MATHEMATICS SCREENING GUIDANCE

Pre-K-12

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The Importance of Screening

Rhode Island Board of Education Secondary Regulations §2.2.1 and Rhode Island General Law §16-7.1-2 state that LEAs must develop a screening process to identify K-12 students in need of additional diagnostic assessment and instructional support in Math.

Screening assessments are a critical component of an LEA's Comprehensive Assessment System and MTSS framework. "Screening in math can be compared to other health screeners like checking weight using a scale, checking blood pressure, or taking one's temperature. All these health screeners provide a check on health risk while math screeners provide a sense of a student's academic health. When educators utilize reliable, valid, and efficient assessment systems as screeners, they can identify students earlier who might be at-risk in math, thus allowing for intervention to be delivered in a timelier manner" (Lembke, 2024).

Lembke (2024) continues to say that "Characteristics of high-quality screening tools include ease of use (administration, scoring, cost, training), high accuracy in predicting success on the outcome of interest, can be easily linked to instruction, and provide precision in distinguishing students who might develop difficulty in the target area. Additionally, strong screening measures include those that are **reliable** and **valid** — reliable in terms of eliciting a result that would be similar from week to week, with fluctuations only occurring due to student progress, and valid meaning that the measures truly capture what they purport to measure".

Longitudinal research strongly suggests that students who perform poorly on simple mathematics problems at the end of kindergarten and first grade are likely to continue to perform poorly in mathematics through fourth grade (Duncan et al., 2007; Jordan, Kaplan, Ramineni, & Locuniak, 2009; Morgan, Farkas, & Wu, 2009, as cited in Clarke et al.,2012).

In fact, using a nationally representative sample of students, Morgan et al, 2009 found that students who remained in the lowest 10th percentile at both the beginning and end of kindergarten (often considered an indicator of a learning disability in mathematics) had a 70% chance of remaining in the lowest 10th percentile five years later. They also tended to score, on average, two standard deviation units (48 percentile points) below students who were in the acceptable range of mathematics performance in kindergarten. Jordan et al., 2009 found that kindergartners' number sense, that is, their knowledge of number

relationships and the meaning of number concepts, predicts later mathematics achievement even when statistically controlling for IQ and socioeconomic status (Clarke et al., 2012).

"Recurring findings from many studies demonstrate that significant mathematical developmental differences exist between students in kindergarten and first grade and, more importantly, those differences can be pinpointed accurately with brief and easy-to-use screening tools. While differences observed in young children may result from exposure to mathematics before formal schooling or from student performance on more formal mathematics in school, screening young children on each component of number sense offers a critical link to instruction and additional instructional services" (Gersten et al., 2011).

There is a great need and demand for reliable, efficient, and valid elementary level mathematics screening and diagnostic tools to identify students with mathematics deficiencies so teachers can intervene with differentiated lessons in order to remediate student deficiencies. Most current tools either provide inadequate diagnostic information or are too time consuming to administer on a large scale to K-2 classrooms (Brendefur, Thiede, & Strother, 2011). This underscores the points previously made that high quality screeners must have strong predictive validity (a score should accurately predict difficulty on future math assessments), reliability (when compared to equivalent assessments), brevity, ease of use, and availability of normative data (Lembke, 2024).

Screening is vital in secondary schools as they focus on identifying gaps in more advanced and specific content areas, such as algebra and geometry. This ensures that students are prepared for the complexity of the curriculum and that they have the skills necessary for academic success in higher education and readiness for their future careers. Screening helps identify students who may need additional support to achieve these goals. In secondary school, screening continues to monitor progress, but with a focus on readiness for post-secondary experiences and meeting graduation requirements. This helps keep students on track for post-secondary success. Interventions at this level are often targeted and subject-specific, addressing particular areas of weakness that could hinder academic performance. This includes providing support for advanced coursework and preparation for college or vocational training. Screening provides ongoing data to inform instructional decisions for students with learning disabilities or other challenges, ensuring that they receive the appropriate support to succeed in a more demanding academic environment.

Screening in elementary school when compared to secondary school share the overarching goals of early detection, progress monitoring, and guiding interventions, but differ in focus and implementation due to the developmental stages and specific needs of students. In elementary school, screening is crucial for early detection of learning difficulties which lead to the development of interventions to support the acquisition of foundational skills, such as basic arithmetic and literacy. It involves

tracking developmental progress and determining which young learners will need additional intervention. In contrast, secondary school screening focuses on identifying gaps in more advanced content areas, ensuring academic and career readiness, and monitoring progress towards standardized tests and graduation requirements. Interventions at this level are more targeted and subject-specific, addressing particular areas of weakness to prepare students for higher education and vocational success. Screening at all levels emphasizes supporting diverse learners with appropriate scaffolds and supports to meet the demands of more complex mathematics concepts.

Lembke (2024) outlines how universal screening plays an integral role in the Multi-Tiered System of Support (MTSS) framework:

> In an MTSS model, screening data from all students is utilized to determine who is on track to meet long term goals in maths, and who is in need of additional support. In this way, maths screening data is utilized for students in Tier 1 to determine who might show signs of maths risk, and for students in Tiers 2 and 3 to determine if risk remains after a period of instruction and intervention — and to what degree this risk has been remediated or has grown. When thinking about how universal screening is situated within an MTSS model, we often think of universal screening occurring three times per year (beginning, middle, and end of school year) while Tier 1 (class wide, or school-wide instruction), Tier 2 (targeted intervention, small group), and Tier 3 (individualized intervention) are also occurring.

Mathematics screening assessments are (RIDE, 2010):

- Used as a first alert or indication of being at risk for deficits in mathematics skills or concepts.
- Administered to **all** students *before* instruction.
- Quick and easy to administer to a large number of students.
- Generally used to assess key skills that are indicators of a students' larger skill set, rather than an in-depth analysis of the standards.
- Correlated with content and/or instructional objectives germane to grade level performance.

- Rarely able to provide specific information needed to determine the most appropriate intervention or target for instruction.

Mathematics screening assessments are **not**:

- Designed to identify or diagnose a specific math learning disability.
- Interim or Benchmark assessments on their own
    - Mathematics Screeners can be viewed as a subset of an interim assessment with a specific focus on screening for risk of mathematical difficulty, but do not delve deep enough to ascertain what the specific difficulties are or why those difficulties exist.

Mathematics screening assessments should be used to answer questions, including but not limited to (Lembke, 2024):

- Which students are experiencing mathematics difficulty?
- Which students are at risk for mathematics difficulty and need further diagnostic assessment(s) and/or additional interventions, and how consequential are those risks?
- In which areas of math is a student struggling?
- How will the screening data be used?
- Is the screener reliable and valid for the intended use?
- What is the cost for the screening compared to the utility? For instance, if this is the first time implementing math screening, a school may want to pilot a free or low-cost screener with a small group of students to get a sense of implementation concerns
- How long does it take to complete?
- How is the data gathered, where is it stored, and how easy is it to access?
- Who needs to be trained to administer the screening tool, and how difficult is it to train?
- How are the assessment results presented?
- What level of ongoing support is needed?
- Can the screening tool be used across grades?
- Does the tool correctly classify students into the correct ranges according to their skill levels and are students from a variety of backgrounds and programs accurately represented? (e.g., differently abled students, multilingual learners)

Screening Overview

Based on the Rhode Island Secondary Regulations §2.2.1 LEAs must screen all students **at least once a year**. While having data three times a year is suggested we also recommend thinking about other types of assessment data that may reduce the need to test all students three times a year. For example, if a student performed very well on the beginning of the year screening assessment, and unit and formative assessments given throughout the year show the student is continuing to make progress and excel, you may not need to assess the student mid-year. A sample screening schedule is outlined in Figure 1.

The intended purpose and function of screening varies slightly at each point during the year at which that screener is administered (Lembke, 2024).

Point in Time	Purpose
Beginning of Year	• Identify which students are at grade level • Identify early indicators for students who are at-risk for falling behind
Mid-Year	• Identify which students are at grade level • Identify which students have started to fall behind their peers and the determined benchmark *Mid-Year is especially important for young learners
End of Year	• Document students' academic performance after a year of instruction • Identify students that might need additional instruction in the following academic year

Skills to Assess for Early Identification of Mathematics Difficulties

Developing number sense in early elementary education is essential as it establishes a fundamental understanding of numbers and their relationships, serving as a crucial building block for more complex mathematical concepts and problem-solving skills. Children with strong number sense can think flexibly about numbers and employ various strategies to solve problems, enhancing their overall problem-solving abilities. Additionally, a solid number sense reduces math anxiety by fostering confidence and competence, promoting a positive attitude towards mathematics, and encouraging continuous learning. Early development of number sense is linked to better performance in mathematics throughout elementary school and beyond, laying the groundwork for future success in advanced mathematical topics.

"Number sense is not a finite entity that a student either has or does not have but rather a process that develops and matures with experience and knowledge"(Cain & Faulkner, 2009).

The focus of defining indicators of Number Sense allows for a more detailed assessment of students' abilities, facilitating early identification of specific areas where they may need additional support. Improving the overall effectiveness of the screening process leads to better-informed instructional decisions and more tailored educational interventions. Effective implementation of a research-based screening measure is critical for early identification of students at risk of difficulties in mathematics. Difficulties in math can be reduced with early evidence-based intervention.

Virtually all math screening measures for the primary grades rely on assessing aspects of what is often referred to as number sense (Clarke et al., 2012). While research has shown that number sense is one of the most ubiquitous measures when talking about math screeners, it is also hard to define. Different organizations have developed, refined, and researched varying definitions of number sense. Case (1998) noted, "number sense is difficult to define but easy to recognize." While Okamoto and Case (1996) (cited in Clarke et al., 2012) describe number sense as the development of increasingly sophisticated understanding of numbers and understanding that is typically represented by students' ability to use increasingly sophisticated mental number lines. Further still, the National Council of Teachers of Mathematics (1989) defines number sense as "*the ability to understand the meaning of numbers, define different relationships among numbers, recognize the relative size of numbers, and think flexibly with numbers.*"

Phrases such as "number sense," "operation sense," and "intuitive understanding of number" are used throughout the Curriculum and Evaluation Standards for School Mathematics (NCTM, 1989) to describe an intangible quality possessed by successful mathematics learners. Number sense refers to an intuitive feeling for numbers and their various uses and interpretations, an appreciation for various levels of accuracy when computing, the ability to detect arithmetical errors, and a common-sense approach to using numbers (Howden 1989; McIntosh, Reys, & Reys 1991). Number sense is not a finite entity that a student either has or does not have but rather a process that develops and matures with experience and knowledge (Cain & Faulkner, 2009). It does not develop by chance, nor does being skilled at manipulating numbers necessarily reflect this acquaintance and familiarity with numbers. Above all, number sense is characterized by a desire to make sense of numerical situations, including relating numbers to context and analyzing the effect of manipulations on numbers. It is a way of thinking that should permeate all aspects of mathematics teaching and learning.

"Above all, number sense is characterized by a desire to make sense of numerical situations, including relating numbers to context and analyzing the effect of manipulations on numbers. It is a way of thinking that should permeate all aspects of mathematics teaching and learning"(Cain and Faulkner, 2009) .

As clearly demonstrated, number sense has historically been defined in somewhat circular terms. This circular tendency reflects, perhaps unwittingly, a cultural vision of mathematical ability as something that is gifted to the individual rather than learned through specific patterns of habit and patience (Cain and Faulkner, 2009).

Possessing number sense ostensibly permits one to achieve everything from understanding the meaning of numbers to developing strategies for solving complex math problems; from making simple magnitude comparisons to inventing procedures for conducting numerical operation (Berch, 2005). Math difficulties in late elementary grades have been linked to a failure to develop basic number sense and poor performance on one-to-one correspondence, number identification, and number line estimation (Locuniak & Jordan, 2008; Mazzocco & Thompson, 2005).

"This circular tendency reflects, perhaps unwittingly, a cultural vision of mathematical ability as something that is gifted to the individual rather than learned through specific patterns of habit and patience" (Cain & Faulkner, 2009).

Early number sense predicts later math achievement, *over and above* reading skill and general cognitive competencies (Gersten et al., 2011).

While the term "number sense" is broad, and defined differently from organizations and researchers over time, RIDE will classify number sense to include the following skills: Subitization, Magnitude Comparison, Strategic Counting, Math Fact Retrieval/Semantic Memory, Numeral Recognition, Cardinality, One to One Correspondence, Geometry, and Measurement.

While this document does not aim to be exhaustive, it provides definitions for each of these terms to establish a standardized understanding. Local Education Agencies (LEAs) should refer to these definitions when selecting screeners to evaluate these skills. Appendix C includes descriptions of these skills.

