The MTSS Framework for Mathematics

KSDE Numeracy Conference
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Deborah McVey
Kansas MTSS Core Team
Agenda

- MTSS Framework
- Assessment
  - Comprehensive Assessment Plan
  - Universal screening
  - Progress monitoring
  - Diagnostic assessment
- Intervention
  - Model of intervention
  - Early Numeracy Quadrants
  - Math Quadrants
  - Adjusting Instruction
What is MTSS?

- A coherent continuum of evidence based, system-wide practices to support
- a rapid response to academic and behavioral needs
- with frequent data-based monitoring for instructional decision making
- to empower each Kansas child to achieve high standards.
The big “BIG” idea of MTSS

1. **Decide what is important** for students to know
2. **Teach what is important** for students to know
3. **Keep track** of how students are doing
4. **Make changes** according to the results you collect

*Dave Tilly, Heartland AEA; 2005*
Core Beliefs of MTSS

- Every child learns and achieves to high standards
- Learning includes academic and social competencies
- Every member of the learning community continues to grow, learn and reflect
- Every leader at all levels are responsible for every child
- Change is intentional, coherent and dynamic
Self-Correcting Feedback Loop

Improving the Building System
- Analyze Data
- Evaluate Effectiveness
- Building Leadership Team
  - Communication
  - Refine to Meet Needs of Building System

Improving Instruction
- Analyze Data
- Evaluate Effectiveness
- Collaborative Teams
  - Refine Student Instruction

Improving the District System
- Analyze Data
- Evaluate Effectiveness
- District Leadership Team
  - Communication
  - Refine to Meet Needs of District System

(C) 2009 Kansas MTSS
MTSS Materials & Supports

- MTSS Documents
  - Innovation Configuration Matrix (ICM)
  - Research Base
  - Structuring Guide
  - Implementation Guides

- Training Support
  - Recognized trainers across Kansas

- MTSS website [www.kansasmtss.org](http://www.kansasmtss.org)
ALL: Core Instruction & Curriculum

SOME: Supplemental (+ CORE)

FEW: Intense (+ CORE)

Core with Differentiation to Meet Needs of Culturally and Linguistically Diverse Students

Group Problem Solving to match Student Needs with Protocol Interventions

Individual Student Problem Solving to Create Customized Interventions
Models for Math Intervention Groups

- Targeted skills (used for MTSS)
- Targeted topics
The MTSS Targeted Skills Model

- The targeted skills model utilizes a diagnostic assessment process for the purpose of creating small homogenous groupings for supplemental and intensive instruction.

- The targeted skills model enables the use of the protocol component of the hybrid model, and ensures the remediation of missing prerequisite skills.
Problems with the Targeted Topics Model

- This model often results in spending intervention time on the math indicators that are assessed during that school year, often to the exclusion of non-assessed indicators.

- This model does not include the systematic procedures needed for a protocol model of instruction of missing pre-requisite skills.
Assessment
Roles of Assessment

Teachers should utilize assessment to determine:

- student strengths and weaknesses,
- student groups,
- effective instruction,
- student growth, and
- when to regroup students.
A Comprehensive Assessment Plan

- The purpose of the comprehensive assessment system is to document and monitor achievement, to make informed decisions about instruction, and to evaluate effectiveness of programs and instructional strategies.
- A meaningful comprehensive assessment system provides a complete picture of diverse learning goals and how well students are attaining them.
Five Steps to Develop A Comprehensive Assessment Plan

1. Selecting four specific types of assessments: universal screening, progress monitoring, diagnostic, and outcome.
2. Determining who will conduct the specific assessments and the professional development for those conducting assessments
3. Developing an assessment schedule
4. Establishing a data management system
5. Planning and delivering professional development for teachers to provide understanding of the comprehensive assessment system and how to use the data to make instructional decisions.
### Types of Assessments that Comprise a Comprehensive Assessment Plan

