarizes the descriptive statistics and reliability statistics for the KRA overall and domain scores in fall 2024. Appendix B summarizes the descriptive and reliability statistics for each student group. Table 9 is based on the students who completed or partially completed the KRA in fall 2024.

Table 9. Summary of Descriptive and Reliability Statistics for the KRA in Fall 2024

Domain	Mean	SD	Range	Cronbach's Alpha	SEM
Overall	265.77	15.07	202–298	0.95	3.29
Language and Literacy	264.56	16.61	202–298	0.87	5.88
Mathematics	263.69	17.29	202–298	0.82	7.26
Physical Well-Being and Motor Development	274.04	19.45	202–293	0.88	6.72
Social Foundations	271.46	21.69	202–298	0.93	5.91

Note. $N = 53,611$.

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).

7 SUMMARY OF RESULTS FOR FALL 2024 ADMINISTRATION

7.1 Fall 2024 Cohort Demographics

Table 10 provides a demographic summary of the students who completed the KRA in fall 2024. The demographic data are entered into the KReady system by data managers in each district. The South Carolina Department of Education does not require the entry of demographic data into the KReady system; therefore, some demographic information is not reported. Given the inconsistency of reporting demographic information, caution must be taken when interpreting results for student groups.

Table 10. Demographic Summary of Students for the KRA in Fall 2024

Student Group	N	%
Female	22,202	41.41
Male	23,798	44.39
Sex Not Reported	7,611	14.20
English Learner: No	49,157	91.69
English Learner: Yes	4,454	8.31
Special Education: No	50,216	93.67
Special Education: Yes	3,395	6.33
All Students	53,611	100.00

Note. Percentages may not total 100 due to rounding.

7.2 Fall 2024 Cohort Results

Table 11 provides the percentage of students at each performance level for all groups of students who completed the KRA in fall 2024. The descriptive and reliability statistics for the overall score and domain scores for all students are provided in Appendix B.

Table 11. Percentage of Students at Each Performance Level in Fall 2024

Student Group	Demonstrating Readiness	Approaching Readiness	Emerging Readiness
Female	44.93	33.46	21.61
Male	34.04	35.09	30.87
Sex Not Reported	36.62	35.51	27.87
English Learner: No	40.53	34.62	24.86
English Learner: Yes	21.08	32.94	45.98
Special Education: No	40.44	34.83	24.72
Special Education: Yes	16.29	29.19	54.52
All Students	38.91	34.48	26.61

Note. Percentages may not total 100 due to rounding.

Table 12 provides the overall and domain scores by decile, based on the results from all students who completed the KRA in fall 2024. Appendix C includes frequency distributions of the overall and domain scores.

Table 12. Overall and Domain Scores by Decile in Fall 2024

Domain	10	20	30	40	50	60	70	80	90
Overall	248	255	259	263	266	269	273	277	285
Language and Literacy	246	254	258	262	265	269	271	277	286
Mathematics	245	251	257	259	264	267	271	277	286
Physical Well-Being and Motor Development	248	258	263	269	278	278	293	293	293
Social Foundations	244	254	259	265	272	278	287	298	298

Table 13 provides a summary of the descriptive statistics for the overall score and domain scores by performance level. The results include all students who completed the KRA in fall 2024.

Table 13. Descriptive Statistics for Overall and Domain Scores by Performance Level in Fall 2024

Performance Level	N	Overall Mean	Overall SD	LL Mean	LL SD	MA Mean	MA SD	PD Mean	PD SD	SF Mean	SF SD
Demonstrating Readiness	20,862	279.93	8.24	278.84	9.93	277.31	11.95	287.83	9.23	288.29	12.20
Approaching Readiness	18,483	263.84	3.42	262.97	6.26	262.24	8.95	274.87	14.32	270.71	14.74
Emerging Readiness	14,266	247.56	10.44	245.74	13.66	245.63	14.51	252.80	17.36	247.83	17.20

