A General Overview of KeyMath3

Presented by:
Gloria Maccow, Ph.D.
Assessment Training Consultant

Overview

1. KeyMath™3 Diagnostic Assessment
   NCTM standard alignment content
2. KeyMath™3 ASSIST Scoring Software
   Aligning results to intervention
3. KeyMath™3 Essential Resources
   Targeted intervention

A Formula for Success
Introduction KeyMath™3 Diagnostic Assessment

- Nationally standardized and criterion referenced diagnostic assessment of mathematics concepts and skills.
- Untimed and individually administered with content covering grades Pre-K through 9.
- Part of a system designed for RtI Tiers II and III.

Overview - KeyMath™3 Diagnostic Assessment

- KeyMath™3 measures a student’s understanding and application of critical math concepts
- Age Range: 4:6 through 21:11
- Content Range: Pre-K through grade 9
- 30-90 minute administration time
- Timesaving option to administer select areas
- Convenient computer scoring
- Essential Resources intervention material
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Applications

Primary Users
- Educational Diagnosticians
- School Psychologists
- Special Education Directors and Teachers
- Title 1 Teachers
- General educators with struggling students
- Math Teachers and Coaches

KeyMath™3 Diagnostic Assessment
Program Components

• Manual
• Two easels
• Record form (A or B) and student response booklet for computation
• ASSIST™ computer scoring and reporting software
  — Direct Link to the Essential Resources intervention program

KeyMath™3 Key Features

• All new items.
• Aligned to the National Council of Teachers of Mathematics (NCTM) Principles and Standards of Mathematics.
• Ability to measure progress in 3 month intervals.
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10 NCTM Standards

- Five Content Standards
  - Number and Operations, Algebra, Geometry, Measurement, Data Analysis & Probability
- Five Process Standards
  - Problem Solving, Connections, Communication, Representation, Reasoning & Proof

NCTM Standards Match to KeyMath™3

<table>
<thead>
<tr>
<th>KeyMath™-3 Subtests</th>
<th>Content Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numeration</td>
<td>Number and Operations</td>
</tr>
<tr>
<td>Algebra</td>
<td>Algebra</td>
</tr>
<tr>
<td>Geometry</td>
<td>Geometry</td>
</tr>
<tr>
<td>Measurement</td>
<td>Measurement</td>
</tr>
<tr>
<td>Data Analysis &amp; Probability</td>
<td>Data Analysis &amp; Probability</td>
</tr>
</tbody>
</table>

NCTM Standards Match

5 Process Standards

- Problem Solving
- Connections
- Communication
- Representation
- Reasoning & Proof

All 5 are incorporated into the KeyMath™3 items throughout the 10 subtests

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KeyMath™3 Revisions

What’s new?
- Includes Algebra concepts at all levels
- New Subtests
- All new items
- Updated norms
- Linked to interventions
- 372 full color items in each form
- A developmental scale (the GSV) for measuring student progress

KeyMath™3 Content Areas & Subtests

TOTAL TEST

BASIC CONCEPTS
- Numeration
- Algebra
- Geometry
- Measurement
- Data Analysis & Probability

OPERATIONS
- Mental Computation & Estimation
- Addition & Subtraction
- Multiplication & Division

APPLICATIONS
- Foundations of Problem Solving
- Applied Problem Solving

KeyMath™3 Administration

Begin with Numeration Subtest
Start with item that corresponds to examinee’s grade level.

Other subtests
Begin administration with item that corresponds to Numeration ceiling item.

Parallel Forms A and B
+ Alternate every three months
+ Forms matched statistically and by content

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KeyMath™3 Administration

<table>
<thead>
<tr>
<th>Establish a Basal</th>
<th>Basal Set: three consecutive correct responses immediately preceding the first incorrect response. Basal Item: lowest numbered item in basal set.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish a Ceiling</td>
<td>Ceiling Set: Four consecutive incorrect responses. Ceiling Item: Highest numbered item in the ceiling set.</td>
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</table>

Administration Times

Areas may be administered individually
- Focus on students area of greatest need
- Shorter administration time

