



Math Assessment Overview

Provided by Dr. Ben Clarke

Watch Dr. Clarke's conversation with Dean Ballard, CORE's Director of Mathematics, about how to select and use elementary math assessments to guide instruction.

[Watch the Video](#)

Students at risk for math difficulties must be identified early and provided support in order to prevent poor long term math achievement trajectories from developing (Fuchs et al., 2011). Within MTSS and RTI frameworks, risk level for math learning difficulties is assessed first through universal screening. Universal screening is conducted to determine which students require additional support in mathematics. Students who are identified as at risk for math difficulties receive additional support in Tier 2 of the MTSS framework, and their progress towards academic goals is measured through progress monitoring (Hosp et al, 2016). Progress monitoring for K-3 students is conducted for students who did not score above the benchmark score on screening assessments and students who are identified to be at risk should receive progress monitoring assessments weekly on material aligned with their instructional level and monthly on material aligned with their grade level (Hosp et al, 2016). General outcome measures (GOMs) and skills-based measures (SBMs) are types of curriculum-based measures that can be used to screen for math learning difficulties and as measures of progress monitoring in order to determine progress towards academic goals (Hosp et al., 2016). For students who do not respond to Tier 2, additional diagnostic measures are utilized to determine specific areas in which a student needs additional instructional support (Hosp et al., 2016).

Why is early assessment important?

Early assessment of mathematics ability is essential for determining the math difficulties students may face currently and throughout their development of understanding and applying mathematics (Gersten et al, 2012). Early math screeners often target a student's initial and early understanding of number often referred to as number sense. Number sense, which is the understanding of numbers, their relationships, and number concepts (Gersten & Chard, 1999; Berch, 2005), is hypothesized to be based upon the development of a mental number line (Siegler et al., 2008). Early number sense in kindergarten is predictive of later math achievement and level of number competence in kindergarten is moderately predictive of 3rd grade math achievement (Jordan et al., 2009). By identifying potential difficulties early, schools can intervene to alter long term trajectories in mathematics development.

What's available (examples)

Screening and Progress Monitoring Measures: Screeners are designed to provide a quick check on a student's risk status in a particular topic area. Screeners are used with all students. As such, they need to be time efficient and easy to administer and score. Screeners are used to determine who is at-risk of experiencing math learning difficulties. Progress monitoring measures are designed to demonstrate the effect of instruction and intervention on student achievement over time and are used with students identified as at-risk on a screener and are receiving a research based intervention. (Foegen et al, 2007). Progress monitoring measures are typically developed based on the standard curriculum for each grade level and provide teachers with information about the skills individual students have or have not mastered within a curriculum (Foegen et al, 2007). Because they are given frequently (e.g. weekly) to assess intervention response, progress monitoring measures are designed to be efficient to administer. Many screeners are also used as progress monitoring measures.

- **ASPENS, K-1**

Assesses number sense using grade-appropriate magnitude comparison and missing number measures. Numeral Identification measure administered to K and Basic Arithmetic Facts & Base 10 measure to 1st grade.

- **Iowa Assessments, K-2**
A measure of math achievement providing a continuous standard score scale based on performance of nationally representing groups. Emphasize understanding, discovery, and quant thinking. Available in either web-based or paper format.
- **MAP Growth, K-2**
Computer adaptive assessment calibrated to an equal-interval scale. Used as screener for RTI programs.
- **i-READY Diagnostic Growth Monitoring Mathematics, K-8**
Brief, computer delivered, periodic adaptive assessment in math for students K-8 assessing number and operations/the number system, algebraic thinking, geometry and measurement.
- **FAST earlyMath, K-1**
Assesses the student ability and automaticity at naming numerals. Resulting score is the number of numerals named correctly per minute. Available for scoring via computer with an option of an inventory. (Good reliability, unconvincing validity.)
- **Star Math, Grade 1-2**
Used to assess short-term performance skill in math computation, application, and concepts. (Good reliability, unconvincing validity.)
- **AimswEBplus Math, K**
Brief screening and monitoring assessment system for early numeracy. Individual administration for number naming fluency. A detailed summary and report is immediately generated for students, classrooms, and districts.

Diagnostic Measures: Diagnostic measures aid in determining a students' individual strengths, weaknesses, knowledge, and skills. Diagnostic measures are used to identify student difficulties and guide lessons, intervention, and curriculum planning for students who continue to struggle. Because diagnostic measures provide more detailed information, they typically take longer to administer and thus should only be used with students who are not responding to a research based intervention.

- **GMADE, K-2**
Assesses core skills in concepts/communication, operations/computation, process/application. Involves whole group administration and immediate scoring.
- **ADAM (Adaptive Diagnostic Assessment of Math), K-2**
Comprehensive and adaptive assessment. Isolates mastery level in number/operations, algebra, geometry, data analysis, and measurement.
- **KeyMath-3, K-2**
Individually administered measure of essential math concepts and skills. Paper based using either computer or manual scoring.
- **TEMA, K-2**
Measures formal and informal concepts involved in numbering skills, number-comparison facility, numeral literacy, mastery of number facts, calculation skills, and understanding concepts. Can be used as a norm-referenced measure or a diagnostic measure of math performance.

National Center on Intensive Intervention (NCII): NCII builds the capacity of state and local education agencies, universities, practitioners, and other stakeholders to support implementation of intensive intervention in literacy, mathematics, and behavior for students with severe and persistent learning and/or behavioral needs. NCII's approach to intensive intervention is data-based individualization (DBI).

The [NCII website](#) includes reviews of screening and progress monitoring measures on their "Tools Chart" page.