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

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APPENDIX A

CLASSICAL ITEM STATISTICS

Appendix A1. Classical Item Statistics – Language and Literacy Domain

Item	N	Max	Mean	SD	Difficulty (p-value)	Item-total Correlation	0 Points %	1 Point %	2 Points %	3 Points %
A322	53,567	1	0.50	0.50	0.50	0.32	49.55	50.45	N/A	N/A
A323	53,566	1	0.64	0.48	0.64	0.32	36.16	63.84	N/A	N/A
A326	53,569	1	0.66	0.47	0.66	0.31	34.14	65.86	N/A	N/A
A327	53,564	1	0.59	0.49	0.59	0.37	41.14	58.86	N/A	N/A
A331	53,550	3	1.77	1.14	0.59	0.64	20.77	16.64	27.62	34.97
A333	53,542	3	2.01	1.13	0.67	0.61	16.69	13.99	21.28	48.04
A334	53,537	3	1.98	1.05	0.66	0.63	12.74	18.17	27.46	41.63

Item	N	Max	Mean	SD	Difficulty (p-value)	Item-total Correlation	0 Points %	1 Point %	2 Points %	3 Points %
A336	53,564	1	0.35	0.48	0.35	0.27	64.60	35.40	N/A	N/A
A343	53,540	3	2.60	0.84	0.87	0.58	6.21	4.86	12.01	76.92
A345	53,568	3	2.19	0.93	0.73	0.54	6.39	16.20	29.06	48.34
B317	53,562	1	0.78	0.41	0.78	0.42	21.91	78.09	N/A	N/A
B320	53,563	3	1.65	1.29	0.55	0.54	31.50	12.57	15.37	40.55
B385	53,564	1	0.65	0.48	0.65	0.36	35.08	64.92	N/A	N/A
R340	53,540	2	1.52	0.68	0.76	0.68	10.56	26.81	62.63	N/A
R341	53,541	2	1.61	0.66	0.81	0.67	10.06	18.40	71.54	N/A
R346	53,540	2	1.32	0.73	0.66	0.70	16.06	35.56	48.39	N/A
R401	53,525	2	1.32	0.75	0.66	0.66	17.18	33.52	49.30	N/A

Appendix A2. Classical Item Statistics – Mathematics Domain

Item	N	Max	Mean	SD	Difficulty (p-value)	Item-total Correlation	0 Points %	1 Point %	2 Points %	3 Points %
A348	53,556	3	2.19	1.07	0.73	0.66	9.97	19.29	12.13	58.60
A349	53,553	1	0.80	0.40	0.80	0.46	19.77	80.23	N/A	N/A
A351	53,555	3	2.50	0.88	0.83	0.66	6.47	7.17	16.21	70.15
A354	53,577	3	1.93	1.22	0.64	0.57	21.10	14.44	14.73	49.73
A355	53,553	1	0.71	0.45	0.71	0.46	29.25	70.75	N/A	N/A
A358	53,576	1	0.30	0.46	0.30	0.34	69.63	30.37	N/A	N/A
A359	53,574	1	0.80	0.40	0.80	0.38	19.88	80.12	N/A	N/A
A362	53,575	1	0.43	0.49	0.43	0.30	57.27	42.73	N/A	N/A
A363	53,573	1	0.73	0.44	0.73	0.43	26.88	73.12	N/A	N/A
A366	53,572	2	1.36	0.76	0.68	0.51	17.44	28.86	53.69	N/A
A367	53,571	1	0.50	0.50	0.50	0.44	49.98	50.02	N/A	N/A
A370	53,571	2	1.59	0.71	0.80	0.35	13.09	14.74	72.17	N/A
A372	53,551	2	1.61	0.63	0.80	0.58	7.68	23.96	68.36	N/A

Appendix A3. Classical Item Statistics – Physical Well-Being and Motor Development Domain

