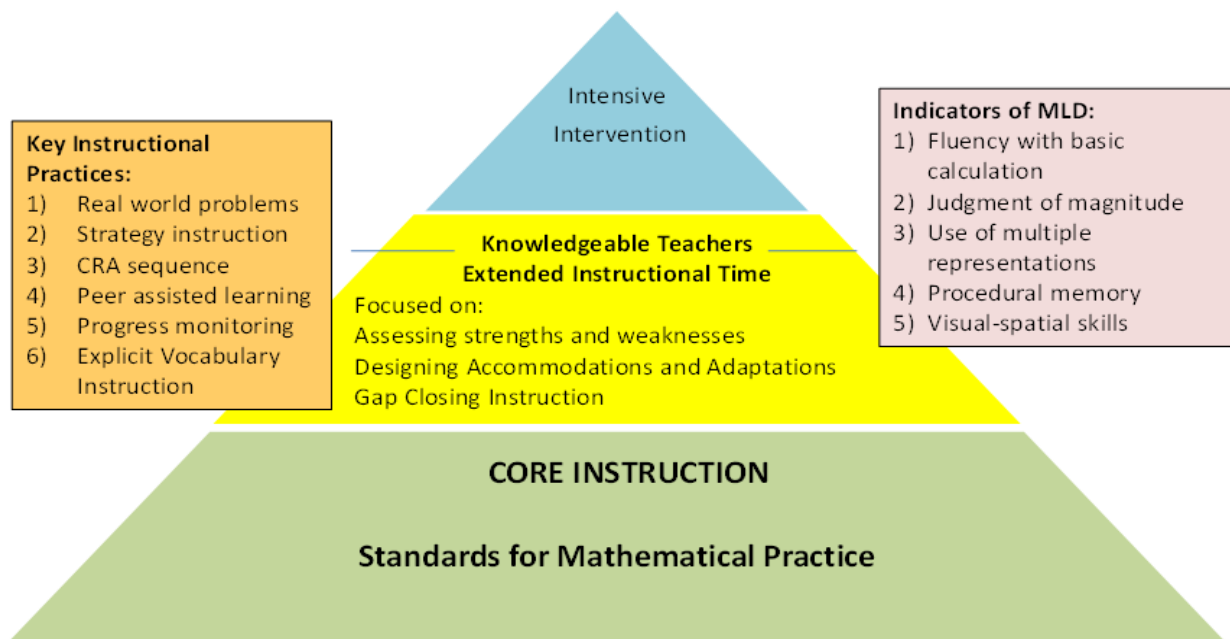


An Instructional Framework Tier 2 Mathematics Intervention



Subtypes of Mathematics Learning Disabilities

	Procedural	Semantic	Visuospatial
Characteristics	<ul style="list-style-type: none"> • Difficulty with execution of procedures • Developmentally immature strategies • Do not comprehend the numeric symbol system • Cannot covert symbols to meaning 	<ul style="list-style-type: none"> • Affects ability to count and calculate • Weakness in verbal code • Cannot retrieve words associated with symbols • Cannot match word from of numbers to symbols • Does not improve over time 	<ul style="list-style-type: none"> • Cannot decipher magnitude representations • Difficulty spatially representing mathematical information • Lack an “internal number line”
Struggles in Classroom	<ul style="list-style-type: none"> • Reading numbers aloud • Writing numbers from dictation • Converting a story problem to an equation • Recalling sequence of steps to an algorithm 	<ul style="list-style-type: none"> • Generate symbols for words • Writing numbers from dictation • Converting a story problem to an equation • May also struggle with sound to symbol pairing in reading 	<ul style="list-style-type: none"> • Determining which number is larger • May reverse a clock, number line or 4 coordinate grid • Converting an equation to a different form: Example: $9 \times 4 = (10 \times 4) - 4$ • Unreasonable answers – Example: $2 \times 4 = 24$ • Estimation • Making a visual model independently
Strengths in Classroom	<ul style="list-style-type: none"> • Determine magnitude • Recall basic facts • Read • Learn mathematics through language and visual models 	<ul style="list-style-type: none"> • Determine magnitude • Understand mathematical concepts and vocabulary • Learn mathematics through use of visual models 	<ul style="list-style-type: none"> • Convert between language and symbols • Interpret a story problem • Recall basic facts • Understand mathematical concepts and vocabulary • Learn mathematics through language and visual aids

Source: Geary, D.C. (2004)

Top 10 Learning Supports

- 1) Preteaching/Reteaching
- 2) Visual Aids
- 3) Visual Models
- 4) Cue Cards
- 5) Strategy Cards
- 6) Color Coded Procedures
- 7) Error Analysis
- 8) Schema Diagrams
- 9) Make it Simpler
- 10) Peer Assisted Learning

Explicit Vocabulary Instruction

- 1) Interactive Notebooks
- 2) Foldables
- 3) Cue Cards
- 4) Anchor Charts
- 5) Graphic Organizers

Websites:

<http://www.graniteschools.org/mathvocabulary/>
<http://www.graniteschools.org/mathvocabulary/vocabulary-cards/>

<http://www.k-5mathteachingresources.com/Math-Anchor-Charts.html>

Dinah Zike Foldable Books: www.dinah.com

www.creativemathematics.com

Suggested Accommodations by Type of Difficulty

Fluency With Basic Calculation	Judgment of Magnitude	Use of Multiple Representations	Procedural Memory	Visual Spatial Skills
<ul style="list-style-type: none"> • Visual aids for calculation of basic facts such as 100's charts, number lines, counters, fact charts • Calculator • Take time factor off of basic fact assessments • Strategy notebook – draw models of strategies such as counting on or double and double again. • Card ring of tricky facts they can't remember • Use assessments to identify which facts student can recall or reason through quickly and which they consistently struggle with. Base visual aids on strengths and weaknesses. 	<ul style="list-style-type: none"> • Models notebook or cards to use as reference when solving problems (tree diagram, area model, open number line, arrow math) • Use visual models to draw problems. • Manipulatives • Use problems with smaller numbers students can be successful with. • Check with a buddy – explain in words how the problem was solved – does my answer make sense? • Identify errors in the work of others – find the answer that doesn't make sense. • Use measuring activities to develop this area of weakness. 	<ul style="list-style-type: none"> • Models notebook or card (tree diagram, area model, open number line, arrow math) • Use visual models to draw the problem. • Manipulatives • Use problems with smaller numbers students can be successful with. • Check with a buddy – explain in words how the problem was solved – • Cards or charts to connect words to symbols to models • Make a story to go with symbolic equations. 	<ul style="list-style-type: none"> • Cue cards for multi step procedures • Personal math notebook for procedures to remember • Sample problem for student to use as a guide • Have the student talk through the procedure before doing independently • Use visual models to draw the problem before solving. • Work with a buddy • Prompting • Use color coding for different parts of problem such as red for step 1, blue for step 2 	<ul style="list-style-type: none"> • Turn lined paper sideways • Use graph paper • Do not ask student to copy problems off of the board – copy for them or print out problems • Prompt student when models are not drawn proportionally • Use color coding for different parts of problem such as red for ones place, blue for tens, etc • Computer assisted instruction so student can reduce need to write problems • Cue cards to remember directionality such as a clock, place value order, positive/negative quadrants