<table>
<thead>
<tr>
<th>Broad Type of Assessment</th>
<th>Specific Type of Assessments</th>
<th>Characteristics</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Formative Assessment</strong></td>
<td><strong>Universal Screening:</strong></td>
<td>Provides measures of fluency and accuracy of critical early learning skills.</td>
<td>Used to identify students who may need additional supports.</td>
</tr>
<tr>
<td></td>
<td><strong>Progress Monitoring of Core Instruction:</strong></td>
<td>Assessments embedded within classroom activities and linked to specific units of instruction measuring content area curriculum standards and instruction.</td>
<td>Used to determine if students have learned concepts and skills taught so instruction may be adjusted.</td>
</tr>
<tr>
<td></td>
<td><strong>Progress Monitoring of Intervention:</strong></td>
<td>Assessments that provide measures of skills targeted by intervention.</td>
<td>Used to ensure effectiveness of intervention.</td>
</tr>
<tr>
<td></td>
<td><strong>Diagnostic Assessment</strong></td>
<td>Assessments that probe knowledge and skill in depth.</td>
<td>Used to determine instructional focus of intervention.</td>
</tr>
<tr>
<td><strong>Summative Assessment</strong></td>
<td><strong>Outcome Assessments:</strong></td>
<td>Assessments that measure level of achievement of content area curriculum standards and instruction after instruction.</td>
<td>Used to determine student achievement and instructional effectiveness.</td>
</tr>
</tbody>
</table>
Two Broad Types of Assessment

- Formative Assessment
  - Enables teachers to adjust instruction

- Summative Assessment
  - Summarizes student learning of content
Summative Assessment

- Summative assessments are administered after instruction and measures students against a defined set of grade-level content standards.
- They are designed to evaluate student performance after instruction has been completed.
- They are useful in determining the overall effectiveness of a given program (for individual students or groups).
- They include outcome assessments such as state or district mandated tests that measure specified standards or outcomes.
Example of Summative Assessments

- Kansas Computerized Assessment (KCA) which is offered one time at the end of the semester or school year to evaluate student performance against a defined set of grade-level content standards.
Formative Assessments

- are designed to aid learning by providing explicit feedback related to student performance
- are used to make immediate instructional decisions on behalf of individuals or groups of students
- include universal screening, progress monitoring, and diagnostic tests.
# Three Major Types of Formative Assessments

<table>
<thead>
<tr>
<th>TYPE</th>
<th>USE</th>
<th>PURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Universal Screening</td>
<td>Identify students who need more intense assessment to determine the potential for intervention.</td>
<td>“First Alert”</td>
</tr>
<tr>
<td>2a) Progress Monitoring of Core Instruction</td>
<td>Determine if students have learned content area curriculum standards and skills taught</td>
<td>“Dip stick”</td>
</tr>
<tr>
<td>2b) Progress Monitoring of Intervention</td>
<td>Ensure effectiveness of intervention and inform instructional decisions</td>
<td>“Growth Charts”</td>
</tr>
<tr>
<td>3) Diagnostic</td>
<td>Determine instructional focus of intervention</td>
<td>“In-depth View”</td>
</tr>
</tbody>
</table>
Universal Screening
Key Features of Universal Screeners

• Universal screening of ALL students occurs at least three times per year

• Procedures must identify which students are proficient in the target skill, which students are developing the skill, and which are deficient in the skill

• Procedures lead to data for decision making about
  ◦ how to create instructional change so that all students reach proficiency
  ◦ which students need more intensive interventions

(NASDSE, 2005)
Uses of a Universal Screener

- To screen all students three times a year (fall, winter, spring)
  - Provides information for building and district on the number of students not at grade level.
  - Early warning for students who need additional support

- To initially group students for intervention

- To help plan classroom instruction based on data

- To monitor the progress of students who are at benchmark
Universal Screening

- The most common universal screening assessment used in the area of academics is curriculum-based measurement.

- Curriculum based measures provide both accuracy and fluency data, both of which are predictive of later academic success.

  Fuchs and Fuchs (2005); Salvia, Ysseldyke, and Bolt (2007)
Universal Screeners

- Must measure predictive skills per grade level and time of year
- Must measure accuracy and fluency
- Must be quick and easy to give to large numbers of students (10 min. or less)
- Results need to rank the students so that those who are doing poorly may be identified
Brief assessments focused on target skills (e.g. phonological awareness) that are highly predictive of future outcomes (Jenkins, 2003)

All students are screened in one or more of these academic areas and those identified at risk are provided evidence-based interventions in the at-risk area.
Mathematics Tasks for Universal Screening

- Kindergarten and Grade 1:
  - Early numeracy probes

- Grades 1–8:
  - Computation

- Grades 2–8:
  - Concepts and Applications

- High school – two step process
  - Step One: group assessment and other information to identify those who may be at-risk
  - Step Two: administer 8th grade computation and concepts/application probes to those identified as being at-risk
The High School Two-Step Screening Process for Academics

• **Step 1**: Combine several factors to decide if further screening needs to occur. Here are some possible risk factors:
  ◦ Low grades, teacher recommendation, or poor attendance
  ◦ Non-proficient on most recent state assessment
  ◦ Scores more than 1 standard deviation below mean on NWEA MAP test or other group assessment

