Finding the Root of the Problem: A Needs-Based Approach to Identifying & Supporting Struggling Math Students

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WSASP Fall Convention, October 23, 2026

Today's Focus

1 - UNDERSTANDING
Why do students struggle with math?
What are the roots of their learning challenges?

2 - SUPPORTING
How can we support them?
What makes interventions effective?

3 - IDENTIFYING
How can we identify learning challenges?
What screening tools can we use to identify root challenges?

1 - UNDERSTANDING
Why Students Struggle with Math

Math learning challenges are heterogenous with many underlying roots!

These roots include: Engagement
Skill development
Curriculum & instruction
Core challenges

Roots can be primary or secondary.

Engagement

Students struggle with math when they aren't taking in instruction and haven't had sufficient opportunities to learn.

Physical absence
Missed instruction creates holes & weaknesses that compound.

Global challenges
Vision, hearing, language, social-emotional, and behavioral challenges create barriers to learning.

Inattention & off-task behavior
Learning requires focus and engaged.

Not doing the work
Learning requires solving lots and lots of problems.

Skill Development

Students struggle with math when they haven't developed the necessary understanding and skills to solve problems.

Prerequisite knowledge
Math builds on itself and requires a foundation of knowledge to learn new concepts and skills.

Conceptual understanding
Without understanding underlying concepts, learning is incomplete and difficult to sustain.

Procedural skills
Skills are required to solve advanced problems in developmentally-appropriate ways.

Problem solving skills
Specific skills are needed to apply concepts and skills to novel problems.

Active learning skills
Specific skills are needed to fully engage in learning and understanding.

Curriculum & Instruction

Students struggle with math when math lessons aren't meeting their learning needs.

Pace
Instruction may move at a pace that students are unable to follow, process, or internalize.

Content
Curriculum may include material that is developmentally too high or low for understanding.

Format
Instruction may take a form that does not allow for meaningful engagement, inquiry, or understanding.

Coherence
Instruction may not make the connections needed for learning and understanding to occur.

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Core Challenges

Students struggle with math when they have brain-based challenges that prevent them from learning and problem solving.

Calculation
Difficulty with math fact fluency & automaticity.

Visual processing
Difficulty perceiving, remembering, organizing, &/or manipulating visual information.

Executive functioning
Difficulty monitoring & regulating thinking: disinhibition, inattention, cognitive rigidity, disorganization.

Anxiety
Triggered by mismatched instruction, anticipated or real-time challenges, &/or learning environment.

Cognitive overload
Triggered by cognitive demands that exceed thinking & processing abilities, and prolonged effort & exertion.

1 - SUMMARY

Why Students Struggle with Math

Engagement	Skill Development	Curric. & Instruct.	Core Challenges
Physical absence	Prerequisite knowledge	Content	Calculation
Global challenges	Conceptual understanding	Pace	Visual processing
Inattentive & off-task	Procedural skills	Format	Executive functioning
Not doing the work	Problem solving skills	Coherence	Anxiety
	Active learning skills		Cognitive overload

2 - SUPPORTING

How To Support Struggling Math Students

Students learn best when instruction and supports are targeted to address their underlying root challenges and learning needs.

Root challenges ⟶ Interventions & supports

Engagement

Root Challenges

Students have not had enough full-strength learning opportunities.

- Physical absence
- Global challenges
- Inattentive & off-task
- Not doing the work

Strategies

1 - **Address engagement factors** directly

2 - Supplement instruction to **compensate for missed learning opportunities**

Skill Development

Root Challenges

Missing skills and/or concepts is preventing is blocking learning or problem solving.

- Prerequisite knowledge
- Conceptual understanding
- Procedural skills
- Problem solving skills
- Active learning skills

Strategies

1 - Supplement instruction to **develop & strengthen missing skills**

Curriculum & Instruction

Root Challenges

Instruction is not providing what students need to learn and problem solve.

- Pace
- Content
- Format
- Coherence

Strategies

1 - Audit & **enhance existing curriculum & instruction**

2 - Supplement instruction to **compensate for missing learning experiences**

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Core Challenges

Root Challenges

Brain-based challenges are blocking learning & problem-solving.

- Calculation
- Visual processing
- Executive functioning
- Anxiety
- Cognitive overload

Strategies

1 - Build strong **foundational concepts & skills**

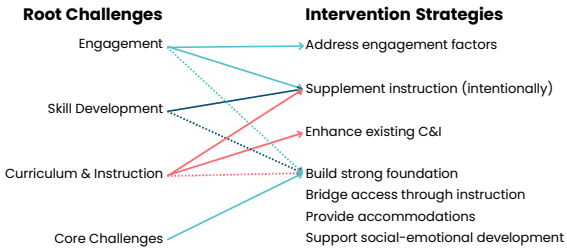
2 – **Bridge access** through intentional instruction

3 - Provide appropriate **accommodations**

4 – Support **social-emotional development**

2 - SUMMARY

How to Support Struggling Math Students



3 - IDENTIFYING

How To Identify Challenges & Needs

In addition to screening for achievement, we can also screen for potential root challenges to guide intervention decisions.

School psychologist are well-equipped with assessment and consultation skills that can aid in screening for math learning challenges and needs.

Strategies for Identifying Root Challenges

1 – Teacher consultation
- Impressions of students
- Impressions of C&I

2 – Learn from the student
- Ask about their experiences
- Do math with them / Think-aloud math

3 – Curriculum & instruction audit
- What does curriculum look like?
- What does instruction look like?

4 – Mini-RtI
- What happens when you supplement instruction?
- What happens when you provide accommodations?

5 – Analyze achievement data
- What concepts and skills are low?
- Are there patterns that could signal a root?
- Are there areas where all students are struggling?

6 – Your assessment toolkit
- Review of records
- Classroom observations
- Anything you like

3 – SUMMARY

How to Identify Root Challenges

Guiding Questions

Why are students struggling?

What are the roots of their math learning challenges?

What explains why they aren't learning?

Strategies

1. Teacher consultation
2. Learn from the student
3. Curriculum & instruction audit
4. Mini-Response to intervention
5. Analyze achievement data
6. Your assessment toolbox



Summary





1 - UNDERSTANDING

There are A LOT of reasons why students struggle with math.

We have the best chance of helping when we understand the roots of their challenges.

2 - SUPPORTING

Students learn best when instruction & interventions address their underlying learning needs.

We can be intentional about what we do and why.

3 - IDENTIFYING

School psychs are well-equipped to help identify root challenges.

We can use our skills to better understand why students are struggling and what they need to thrive.

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