Number Sense Indicators	
Subitization	The ability to instantly recognize the number of objects in a small group without the need for counting.
Magnitude Comparison	Understanding and evaluating the relative sizes or quantities of numbers, such as determining which number is greater or smaller, and by how much.
Strategic Counting	The ability to understand how to count efficiently and use counting strategies.
Math Fact Retrieval/Semantic Memory	The ability to automatically retrieve addition and subtraction number combinations and the ability to store and retrieve abstract information efficiently.
Numeral Recognition	Encompasses the ability to identify and name numbers, understand their values, and recognize their corresponding symbols.
Cardinality	The understanding of the quantity or number of elements in a set. It is the realization that the last number counted in a sequence represents the total number of objects in that set.
One-to-One Correspondence	The precise matching of each element in one set to a unique element in another set, typically aligning objects with number names in counting. This process ensures that each object is counted once and only once, which is crucial for accurate counting.
Measurement and Data	How to compare and quantify objects, and collect, organize, and interpret information.
Geometry	Develops spatial reasoning, shape recognition, and an understanding of the physical world around them.

When should the Number Sense Indicators be assessed?

Skill	Grades		
	K	1	2
Subitization	✓	✓	
Magnitude Comparison	✓	✓	✓
Strategic Counting	✓	✓	✓
Math Fact Retrieval/Semantic Memory			✓
Numeral Recognition	✓	✓	
Cardinality	✓	✓	
One to One Correspondence	✓	✓	
Geometry	✓	✓	✓
Measurement and Data		✓	✓

*This table intentionally provides guidance for skills that should be assessed in K-2 that exist parallel to, and in conjunction with, the RI Core Standards in Mathematics. This focus is based on skills that are within the K-2 standards, while the grades 3-12 assessments target the standards more explicitly.

Selecting a Math Screener

Using the Tool

This tool is designed for LEAs to learn about and compare mathematics screeners. **The Rhode Island Department of Education (RIDE) does not endorse specific screening assessments.** This tool is not intended to provide a comprehensive list of all available math screeners; it is a sample list of widely used assessment tools that LEAs may wish to consider using when screening students in mathematics and deciding future interventions. RIDE encourages LEAs to research and select the screener that best meets their needs.

The following outline details the purpose of each component of the tool:

Name of the Screening Assessment

Grade Levels: Each assessment targets a different grade span.

Administration: Describes how the assessment is administered.

- Paper indicates students use paper copies of the assessment.
- Digital indicates students complete the assessment on a device.
- Some assessments are conducted on paper but have a digital portal in which teachers input the data into an assessment program.

National Center on Intensive Intervention (NCII): Link to the NCII report/review of individual screeners, where applicable.

Language(s): Indicates the available languages for the assessment.

Time: Time requirements vary by assessment. These times are approximate and provided by the vendor.

Progress Monitoring Tools: Indicates whether progress monitoring tools are included.

To determine skills assessed at individual grade levels, the Rhode Island Early Learning and Development Standards, RI Core Math Standards , RI Core Standards/Common Core State Standards Comparison Tables, and Appendix C: Defining Foundational Skills are included for reference.

Assesses: Table listing the content standards/domains addressed in this document, along with a second column to be filled in to answer the following question: At which grade levels are each of the following skills addressed/covered in your screener?

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization											Operations and Algebraic Thinking										
Magnitude Comparison											Geometry										
Strategic Counting											Ratios and Proportional Relationships										
Math Fact Retrieval/Semantic Memory											The Number System										
Numeral Recognition											Expressions and Equations										
Cardinality											Statistics and Probability										
One to One Correspondence											Number and Quantity										
Number and Operations – Base Ten											Functions										
Number and Operations – Fractions											Algebra										
Measurement and Data																					

Math Screener Comparison Chart K-2

*Denotes partial alignment for specific skills at each grade levels. Refer to "When should Number Sense Indicators be assessed?" for more details.
X denotes full alignment.
A blank square denotes that a skill is not assessed at that grade level/span.

	Subitizing	Magnitude Comparison	Strategic Counting	Math Fact Retrieval/ Semantic Memory	Numerical Recognition	Cardinality	1:1 Correspondence	Geometry	Measurement
Acadience Math (K-6)	*	*	*		**X**	*		*	*
aimswebPlus (Pk-12)	*	*	*	**X**	**X**	**X**		**X**	**X**
ASPENS (K-1)		**X**	**X**	**X**	*				

Classworks Universal Screener (K-10)	X	X	X	X	X	X	X	X	X
easyCBM(K-8)			*		X	X		X	X
Exact Path (K-12)	X	X	X	X	X	*	*	X	X
FastBridge aMath (K-12)		X				*		X	X
FastBridge earlyMath (K-1)	*	*	X	*	X	*	*		

Forefront USNS (K-6)	*	*	X	X	X	*	X		
Iowa Algebra Aptitude Test (7-8)									
Iowa Assessments (Forms E, F, G) (K-12)				X				X	X
I-Ready (K-12)		X	X	X	X	*	*	X	X
Istation Math (K-8)	X	X	X	X	X	X	X	X	X

IXL LevelUp (K-12)	*	X	*	X	*	*	*	X	X
MAP Growth (K-12)		X	X	X	X	X	X	X	X
mCLASS 1st edition (K-3)		X	X	X	X				
mCLASS 2nd edition (K-8)		X	*	X	*	X	X	X	X
MyIGDIs (PK)	X	X	X		X	X	X		
Renaissance STAR Math (K-12)	X	X	X	X	X	X	X	X	X

Spring Math (K-7)		**X**	*	**X**	*	*	*		

Math Screener Comparison Chart 3-5

*Denotes partial alignment for specific skills at each grade levels. Refer to "When should Number Sense Indicators be assessed?" for more details.
X denotes full alignment.
A blank square denotes that a skill is not assessed at that grade level/span.

	Operations and Algebraic Thinking	Number and Operations - Base Ten	Number and Operations - Fractions	Measurement and Data	Geometry
Acadience Math (K-6)	**X**	**X**	**X**	**X**	**X**
aimswebPlus (PK-12)	**X**	**X**	**X**	**X**	**X**
ASPENS (K-1)					

Classworks Universal Screener (K-10)	X	X	X	X	X
easyCBM (K-8)	X	X	X	X	X
Exact Path Diagnostic Assessment (K-12)	X		X	X	X
FastBridge aMath (K-8)	X	X	X	X	X
FastBridge earlymath (K-1)					

Forefront USNS (K-6)	X	X	X		
Iowa Algebra Aptitude Test (7-8)					
Iowa Assessments (Forms E, F, G) (K-12)	*	X	X	X	X
I-Ready (K-8)	X	X	X	X	X
Istation Math (K-8)	X	X	X	X	X
IXL LevelUp (K-12)	X	X	X	X	X

MAP Growth (K-8)	X	X	X	X	X
mCLASS 1st edition (K-3)		X	X		
mCLASS 2nd edition (K-8)	X	X	X	X	X
MyIGDIs (PK)					
Renaissance STAR Math (K-12)	X	X	X	X	X
Spring Math (K-7)	X	X			

Math Screener Comparison Chart 6-8

*Denotes partial alignment for specific skills at each grade levels. Refer to "When should Number Sense Indicators be assessed?" for more details.
X denotes full alignment.
A blank square denotes that a skill is not assessed at that grade level/span.

	Geometry	Ratios and Proportional Relationships	The Number System	Expressions and Equations	Statistics and Probability
Acadience Math (Composite) (K-6)	**X**	**X**	**X**	**X**	**X**
aimswebPlus (PK-12)	**X**	**X**	**X**	**X**	**X**
ASPENS (K-1)					

Classworks Universal Screener (K-10)	X	X	X	X	X
easyCBM (K-8)	X	X	X	X	X
Exact Path Diagnostic Assessment (K-12)	X	X		X	X
FastBridge aMath (K-8)	X	*	X	X	X
FastBridge earlyMath Composite (K-1)					

Forefront USNS (K-6)					
Iowa Algebra Aptitude Test (7-8)	*	X	*	X	*
Iowa Assessments (Forms E,F,G) (K-12)	X			X	X
I-Ready (K-12)	X	*	X	X	X
Istation Math (K-8)	X	X	*	*	*
IXL LevelUp (K-8)	X	X	X	X	X

MAP Growth (K-12)	X	*	X	X	X
mCLASS 1st edition (K-3)					
mCLASS 2nd edition (K-8)	X	X	X	X	X
MyIGDIs (PK)					
Renaissance STAR Math (K-12)	X	X	X	X	X
Spring Math (K-7)		X	X	X	

Math Screener Comparison Chart 9-12

*Denotes partial alignment for specific skills at each grade levels. See "When should Number Sense Indicators be assessed?" for more details.
X denotes full alignment.
A blank square denotes that a skill is not assessed at that grade level/span.

	Number and Quantity	Algebra	Functions	Geometry	Statistics and Probability
Acadience Math (Composite) (K-6)					
aimswebPlus (PK-12)	**X**	**X**	**X**	**X**	**X**
ASPENS (K-1)					

Classworks Universal Screener (K-10)	X	X	X	X	X
easyCBM (K-8)					
Exact Path Diagnostic Assessment (K-12)		X	X	X	X
FastBridge aMath (K-12)	X	X	X	X	X
FastBridge earlyMath Composite (K-1)					
Forefront USNS (K-6)					

Iowa Algebra Aptitude Test (7-8)					
Iowa Assessments (Forms E,F,G) (K-12)		X	X	X	X
I-Ready (K-12)	X	X	X	X	X
Istation Math (K-8)					
IXL LevelUp (K-8)					
MAP Growth (K-12)					

mCLASS 1st edition (K-3)					
mCLASS 2nd edition (K-8)					
MyIGDIs (PK)					
Renaissance STAR Math (K-12)		**X**	**X**	**X**	**X**
Spring Math (K-7)					

Determining Benchmarks for "Below Grade Level"

Per legislation, students identified as **below or significantly below benchmark/grade level** shall be provided with specialized interventions and supports. Each publisher uses specific language to designate students at, below, and significantly below benchmark. These benchmarks may or may not be aligned with the current benchmarks of the state assessment. Please note that some assessments allow LEAs to set localized norms. However, as a word of caution, adjusting norms will impact designations and students should be compared using national norms. Of significant importance is looking at whether your measures are normative, or criterion based. Percentiles are normative, so you may have students who may be above the 25th percentile and still may not be meeting grade level standards. It is important to use the information as a guide rather than a rule, considering the individual contexts of the classroom, school, or district. It is also important to use criterion measures such as scaled scores to both understand performance relative to the standards and grade level peers. For additional information regarding criterion and norm referenced measures, please refer to "Criterion versus Norm Referenced Measures" at the end of this section.

	At/Above Benchmark	**Below Benchmark**	**Significantly Below Benchmark**
	Students are at minimal risk for requiring mathematics-based intervention.	*Students should receive targeted intervention based on their specific need*	*Students should receive intensive intervention through data-based individualization.*
Acadience Math (K-6)	At/Above Benchmark	Below Benchmark	Well Below Benchmark
aimswebPlus (PK-12)	Low Risk	Moderate Risk	High Risk
ASPENS (K-1)	Benchmark (above 35th percentile)	Strategic (between 16th and 35th percentiles)	Intensive (below 15th percentile)
Classworks Universal Screener (K-10)	At/Above Grade Level (at or above 40th percentile)	On Watch (between 25th and 40th percentile) Intervention (between 10th and 25th percentile)	Urgent Intervention (below 10th percentile)
easyCBM (K-8)	Low Risk (white - between 21st and 89th percentile; green - 90th percentile or greater)	Some Risk (yellow - between 11th and 20th percentile)	High Risk (red - below 10th percentile)

Exact Path Diagnostic Assessment (K-12)	Meets/Exceeds	Approaching	Below
FastBridge aMath (K-12)	Low/No Risk	Some Risk	High Risk
FastBridge earlyMath (K-1)	Low/No Risk	Some Risk	High Risk
Forefront USNS (K-6)	Proficient	Approaching Proficiency/Needs Support; Basic, Below Basic	Needs Support; Well Below Basic
Iowa Algebra Aptitude Test (6-8)	Advanced (Gr. 6 between 77th and 99th percentile; Gr. 7/8 between 89th and 99th percentile)	Proficient (Gr. 6 between 41st and 76th percentile; Gr. 7/8 between 41st and 88th percentile)	Not Proficient (Gr. 6-8 between 1st and 40th percentile)
Iowa Assessments (Forms E,F,G) (K-12)	High (above 64th percentile)	Mid (between 36th and 64th percentile)	Low (below 36th percentile)
I-Ready (K-12)	No Observed Risk	At Some Risk	At Risk
Istation Math (K-8)	Above 40th percentile/At Grade Level	Between 21st and 40th percentile/ Intervention	20th percentile and below/ Intensive Intervention
IXL LevelUp (K-12)	At/Above Grade Level	Below Grade Level	Well Below Grade Level
MAP Growth (K-12)	Average (between 41st and 60th percentile); Above Average (between 61st and 80th percentile); High (above 80th percentile)	Below Average (between 21st and 40th percentile)	Low (below 20th percentile)
mCLASS 1st edition (K-3)	Core Support/Negligible Risk/Minimal Risk (at/above 40th percentile)	Strategic Support/Some Risk (between 20th and 40th percentile)	Intensive support/At risk (below 20th percentile)
mCLASS 2nd edition (K-8)	Core Support/Negligible Risk/Minimal Risk (at/above 40th percentile)	Strategic Support/Some Risk (between 20th and 40th percentile)	Intensive support/At risk (below 20th percentile)
MyIGDIs Early Numeracy (PK)	(Green)Tier 1/Strong progress	(Orange) More information needed	(Red)Tier II/III/At-Risk progress
Renaissance STAR Math (K-12)	At/Above Benchmark	Below Benchmark/On Watch	Intervention/Urgent Intervention
Spring Math (K-7)	Mastery	Instructional	Frustrational

Based on Lembke (2024) recommendations, once a screener has been administered, teams should consider questions, including but not limited to:

- Which students may need supplemental instruction to reach the grade level proficiency and,
- Which degree of intervention intensity (universal, targeted, or intensive) does each student need?