• **Step 2**: Any student identified as being at risk from Step 1 should be screened at the 8th grade level of a listed universal screening assessment
# Recommended Target Areas for Screening & Progress Monitoring for Mathematics

<table>
<thead>
<tr>
<th>Recommended Grade Levels</th>
<th>Measures</th>
<th>Proficiencies Assessed</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-1</td>
<td>Quantity Discrimination</td>
<td>Ability to tell which of two numbers is larger</td>
<td>Screening and progress monitoring</td>
</tr>
<tr>
<td></td>
<td>Missing Number</td>
<td>Insert the number missing from a sequence of 3 numbers</td>
<td>Screening and Progress Monitoring</td>
</tr>
<tr>
<td>1</td>
<td>Computation</td>
<td>Proficiency and automaticity with basic computation skills</td>
<td>Screening and Progress Monitoring</td>
</tr>
<tr>
<td>2-8</td>
<td>Computation</td>
<td>Proficiency and automaticity with grade-level computation skills</td>
<td>Screening and Progress Monitoring</td>
</tr>
<tr>
<td></td>
<td>Concepts/ Application</td>
<td>Math concepts, problem-solving, and vocabulary</td>
<td>Screening and Progress Monitoring</td>
</tr>
</tbody>
</table>
Examples of Math Screeners

- AIMSweb
- STEEP
Early Numeracy Measures

- Number recognition (Number Identification)
- Oral counting
- Magnitude comparison (Quantity Discrimination)
- Strategic counting (Missing Number)
Computation Probes

For students in Grades 1–8:

- Student is presented with computation problems representing the year-long, grade-level mathematics curriculum.
- Student works for set amount of time (time limit varies for each grade).
- Teacher grades test after student finishes.
<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14 × 3 =</td>
</tr>
<tr>
<td>2</td>
<td>84 ÷ 12 =</td>
</tr>
<tr>
<td>3</td>
<td>Write the fraction in lowest terms</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>540 + 280 =</td>
</tr>
<tr>
<td>6</td>
<td>Write the fraction in lowest terms</td>
</tr>
<tr>
<td>7</td>
<td>18 ( \times 4 ) =</td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>225 - 134 =</td>
</tr>
<tr>
<td>10</td>
<td>Write the fraction in lowest terms</td>
</tr>
<tr>
<td>11</td>
<td>4[\frac{50}{11} = \frac{526}{11} ]</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>423 ( \times 21 ) =</td>
</tr>
<tr>
<td>14</td>
<td>6.12 + 1.08 =</td>
</tr>
<tr>
<td>15</td>
<td>10[\frac{100}{-1.28} = ]</td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>537 ( \times 21 ) =</td>
</tr>
<tr>
<td>18</td>
<td>0.73 - 0.22 =</td>
</tr>
<tr>
<td>19</td>
<td>( \frac{5}{51} + \frac{2}{51} = )</td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>
For students in Grades 2–8:

- Student is presented with problems representing the year-long, grade-level mathematics curriculum. Concepts and application problems include math problem-solving, math concepts, and math vocabulary.

- Student works for set amount of time (time limit varies by grade).

- Teacher grades test after student finishes.
Concepts and Applications

GRADE 5 PROBE

1. Write the appropriate unit in the blank.
   ![Ruler Image]
   
   The length of the chili is 3.5 cm.

2. In the blank, write the least common multiple of the two numbers.
   6, 48
   ________

3. Andrew started sketching at time A. He stopped sketching at time B.
   ![Clock Images]
   Andrew sketched for a total of ________ hours and ________ minutes.

4. Write the number in the blank.
   Six million, seven hundred thirty-five thousand, one hundred forty-two
   ________

5. Write <, >, or = in each blank.
   \[
   \frac{4}{7} \quad \frac{2}{3} \quad \frac{4}{6}
   \]

6. Write the number in the blank.
   
   April Fruit Sales
   
<table>
<thead>
<tr>
<th>Kinds of Fruit</th>
<th>Kilograms (kg) Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>80</td>
</tr>
<tr>
<td>Bananas</td>
<td>60</td>
</tr>
<tr>
<td>Grapes</td>
<td>40</td>
</tr>
<tr>
<td>Strawberries</td>
<td>30</td>
</tr>
</tbody>
</table>

7. In a survey, 175 students were asked whether lemonade should be added to the school menu. One-fifth of the students replied yes.
   Write down the number of students who replied yes.