<table>
<thead>
<tr>
<th>Grade</th>
<th>Basic Concepts</th>
<th>Operations</th>
<th>Applications</th>
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</thead>
<tbody>
<tr>
<td>Pre-K</td>
<td>10 - 40</td>
<td>5 - 15</td>
<td>5 - 20</td>
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<tr>
<td>4 to 6</td>
<td>40 - 45</td>
<td>10 - 20</td>
<td>15 - 20</td>
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<tr>
<td>7 to 12</td>
<td>40 - 45</td>
<td>15 - 25</td>
<td>15 - 20</td>
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Norms Development

- 4,000 individuals from 4 years 6 mos to 21 years 11 mos
- Both “Age” and “Grade” norms for Fall and Spring 2006
- Norms for the entire assessment and for specific areas
- Norm sample matched to 2005 U.S. census
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Concurrent Validity

<table>
<thead>
<tr>
<th>Test</th>
<th>Basic Concepts</th>
<th>Operations</th>
<th>Applied Problem Solving</th>
<th>Grade</th>
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<tbody>
<tr>
<td>KTEA-II</td>
<td>.79</td>
<td>.82</td>
<td>.68</td>
<td>(gr k-5)</td>
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<tr>
<td>ITBS</td>
<td>.78</td>
<td>.75</td>
<td>.75</td>
<td>(gr k-8)</td>
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<tr>
<td>GMADE</td>
<td>.83</td>
<td>.63</td>
<td>.75</td>
<td>(gr k-5)</td>
</tr>
<tr>
<td>MAP</td>
<td>.81</td>
<td>.80</td>
<td>.75</td>
<td>(gr k-5)</td>
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<table>
<thead>
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<th>Test</th>
<th>Basic Concepts</th>
<th>Operations</th>
<th>Applied Problem Solving</th>
<th>Grade</th>
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<tr>
<td>KTEA-II</td>
<td>.85</td>
<td>.87</td>
<td>.76</td>
<td>(gr 6-12)</td>
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<tr>
<td>GMADE</td>
<td>.83</td>
<td>.84</td>
<td>.74</td>
<td>(gr 6-12)</td>
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<tr>
<td>MAP</td>
<td>.86</td>
<td>.87</td>
<td>.82</td>
<td>(gr 6-12)</td>
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Reliability

Internal Consistency of Form A

<table>
<thead>
<tr>
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<th>Basic Concepts</th>
<th>Operations</th>
<th>Applications</th>
<th>Total</th>
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<tr>
<td>Fall</td>
<td>.95</td>
<td>.93</td>
<td>.89</td>
<td>.97</td>
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<td>Spring</td>
<td>.96</td>
<td>.93</td>
<td>.88</td>
<td>.97</td>
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Technical Properties

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<tr>
<th>Clinical Group</th>
<th>Mean Difference</th>
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<tr>
<td>LD Math</td>
<td>-15.6</td>
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<tr>
<td>LD Reading</td>
<td>-12.5</td>
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<tr>
<td>Combined LD Math &amp; Reading</td>
<td>-22.2</td>
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<tr>
<td>ID (Intellectual Disability)</td>
<td>-34</td>
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<tr>
<td>ADHD</td>
<td>-1.1</td>
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<tr>
<td>Gifted and Talented</td>
<td>16.6</td>
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**KeyMath™3 Scores**

**For Areas and Total Test:**
- Standard Scores (x=100, SD=15, Range 55-145)
- Confidence Intervals
- GE and AE
- PR

**For Subtest:**
- Scaled Scores (x =10, SD=3, Range 1-19)
- Confidence Intervals
- GE and AE

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**KeyMath™3 Scores**

**To measure growth:**
- Grade equivalents
- Age equivalents
- KeyMath-3 Developmental Scores
  - Grade Equivalents
  - Age Equivalents
  - Growth Scale Value (GSV)\(^1\)

\(^1\)available only with the ASSIST™ scoring program

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**Measuring Growth**

Growth Scale Value (GSV)
- Based on IRT ability Scale
- Designed for measuring change
- Reflects absolute performance like a raw score not relative standing (normative)
- Allows direct comparison of GSV scores obtained on the alternate forms of an area
- Useful for documenting progress (AYP)
- Helpful in measuring response to intervention
Key Features

- Quickly and accurately scores the test
- Pinpoints student’s strengths & weaknesses
- Linked to Essential Resources intervention program
- Available in Network Client/Server version as well as single user version
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ASSIST™ Reports
- Comprehensive Narrative Report
- Score Summaries
- Area Comparisons
- Score Profiles
- Item and Functional Range Analysis
- Progress Report (GSV)
- Parent/Caregiver Letter