To determine next steps, teams should analyze their data:

- Once universal screening scores are obtained, identify students at risk or underperforming using the data provided by the screener
  - General guidelines indicate that students performing below the 25th percentile are in need of intervention. This may vary depending on the specific school population
- For students at risk, determine the level of intervention intensity:
  - For example:
    - Students between the 10th and 25th percentile = targeted intervention (Tier 2)
    - Students below the 10th percentile = intensive intervention (Tier 3)

Criterion versus Norm Reference Measures	
Type of Measure	Description
Criterion Referenced	A test in which the results can be used to determine a student's progress toward mastery of a content area. Performance is compared to an expected level of mastery in a content area rather than to other students' scores. Such tests usually include questions based on what the student was taught and are designed to measure the student's mastery of designated objectives of an instructional program. The "criterion" is the standard of performance established as the passing score for the test. *Items are selected for criterion referenced tests based on content and specifically to be able to differentiate between proficiency levels.*
Norm Referenced	A test in which a student or a group's performance is compared to that of a norm group. The results are relative to the performance of an external group and are designed to be compared with the norm group providing a performance standard. Often used to measure and compare students, schools, districts, and states on the basis of norm-established scales of achievement. *Items are selected for norm referenced tests specifically for the purpose of being able to differentiate between student scores.*

Appendix A: Individual Math Screener Summaries

Acadience Math(K-6)

Grade Levels: K-6.

National Center on Intensive Intervention (NCII): Acadience NCII Review

Administration: Acadience Math administered to students using paper copies of the assessment. Please note that teachers can capture student responses via paper-pencil or digital scoring via Acadience Learning Online. Acadience Administration Manual

Language(s): Acadience Math is available in English.

Time: The amount of time it will take to complete the benchmark assessment for each student will vary by grade and time of year. The table provides an estimate of the time required per student:

Grade	Time of Year and Measures	Time to Test	Total
Kindergarten	BOY, MOY, EOY: BQD, NIF, NNF	Three 1-minute tests given individually	3 minutes
First Grade	BOY: NIF, NNF, AQD, MNF, Computation MOY, EOY: AQD, MNF, Computation	Four 1-minute tests given individually; Two 2-minute tests done whole class. AND Two 1-minute tests given individually; Two 2-minute tests done whole class	8 minutes 6 minutes
Second Grade	BOY, MOY, EOY: Computation, Concepts and Applications	Two 2-minute tests individually and one 5-minute test done whole class	9 minutes
Third-Sixth Grade	BOY, MOY, EOY: Computation, Concepts and Applications	Two 3- to 6-minute tests individually and one 10- to 16-minute test	18-28 minutes

Note: BOY = beginning of year, MOY = middle of year, EOY = end of year. Time to test does not take into account time required for scoring the measures.
BQD = Beginning Quantity Discrimination; NIF= Number Identification Fluency; NNF = Next Number Fluency; AQD = Advanced Quantity Discrimination; MNF = Missing Number Fluency.

Progress Monitoring Tools: Acadience Math materials are also available for progress monitoring. The progress monitoring materials include 20 alternate forms of equivalent difficulty of each of the Acadience Math measures: BQD, NIF, NNF, AQD, MNF, Computation (20 different progress

monitoring worksheets for each grade 1–6; 120 total), Concepts and Applications (20 different progress monitoring worksheets for each grade 2–6; 100 total).

*Note: BQD = Beginning Quantity Discrimination; NIF= Number Identification Fluency; NNF = Next Number Fluency; AQD = Advanced Quantity Discrimination; MNF = Missing Number Fluency.

To determine skills assessed at individual grade levels, reference the: Rhode Island Early Learning and Development Standards, RI Core Math Standards , RI Core Standards/Common Core State Standards Comparison Tables, and Appendix C: Defining Foundational Skills

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization	✓										Operations and Algebraic Thinking		✓	✓	✓	✓	✓	✓			
Magnitude Comparison	✓	✓									Geometry			✓	✓	✓	✓	✓			
Strategic Counting	✓	✓									Ratios and Proportional Relationships							✓			
Math Fact Retrieval/Semantic Memory											The Number System							✓			
Numeral Recognition	✓	✓									Expressions and Equations							✓			
Cardinality	✓										Statistics and Probability							✓			
One to One Correspondence											Number and Quantity										
Number and Operations – Base Ten		✓	✓	✓	✓	✓	✓				Functions										
Number and Operations – Fractions				✓	✓	✓	✓				Algebra										
Measurement and Data	✓		✓	✓	✓	✓	✓														

aimswebPlus (PK-12)

Grade Levels: PK-12 (refer to aimswebPlus Assessment Matrix)

National Center on Intensive Intervention (NCII): aimswebPlus has not been reviewed as an academic screener. While NCII has reviewed aimswebPlus as a progress monitoring tool, that review is no longer applicable: the NCII review posted on the website was from 2017, and since then, our products have significantly evolved.

The Pearson team is committed to updating and expanding our presence on the NCII website throughout 2024 and beyond. We adhere to the NCII submission timelines and will submit updates as those windows open. Meanwhile, we have provided a guidance document that outlines our current and developing evidence that aligns with the NCII categories.

Administration:

Measure	Grade Levels & Periods	Progress Monitoring and SLA	Time	Administration Method		
						
The measure or assessment name and acronym	The grade/age levels and screening periods (fall, winter, spring, summer) when benchmarking measures are available, and the grade levels that monitoring measures are available throughout the year	The measure is available for progress monitoring and survey level assessment (SLA)	The average completion time for untimed measures or the time allowed for timed measures	***Digital Record Forms (DRF) measure:*** The measure is administered to students in one-to-one test sessions. Students view printed/digital materials and provide an answer. Examiners mark students' responses on the DRF in their aimswebPlus account.	***TestNav measure:*** The measure is delivered to students through TestNav, an online test delivery platform. Each student has unique login credentials (username and password) to access assigned measures in the Reading or Math domains. These measures may be group administered.	***Paper/Pencil measure:*** The students write their responses on a printed test form. Examiners hand score the responses and enter the results into the aimswebPlus system. These measures may be group administered.

aimswebPlus measures are administered using three administration methods: digital record form (DRF), where test administrator inputs responses directly into system; independent computer-based assessment on Pearson's TestNav assessment platform; or paper/pencil, where student responds directly on paper and test administrator inputs responses for scoring and reporting. Each aimswebPlus measure utilizes the administration method that optimizes the experience for both the student and the examiner.

DRF: Quantity Total Fluency, Concepts & Applications, Number Naming Fluency, Quantity Difference Fluency, Number Comparison Fluency–Pairs, Math Facts Fluency–1 Digit, Math Facts Fluency–Tens

TestNav: Number Comparison Fluency–Triads, Mental Computation Fluency, Concepts & Applications

Paper/Pencil: Classic Mathematics Concepts and Applications (M–CAP)

Language(s): English and Spanish

Time:
Pre-K: 9–14 minutes
K–1: 10–15 minutes
2–12: 19–42 minutes

Progress Monitoring Tools: Progress monitoring available for Number Naming Fluency, Quantity Total Fluency, Quantity Difference Fluency, Number Comparison Fluency–Pairs, Math Facts Fluency–1 Digit, Math Facts Fluency–Tens, Number Comparison Fluency–Triads, Mental Computation Fluency, Classic Mathematics Concepts and Applications

To determine skills assessed at individual grade levels, reference: ***Rhode Island Early Learning and Development Standards***, ***RI Core Math Standards*** , ***RI Core Standards/Common Core State Standards Comparison Tables,*** ***and*** ***Appendix C: Defining Foundational Skills***

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization	✓	✓									Operations and Algebraic Thinking	✓	✓	✓	✓	✓	✓				
Magnitude Comparison		✓	✓	✓	✓	✓	✓	✓	✓	✓	Geometry	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Strategic Counting	✓										Ratios and Proportional Relationships							✓	✓	✓	✓
Math Fact Retrieval/Semantic Memory		✓	✓	✓	✓	✓	✓	✓	✓	✓	The Number System							✓	✓	✓	✓

Numeral Recognition	✓	✓									Expressions and Equations							✓	✓	✓	✓
Cardinality	✓	✓									Statistics and Probability							✓	✓	✓	✓
One to One Correspondence											Number and Quantity	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Number and Operations – Base Ten	✓	✓	✓	✓	✓	✓					Functions									✓	✓
Number and Operations – Fractions				✓	✓	✓					Algebra							✓	✓	✓	✓
Measurement and Data	✓	✓	✓	✓	✓	✓															

aimswebPlus Testing Window Summary

Early Numeracy & Math

F = Fall W = Winter S = Spring SU = Summer

Measure	Pre-K Benchmark/Screening				Kindergarten Benchmark/Screening				Grade 1 Benchmark/Screening				Grades 2–12 Benchmark/Screening				Progress Monitoring & SLA	Time	Admin. Method
	F	W	S	SU	F	W	S	SU	F	W	S	SU	F	W	S	SU			
Number Naming Fluency (NNF)		✓	✓	✓	✓[a]	✓[a]	✓[a]	✓[a]	✓[b]	✓[b]	✓[b]						✓[c]	~1 min	
Quantity Total Fluency (QTF)	✓	✓	✓	✓	✓[a]	✓[a]	✓[a]	✓[a]									✓[c]	1 min	
Quantity Difference Fluency (QDF)					✓[b]	✓	✓	✓									✓[c]	1 min	
Concepts & Applications (CA)	✓	✓	✓	✓	✓[a]	✓[a]	✓[a]	✓[a]	✓[a]	✓[a]	✓[a]	✓[a]						~7–12 min	
Number Comparison Fluency–Pairs (NCF-P)									✓[a]	✓[a]	✓[a]	✓[a]					✓[d]	1 min	
Math Facts Fluency–1 Digit (MFF-1D)									✓[a]	✓[a]	✓[a]	✓[a]					✓[d]	1 min	
Math Facts Fluency–Tens (MFF-T)									✓[b]	✓	✓	✓					✓[d]	1 min	
Concepts & Applications (CA)													✓[a]	✓[a]	✓[a]	✓[a]		~12–35 min	
Number Comparison Fluency–Triads (NCF-T)													✓[agh]	✓[agh]	✓[agh]	✓[agh]	✓[gh]	3 min	
Mental Computation Fluency (MCF)													✓[agh]	✓[agh]	✓[agh]	✓[agh]	✓[gh]	4 min	

a - required for composite
b - newly added without national norms
c - uses kindergarten progress monitoring forms
d - uses Grade 1 progress monitoring forms
g - Grades 9-12 forms use Grade 8 norms
h - component of Number Sense Fluency (NSF)

(aimswebPlus, 2024)

Assessing Student Proficiency in Early Number Sense (ASPENS) (K-1)

Grade Levels: K-1

National Center on Intensive Intervention (NCII): ASPENS NCII Review
Refer to Brafford et al., 2023 for further information on psychometrics regarding dual-learners (Multilingual Learners).

Full citation: Brafford, T., Clarke, B., Gersten, R. M., Smolkowski, K., Sutherland, M., Dimino, J., & Fainsten, D. (2023). Exploring an early numeracy screening measure for English learners in primary grades. Early Childhood Research Quarterly, 63, 278-287. https://doi.org/10.1016/j.ecresq.2022.12.007

Administration: ASPENS is administered paper/pencil, individually.

Language(s): English

Time: Approximately 7 minutes for administration, 2 minutes for scoring.

Progress Monitoring Tools: Yes, progress monitoring tools are included.

