

Accelerating Acquisition of Basic Mathematics Skills: Elementary and Middle School

Center on Instruction

An emerging consensus of research and expert opinion is that it is important to build the basic or foundational skills in mathematics of all students who need them, while also providing them with access to grade level concepts and content. Response to Intervention (RTI) models provide an excellent venue for accelerating achievement in foundational skills and proficiencies. In an RTI model, students receive daily help learning not only so-called “basic skills” (e.g., mathematics facts and computation) but also higher order skills, such as problem solving, and the critical content in the discipline. For information about what experts suggest as the critical content in mathematics, see the National Council of Teachers of Mathematics (NCTM) Curriculum Focal Points (National Council of Teachers of Mathematics, 2006) and the report of the National Mathematics Advisory Panel (2008).

Developing foundational skills in students who lack them requires school-wide commitment. It requires that classroom teachers provide differentiated instruction, create learning situations where heterogeneous pairs of students work together to build foundational skills, and provide sensible accommodations to ensure that all students, including those with disabilities and English language learners, receive meaningful access to the core grade-level curricula content. A leadership team consisting of at least two people (including school psychologists, special educators, teachers, and possibly the principal) needs to ensure that the school conducts universal screening in mathematics, monitors the progress of identified students on a regular basis, and prepares teachers to teach higher order mathematics skills through high-quality professional development.

Action Principles

For District

1. Provide ongoing support and mentoring for schools as they expand RTI programs in mathematics (Gersten, Beckmann, Clarke, Foegen, Marsh, Star, & Witzel, 2009; Gersten, Compton, Connor, Dimino, Santoro, Linan-Thompson, & Tilly, 2008).
2. Create a syllabus or curriculum guide that can be used district-wide for double dose mathematics courses (Kamil, Borman, Dole, Kral, Salinger, & Torgesen, 2008; Boardman, Roberts, Vaughn, S., Wexler, Murray, & Kosanovich, 2008; Nomi & Allensworth, 2009).
3. Analyze district-wide data to identify schools that appear to be consistently building foundational skills in mathematics in low-performing students. Examine their programs and use principles learned and personnel from those schools to provide mentoring to others (Hamilton, Halverson, Jackson, Mandinach, Supovitz, & Wayman, 2009).

For School

1. Implement Response to Intervention models in mathematics, when feasible. In mathematics, beginning at only one grade range (e.g., grades 6-8 for algebra readiness or K-3 for early preventative work) is recommended (Gersten, Beckmann, Clarke, Foegen, Marsh, Star, & Witzel, 2009; Gersten, Compton, Connor, Dimino, Santoro, Linan-Thompson, & Tilly, 2008; Glover & Vaughn, 2010).
2. Establish double dose courses in middle school for students who are taking pre-algebra or other challenging, grade-level mathematics courses but lack foundational skills. Create coordination between these courses and the regular grade-level courses. For example, if the grade-level course is focusing on proportional reasoning, a key component in the double dose or foundational course should be fractions (concepts and operations), so students can succeed in grade-level mathematics courses while building foundational skills (Nomi & Allensworth, 2009).

3. Use peer-assisted learning or class-wide peer tutoring in day-to-day classroom instruction in mathematics. Schedule these activities two or three times a week. These should never supplant instruction, but rather support time normally devoted to individual seatwork (Fuchs, Fuchs, Mathes, & Simmons, 1997).
4. Use differentiated instruction for part of mathematics lessons. Use formative assessment data to determine which students require help in foundational mathematics competencies (Connor, Morrison, Fishman, Schatschneider, & Underwood, 2007; Tomlinson & McTighe, 2006).

References and Resources

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