ASSIST™ Narrative Report
- Describes student’s subtest, area, and total test scores
- Explains percentile ranks and descriptive categories
- Describes student’s mathematical performance in relation to nationally representative sample

See attached Sample Report for Tommy J. Testcase

ASSIST™ Score Summary
- Excellent tool for identifying and prioritizing instructional programs
- Easily and quickly identify an examinee’s lowest and highest areas of functioning
**ASSIST™ Area Comparisons**

- Allow direct comparison of individual’s performance in one area with one’s overall test performance or performance in the other areas
- Convey level of statistical significance of difference between two area standard scores and frequency with which a difference that large was observed in the norm sample

**ASSIST™ Area Comparisons**

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Standard Score Difference</th>
<th>Significance Level</th>
<th>Frequency of Occurrence</th>
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</thead>
<tbody>
<tr>
<td>Basic Concepts &lt; Operations</td>
<td>21</td>
<td>&lt;.01</td>
<td>1-5%</td>
</tr>
<tr>
<td>Basic Concepts &lt; Applications</td>
<td>3</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Operations &gt; Applications</td>
<td>18</td>
<td>&lt;.01</td>
<td>6-10%</td>
</tr>
</tbody>
</table>

NS = Not significant

**ASSIST™ Score Profiles**

- Present graphical representation of examinee’s subtest scale scores, and area and total test standard scores
- Identify quickly and easily students’ strengths and weaknesses
- Show graph of subtest scale scores and area and total test standard scores
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**ASSIST™ Item & Functional Range Analysis**
- Identifies KeyMath™-3 DA items that fall within an individual’s functional range
- Notes items that may require particular attention
- Presents the behavioral objective measured by each of the items included in the analysis
- Identifies appropriate lessons in the KeyMath™-3 Essential Resources

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**ASSIST™ Progress Report**
- Evaluates effectiveness of math intervention programs for individuals and groups
- GSVs have significant advantage over standard scores and percentile ranks for measuring growth and tracking progress

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**ASSIST™ Progress Report**
Answers the following questions:
1. How much gain?
2. Is that gain significant?
3. How does the student’s growth compare to the sample’s?
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**ASSIST™ Parent Caregiver Report**

- Communicates test results to parents/caregivers through one-page letter
- Describes features of the test
- Provides percentile ranks and descriptive categories for content areas and for total test

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**KeyMath™-3 Essential Resources**

Components
- Oversized teaching easel
- CD ROM Resources
- Transparent cover
- Opaque slide
- Teaching Manual
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**KeyMath™-3 Essential Resources**

Integrated with KeyMath™-3 Diagnostic Assessment content, organization and range.
- Level 1 (Pre-K - grade 4)
- Level 2 (grades 5 and up)

**KeyMath™-3 Essential Resources**

- ASSIST links you directly to recommended instructional materials based on student’s KeyMath™-3 Diagnostic Assessment results
- May also use this material independently incorporating these engaging activities into your teaching program

**KeyMath™-3 Essential Resources**

Targeted materials to build a customized instructional program
- Over 400 lessons with activities per level
- Over 200 guided and nearly 450 independent worksheets per level
- Nearly 150 assessments per level including readiness, review, mastery and alternative
- Progress Monitoring Report - one for each of the 10 Content Strands
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KeyMath™-3 Essential Resources
Automatically highlights recommended lessons based on DA results

KeyMath™-3 Essential Resources
Conveniently preview thumbnails of all material

Easel Teacher Display
Convenient teaching easel
Reverse side of Student Display
Specific Instructions
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**Practice and Assessment**
- Guided Practice
  - Readiness Assessment
  - Review Assessment
  - Mastery Assessment
- Independent Practice
  - Alternative Assessment

**Progress Monitoring**
- Record for each of the 10 content strands
- Monitor individual student progress with KeyMath™3 Essential Resources assessments as you move through the lessons
- Monitor progress and determine any needed adjustments to student instructional plan

**Progress Monitoring**
- Track student performance over time
- Determine possible adjustments to education plan
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Instructional Planning

Essential Resources Use

- Obtain recommended lessons from the Diagnostic Assessment results
- Review for appropriateness for the student
- Administer readiness assessment
- Teach the specific lesson with guided practice sheets
- Have student complete independent practice
- Administer review assessment
- Re-teach lesson with variations (if needed)
- Administer mastery assessment
KeyMath3
Gabriele: Case Study