To determine skills assessed at individual grade levels, reference: Rhode Island Early Learning and Development Standards, RI Core Math Standards , RI Core Standards/Common Core State Standards Comparison Tables, and Appendix C: Defining Foundational Skills

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization											Operations and Algebraic Thinking										
Magnitude Comparison	✓	✓									Geometry										
Strategic Counting	✓	✓									Ratios and Proportional Relationships										
Math Fact Retrieval/Semantic Memory		✓									The Number System										

Numeral Recognition	✓										Expressions and Equations										
Cardinality											Statistics and Probability										
One to One Correspondence											Number and Quantity										
Number and Operations – Base Ten											Functions										
Number and Operations – Fractions											Algebra										
Measurement and Data		✓																			

ASPENS has benchmark scores for each grade level and each time of testing (fall, winter, and spring) that correspond to predicted end-of-year performance on a nationally standardized test of mathematics:

a. above the 35th percentile (also known as minimal risk or at or above grade level);
b. between the 16th and 35thpercentile (some risk); and,
c. at or below the 15th percentile (significantly below grade level or high risk).

Performance Category	Interpretation	Kindergarten Composite Score	Grade 1 Composite Score
Benchmark	Students very likely to end the year either at, above, or near grade level. Only requires core (Tier 1) instruction.	Above 125	Above 57
Strategic	Students have roughly a 50-50 chance of ending the year at grade level. Monitor progress and consider intervention if status was also Strategic in the fall and winter.	75–125	41–57
Intensive	Unlikely to end the year at or above grade level. Requires intervention.	Below 75	Below 41

(ASPENS, 2024)

Classworks Universal Screener (K-10)

Grade Levels: K– 10

National Center on Intensive Intervention (NCII): Classworks Universal Screener NCII Review

Administration: Digital

Language(s): English and Spanish

Time: Approximately 35-40 minutes to complete an assessment.

Progress Monitoring Tools: Curriculum Based Measurements are included with the purchase of Classworks. Classworks Progress Monitoring is endorsed by NCII and appears on the Academic Progress Monitoring Tools chart.

To determine skills assessed at individual grade levels, reference: ***Rhode Island Early Learning and Development Standards*****,** ***RI Core Math Standards*** **,** ***RI Core Standards/Common Core State Standards Comparison Tables,*** ***and*** ***Appendix C: Defining Foundational Skills***

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization	✓	✓	✓	✓	✓						Operations and Algebraic Thinking	✓	✓	✓	✓	✓	✓				
Magnitude Comparison	✓	✓	✓	✓	✓	✓					Geometry	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Strategic Counting	✓	✓	✓	✓	✓						Ratios and Proportional Relationships							✓	✓	✓	✓
Math Fact Retrieval/Semantic Memory	✓	✓	✓	✓	✓	✓					The Number System							✓	✓	✓	✓
Numeral Recognition	✓	✓									Expressions and Equations							✓	✓	✓	✓

Cardinality	✓	✓									Statistics and Probability							✓	✓	✓	✓
One to One Correspondence	✓	✓									Number and Quantity							✓	✓	✓	✓
Number and Operations – Base Ten	✓	✓	✓	✓	✓	✓					Functions									✓	✓
Number and Operations – Fractions				✓	✓	✓					Algebra							✓	✓	✓	✓
Measurement and Data	✓	✓	✓	✓	✓	✓															

easyCBM (K–8)

Grade Levels: K-8

National Center on Intensive Intervention (NCII): easyCBM NCII Review

Administration: All math measures are designed to be taken by students directly on the computer, with automatic scoring and reporting systems providing just-in-time information to make educational decisions. Because occasions arise when a computer-based test may not be desirable (e.g., lack of computers, student need for accommodations), all easyCBM© measures are also available through downloadable PDFs, with teacher data-entry into the system once students have completed their tests. Computer-based administration of the measures, where students directly respond to the test items online, is recommended for measures that are not individually administered.

Language(s): English and Spanish

Time: The Proficient Math assessments are more challenging and recommended for benchmarking. It has a more spiraled approach to assessing math domains. This measure also includes some questions one grade level above and below. The number of items on the Proficient Math assessment range from 30 items in K, to 35 items in grades 1 & 2, 40 items in grades 3-5, and 45 items in grades 6-8. The assessment is untimed and takes approximately 20 minutes.

An alternative to the Proficient Math assessment is the Basic Math assessment. The Basic Math assessment contains about 45 items that assess specific standards per grade level. This assessment is designed for those students scoring in the lowest 20% on classroom math assessments. The Basic Math assessment has 45 items per assessment and administration time is usually 15-30 minutes.

The Math progress monitoring measures are shorter and take approximately 15 minutes per probe to administer.

Progress Monitoring Tools: With progress monitoring, the Basic Math measure is broken into three Focal Points as identified by NCTM. Within the constructs of mathematics, elements are woven in to build the foundation and progress a student to the next level of mathematics and/or the next topic.

The math progress monitoring probes are parallel in difficulty, so students can continue to practice the same skill, if needed, several times before the next benchmark administration. There are 10 measures for each of the three NCTM strands for each grade and, 10 measures of the Proficient Math probes, for a total of 40 math progress monitoring measures per grade.
CBMSkills may be used for math skill practice for grades K-5 to prepare for the benchmark assessments. CBMSkills Grade Level Modules (Math and Reading)

To determine skills assessed at individual grade levels, reference: Rhode Island Early Learning and Development Standards, RI Core Math Standards , RI Core Standards/Common Core State Standards Comparison Tables, and Appendix C: Defining Foundational Skills

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization											Operations and Algebraic Thinking	✓	✓	✓	✓	✓	✓	✓			
Magnitude Comparison											Geometry	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Strategic Counting	✓										Ratios and Proportional Relationships						✓	✓	✓	✓	
Math Fact Retrieval/Semantic Memory											The Number System						✓	✓	✓	✓	
Numeral Recognition	✓	✓									Expressions and Equations						✓	✓	✓	✓	
Cardinality	✓	✓									Statistics and Probability						✓	✓	✓	✓	
One to One Correspondence											Number and Quantity										
Number and Operations – Base Ten	✓	✓	✓	✓	✓	✓	✓				Functions								✓	✓	
Number and Operations – Fractions			✓	✓	✓	✓	✓				Algebra										
Measurement and Data	✓	✓	✓	✓	✓	✓	✓														

Exact Path Diagnostic Assessment (K-12)

Grade Levels: K-12

National Center on Intensive Intervention (NCII): **Exact Path NCII Review**

Administration: All digital, no paper component

Language(s): The diagnostic is available in English.

Time:

- K-1: Approximately 25 questions, suggested time: approximately 20 minutes to complete.
- 2-12: Approximately 40 questions, suggested time: 30-60 minutes to complete.
- Suggested to be completed within two 20–30-minute sessions.

Progress Monitoring Tools: Progress Monitoring is included within the Learning Path once the diagnostic is completed, but no PM during diagnostic.

To determine skills assessed at individual grade levels, reference: ***Rhode Island Early Learning and Development Standards*****,** ***RI Core Math Standards*** **,** ***RI Core Standards/Common Core State Standards Comparison Tables,*** **and** ***Appendix C: Defining Foundational Skills***

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization	✓	✓	✓								Operations and Algebraic Thinking		✓	✓	✓	✓	✓	✓	✓	✓	✓
Magnitude Comparison	✓	✓	✓	✓	✓	✓					Geometry	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Strategic Counting	✓	✓	✓								Ratios and Proportional Relationships				✓	✓	✓	✓	✓	✓	✓

Math Fact Retrieval/Semantic Memory	✓	✓	✓	✓							The Number System		✓	✓	✓	✓					
Numeral Recognition	✓	✓	✓	✓	✓						Expressions and Equations	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cardinality	✓										Statistics and Probability	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
One to One Correspondence	✓										Number and Quantity		✓	✓	✓	✓	✓	✓	✓	✓	
Number and Operations – Base Ten	✓	✓									Functions									✓	✓
Number and Operations – Fractions				✓	✓	✓	✓	✓	✓	✓	Algebra	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Measurement and Data	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓											

Since the assessment is adaptive, students may see a variety of skills and standards presented in the diagnostic regardless of their enrolled grade level. More advanced students may see skills beyond their own grade level standards while students working below grade level may see skills from previous grades. See the Learning Progression Report (edmentum.com) for more information.

FastBridge aMath (K-12)

Grade Levels: K-12

National Center on Intensive Intervention (NCII): **FastBridge aMath NCII Review**

Administration: Computer

Language(s): English

Time: 20-30 minutes

Progress Monitoring Tools: Yes. FastBridge combines computer-adaptive tests (CAT) and curriculum-based measures (CBMs) for screening and progress monitoring, so educators gain visibility into the math skill strengths and needs of their learners. Valid and reliable progress monitoring within FastBridge helps measure whether math interventions are effective for learners and whether to continue or adjust supports.

To determine skills assessed at individual grade levels, reference: ***Rhode Island Early Learning and Development Standards*****,** ***RI Core Math Standards*** **,** ***RI Core Standards/Common Core State Standards Comparison Tables,*** ***and*** ***Appendix C: Defining Foundational Skills***

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization											Operations and Algebraic Thinking	✓	✓	✓	✓	✓	✓				
Magnitude Comparison	✓	✓	✓	✓	✓	✓					Geometry	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Strategic Counting											Ratios and Proportional Relationships							✓	✓		
Math Fact Retrieval/Semantic Memory											The Number System							✓	✓	✓	

Numeral Recognition											Expressions and Equations							✓	✓	✓	
Cardinality	✓										Statistics and Probability							✓	✓	✓	✓
One to One Correspondence											Number and Quantity										✓
Number and Operations – Base Ten	✓	✓	✓	✓	✓	✓					Functions									✓	✓
Number and Operations – Fractions				✓	✓	✓					Algebra										✓
Measurement and Data	✓	✓	✓	✓	✓	✓															

FastBridge earlyMath (K-1)

Grade Levels: K-1*

*Pre-K in Lab Status

National Center on Intensive Intervention (NCII): **FastBridge earlyMath NCII Review**

Administration: Paper-Based

Language(s): English

Time: 1-4 Minutes

Progress Monitoring Tools: Yes. FastBridge combines computer-adaptive tests (CAT) and curriculum-based measures (CBMs) for screening and progress monitoring, so educators gain visibility into the math skill strengths and needs of their learners. Valid and reliable progress monitoring within FastBridge helps measure whether math interventions are effective for learners and whether to continue or adjust supports.

To determine skills assessed at individual grade levels, reference: ***Rhode Island Early Learning and Development Standards*****,** ***RI Core Math Standards*** **,** ***RI Core Standards/Common Core State Standards Comparison Tables.*** **and** ***Appendix C: Defining Foundational Skills***

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization	✓										Operations and Algebraic Thinking										
Magnitude Comparison	✓										Geometry										
Strategic Counting	✓	✓									Ratios and Proportional Relationships										
Math Fact Retrieval/Semantic Memory		✓									The Number System										

Numeral Recognition	✓	✓									Expressions and Equations										
Cardinality	✓										Statistics and Probability										
One to One Correspondence	✓										Number and Quantity										
Number and Operations – Base Ten											Functions										
Number and Operations – Fractions											Algebra										
Measurement and Data																					

Forefront USNS (K-6)

Grade Levels: K-6; 3 assessments per grade level.

National Center on Intensive Intervention (NCII): The USNS assessments have not yet been submitted for review by the NCII.

A Validity Study was completed: Complete Study Summary
Research that demonstrates predictive validity: Wilkins, Woodward, and Norton (2020)

Administration: Interview and paper.

Fall assessments for all grades are entirely interview based. Midyear and Spring Screeners have a written component. Spring assessments for grades 5 and 6 are entirely paper.

A full assessment guide including script, and detailed rubrics are provided for every assessment.

Language(s): English and Spanish

Time: Interviews take 3-8 minutes per student.
Paper portions (administered whole group) take approximately 30 –45 minutes.

Progress Monitoring Tools: The USNS assessments are validated as a Tier 1 progress monitoring tool.

To determine skills assessed at individual grade levels, reference: Rhode Island Early Learning and Development Standards, RI Core Math Standards , RI Core Standards/Common Core State Standards Comparison Tables, and Appendix C: Defining Foundational Skills

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization	✓										Operations and Algebraic Thinking	✓	✓	✓	✓	✓	✓	✓			
Magnitude Comparison		✓	✓	✓	✓	✓					Geometry										

Publisher's Note: Including Fractions																						
Strategic Counting	✓	✓	✓	✓							Ratios and Proportional Relationships											
Math Fact Retrieval/Semantic Memory		✓	✓	✓	✓	✓					The Number System											
Numeral Recognition	✓	✓	✓	✓	✓	✓	✓				Expressions and Equations											
Cardinality	✓										Statistics and Probability											
One to One Correspondence	✓	✓									Number and Quantity	✓	✓									
Number and Operations – Base Ten	✓	✓	✓	✓	✓	✓	✓				Functions											
Number and Operations – Fractions				✓	✓	✓	✓				Algebra	✓	✓	✓	✓	✓	✓	✓				
Measurement and Data																						

Iowa Algebra Aptitude Test (6-8)

Grade Levels: Can be used at any grade to determine if a student is ready for Algebra. Most take the assessment in middle school and the norms were established with students from grades 6-8.