Item	N	Max	Mean	SD	Difficulty (p-value)	Item-total Correlation	0 Points %	1 Point %	2 Points %	3 Points %
R373	53,506	2	1.74	0.52	0.87	0.55	3.83	18.64	77.53	N/A
R378	53,513	2	1.53	0.66	0.77	0.61	9.60	27.33	63.06	N/A
R380	53,539	2	1.65	0.60	0.83	0.60	6.67	21.39	71.93	N/A
R381	53,539	2	1.73	0.54	0.87	0.59	4.69	17.22	78.08	N/A
R382	53,538	2	1.56	0.66	0.78	0.67	9.67	24.56	65.77	N/A
R383	53,544	2	1.81	0.46	0.90	0.57	3.02	13.17	83.81	N/A
R384	53,543	2	1.74	0.52	0.87	0.57	3.73	18.83	77.43	N/A
R397	53,510	2	1.89	0.36	0.94	0.43	1.36	8.43	90.21	N/A
R398	53,512	2	1.91	0.33	0.95	0.43	1.30	6.68	92.03	N/A

Appendix A4. Classical Item Statistics – Social Foundations Domain

Item	N	Max	Mean	SD	Difficulty (p-value)	Item-total Correlation	0 Points %	1 Point %	2 Points %	3 Points %
R300	53,554	2	1.63	0.61	0.82	0.60	6.90	23.06	70.04	N/A
R302	53,550	2	1.66	0.60	0.83	0.63	6.76	20.92	72.32	N/A
R306	53,549	2	1.65	0.59	0.83	0.52	6.03	22.88	71.09	N/A
R307	53,547	2	1.37	0.70	0.68	0.62	12.62	38.11	49.26	N/A
R309	53,530	2	1.36	0.71	0.68	0.71	13.81	36.22	49.97	N/A
R310	53,535	2	1.35	0.69	0.67	0.70	12.70	39.73	47.58	N/A
R312	53,532	2	1.57	0.62	0.78	0.67	6.78	29.87	63.35	N/A
R313	53,537	2	1.76	0.53	0.88	0.59	4.63	15.11	80.26	N/A
R314	53,537	2	1.73	0.53	0.87	0.54	4.24	18.21	77.55	N/A
R315	53,511	2	1.52	0.69	0.76	0.71	11.57	24.70	63.72	N/A
R400	53,551	2	1.47	0.67	0.74	0.52	10.24	32.37	57.40	N/A

APPENDIX B

DESCRIPTIVE AND RELIABILITY STATISTICS BY STUDENT GROUP

The South Carolina Department of Education does not require the entry of demographic data into the KReady system; therefore, some demographic information is not reported. Given the inconsistency of reporting demographic information, caution must be taken when interpreting results for student groups.

Appendix B1. Descriptive and Reliability Statistics – Overall Score

Student Group	N	Mean	SD	Alpha	SEM
Female	22,202	268.07	14.40	0.95	3.31
Male	23,798	263.89	15.47	0.96	3.28
Sex Not Reported	7,611	264.97	14.79	0.95	3.29
English Learner: No	49,157	266.39	14.96	0.95	3.29
English Learner: Yes	4,454	258.88	14.46	0.95	3.18
Special Education: No	50,216	266.60	14.46	0.95	3.3
Special Education: Yes	3,395	253.55	18.22	0.97	3.34
All Students	53,611	265.77	15.07	0.95	3.29

Appendix B2. Descriptive and Reliability Statistics – Language and Literacy Domain Score

Student Group	N	Mean	SD	Alpha	SEM
Female	22,202	266.28	15.91	0.87	5.77
Male	23,798	263.27	17.23	0.88	5.98
Sex Not Reported	7,611	263.58	16.19	0.87	5.82
English Learner: No	49,157	265.45	16.22	0.87	5.87
English Learner: Yes	4,454	254.72	17.70	0.89	5.93
Special Education: No	50,216	265.31	16.02	0.87	5.8
Special Education: Yes	3,395	253.42	20.77	0.90	6.59
All Students	53,611	264.56	16.61	0.87	5.88