- 2nd grade
- Struggling with math assignments
- Tutor noted knows addition/subtraction facts, but can’t apply to problem-solving
- KM3 administered to determine functional level and developing skills

Gabriele’s Score Summary

<table>
<thead>
<tr>
<th>Subtest/Area</th>
<th>Scaled Score</th>
<th>Standard Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numeration</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Algebra</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Geometry</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Measurement</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Data Analysis</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>BASIC CONCEPTS</td>
<td></td>
<td>78</td>
</tr>
</tbody>
</table>

 Gabriele’s Score Summary

<table>
<thead>
<tr>
<th>Subtest/Area</th>
<th>Scaled Score</th>
<th>Standard Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental Computation</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Addition/Subtraction</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Multiplication/Division</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>OPERATIONS</td>
<td></td>
<td>99</td>
</tr>
</tbody>
</table>
Gabriele’s Score Summary

<table>
<thead>
<tr>
<th>Subtest/Area</th>
<th>Scaled Score</th>
<th>Standard Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundations of Problem Solving</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Applied Problem Solving</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>APPLICATIONS</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>TOTAL TEST</td>
<td>84</td>
<td></td>
</tr>
</tbody>
</table>

Gabriele’s Score Profile

- Operations is a strength
- Measurement is a weakness
- Mental Computation and Addition/Subtraction are strengths

Gabriele’s Area Comparisons

<table>
<thead>
<tr>
<th>Area</th>
<th>Area</th>
<th>Diff</th>
<th>Sig</th>
<th>Freq</th>
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</thead>
<tbody>
<tr>
<td>Basic Concepts 78</td>
<td>Operations 99</td>
<td>21</td>
<td>&lt;.01</td>
<td>1-5%</td>
</tr>
<tr>
<td>Basic Concepts 78</td>
<td>Applications 81</td>
<td>3</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Operations 99</td>
<td>Applications 81</td>
<td>18</td>
<td>&lt;.01</td>
<td>6-10%</td>
</tr>
</tbody>
</table>
Gabriele’s Functional Range

Numeration Incorrect items:
- Name ordinal position of an object in a row of 6 objects
- Sequence set of 4 one- & two-digit numbers
- Select which of 3 small stacks from a set of 5 total 8
- Determine one-digit number to add to multiple of 10 to equal 2-digit number

Gabriele’s Functional Range

Geometry Incorrect items:
- Select shape that fills in a gap when rotated or flipped
- Use row numbers and position in row to identify object in a grid
- Identify shape that doesn’t belong in a set of shapes

Gabriele’s Functional Range

Measurement Incorrect items:
- Order objects by length
- Recognize that heights cannot be compared between two people if one is sitting
Gabriele’s Functional Range

Mental Computation & Estimation
Incorrect items:
- Subtract two-digit number from multiple of 10
- Subtract 2 two-digit numbers
- Subtract two-digit number from three-digit number when regrouping is required

Gabriele’s Functional Range

Addition & Subtraction Incorrect items:
- Subtract two-digit number from multiple of 10 with regrouping
- Subtract 2 two-digit numbers with regrouping
- Subtract two-digit number from a three-digit number with regrouping

Gabriele’s Focus Items:
Geometry

Items Above Functional Range
- Correct wrong element in a mirror image display of blocks
- Recognize similar & different attributes in pair of objects
Gabriele’s Focus Items:
Mental Computation & Estimation

Item Above Functional Range
- Select from set of two-digit numbers
  the 2 numbers that would make a
given sum

Item Below Functional Range
- Select from set of one-digit numbers
  the 2 numbers that would make a
given sum

Developing an Essential Resource
Instructional Plan for Gabriele

- Error patterns on Numeration subtest.
- Determine where these are covered in
  the instructional sequence.
- Target Instructional Segment:
  - Contains earliest Numeration Concept
    Cluster that addresses the behavioral
    objectives of 2 or more of the item
    errors.

KeyMath 3 Summary

- Diagnostic Assessment “Identify”
- Analysis “Determine Need”
- Intervention “Essential Resources”
- Monitor Progress “Re-assess”

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For more information contact your Pearson Assessment Consultant

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<th>Geographic Area</th>
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<tbody>
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