National Center on Intensive Intervention (NCII): N/A

Administration: The Iowa Algebra Aptitude Test can be administered paper and pencil or online. Online is designed to be taken by students directly on the computer, with automatic scoring and reporting systems providing just-in-time information to make educational decisions. For paper and pencil administration, the assessment can be hand-scored or sent to Riverside Scoring to be scored.

Language(s): The assessment is available in English with paper and pencil administration. When taking IAAT online audio can be enabled, and Google translate can be set.

Time: The assessment takes 40 minutes.

Progress Monitoring Tools: Progress monitoring tools are not included.

To determine skills assessed at individual grade levels, reference: Rhode Island Early Learning and Development Standards, RI Core Math Standards , RI Core Standards/Common Core State Standards Comparison Tables, and Appendix C: Defining Foundational Skills .

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization											Operations and Algebraic Thinking						✓				
Magnitude Comparison											Geometry						✓	✓			
Strategic Counting											Ratios and Proportional Relationships							✓	✓	✓	✓
Math Fact Retrieval/Semantic Memory											The Number System							✓			

Numeral Recognition											Expressions and Equations							✓	✓	✓	
Cardinality											Statistics and Probability							✓			
One to One Correspondence											Number and Quantity										
Number and Operations – Base Ten											Functions										
Number and Operations – Fractions					✓	✓					Algebra										
Measurement and Data				✓	✓																

Iowa Assessments (Forms E,F,G) (K-12)

Grade Levels: K-12

National Center on Intensive Intervention (NCII): Iowa Assessments NCII Review

Administration: The Iowa Assessments can be administered paper and pencil or online. Online is designed to be taken by students directly on the computer, with scoring and reporting systems to make educational decisions. For paper and pencil administration, the assessment can then be hand-scored or sent to Riverside Scoring to be scored.

Language(s): English and Spanish

Time: Time requirements vary by level. Level 5 to 8 are untimed, so administration time is approximate.

- Level 5 and 6 (grades K and 1) takes approximately 25 minutes.
- Level 7-8 (grades 1-3) has two parts. Computation takes approximately 25 minutes and Part I takes approximately 50 minutes. A separate score can be obtained for the two parts, or a total score is provided when taking both parts.
- Level 9-14 (grades 3-8) has two parts, and each part takes 30 minutes to administer.
- Level 15-17/18 (grades 9-12) is one part and takes 40 minutes.

Progress Monitoring Tools: Progress Monitoring tools are not included.

To determine skills assessed at individual grade levels, reference: Rhode Island Early Learning and Development Standards, RI Core Math Standards , RI Core Standards/Common Core State Standards Comparison Tables, and Appendix C: Defining Foundational Skills

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization											Operations and Algebraic Thinking		✓	✓		✓	✓	✓	✓	✓	✓
Magnitude Comparison											Geometry	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Strategic Counting											Ratios and Proportional Relationships										
Math Fact Retrieval/Semantic Memory			✓	✓	✓	✓	✓	✓	✓		The Number System										
Numeral Recognition			✓	✓	✓	✓	✓	✓	✓		Expressions and Equations			✓	✓	✓	✓	✓	✓	✓	✓
Cardinality											Statistics and Probability			✓	✓	✓	✓	✓	✓	✓	✓
One to One Correspondence											Number and Quantity	✓	✓	✓							
Number and Operations – Base Ten		✓	✓	✓	✓	✓	✓	✓	✓	✓	Functions										✓
Number and Operations – Fractions			✓	✓	✓	✓	✓	✓	✓	✓	Algebra									✓	✓
Measurement and Data	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓											

I-Ready (K-12)

Grade Levels: K-12

National Center on Intensive Intervention (NCII):
The *i-Ready Diagnostic* for Mathematics has received strong ratings from NCII for both the Academic Screening Tool Chart and the Academic Progress Monitoring Tool Chart. The *i-Ready* system is also the only system to be featured on all three academic tool charts, with a positive rating on the Academic Intervention Chart as well.
Academic Screening: https://charts.intensiveintervention.org/screening/tool/?id=dbb425fc248db8fd
Academic Progress Monitoring: https://charts.intensiveintervention.org/progressmonitoring/tool/?id=95c8f52374df8b7c
Academic Intervention: https://charts.intensiveintervention.org/intervention/toolGRP/b947b24429288488

Administration: The *i-Ready Diagnostic* for Mathematics is an entirely digital assessment. It is computer adaptive, which saves educators time while maximizing the screening information returned to teachers. The assessment is group-administered, and all questions are scored automatically.

Language(s): The *i-Ready Diagnostic* for Mathematics is available in English and Spanish.

Time: *i-Ready Diagnostic* is individually administered, untimed, and designed to be administered three times per year. The *Diagnostic* may be broken into multiple sessions; *i-Ready* saves each student's place upon exiting. We recommend multiple testing sessions so students do not feel rushed and can produce their best work. During the *Diagnostic*, students are provided intermittent breaks to maximize their performance and promote their engagement with the assessment.

Curriculum Associates conducted research into the time it takes students to complete the *Diagnostic* using data from the millions of students who completed a *Diagnostic* during the 2017–2018 school year. Our goal was to provide insight into the duration of the assessment so that teachers can allocate appropriate time for testing and ensure students have ample time to complete the *Diagnostic*—but not so much time that instructional time is impacted more than necessary.

Our research found that, on average, the *Diagnostic* takes students 25–75 minutes per subject to complete, and the time it typically takes students varies by grade level. We have organized the duration guidance in Table 1 broken down by grade band.

Table 1. *i-Ready Diagnostic* Scheduling Information and Duration Guidance			
Grade(s)	**When to Schedule the First *Diagnostic***	**How Long to Schedule for Each *Diagnostic* (per Subject)***	**Estimated Total Active Testing Time (per Subject)****
K	Four to six weeks into the school year	Three 20-minute sessions	An average student takes 25–35 minutes of active testing time to complete the *Diagnostic* for each subject. The vast majority of students complete in fewer than 45 minutes.
1	Start as soon as possible†	Two 20- to 30-minute sessions	
2–5	Start as soon as possible†	Two 40- to 50-minute sessions	An average student takes 40–60 minutes of active testing time to complete the *Diagnostic* for each subject. The vast majority of students complete in fewer than 80 minutes.
6–12	Start as soon as possible†	Plan number and length of testing session based on your schedule††	An average student takes 60–75 minutes of active testing time to complete the *Diagnostic* for each subject. The vast majority of students complete in fewer than 90 minutes.

* We recommend 12–18 weeks between each *Diagnostic* administration. Scheduling recommendations are based on average active testing time to complete the *Diagnostic* for each subject, plus logging in, viewing tutorial videos, etc. Some students may take more or less time to complete the *Diagnostic*, depending on a variety of factors. We do not recommend students try to complete the *Diagnostic* in one session.

** Active testing time statistics only refers to active time spent taking the assessment and does not include account login time, tutorial videos, or the time after a session has gone inactive (after 29 minutes of inactivity on a single question).

† Administer the *Diagnostic* as soon as possible for your district/school, based on priorities and needs of your community.

†† Most students complete within 60–90 minutes (e.g., two 45-minute sessions). Some will need additional time.

Progress Monitoring Tools

i-Ready includes multiple forms of both formal and informal progress monitoring to help teachers effectively track student progress and inform instructional decision making.

Formal Progress Monitoring: Monitor change over time, inform educators if students are benefiting from instruction and intervention, and understand where students might be in their learning by the end of the year.

- i-Ready Diagnostic, K–12 (adaptive universal screener): administer three times annually
- i-Ready Growth Monitoring, K–8: administer monthly, between Diagnostics

Informal Progress Monitoring: Use a variety of standardized and non-standardized measures, including curriculum materials, at frequent intervals as part of regular instruction to determine if students have learned the content and are improving their performance.

- i-Ready Standards Mastery, 2–8: use as needed to pinpoint misconceptions

- i-Ready Personalized Instruction, K–8: quiz in each lesson (The I-Ready Personalized Instruction exists as a separate purchase, and does not come included with the I-Ready Diagnostic)
- Tools for Instruction, K–8: when recommended in i-Ready reports, use the Checks for Understanding in the lessons to measure student proficiency of a given skill

To determine skills assessed at individual grade levels, reference: *Rhode Island Early Learning and Development Standards*, *RI Core Math Standards* , *RI Core Standards/Common Core State Standards Comparison Tables,* ***and*** *Appendix C: Defining Foundational Skills*

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization											Operations and Algebraic Thinking	✓	✓	✓	✓	✓	✓				
Magnitude Comparison	✓	✓	✓	✓	✓	✓	✓	✓	✓		Geometry	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Strategic Counting	✓	✓	✓								Ratios and Proportional Relationships							✓	✓		
Math Fact Retrieval/Semantic Memory		✓	✓	✓							The Number System							✓	✓	✓	
Numeral Recognition	✓	✓									Expressions and Equations							✓	✓	✓	
Cardinality	✓										Statistics and Probability							✓	✓	✓	✓
One to One Correspondence	✓										Number and Quantity										✓
Number and Operations – Base Ten	✓	✓	✓	✓	✓	✓					Functions									✓	✓
Number and Operations – Fractions				✓	✓	✓					Algebra										✓
Measurement and Data	✓	✓	✓	✓	✓	✓															

Istation Math (K-8)

Grade Levels: K-8 (English), K-5 (Spanish)

National Center on Intensive Intervention (NCII): Istation Math NCII Review

Administration: Digitally

Language(s): K-8 (English), K-5 (Spanish)

Time: The following are the actual average assessment times experienced across all classrooms:

- K: 11 minutes
- 1st: 12 minutes 30 seconds
- 2nd: 13 minutes, 48 seconds
- 3rd: 15 minutes, 24 seconds
- 4th: 17 minutes, 42 seconds
- 5th: 20 minutes, 24 seconds
- 6th: 21 minutes, 42 seconds
- 7th: 20 minutes, 48 seconds
- 8th: 19 minutes

Progress Monitoring Tools: Progress Monitoring tools as well as intervention and supplemental curriculum tools are included.

To determine skills assessed at individual grade levels, reference: ***Rhode Island Early Learning and Development Standards*****,** ***RI Core Math Standards*** **,** ***RI Core Standards/Common Core State Standards Comparison Tables,*** ***and*** ***Appendix C: Defining Foundational Skills***

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization	✓	✓									Operations and Algebraic Thinking	✓	✓	✓	✓	✓	✓				

Magnitude Comparison	✓	✓	✓	✓	✓	✓					Geometry	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Strategic Counting	✓	✓	✓								Ratios and Proportional Relationships							✓	✓	✓	
Math Fact Retrieval/Semantic Memory	✓	✓	✓	✓	✓	✓					The Number System						✓	✓	✓		
Numeral Recognition	✓	✓									Expressions and Equations						✓	✓	✓		
Cardinality	✓	✓									Statistics and Probability								✓		
One to One Correspondence	✓	✓									Number and Quantity	✓	✓								
Number and Operations – Base Ten	✓	✓	✓	✓	✓	✓					Functions									✓	
Number and Operations – Fractions				✓	✓	✓					Algebra										
Measurement and Data	✓	✓	✓	✓	✓	✓	✓	✓	✓												

IXL LevelUp Universal Screener (K-8)

Grade Levels: The IXL LevelUp Universal Math Screener assesses the complete span of Kindergarten through Grade 8.

National Center on Intensive Intervention (NCII): I-Ready NCII Review

Administration: IXL's screener is administered digitally. Below, IXL describes the process of setting up the screener and the student experience. Simple and Efficient Screener Set-Up. Administrators can quickly set up a screener window at the beginning of the school year for early identification of students who may need additional math support. Administrators can customize the start and end dates of the screener window, the grade levels and schools to assign the screener to, and a name for the screener to differentiate it if multiple screeners are set up**.** The screener can be used up to five times per school year, offering maximum opportunity for identifying and helping at-risk students.

Language(s): The IXL LevelUp Universal Math Screener is available in English and in Spanish.

Time: On average, the screener only takes about 20 minutes to complete and delivers results immediately.

Progress Monitoring Tools: IXL's LevelUp Universal Math Screener provides useful reporting to understand student progress in the school or district.

Refer to Getting Started with the i-Ready Screener for more in depth information.

To determine skills assessed at individual grade levels, reference: Rhode Island Early Learning and Development Standards, RI Core Math Standards , RI Core Standards/Common Core State Standards Comparison Tables, and Appendix C: Defining Foundational Skills

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization	✓										Operations and Algebraic Thinking	✓	✓	✓	✓	✓	✓				
Magnitude Comparison	✓	✓	✓								Geometry	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Strategic Counting	✓										Ratios and Proportional Relationships							✓	✓	✓	
Math Fact Retrieval/Semantic Memory		✓	✓	✓							The Number System							✓	✓	✓	
Numeral Recognition	✓										Expressions and Equations							✓	✓	✓	
Cardinality	✓										Statistics and Probability							✓	✓	✓	
One to One Correspondence	✓										Number and Quantity										
Number and Operations – Base Ten	✓	✓	✓	✓	✓	✓					Functions									✓	
Number and Operations – Fractions				✓	✓	✓					Algebra										
Measurement and Data	✓	✓	✓	✓	✓	✓															

***Please note: IXL's screener assesses each skill at the grade level(s) in alignment with the RI standards. Because IXL's screener is adaptive and will adjust to the proficiency level of the student, it may assess students on skills from lower or higher grades than their rostered grade.**

MAP Growth (K-12)

Grade Levels: K-2, 2-5, 6+, and high school course-specific assessments.