Appendix B3. Descriptive and Reliability Statistics – Mathematics Domain Score

Student Group	N	Mean	SD	Alpha	SEM
Female	22,202	264.86	16.58	0.81	7.18
Male	23,798	263.02	18.03	0.83	7.34
Sex Not Reported	7,611	262.33	16.75	0.81	7.22
English Learner: No	49,157	264.47	16.98	0.82	7.26
English Learner: Yes	4,454	255.01	18.28	0.84	7.32
Special Education: No	50,216	264.41	16.76	0.81	7.21
Special Education: Yes	3,395	253.03	21.08	0.86	7.84
All Students	53,611	263.69	17.29	0.82	7.26

Appendix B4. Descriptive and Reliability Statistics – Physical Well-Being and Motor Development Domain Score

Student Group	N	Mean	SD	Alpha	SEM
Female	22,202	277.93	17.76	0.87	6.47
Male	23,798	270.44	20.22	0.88	6.91
Sex Not Reported	7,611	273.94	19.54	0.88	6.76
English Learner: No	49,157	274.33	19.44	0.88	6.67
English Learner: Yes	4,454	270.83	19.25	0.87	7.03
Special Education: No	50,216	275.16	18.62	0.87	6.82
Special Education: Yes	3,395	257.52	23.54	0.92	6.86
All Students	53,611	274.04	19.45	0.88	6.72

Appendix B5. Descriptive and Reliability Statistics – Social Foundations Domain Score

Student Group	N	Mean	SD	Alpha	SEM
Female	22,202	275.89	20.25	0.92	5.88
Male	23,798	267.28	22.07	0.93	5.93
Sex Not Reported	7,611	271.59	21.98	0.93	5.97
English Learner: No	49,157	271.89	21.67	0.93	5.85
English Learner: Yes	4,454	266.67	21.35	0.91	6.22
Special Education: No	50,216	272.68	20.91	0.92	5.96
Special Education: Yes	3,395	253.39	24.81	0.94	5.92
All Students	53,611	271.46	21.69	0.93	5.91

APPENDIX C

FREQUENCY DISTRIBUTIONS OF OVERALL AND DOMAIN SCORES

Appendix C1. Frequency Distribution – Overall Score

Scale Score	Performance Level	Frequency	Percent	Cumulative Frequency	Cumulative Percent
202	Emerging Readiness	160	0.30	160	0.30
203	Emerging Readiness	53	0.10	213	0.40
208	Emerging Readiness	38	0.07	251	0.47
211	Emerging Readiness	70	0.13	321	0.60
214	Emerging Readiness	50	0.09	371	0.69
217	Emerging Readiness	52	0.10	423	0.79
219	Emerging Readiness	64	0.12	487	0.91
220	Emerging Readiness	44	0.08	531	0.99
222	Emerging Readiness	53	0.10	584	1.09
224	Emerging Readiness	53	0.10	637	1.19
225	Emerging Readiness	45	0.08	682	1.27
226	Emerging Readiness	64	0.12	746	1.39
227	Emerging Readiness	59	0.11	805	1.50

Scale Score	Performance Level	Frequency	Percent	Cumulative Frequency	Cumulative Percent
228	Emerging Readiness	51	0.10	856	1.60
229	Emerging Readiness	59	0.11	915	1.71
230	Emerging Readiness	61	0.11	976	1.82
231	Emerging Readiness	63	0.12	1,039	1.94
232	Emerging Readiness	55	0.10	1,094	2.04
233	Emerging Readiness	78	0.15	1,172	2.19
234	Emerging Readiness	67	0.12	1,239	2.31
235	Emerging Readiness	192	0.36	1,431	2.67
236	Emerging Readiness	112	0.21	1,543	2.88
237	Emerging Readiness	199	0.37	1,742	3.25
238	Emerging Readiness	127	0.24	1,869	3.49
239	Emerging Readiness	265	0.49	2,134	3.98
240	Emerging Readiness	120	0.22	2,254	4.20
241	Emerging Readiness	309	0.58	2,563	4.78
242	Emerging Readiness	347	0.65	2,910	5.43
243	Emerging Readiness	197	0.37	3,107	5.80
244	Emerging Readiness	399	0.74	3,506	6.54
245	Emerging Readiness	489	0.91	3,995	7.45
246	Emerging Readiness	522	0.97	4,517	8.43
247	Emerging Readiness	576	1.07	5,093	9.50