8. Solve for the value of \( p \).
   \[2 \times p = 82\]
How to Administer and Score Mathematics Probes

- Early numeracy probes are individually administered.
- Computation and Concepts/Applications probes can be administered in a group setting.
- The answers are graded as correct or incorrect and are weighted for level of difficulty.
Progress Monitoring
Key Features of Progress Monitoring Assessments

• Procedures must determine whether intervention efforts are producing the desired improvement in rate of learning.

• When choosing assessment tools, consider research by Fuchs (1986) indicating that students achieve the most when:
  ◦ Progress is monitored frequently
  ◦ Progress data is displayed on graphs
  ◦ Ambitious goals are set from screening data
  ◦ Teams use preset data utilization rules in analyzing data
Progress Monitoring

• Designed to:
  ◦ Estimate rates improvement
  ◦ Identify students who are not demonstrating adequate progress
  ◦ Be very sensitive to student learning
  ◦ Compare the efficacy of different forms of instruction
  ◦ Design more effective, individualized instructional programs for struggling learners

(Fuchs & Fuchs, 2004)
Why Is Progress Monitoring Important?

- Research has demonstrated that when teachers use progress monitoring for instructional decision-making purposes:
  - Students achieve more.
  - Teacher decision-making improves.
  - Students tend to be more aware of their performance.

(Fuchs, Deno, Mirkin, 1984; Fuchs, Fuchs, Hamlett, & Ferguson, 1992; Stecker, Fuchs, & Fuchs, 2005)
Two Types of Progress Monitoring

① Progress Monitoring of Core
- tied to content area curriculum standards and instruction
- administered for the purpose of helping teachers to know whether students have learned the concepts and skills taught so that instruction may be adjusted to re-teach concepts or to provide additional practice on skills not yet mastered
Examples of Progress Monitoring Core

- The Kansas Formative Assessment System
Two Types of Progress Monitoring

② Progress Monitoring of Interventions

• provides measures of skills targeted to ensure effectiveness of the intervention.
• must be able to show small increments of change that allow staff to determine if students are making adequate progress with the current intervention/level of support by ensuring the gap is closing at a desired rate.
• inform instructional decisions and shows the effectiveness of the interventions.
Use the assessments that are listed for universal screening if they have multiple forms of the probes available to be used for progress monitoring.
Frequency of Progress Monitoring

- **Supplemental** – every two weeks
- **Intensive** – weekly

- 20-30 alternate forms per grade level is sufficient
Mathematics Tasks for Progress Monitoring

- Kindergarten and Grade 1:
  - Early numeracy probes

- Grades 2 – High School
  - Computation and concepts/application

- Examples:
  - AIMSweb
  - STEEP
Diagnostic Assessment
Diagnostic

- Must give specific information about the student’s skill or knowledge
- Must focus on sampling student work in ways that are instructionally relevant
- Must lead to decision-making for instructional planning
- Often includes analysis of student errors
Types of Diagnostic Assessment

1. Diagnostic information used to differentiate core instruction
2. Diagnostic process where brief measures are used to place students into intervention groups
3. Formal diagnostic assessments used when additional information is needed for students not making progress.
Examples of Diagnostic Assessments to Differentiate the Core Curriculum

- NWEA (MAP)
- Scantron

These types of assessments can be used for the first step in the two-step screening process for students in grades 9-12.
Diagnostic Process for Math

1) Test computation and concepts & application skills at lower grade levels to identify instructional level.

2) Use error analysis at instructional level plus single-skill CBM probes to further assess math difficulties and help pin-point instructional needs.

3) If using AIMSweb, review student intervention report (at instructional level if possible).

4) Utilize pre-tests or placement tests from possible math intervention materials.
Formal Diagnostic Math Assessments

- STAR Math
- Key Math 3
- Algebra Readiness Diagnostic Testing Program
- Diagnostic Test for Pre-Algebra Math
Intervention
Students Struggling in Math Need:

- Core Instruction that provides:
  - a **balance** of student-centered and teacher-directed instruction
  - **differentiation** of core materials and instruction
  - use of **peer tutoring strategies**
  - **fidelity** to core curriculum

- And additional skill-targeted intervention
# Model of Instruction

## Early Numeracy (Grades K-1)

<table>
<thead>
<tr>
<th>Level</th>
<th>Core</th>
<th>Supplemental</th>
<th>Intense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>50 minutes</td>
<td>20 – 30 minutes</td>
<td>50 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 - 5 students</td>
<td>1 - 3 Students</td>
</tr>
</tbody>
</table>