National Center on Intensive Intervention (NCII): MAP Growth NCII Review
The National Center on Intensive Intervention (NCII) evaluated MAP Growth as an academic screening tool. MAP Growth Math and Reading tests for grades 3–8 received the highest rating of "convincing evidence" for classification accuracy, reliability, and validity. For grades K–2, MAP Growth received "convincing evidence" or "partially convincing evidence" ratings for classification accuracy, and "convincing evidence" ratings for reliability and validity (except validity for kindergarten Reading). For the NCII rating summary of MAP Growth assessments, visit https://charts.intensiveintervention.org/chart/academic-screening.

Administration: NWEA assessments are digital web-based, software-as-a-service solutions. No local installation is required.

Language(s): English and Spanish

Time: MAP Growth assessments are untimed, which means students demonstrate their knowledge without the pressure of a deadline creating additional stress and influencing their performance. On average, each assessment takes 40–60 minutes to complete. In 2022, NWEA standardized the test length so that all MAP Growth tests have 40–43 items. This will decrease the amount of time needed to complete tests in comparison to previous years.

Progress Monitoring Tools: MAP Growth provides progress-based monitoring to track student progress in math. MAP Growth assessments were designed to measure growth, and they provide rich data to help educators create growth targets within the system.

MAP Growth data enables educators to see growth from one administration to the next, over the school year, and across multiple years of MAP Growth administrations. This rich data helps educators and students create growth targets for the next benchmark within the system and monitor progress toward goals.

Because MAP Growth assessments are designed to measure change in achievement status, or growth, the reports contain longitudinal data. Reports show results for both individual assessments and across multiple administrations.

To determine skills assessed at individual grade levels, reference: ***Rhode Island Early Learning and Development Standards*****,** ***RI Core Math Standards*** **,** ***RI Core Standards/Common Core State Standards Comparison Tables,*** ***and*** ***Appendix C: Defining Foundational Skills***

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization											Operations and Algebraic Thinking	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Magnitude Comparison	✓	✓	✓	✓	✓	✓	✓	✓			Geometry	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Strategic Counting	✓	✓	✓								Ratios and Proportional Relationships							✓	✓		
Math Fact Retrieval/Semantic Memory			✓	✓	✓						The Number System							✓	✓	✓	
Numeral Recognition	✓	✓									Expressions and Equations					✓	✓	✓	✓	✓	✓
Cardinality	✓	✓									Statistics and Probability						✓	✓	✓	✓	✓
One to One Correspondence	✓	✓									Number and Quantity										✓
Number and Operations – Base Ten	✓	✓	✓	✓	✓	✓					Functions									✓	✓
Number and Operations – Fractions				✓	✓	✓					Algebra	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Measurement and Data	✓	✓	✓	✓	✓	✓															

MAP Growth assessments are aligned to Rhode Island Core Math Standards and our item pools are regularly updated to reflect the standards. NWEA content specialists begin the test development process by closely studying the RI Core Math Standards and accompanying materials and appendices. They look for areas of focus within each subject and map the learning progressions from one grade to the next. Content specialists

then organize the critical concepts and progressions within the standards into a framework for each test. This two-tier framework contains the instructional areas and sub-areas that form the structure of the test.

The instructional areas and sub-areas in the MAP Growth Math frameworks have a direct relationship with the RI Core Math Standards. Items in MAP Growth assessments come from the robust NWEA item bank. The Rhode Island assessments consist of items that are carefully selected and aligned to the Rhode Island standards by NWEA content specialists. Items are aligned to individual standard statements when the content within the item clearly assesses the concept within the standard at the appropriate reading level, difficulty level, and level of cognitive complexity. Item alignments for these tests receive a second review for quality and consistency by at least one additional content specialist. As a result, each item in the assessment item pool has a confirmed alignment to the RI Core Math Standards.
Creating tests in this manner means that they align tightly to the standards and provide an accurate measure of student achievement. The test frameworks are available at: https://cdn.nwea.org/state-information/index.html#/state/rhode%20island.

With computer adaptive tests such as MAP Growth, each student experiences an individualized test based on their responses to each question. The assessments adapt above and below grade levels to accurately identify every student's true achievement level. The algorithms used to deliver a unique and tailored test to each student are based upon Rasch item difficulty calibrations, where items are delivered so that students will likely respond correctly 50% of the time. As a result, students at all levels of learning stay engaged. Struggling students who might otherwise get frustrated and stop trying and high-achieving students who might get bored by strictly grade-level assessments will remain interested, as subsequent questions adapt to their abilities.

mCLASS 1st edition (K-3)

Note: This edition of the mCLASS Screener will only be available through June 2025, and will be transitioning to a new edition of the screener. The 2nd edition information directly follows this one.

Grade Levels: K-3

National Center on Intensive Intervention (NCII): mCLASS NCII Review

Administration: In a universal screening and progress monitoring system, teachers and coaches administer assessments to students at selected intervals during the school year in order to collect data critical to informing instruction. We deliver the proposed mCLASS assessments in Kindergarten and Grade 1 on mobile technology devices to make the process of collecting, analyzing, and applying assessment data easier, and more efficient. In grades 2-3, benchmark and progress monitoring measures are delivered in paper/pencil format to facilitate efficient group administration and reduce the classroom time devoted to assessment. Each measure is then scored by a teacher, and summary scores are entered into mCLASS. The mobile, technology-enabled delivery model facilitates teacher "buy-in".

Math diagnostic interview

In a Diagnostic Interview, the teacher works directly with the child. For most measures, the child is presented with a variety of stimulus materials (e.g. with chips, pencil, paper, etc) so the child can demonstrate their thinking and problem-solving strategies.

Language(s): English and Spanish

Time

Grade	Measure	Assessment Time
K	Counting	1 minute
	Missing Number	1 minute
	Number Identification	1 minute
	Quantity Discrimination	1 minute
1	Counting	1 minute
	Missing Number	1 minute
	Next Number	1 minute
	Number Facts	1 minute
	Number Identification	1 minute
	Quantity Discrimination	1 minute
2 (Group Administered)	Computation	2 minutes
	Concepts	2 minutes
	Missing Number	2 minutes
	Number Facts	2 minutes
	Quantity Discrimination	2 minutes
3 (Group Administered)	Computation	2 minutes
	Concepts	2 minutes
	Missing Number	2 minutes
	Number Facts	2 minutes
	Quantity Discrimination	2 minutes

*Please note that the optional supplemental measures (Basic Concepts, Mixed Concepts, Advanced Concepts, Multiplication/Division Concepts, and Fraction Concepts) are group administered and require an additional 5-7 minutes for each measure.

Progress Monitoring Tools: Yes, Progress Monitoring Tools are included.

To determine skills assessed at individual grade levels, reference: ***Rhode Island Early Learning and Development Standards*****,** ***RI Core Math Standards*** **,** ***RI Core Standards/Common Core State Standards Comparison Tables,*** ***and*** ***Appendix C: Defining Foundational Skills*****.**

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization											Operations and Algebraic Thinking										
Magnitude Comparison	✓	✓	✓	✓							Geometry										
Strategic Counting	✓	✓	✓	✓							Ratios and Proportional Relationships										
Math Fact Retrieval/Semantic Memory		✓	✓	✓							The Number System										
Numeral Recognition	✓	✓									Expressions and Equations										
Cardinality											Statistics and Probability										
One to One Correspondence											Number and Quantity										

Number and Operations – Base Ten			✓	✓							Functions										
Number and Operations – Fractions			✓	✓							Algebra										
Measurement and Data																					

mCLASS 2nd Edition (K-8)

Grade Levels: K-5 (2025-2026 School Year); K-8 full release coming 2026-2027 School Year

National Center on Intensive Intervention (NCII): N/A

Administration: Digital – students complete assessment on a device.

Language(s): English (K-5 Spanish Available 2026-2027; 6-8 Spanish Available 2027-2028)

Time: 20-30 Minutes

Progress Monitoring Tools: Yes, Progress Monitoring tools are included.

To determine skills assessed at individual grade levels, reference: ***Rhode Island Early Learning and Development Standards*****,** ***RI Core Math Standards*** **,** ***RI Core Standards/Common Core State Standards Comparison Tables,*** ***and*** ***Appendix C: Defining Foundational Skills*****.**

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization											Operations and Algebraic Thinking	✓	✓	✓	✓	✓	✓				
Magnitude Comparison	✓	✓	✓	✓							Geometry	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Strategic Counting	✓		✓								Ratios and Proportional Relationships							✓	✓	✓	
Math Fact Retrieval/Semantic Memory	✓	✓	✓								The Number System							✓	✓	✓	
Numeral Recognition	✓										Expressions and Equations							✓	✓	✓	

Cardinality	✓	✓									Statistics and Probability							✓	✓	✓	
One to One Correspondence	✓	✓									Number and Quantity										
Number and Operations – Base Ten	✓	✓	✓	✓	✓	✓					Functions									✓	
Number and Operations – Fractions				✓	✓	✓	✓				Algebra										
Measurement and Data	✓	✓	✓	✓	✓	✓															

MyIGDIs Early Numeracy (PK)

Grade Levels: MyIGDIs for Preschool are curriculum-based measures that assess the development of early mathematics and number sense for children one or two years before entering kindergarten.

National Center on Intensive Intervention (NCII): N/A

Administration: Paper. MyIGDIs Early Numeracy is administered in a 1-on-1 setting using paper-based forms. Data can be recorded on paper Record Forms and/or can be entered into the online MyIGDIs Data System for easy benchmark visualizations for class, school, or district, and digital record keeping.

Language(s): English.

Time: Clear instructions, student prompts, and scoring information allow for the administration of MyIGDIs early numeracy measures in about 8-10 minutes per child

Progress Monitoring Tools: In addition to seasonal screening, educators can administer one or more MyIGDIs Early Numeracy measures to monitor the progress of children receiving intervention in 2-3 minutes each as often as every 3 weeks.

To determine skills assessed at individual grade levels, reference: ***Rhode Island Early Learning and Development Standards*****,** ***RI Core Math Standards*** **,** ***RI Core Standards/Common Core State Standards Comparison Tables,*** ***and*** ***Appendix C: Defining Foundational Skills*****.**

Assesses:

Skill:	Grade Levels Assessed:											Skill:	Grade Levels Assessed:									
	PK	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization	✓											Operations and Algebraic Thinking										
Magnitude Comparison	✓											Geometry										
Strategic Counting	✓											Ratios and Proportional Relationships										

Math Fact Retrieval/Semantic Memory												The Number System										
Numeral Recognition	✓											Expressions and Equations										
Cardinality	✓											Statistics and Probability										
One to One Correspondence	✓											Number and Quantity										
Number and Operations – Base Ten												Functions										
Number and Operations – Fractions												Algebra										
Measurement and Data																						

Renaissance STAR Math (K-12)

Grade Levels: K–12

National Center on Intensive Intervention (NCII): Renaissance STAR Math NCII Review

Administration: Digital. Star Math is a computer-adaptive assessment that students take digitally. Computer-adaptive tests (CAT) individualize, or adapt, assessment questions to each student's skill level to reveal what they know and what they still need to learn. CAT data gives an accurate measure of broad achievement and a highly reliable prediction of student performance on high-stakes exams.

Language(s): English and Spanish

Time: Star Math and Star Math Spanish: 20-30 minutes

Progress Monitoring Tools: Star Math computer-adaptive tests can be used as progress monitoring tools for students below grade-level targets, so teachers can regularly monitor students as they progress through the school year.
Star Math is valid and reliable for progress monitoring up to weekly, for those requiring more data. By providing educators with data on all students quickly and efficiently, and then using this data for frequent progress monitoring, educators can save time on classroom instruction while simultaneously addressing students who are at risk.

To determine skills assessed at individual grade levels, reference: ***Rhode Island Early Learning and Development Standards*****,** ***RI Core Math Standards*** **,** ***RI Core Standards/Common Core State Standards Comparison Tables,*** ***and*** ***Appendix C: Defining Foundational Skills*****.**

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS
Subitization	✓	✓	✓								Operations and Algebraic Thinking	✓	✓	✓	✓	✓	✓				
Magnitude Comparison	✓	✓	✓								Geometry	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Strategic Counting	✓	✓	✓								Ratios and Proportional Relationships							✓	✓	✓	✓

Math Fact Retrieval/Semantic Memory	✓	✓	✓								The Number System							✓	✓	✓	
Numeral Recognition	✓	✓	✓								Expressions and Equations					✓	✓	✓	✓	✓	✓
Cardinality	✓	✓	✓								Statistics and Probability							✓	✓	✓	✓
One to One Correspondence	✓	✓	✓								Number and Quantity	✓	✓	✓	✓	✓	✓	✓			
Number and Operations – Base Ten	✓	✓	✓	✓	✓	✓					Functions								✓	✓	✓
Number and Operations – Fractions				✓	✓	✓	✓	✓	✓		Algebra	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Measurement and Data	✓	✓	✓	✓	✓	✓															

*Because Star Math is adaptive, students may see some content in lower grade levels than their current grade level (e.g., 4th graders could see 2nd grade content depending on their performance on the test). However, students will never see items testing skills beyond their current grade level (e.g. a 5th grade student will not see items about functions).

