

Mathematics Interventions

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Literacy Fluency \neq Numerical Fluency

Mathematical Teaching Practices

Leinwand, S., et al. (2014). *Principles to Actions: Ensuring Mathematical Success for All*. Reston, VA: NCTM: The National Council of Teachers of Mathematics, Inc., p. 10

Effective Mathematics Teaching Practices

Establish mathematics goals to focus learning. Effective teaching of mathematics establishes clear goals for the mathematics that students are learning, situates goals within learning progressions, and uses the goals to guide instructional decisions.

Implement tasks that promote reasoning and problem solving. Effective teaching of mathematics engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allow multiple entry points and varied solution strategies.

Use and connect mathematical representations. Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving.

Facilitate meaningful mathematical discourse. Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments.

Pose purposeful questions. Effective teaching of mathematics uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships.

Build procedural fluency from conceptual understanding. Effective teaching of mathematics builds fluency with procedures on a foundation of conceptual understanding so that students, over time, become skillful in using procedures flexibly as they solve contextual and mathematical problems.

Support productive struggle in learning mathematics. Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.

Elicit and use evidence of student thinking. Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.

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Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Addressing Gaps in Mathematics Learning

Pre-Teaching/Learning Supports	Teaching/Learning Supports	Post Teaching/Learning
Learner Profiles	High Quality Tasks Student Access to Scaffolds and Strength in Heterogeneous Groups Addressing Math Anxiety	PLC Collaboration Refine and Reflection

Pre Teaching/Learning Support Learner Profiles

Learner Profile

Planning lessons with a few focal students in mind is a useful model for addressing the diverse learning needs of students. It is helpful to use three students as proxies; a typical learner, a student with a disability that affects their achievement in math (who has an IEP), and a high-performing student. When you fill in this table, consider the students' strengths and needs in the following areas: **Math Content, Conceptual Processing, Language, Visual/Spatial, Organization, Memory, Attention, Psycho-Social, and Fine Motor.**

Student:	Strengths:	Barriers:	Ways to Support:
Typical Student			
Student with an IEP			
English Learners			
High Ability Learners			



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Teaching/Learning Supports

High Quality Mathematical Tasks

DSD Approved Task Bank:

<https://www.davis.k12.ut.us/academics/mathematics/elementary>

→ Resources for Educators → Mathematical Task Resources

MULTIPLYING DECIMALS TO MAKE A WHOLE NUMBER PRODUCT

Directions: Using the digits 1 to 9 at most one time each, fill in the boxes to make a whole number product.

. × .

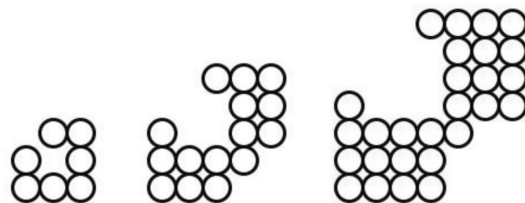
<https://www.openmiddle.com>

Would You Rather...

Read 12 pages every night in a chapter book with 144 pages?

Read 50 pages 3 times a week in a chapter book with 132 pages?

<https://www.wouldyourathermath.com/category/3to5/>



<https://www.youcubed.org/tasks/>

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Teaching/Learning Supports

Student Access to Scaffolds - Heterogeneous Grouping

Scaffolds

All remediation should take place in context of on grade-level rigorous content

Students must have access to manipulatives and regular instruction on how to use tools

Students should be allowed to use tools to support them in accessing on grade-level rigorous content (Procedural Fluency - knowing when that “ship has sailed”)

Heterogeneous Groups

Reduced risk of student math stigmas

ALL students have access to mathematical rigor - EQUITY

“Funds of Knowledge” are respected and given authority

Builds a Student’s Mathematical Identity

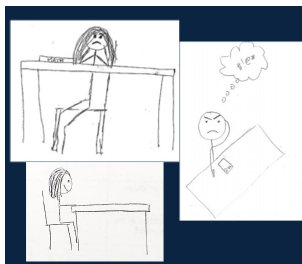
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Teaching/Learning Supports

Addressing Math Anxiety (Taken from Dr. Rachel Bachman, WSU)

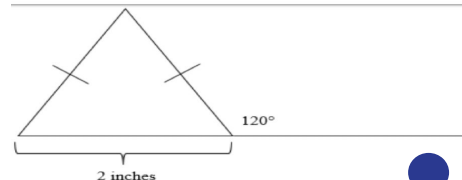
“Draw Yourself Doing Math”



Breathing Techniques
and Mindfulness prior
to math experiences

“Remove the Question”

Consider the image below. Share what you know from the image.



Share what you could figure out from the image.

If you have not already done so, show how to calculate the area of the triangle above.

Mathematical
Identity

Acknowledge
Math Anxiety

Teach Coping
Skills

Change
Teacher
Questions

Adapt Exams

Best worst phrase:
“You are going to be
just fine...”

Anxiety Triggers Mindful Responses

- What's the answer?
- What's the next step?
- What's the formula?
- Quick!
- Don't forget

- What do I notice?
- What does it mean?
- How do I know?
- What happens if...?
- How can I defend this?
- What seems reasonable?

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Teaching/Learning Supports

Post-Teaching/Learning

- Post-lesson Productive PLC Collaboration. What went well? What needs to be refined?
- Peer Observations. I noticed....would you consider....
- Access to high-quality, research based best mathematics teaching practices.

<https://www.davis.k12.ut.us/academics/mathematics/high-school-mathematics>

→ Secondary Math Educators → Professional Development Opportunities → Book Studies

Mathematics Intervention

Do's

- Heterogeneous Student Grouping
- High Quality Co-Teaching (not tutoring) with Para's and/or Educators
- Mathematical Teaching and Learning Practices
- Teacher focus on the “funds of knowledge” students bring to the classroom

Don'ts

- Homogeneous Student Grouping
- “Pull-Outs” (tutor gets 1:1)
- Drill -- Speed -- Accuracy
- Teacher focus on student mathematical deficits