## Math Grades (2-12)

<table>
<thead>
<tr>
<th>Level</th>
<th>Core</th>
<th>Supplemental</th>
<th>Intense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>50 - 60 minutes</td>
<td>20 - 30 minutes</td>
<td>60 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 - 8 students</td>
<td>1 – 5 students</td>
</tr>
</tbody>
</table>
## Organizing Early Numeracy Data

| Quadrant 1: Adequate In Strategic Counting and Magnitude Comparison | Quadrant 2: Adequate in magnitude comparison, low in strategic counting |
| Quadrant 3: Low in both magnitude comparison and strategic counting | Quadrant 4: Low in magnitude comparison, adequate in strategic counting |
Focus on aspect of early numeracy that is lowest and developmentally earliest (may be oral counting or number identification)

Most important: strategic counting (missing number) and magnitude comparison (quantity discrimination)

Examples of instructional materials:
- Math Rescue (multi-sensory, Sopris West)
- Practicing Basic Skills in Math (Sopris West)
- East Carolina Early Numeracy Curriculum (Dr. Scott Methe, East Carolina University, www.enumeracy.com)
<table>
<thead>
<tr>
<th>Quadrant 1: Adequate In Computation and Concepts/Application</th>
<th>Quadrant 2: Adequate in Computation, Low in Concepts/Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadrant 3: Low in both Computation and Concepts/Application</td>
<td>Quadrant 4: Low in Computation, Adequate in Concepts/Application</td>
</tr>
</tbody>
</table>
Supplemental and Intensive Curricular Materials for math

- CRA (concrete, representational, abstract)
  - Recommended for computation instruction
- SBI (schema-based instruction)
  - Recommended for problem-solving instruction
- Strategy instruction
  - Strategies may be taught in intervention, but the use of strategies needs to be cued in core
Quadrant 1: Adequate in Computation and Concepts/Application

- Focus on differentiation of instruction, content knowledge remediation and use of math strategies

- Examples of instructional materials
  - BAIP
  - PALS (Peer-assisted learning strategies)
  - RPT (Reciprocal peer tutoring)
Quadrant 2: Adequate in Computation, Low in Concepts/Application

- Focus on math problem-solving skills and math vocabulary; use SBI (schema-based instruction) for instruction

- Examples of instructional materials
  - Solving Math Word Problems (Asha Jitendra, Pro-Ed)
  - Hot Math
  - Pirate Math
Quadrant 3: Low in both Computation and Concepts/Application

- Focus on calculation instruction (CRA), basic facts review, and problem-solving skills (SBI)

- Examples of instructional materials:
  - Strategic Math series (Edge Enterprises)
  - Computation of Integers (Riccomini & Witzel, Pearson)
  - Computation of Fractions (Witzel & Riccomini, Pearson)
  - Solving Math Word Problems (Jitendra, Pro-Ed)
  - V Math (Cambrium Learning)
Quadrant 4: Low in Computation, Adequate in Concepts/Application

• Focus on calculation skills and basic facts review; use concrete/representational/abstract (CRA) approach to instruction

• Examples of instructional materials
  ◦ Strategic Math series (Edge Enterprises)
  ◦ Computation of Integers (Riccomini & Witzel, Pearson)
  ◦ Computation of Fractions (Witzel & Riccomini, Pearson)
## Math Four Quadrant Instructional Sort

