



MATHEMATICS INTERVENTION

Six Tips Learned from Research

Here are six findings that frequently appear in the intervention literature. These research-based strategies are designed to support teachers in delivering effective, targeted mathematics instruction to students who need additional support.

6 RESEARCH-BASED TIPS

I Ongoing Formative Assessment and Feedback

Identifying weaknesses and monitoring progress, with corrective feedback, are essential for effective intervention.

Example: Have students do one problem as an "exit slip" before leaving for the day. For any mistakes or misconceptions, clearly point them out and help students to understand how to improve upon their work.

Watch "My Favorite No": www.teachingchannel.org/videos/class-warm-up-routine

II Balance Basic Skills and Concept Development

The literature suggests that concept development is a critical piece of intervention. Be systematic and scaffold as needed. In addition, devoting 5–10 minutes of every class to basic skill review is an effective strategy.

Example (basic skills): For fraction concept review, identify the types of skills students should know, then lay out a systematic plan — choose about 3–4 types of exercises to do each day for a week, then 3–4 slightly different ones the next week, and so on until students show progress. See mathandteaching.org/webinars/

Example (concept development): Students should know why the area formula for a triangle is $A = \frac{1}{2}bh$ by relating it to the area formula for parallelograms. This can be done using a quick demonstration or exploration.

See: *Helping Students with Mathematics Difficulties Understand Ratios and Proportions* by Dougherty, Bryant, and more — journals.sagepub.com

III Multiple Instructional Examples

Sequencing may be done from easy to hard, simple to complex, or concrete to abstract. Attend to slight differences and variations in related problems. Be systematic and scaffold as needed.

Example: For solving two-step equations, first work with all whole number values, then mix in some negative integers, then some fractions (depending upon grade level). Use a manipulative or visual representation with the whole number equations, then after moving away from the more concrete, introduce equations with more difficult numbers.

IV Alternate Strategies

Alternate strategies should be provided as options. Students need not be proficient in more than one of them, but they do need at least one strategy to hold onto.

Example: For solving systems of equations, solving graphically is visual and helps with the conceptual understanding of the topic. When solving algebraically, introduce the substitution and elimination methods, and help students choose which **one** they prefer to use.

V Rehearsal

The research clearly states that students must have a good chance at getting problems correct before assigning them many practice problems. Furthermore, cumulative review is important.

Example: Integer subtraction is introduced today, but the teacher hasn't yet determined through formative assessment whether students are grasping it well enough. Practicing many exercises may ingrain an incorrect procedure. Therefore, assign no more than a couple of integer subtraction exercises as homework, along with a small amount of review in a related or different area.

Example: Since operations on integers (and non-integer rational numbers) are critical to success in 7th grade and beyond, provide frequent opportunities for students to practice these operations — at least a little — almost every week from the time they are first introduced.

VI **Teacher Support**

Teachers need to be comfortable with developing conceptual understanding, especially using visuals and "direct and explicit instruction."

Example: There are books, webinars, video tutorials, courses, and colleagues who can provide a wealth of information on how to use visual strategies to develop conceptual understanding.

SOURCES

RESEARCH RESOURCES

RTI Action Network

www.rtinetwork.org/middle-school

National Council of Teachers of Mathematics

nctm.org — [Students with Difficulties](#)

What Works Clearinghouse

ies.ed.gov — [RTI Math Practice Guide](#)

The Institute of Educational Sciences

ies.ed.gov

Education Northwest

educationnorthwest.org — [Math Interventions](#)

The Center on Instruction

www.centeroninstruction.org