Scale Score	Performance Level	Frequency	Percent	Cumulative Frequency	Cumulative Percent
248	Emerging Readiness	668	1.25	5,761	10.75
249	Emerging Readiness	733	1.37	6,494	12.11
250	Emerging Readiness	373	0.70	6,867	12.81
251	Emerging Readiness	821	1.53	7,688	14.34
252	Emerging Readiness	909	1.70	8,597	16.04
253	Emerging Readiness	929	1.73	9,526	17.77
254	Emerging Readiness	1,073	2.00	10,599	19.77
255	Emerging Readiness	1,127	2.10	11,726	21.87
256	Emerging Readiness	1,206	2.25	12,932	24.12
257	Emerging Readiness	1,334	2.49	14,266	26.61
258	Approaching Readiness	1,447	2.70	15,713	29.31
259	Approaching Readiness	814	1.52	16,527	30.83
260	Approaching Readiness	1,705	3.18	18,232	34.01
261	Approaching Readiness	1,731	3.23	19,963	37.24
262	Approaching Readiness	1,030	1.92	20,993	39.16
263	Approaching Readiness	1,979	3.69	22,972	42.85
264	Approaching Readiness	1,047	1.95	24,019	44.80
265	Approaching Readiness	2,256	4.21	26,275	49.01
266	Approaching Readiness	1,166	2.17	27,441	51.19
267	Approaching Readiness	1,274	2.38	28,715	53.56

Scale Score	Performance Level	Frequency	Percent	Cumulative Frequency	Cumulative Percent
268	Approaching Readiness	2,671	4.98	31,386	58.54
269	Approaching Readiness	1,363	2.54	32,749	61.09
270	Demonstrating Readiness	1,403	2.62	34,152	63.70
271	Demonstrating Readiness	1,438	2.68	35,590	66.39
272	Demonstrating Readiness	1,467	2.74	37,057	69.12
273	Demonstrating Readiness	1,523	2.84	38,580	71.96
274	Demonstrating Readiness	1,548	2.89	40,128	74.85
276	Demonstrating Readiness	1,540	2.87	41,668	77.72
277	Demonstrating Readiness	1,533	2.86	43,201	80.58
279	Demonstrating Readiness	1,473	2.75	44,674	83.33
280	Demonstrating Readiness	1,540	2.87	46,214	86.20
282	Demonstrating Readiness	1,493	2.78	47,707	88.99
285	Demonstrating Readiness	1,337	2.49	49,044	91.48
288	Demonstrating Readiness	1,262	2.35	50,306	93.84
291	Demonstrating Readiness	1,145	2.14	51,451	95.97
296	Demonstrating Readiness	915	1.71	52,366	97.68
298	Demonstrating Readiness	1,245	2.32	53,611	100.00

Appendix C2. Frequency Distribution – Language and Literacy Domain Score

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
202	622	1.16	622	1.16
213	227	0.42	849	1.58
222	280	0.52	1,129	2.11
227	286	0.53	1,415	2.64
231	330	0.62	1,745	3.25
234	366	0.68	2,111	3.94
236	421	0.79	2,532	4.72
239	468	0.87	3,000	5.60
241	593	1.11	3,593	6.70
242	649	1.21	4,242	7.91
244	758	1.41	5,000	9.33
246	913	1.70	5,913	11.03
248	1,016	1.90	6,929	12.92
249	1,080	2.01	8,009	14.94
251	1,138	2.12	9,147	17.06
252	1,319	2.46	10,466	19.52
254	1,410	2.63	11,876	22.15
255	1,603	2.99	13,479	25.14
256	1,784	3.33	15,263	28.47