Spring Math (K-8)

Grade Levels: Grades K-8.

A full technical manual is available here: Spring Math Technical Manual

National Center on Intensive Intervention (NCII): Spring Math NCII Review

Administration: All assessments are conducted on paper but have a digital portal in which teachers input the data into a teacher dashboard which automatically summarizes and graphs performance, interprets the data, indicates the next action, and provides all materials needed to take the next action. Screening assessment data are also used for automated program evaluation, mid-stream growth data at the student, class, grade, and school level.

Language(s): English

Time:

- Kindergarten measures are administered class wide, 1 min per measure, with 4 measures at fall, winter, and spring.
- Grades 1-6 measures are administered class wide, 2 min per measure, with 3-4 measures at fall, winter, and spring.
- Grades 7-8 measures are administered class wide, 4 min per measure, with 3 measures at fall, winter, and spring.
- Total screening time per occasion, including scoring and data entry, is 20 min per class or less.

Measures can be seen here: Spring Math Screening By Grades

Progress Monitoring Tools: Spring Math is automated with embedded progress monitoring.

To determine skills assessed at individual grade levels, reference: Rhode Island Early Learning and Development Standards, RI Core Math Standards , RI Core Standards/Common Core State Standards Comparison Tables, and Appendix C: Defining Foundational Skills.

Assesses:

Skill:	Grade Levels Assessed:										Skill:	Grade Levels Assessed:									
	K	1	2	3	4	5	6	7	8	HS		K	1	2	3	4	5	6	7	8	HS

Subitization											Operations and Algebraic Thinking	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Magnitude Comparison	✓	✓	✓	✓	✓	✓	✓				Geometry										
Strategic Counting	✓	✓									Ratios and Proportional Relationships				✓	✓	✓	✓	✓	✓	✓
Math Fact Retrieval/Semantic Memory	✓	✓	✓	✓	✓	✓					The Number System							✓	✓	✓	✓
Numeral Recognition	✓										Expressions and Equations							✓	✓	✓	✓
Cardinality	✓										Statistics and Probability										
One to One Correspondence	✓										Number and Quantity	✓	✓	✓	✓	✓	✓				✓
Number and Operations – Base Ten		✓	✓	✓	✓	✓				✓	Functions									✓	✓
Number and Operations – Fractions											Algebra										
Measurement and Data																					

Appendix B: Early Numeracy Standards

Grade	Skills

Pre-K	• **RIELDS M 1: Number Sense and Quantity**
	  ○ Quickly name the number in a group of objects, up to 10,without counting.
	  ○ Verbally count beyond 20 (or in some way indicate knowledge of numbers beyond 20 in sequence). demonstrating an understanding of the number pattern.
	  ○ Use strategies to count large sets of objects (more than 10).
	  ○ Know the number that comes before and after a specified number (up to 20).
	  ○ Recognize and order each written numeral up to 10.
	  ○ Associate a quantity with a written numeral up to 10.
	  ○ Understand that the last number counted represents the number of objects in a set.
	• **RIELDS M 2: Number Relationships and Operations**
	  ○ Use counting to compare 2 sets of objects and to determine which set has more, less, or the same than the other.
	  ○ Understand that adding one or taking away one changes the number in a group of objects by exactly one.
	  ○ Use toys and other objects as tools to solve simple addition and subtraction problems with totals smaller than 10.
	  ○ Use one-to-one correspondence to compare small sets of similar objects.
	  ○ Understand that a whole is a larger quantity than its parts (e.g., when looking at 2 nests with 3 eggs in each, says a big number such as 8 or 10 to describe how many eggs there are).
	• **RIELDS M 3: Classification and Patterning**
	  ○ Sort objects by more than one attribute (e.g., color and shape) into two or more groups.
	  ○ Sort sets of objects by one characteristic, then sort by a different characteristic and explain the sorting rules (e.g., “These are all of the red ones, but these are all of the big ones”).
	  ○ Classify everyday objects that go together (e.g., mittens, hats, coats).
	  ○ Demonstrate recognition of a simple, repeating pattern.

	○ Extend sequential patterns and replicate these patterns using different materials or modes (e.g., on being told a pattern, replicating the pattern with manipulatives). ○ Identify the core unit of sequentially repeating patterns (e.g., that set of characteristics or items that repeat). ○ Recognize, name, replicate and extend simple growing (or enlarging) patterns (e.g., "one more"). • **RIELDS M 4: Measurement, Comparison, and Ordering** ○ Order (or seriate) four or more items by decreasing or increasing a relative attribute when differences are perceptually clear (e.g., arranging a rock collection from the largest to the smallest) ○ Make small series of objects (e.g., putting three or four objects in order by length). ○ Compare two small sets of objects (five or fewer). ○ Use some appropriate tools to measure different attributes (e.g., choosing a scale for weight and a cup for volume). ○ Use measurement language to describe the attributes of objects (e.g., "This is three-blocks long"). ○ Use comparative language (e.g, "shortest", "heavier", "biggest"). • **RIELDS M 5: Geometry and Spatial Sense** ○ Describe and compare shapes using their attributes in their home language(s) (e.g., "a triangle has three sides, but a square has four.") ○ Combine and separate shapes to make other shapes (e.g., using two triangles to make a square). ○ Build more complex models of buildings, structures, or areas (e.g., their classroom or play-ground) with three-dimensional shapes, such as building blocks ○ Correctly name familiar shapes in their home language(s) (e.g., circle, triangle, and square) and less familiar shapes (e.g., hexagon, trapezoid, and rhombus). ○ Correctly name some three-dimensional shapes in their home language(s) (e.g., cube, cone, cylinder) ○ Build simple examples of buildings, structures, or areas (e.g., their classroom or playground) with three-dimensional shapes, such as building blocks ○ Combine and separate shapes to make designs or pictures (e.g., completing shape puzzles). ○ Understand and use language or similar words in their home language(s) related to directionality, order, and the position of objects, such as "up," "down," "in front," and "behind"
Kindergarten	• **Counting and Cardinality** ○ **Know number names and the count sequence.** ▪ Count to 100 by ones and tens. ▪ Count forward from a number within a known sequence (instead of starting at one)

        - Write numbers from 0 to 20; Represent a number of objects with a written numeral 0-20 (with zero representing a count of no objects).
    - **K.CC.B: Count to tell the number of objects.**
        - Understand the relationship between numbers and quantities.
            - When counting, saying number names in standard order pairing each object with one and only one number name and each number name with one and only one object.
            - Understand that the last number name tells the number of objects counted.
            - Each successive number name refers to a quantity that is one larger.
        - Count to answer "how many?" questions up to 20 things arranged in a line, rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number 1-20, count out that many objects.
    - **K.CC.C: Compare Numbers**
        - Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group for groups up to 10 objects, e.g., by using matching and counting strategies.
        - Compare two numbers between 1 and 10 presented as written numerals.
- **Operations and Algebraic Thinking K. OA**
    - **K.OA. A: Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from**
        - Represent addition and subtraction with objects, fingers, mental images, drawings, verbal explanations, expressions, or equations.
        - Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
        - Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 +1).
        - For any number 1 to 9, find the number that makes 10 when added to the given number e.g., by using objects or drawings, and record the answer with a drawing or equation.
        - Fluently add and subtract within 5, including zero.
- **Number and Operations in Base Ten K.NBT**
    - **K.NBT.A: Work with numbers 11-19 to gain foundations for place value.**

	▪ Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawing, ands record each composition or decomposition by a drawing or equation (e.g., 18=10+8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones. • **Measurement and Data K.MD** ○ **K.MD.A: Describe and compare measurable attributes.** ▪ Describe measurable attributes such as length or weight. Describe several measurable attributes of a single object. ▪ Directly compare two objects with a measurable attribute in common to see which object has "more" or "less" of the attribute. For example, directly compare the heights of two children and describe one child as taller/shorter. ○ **K.MD.B: Classify objects and count the number of objects in each category.** ▪ Classify objects into given categories; count the numbers of objects in each category (up to and including 10) and sort the categories by count. • **Geometry K.G** ○ **K.G.A: Identify and describe shapes (square, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres)** ▪ Describe objects in the environment using names of shapes and describe the relative positions of these objects using terms such as *above, below, besides, in front of, behind,* and *next to.* ▪ Correctly name shapes regardless of their orientation or overall size. ▪ Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid"). ○ **K.G.B: Analyze, compare, create, and compose shapes.** ▪ Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices) and other attributes (e.g., having sides of equal length). ▪ Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes. ▪ Compose simple shapes to form larger shapes. *For example, "Can you join these two triangles with full sides touching to make a rectangle?".*
Grade 1	• **Operations and Algebraic Thinking 1.OA** ○ **1.OA.A: Represent and solve problems involving addition and subtraction.**

        - Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations (number sentences) with a symbol for the unknown number to represent the problem.
        - Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
    - **1.OA.B: Understand and apply properties of operations and the relationship between addition and subtraction**
        - Apply properties of operations to add.
        - Understand subtraction as an unknown-addend problem.
    - **1.OA.C: Add and subtract within 20.**
        - Relate counting to addition and subtraction (e.g., by counting on 2 to add 2)
        - Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use mental strategies such as counting on; making 10 (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a 10 (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 =13).
    - **1.OA.D: Work with addition and subtraction equations**
        - Understand the meaning of the equal sign and determine if equations involving addition and subtraction are true or false.
        - Determine the unknown whole number in an addition or subtraction equation relating three whole numbers.
- **Number and Operations in Base Ten 1.NBT**
    - **1.NBT.A: Extend the counting sequence.**
        - Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.
    - **1.NBT.B: Understand Place Value**
        - Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
            - 10 can be thought of as a bundle of ten ones—called a “ten.”

        - The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
        - The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).
      - Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and<.
    - **1.NBT.C: Use place value understanding and properties of operations to add and subtract.**
      - Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings, and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones, and ones; and sometimes it is necessary to compose a ten.
      - Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. Identify arithmetic patterns of 10 more and 10 less than using strategies based on place value.
      - Subtract multiples of 10 in the range 10–90 from multiples of 10 in the range 10–90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
- **Measurement and Data 1.MD**
  - **1.MD.A: Measure lengths indirectly and by iterating length units**
    - Order three objects by length; compare the lengths of two objects indirectly by using a third object.
    - Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.
  - **1.MD.B: Tell and write time**
    - Tell and write time in hours and half-hours using analog and digital clocks.
  - **1.MD.C: Represent and interpret data.**

	▪ Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. ○ **1.MD.D: Work with money.** ▪ Identify the values of all U.S. coins and know their comparative values (e.g., a dime is of greater value than a nickel). Find equivalent values (e.g., a nickel is equivalent to five pennies). Use appropriate notation (e.g., 69¢). Use the values of coins in the solutions of problems (up to100¢). • **Geometry 1.G** ○ **1.G.A: Reason with shapes and their attributes.** ▪ Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes that possess defining attributes. ▪ Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. ▪ Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.
Grade 2	• **Operations and Algebraic Thinking 2.OA** ○ **2.OA.A: Represent and solve problems involving addition and subtraction.** ▪ Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. ○ **2.OA.B: Add and subtract within 20.** ▪ Fluently add and subtract within 20 using mental strategies.9 By end of grade 2, know from memory all sums of two single-digit numbers and related differences. For example, the sum 6 + 5 = 11 has related differences of 11 – 5 = 6 and 11 – 6 =5. ○ **2.OA.C: Work with equal groups of objects to gain foundations for multiplication.**

        - Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.
        - Use addition to find the total number of objects arranged in rectangular arrays with up to five rows and up to five columns; write an equation to express the total as a sum of equal addends.
- **Number and Operations in Base Ten 2.NBT**
    - **2.NBT.A: Understand place value.**
        - Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones, e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:
            - 100 can be thought of as a bundle of ten tens—called a "hundred."
            - The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0ones).
        - Count within 1,000; skip-count by 5s, 10s, and 100s. Identify patterns in skip counting starting at any number.
        - Read and write numbers to 1,000 using base-ten numerals, number names, and expanded form.
        - Compare two three-digit numbers based on meanings of the hundreds, tens, and one's digits, using >, =, and < symbols to record the results of comparisons.
    - **2.NBT.B: Use place value understanding and properties of operations to add and subtract.**
        - Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
        - Add up to four two-digit numbers using strategies based on place value and properties of operations.
        - Add and subtract within 1,000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones, and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
        - Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.
        - Explain why addition and subtraction strategies work, using place value and the properties of operations.