<table>
<thead>
<tr>
<th>Quadrant 1: Adequate in both Computation and Concepts/Application</th>
<th>Quadrant 2: Adequate in Computation, Low in Concepts/Application</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus of Instruction</strong></td>
<td><strong>Focus of Instruction</strong></td>
</tr>
<tr>
<td>• Core instruction with differentiation</td>
<td>• Concepts/application skill deficits</td>
</tr>
<tr>
<td>• Math content knowledge remediation (e.g., BAIP)</td>
<td>• Problem-solving strategies</td>
</tr>
<tr>
<td>• Schema-based instruction (SBI)</td>
<td></td>
</tr>
<tr>
<td><strong>Examples of Support for Students Exiting from Intervention</strong></td>
<td><strong>Intervention Examples</strong></td>
</tr>
<tr>
<td>• Peer-Assisted Learning Strategies (PALS)</td>
<td>• Solving Math Word Problems (SBI)</td>
</tr>
<tr>
<td>• Reciprocal Peer Tutoring (RPT)</td>
<td>• Hot Math</td>
</tr>
<tr>
<td></td>
<td>• Pirate Math</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quadrant 3: Low in both Computation and Concepts/Application</th>
<th>Quadrant 4: Low in Computation, Adequate in Concepts/Application</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus of Instruction</strong></td>
<td><strong>Focus of Instruction</strong></td>
</tr>
<tr>
<td>• Review of basic facts (10 min each intervention session)</td>
<td>• Review of basic facts (10 min each intervention session)</td>
</tr>
<tr>
<td>• Computation strategies</td>
<td>• Instruction in computation strategies</td>
</tr>
<tr>
<td>• CRA for computation instruction</td>
<td>• CRA for computation instruction (including fractions and algebra)</td>
</tr>
<tr>
<td>• Problem-solving strategies</td>
<td>• Meta-cognitive strategy instruction for fraction computation</td>
</tr>
<tr>
<td>• Schema-based instruction (SBI)</td>
<td></td>
</tr>
<tr>
<td><strong>Intervention Examples</strong></td>
<td><strong>Intervention Examples</strong></td>
</tr>
<tr>
<td>• Strategic Math Series</td>
<td>• Strategic Math Series</td>
</tr>
<tr>
<td>• Computation of Integers/Fractions (CRA)</td>
<td>• Computation of Integers (CRA)</td>
</tr>
<tr>
<td>• Solving Math Word Problems (SBI)</td>
<td>• Computation of Fractions (CRA)</td>
</tr>
</tbody>
</table>
Use Progress Monitoring Data To Adjust Interventions

When data show that a student’s scores are below the aimline, follow these steps to adjust the intervention:

1. Check what you are monitoring
2. Check fidelity of instruction
3. Increase pacing of instruction
4. Change pace of intervention
5. Ensure alignment of programs
6. Adjust the instructional materials
7. Move the student to a different group
Increasing the Intensity of Instruction

- Increase number of opportunities for student response in a minute
- Increase number of questions and error corrections student receives in a minute
- Increase scaffolding
- Provide more modeling (I Do and We Do)
- Increase number of repetition cycles on each skill
- Use more explicit and systematic curriculum (Hall, 2007)
Customize the Intervention

1) Begin with an intensive research-based protocol intervention.

2) Teach the protocol intervention with fidelity.

3) The team determines whether a revision to the program is needed to boost the student’s rate of improvement.

4) If so, an instructional feature, based on a well researched instructional principle, is added to the validated protocol.
# ICEL

## Research-Based Considerations

<table>
<thead>
<tr>
<th>Instruction</th>
<th>Curriculum</th>
</tr>
</thead>
</table>
| • Fidelity of Instruction  
  • Modeling and guided practice prior to independent practice (I Do, We Do, You Do)  
  • Explicit Teaching  
  • Scaffolded instruction | • Appropriate match between materials and focus of instruction for quadrant  
  • Sufficiently systematic materials to achieve appropriate rate of progress to reach goal  
  • Balance between teacher-directed and learner-centered approach to curriculum |

<table>
<thead>
<tr>
<th>Environment</th>
<th>Learner</th>
</tr>
</thead>
</table>
| • Classroom routines/behavior management support learning  
  • Appropriate person teaching the intervention group  
  • Transitions are short and brief | • Motivation  
  • Task persistence  
  • Attendance  
  • Pattern of performance errors reflect skill deficits |
Closing the Gap

- Progress monitor frequently at the student’s instructional level and less often at grade level
- Involve the student in goal-setting and progress monitoring
- Provide research-based targeted interventions
  - Match materials to identified focus of instruction
- Increase intensity of instruction if progress monitoring results are not closing the gap
- Increase difficulty of instructional level based on positive progress monitoring results
- Continue monitoring after exiting intervention to assure maintenance of skills
Resources for More Information for Math

- www.kansasmtss.org

- The National RtI Center at www.rti4success.org has information about the technical adequacy of several math tools

- The Kentucky Center for Mathematics at www.kentuckymathematics.org has teacher panel reviews of math assessments and information about diagnostic intervention programs

- Center on Instruction www.centeroninstruction.org
Resources for More Math Information

- **Washington State Program Review Report: K-12 Mathematics Diagnostic-Intervention Programs**

- **Best Evidence Encyclopedia**
  [http://www.bestevidence.org/index.cfm](http://www.bestevidence.org/index.cfm)

- **What Works Clearinghouse**
Questions
Contact Information

- Deb McVey
deb@kansasmtss.org

- Laura Jones
ljones@keystonelearning.org