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
258	1,923	3.59	17,186	32.06
259	2,039	3.80	19,225	35.86
261	2,215	4.13	21,440	39.99
262	2,341	4.37	23,781	44.36
264	2,519	4.70	26,300	49.06
265	2,715	5.06	29,015	54.12
267	2,942	5.49	31,957	59.61
269	3,000	5.60	34,957	65.20
271	2,959	5.52	37,916	70.72
274	3,077	5.74	40,993	76.46
277	3,150	5.88	44,143	82.34
280	2,978	5.55	47,121	87.89
286	2,708	5.05	49,829	92.95
294	2,133	3.98	51,962	96.92
298	1,649	3.08	53,611	100.00

Appendix C3. Frequency Distribution – Mathematics Domain Score

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
202	736	1.37	736	1.37
216	222	0.41	958	1.79
225	328	0.61	1,286	2.40
230	431	0.80	1,717	3.20
234	544	1.01	2,261	4.22
237	674	1.26	2,935	5.47
240	939	1.75	3,874	7.23
243	1,053	1.96	4,927	9.19
245	1,258	2.35	6,185	11.54
247	1,375	2.56	7,560	14.10
249	1,661	3.10	9,221	17.20
251	1,930	3.60	11,151	20.80
253	2,219	4.14	13,370	24.94
255	2,512	4.69	15,882	29.62
257	2,937	5.48	18,819	35.10
259	3,428	6.39	22,247	41.50
262	3,939	7.35	26,186	48.84
264	4,437	8.28	30,623	57.12
267	4,797	8.95	35,420	66.07

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
271	5,086	9.49	40,506	75.56
277	4,977	9.28	45,483	84.84
286	4,596	8.57	50,079	93.41
298	3,532	6.59	53,611	100.00

Appendix C4. Frequency Distribution – Physical Well-Being and Motor Development Domain Score

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
202	337	0.63	337	0.63
206	80	0.15	417	0.78
216	156	0.29	573	1.07
222	219	0.41	792	1.48
226	254	0.47	1,046	1.95
230	334	0.62	1,380	2.57
234	416	0.78	1,796	3.35
237	448	0.84	2,244	4.19
240	675	1.26	2,919	5.44
243	999	1.86	3,918	7.31
246	1,018	1.90	4,936	9.21
248	1,411	2.63	6,347	11.84
251	1,775	3.31	8,122	15.15
255	2,253	4.20	10,375	19.35
258	3,022	5.64	13,397	24.99
263	4,101	7.65	17,498	32.64
269	6,351	11.85	23,849	44.49
278	8,346	15.57	32,195	60.05

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
293	21,416	39.95	53,611	100.00

Appendix C5. Frequency Distribution – Social Foundations Domain Score

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
202	610	1.14	610	1.14
211	313	0.58	923	1.72
220	316	0.59	1,239	2.31
226	364	0.68	1,603	2.99
230	450	0.84	2,053	3.83
234	505	0.94	2,558	4.77
237	575	1.07	3,133	5.84
239	662	1.23	3,795	7.08
242	824	1.54	4,619	8.62
244	928	1.73	5,547	10.35
247	1,123	2.09	6,670	12.44
249	1,659	3.09	8,329	15.54
251	1,569	2.93	9,898	18.46
254	1,852	3.45	11,750	21.92
256	2,186	4.08	13,936	25.99
259	2,480	4.63	16,416	30.62
262	2,867	5.35	19,283	35.97
265	3,334	6.22	22,617	42.19
268	3,597	6.71	26,214	48.90

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
272	4,093	7.63	30,307	56.53
278	4,433	8.27	34,740	64.80
287	4,942	9.22	39,682	74.02
298	13,929	25.98	53,611	100.00