- **Measurement and Data** **2.MD**
  - **2.MD.A: Measure and estimate lengths in standard units.**
    - Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
    - Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.
    - Estimate lengths using units of inches, feet, centimeters, and meters.
    - Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard-length unit.
  - **2.MD.B: Relate addition and subtraction to length.**
    - Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.
    - Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, …, and represent whole-number sums and differences within 100 on a number line diagram.
  - **2.MD.C: Work with time and money.**
    - Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
      - Know the relationships of time, including seconds in a minute, minutes in an hour, hours in a day, days in a week; days in a month and a year and approximate number of weeks in a month and weeks in a year.
    - Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies (up to $10), using $and ¢ symbols appropriately and whole dollar amounts. *For example, if you have 2 dimes and 3 pennies, how many cents do you have? If you have $3 and 4 quarters, how many dollars or cents do you have? (Students are not expected to use decimal notation.)*
  - **2.MD.D: Represent and interpret data.**
    - Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Organize and record the data on a line plot (dot plot) where the horizontal scale is marked off in whole-number units.
    - Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems,11 using information presented in a bar graph.

- **Geometry** **2.G**
  - **2.G.A: Reason with shapes and their attributes**
    - Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, squares, rectangles, rhombuses, trapezoids, pentagons, hexagons, and cubes.
    - Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
    - Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

Appendix C: Defining Foundational Skills

Magnitude Comparison

Math is not "about numbers" it is "about quantity…..Quantity is the real topic of mathematics and students can be taught that they can model the world through mathematics" (Griffin, 2003 cited in Cain & Faulkner, 2009).

Magnitude comparison in early elementary mathematics is a fundamental skill that plays a crucial role in a child's numerical and mathematical development. This concept involves understanding and evaluating the relative sizes or quantities of numbers, such as determining which number is greater or smaller, and by how much. It is important for a student to be able to differentiate, for example, that 11 is a ***bit*** bigger than 9, but that 18 is a ***lot*** bigger than 9 (Berch (cited in Gersten et al., 2011).). Through magnitude comparison, children enhance their number sense, learning to recognize numerical differences and similarities, which are essential for grasping the number line and understanding numerical relationships. It also aids in the development of ordering and sequencing skills, as children learn to arrange numbers from smallest to largest or vice versa, a critical step in understanding numerical sequences and patterns.

Gersten et al. also emphasize that using magnitude comparison in screening illustrates that screening instruments by nature are not designed to be comprehensive: a good screening instrument will be related to other critical aspects of performance. Once children have a foundational understanding of cardinality, they can use comparison and counting strategies to compare the cardinality of two sets. Comparison situations also allow children to think about how much a set has. This is initially difficult, but it builds on their knowledge of part-whole relationships and connects to operations of addition and subtraction (Cross et al., 2009).

Additionally, magnitude comparison is directly linked to basic arithmetic operations, such as understanding which numbers are larger or smaller helps children perform addition and subtraction more effectively. This skill also fosters critical thinking and problem-solving abilities, as children analyze, compare, and make decisions based on numerical information. Furthermore, many advanced mathematical concepts, such as place value, estimation, and measurement, build on the understanding of numerical magnitude. Mastering magnitude comparison boosts a child's confidence in handling numbers and performing mathematical tasks, leading to a positive attitude towards math and greater proficiency in the subject. By

integrating magnitude comparison activities into early elementary math education, children are equipped with the tools to understand and work with numbers more effectively, forming the groundwork for more complex mathematical concepts and operations they will encounter in their educational journey.

Strategic Counting

The ability to understand how to count efficiently and use counting strategies. This skill is fundamental to developing mathematical understanding and proficiency (Siegler & Robinson, 1982 as cited in Gersten et al., 2011). According to Geary (2004), weakness in this area is a key indicator of which young students are likely to have difficulty learning mathematics. The authors go on to say:

In most cases, competence in counting strategies is strongly related to burgeoning knowledge of number properties. Once a child possesses the "count on" strategy, if asked "what is 9 more than 2?" she will automatically know that it is much more efficient to reverse the problem to 2 more than 9, and simply "count on" from 9. Counting on from the larger addend is important for learning addition and subtraction number combinations, and grasping the count on strategy demonstrates the beginnings of a grasp of the commutative property of addition (Gersten et al., 2012).

Strategic counting plays a pivotal role in early mathematics by fostering a deeper understanding of numbers and their relationships. It involves counting in flexible, purposeful ways that go beyond rote memorization, helping children to develop a variety of counting strategies such as counting by twos, fives, or tens, and using these strategies to solve mathematical problems.

By engaging in strategic counting, children learn to recognize patterns in numbers, which is essential for grasping more complex mathematical concepts such as multiplication and division. It also enhances their ability to perform mental calculations, as they become adept at breaking down numbers and recombining them in efficient ways. For instance, a child might use strategic counting to quickly determine that five groups of two make ten, or that adding seven and eight can be simplified by first adding seven and seven to get fourteen, then adding one more to make fifteen.

Furthermore, strategic counting helps children develop number sense, which is the intuitive understanding of numbers and their relationships. This includes recognizing the relative size of numbers, understanding the effects of operations on numbers, and estimating quantities. Children who are proficient in strategic counting are better equipped to approach mathematical problems with confidence and flexibility, as they can choose from a range of strategies to find solutions.

Retrieval of Basic Arithmetic Facts/Semantic Memory

According to Clarke (2012), the earliest research in mathematics difficulties focused on students in upper elementary who were identified as demonstrating a learning disability. One consistent finding (Goldman, Pellegrino, and Mertz, 1988 as cited in Clarke et al., 2012) was that students who struggled with mathematics in the elementary grades were unable to automatically retrieve addition and subtraction number combinations. Research seems to indicate that although students with learning disabilities in mathematics often make good strides in terms of facility with algorithms, procedures, and simple word problems, severe deficits remain in their retrieval of basic combinations.

These deficiencies suggest problems with *semantic memory* (that is, the ability to store and retrieve abstract information efficiently), which is considered essential for succeeding in, and understanding, mathematics (Geary, 2004). Jordan et al. (2004) goes on to say that poor fact retrieval has its roots in poor number sense and "The ability to solve number combinations involving addition and subtraction, even at the beginning of kindergarten, is considered a powerful predictive measure of mathematics achievement through third grade". In early mathematics, semantic memory helps children recognize and understand number symbols, comprehend mathematical vocabulary, and grasp basic mathematical principles such as addition and subtraction. For instance, when a child learns that the numeral "5" represents a set of five objects, this information is stored in semantic memory. Similarly, understanding that addition involves combining quantities and that subtraction involves taking away is rooted in semantic memory.

Moreover, semantic memory allows for the generalization of mathematical concepts. Once children learn specific mathematical facts or procedures, they can apply this knowledge to new and varied situations. For example, knowing that "2 + 3 = 5" can help a child understand that "3 + 2" also equals 5, demonstrating the commutative property of addition.

Semantic memory also supports the development of problem-solving skills. By drawing on stored mathematical knowledge, children can recognize patterns, make connections between different mathematical ideas, and devise strategies to solve problems. This ability to retrieve and apply relevant information is crucial for success in mathematics.

Numerical Recognition

Numerical recognition is a fundamental skill in early elementary mathematics that underpins all future mathematical learning. It encompasses the ability to identify and name numbers, understand their values, and recognize their corresponding symbols. This skill is crucial for developing a strong number sense, which includes the capacity to compare quantities, perform basic arithmetic operations, and understand the relationships between numbers. Numerical recognition enables children to count accurately, recognize patterns, and solve problems effectively.

Moreover, it plays a pivotal role in helping children understand the concept of quantity, which is essential for grasping more advanced mathematical concepts such as place value, addition, subtraction, and later, multiplication and division. By mastering numerical recognition, young learners build a solid foundation that enhances their confidence and proficiency in mathematics. This foundational skill not only supports their mathematical development but also fosters critical thinking and logical reasoning abilities that are applicable across various subjects and real-life situations.

Similar to how letter-naming accuracy and speed predict a child's ability to benefit from typical reading instruction, Gersten et al., 2012 argue that numeral recognition, measured in early screenings, may identify students with possible difficulties in mathematics.

Cardinality

Cardinality in early elementary mathematics refers to the understanding of the quantity or number of elements in a set. It is the realization that the last number counted in a sequence represents the total number of objects in that set. This concept involves several key components: one-to-one correspondence, where each object is paired with a unique number; stable order, recognizing that numbers follow a fixed sequence; and the understanding that the final number in a count indicates the total quantity. Mastering cardinality helps children comprehend the meaning of numbers and their relationships, laying the foundation for more complex mathematical concepts.

Subitizing

Subitizing is a fundamental skill in early elementary mathematics, referring to the ability to instantly recognize the number of objects in a small group without the need for counting. This skill is crucial because it underpins children's understanding of number sense and quantity. When children can subitize, they can quickly and accurately identify numerical values, which aids in the development of mental arithmetic skills.

Subitizing supports other mathematical competencies, such as addition and subtraction, by enabling children to visualize and manipulate numbers in their minds. For instance, recognizing that a group of five objects can be split into smaller groups (such as two and three) helps children grasp the concept of part-whole relationships. Additionally, it allows them to see patterns and make connections between numbers, fostering a deeper understanding of numerical relationships.

Furthermore, subitizing enhances children's ability to work with larger numbers by enabling them to break down complex quantities into smaller, more manageable groups. This skill is essential for developing strategies for efficient problem-solving and for understanding place value concepts. Overall, subitizing contributes to numerical fluency, providing a strong foundation for more advanced mathematical learning and problem-solving.

One to One Correspondence

One-to-one correspondence is a fundamental concept in early elementary mathematics that significantly impacts a child's ability to understand and work with numbers. It involves the precise matching of each element in one set to a unique element in another set, typically aligning objects with number names in counting. This process ensures that each object is counted once and only once, which is crucial for accurate counting.

The importance of one-to-one correspondence extends beyond mere counting. It helps children understand the principle of cardinality, where the last number counted represents the total number of objects in a set. This understanding is essential for recognizing quantities and comparing different sets of objects to determine which has more, less, or the same number of items.

Moreover, one-to-one correspondence lays the groundwork for basic arithmetic operations such as addition and subtraction. By understanding how to match objects or numbers correctly, children can begin to manipulate these quantities in meaningful ways. For instance, they can combine sets to find a total or remove items to see what remains, both of which are foundational skills for addition and subtraction.

Additionally, one-to-one correspondence supports the development of problem-solving skills and logical thinking. As children practice this concept, they learn to organize their thoughts and actions systematically, which is a critical skill not only in mathematics but also in everyday tasks and later academic pursuits.

Measurement and Data

Measurement and data play a fundamental role in early mathematics by helping young learners develop fundamental skills in quantifying the world around them and organizing information in meaningful ways. These concepts help children to understand the idea that objects and phenomena can be measured, compared, and categorized based on various attributes such as length, weight, volume, and time. Measurement in early mathematics helps children to understand how to compare and quantify objects, helping them to understand the idea of units, and using them consistently.

Through this process they strengthen their ability to make sense of the physical world, building critical thinking as they learn to estimate, measure, and compare varying dimensions and quantities. Students also use these abilities to try and understand more abstract ideas like time and temperature, which become foundational to later understanding of mathematics and science.

Data helps students collect, organize, and interpret information. Children will often begin by sorting objects based on various attributes like color, size, and shape. They will then move on to creating charts or graphs, thinking of ways to visually represent the data they have collected. These skills introduce them to the ideas of comparing and categorizing data; foundational for later statistical thinking. Children learn to ask questions, collect information, and draw conclusions, which leads to enhanced problem-solving abilities.

Geometry

Geometry in early mathematics is crucial to helping students learn and develop spatial reasoning, helping students with the ability to visualize and manipulate objects in space. This skill is fundamental and will support problem solving skills in mathematics as well as other disciplines. Geometry also helps make connections to the real world, making sense of the environment around them and gaining stronger understanding of the relationships between objects, like shape, size, and position. Geometry is also connected to other areas of mathematics. Understanding shapes and their properties helps to lay the foundation for measurement (e.g., perimeter and area) as well as recognizing patterns and relationships.

Geometry skills and concepts also help to foster mathematical thinking, think more critically, and explore various ways to solve the problems to which they are exposed. Building on these skills helps support reasoning and justification, fundamental aspects of mathematical thinking. It also helps students to advance their mathematical language skills.

Geometry also has the potential to expose students to cross-curricular connections. Geometry has deep connections to culture, history, and the world around us. Exposing students to geometry skills early can help students see the applications of geometry in art, architecture, design, and other related fields, to help students understand the cultural significance of mathematics.

Finally, geometry tends to often involve a lot of hands-on activities (e.g., building with blocks, drawing, using manipulatives). This can make learning more engaging and enjoyable for young students, which will help build a positive mindset and attitude towards mathematics.

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