

Response to Intervention (RtI) for Mathematics

Excerpts modified from the IES Practice Guide *Assisting Students Struggling with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools* (2009). The full report is available on the IES website at <http://ies.ed.gov/ncee> and <http://ies.ed.gov/ncee/wwc/publications/practiceguides/>.

Response to Intervention (RtI) is an early detection, prevention, and support system that identifies struggling students and assists them before they fall behind. In the 2004 reauthorization of the Individuals with Disabilities Education Act (PL 108-446), states were encouraged to use RtI to accurately identify students with learning disabilities and encouraged to provide additional supports for students with academic difficulties regardless of disability classification. Although many states have already begun to implement RtI in the area of reading, RtI initiatives for mathematics are relatively new.

RtI begins with high-quality instruction and universal screening for all students. Whereas high-quality instruction seeks to prevent mathematics difficulties, screening allows for early detection of difficulties if they emerge. Intensive interventions are then provided to support students in need of assistance with mathematics learning. Student responses to intervention are measured through frequent progress monitoring to determine whether they have made adequate progress and (1) no longer need intervention, (2) continue to need some intervention, or (3) need more intensive intervention. The levels of intervention are conventionally referred to as “tiers.” RtI is typically thought of as having three tiers. Within a three-tiered RtI model, each tier is defined by specific characteristics.

- **Tier 1** is the mathematics instruction that all students in a classroom receive. It entails universal screening of all students, regardless of mathematics proficiency, using valid measures to identify students at risk for future academic failure—so that they can receive early intervention.
- **In tier 2 interventions**, schools provide additional assistance to students who demonstrate difficulties on screening measures or who demonstrate weak progress. Tier 2 students receive supplemental small group mathematics instruction aimed at building targeted mathematics proficiencies. These interventions are typically provided for 20 to 40 minutes, four to five times each week. Student progress is monitored throughout the intervention to ensure that students are moving in the right direction.
- **Tier 3 interventions** are provided to students who are not benefiting from tier 2 and require more intensive assistance. Tier 3 usually entails one-on-one tutoring along with an appropriate mix of instructional interventions. In some cases, special education services are included in tier 3, and in others special education is considered an additional tier. Ongoing analysis of student performance data is critical in this tier. Typically, specialized personnel, such as special education teachers and school psychologists, are involved in tier 3 and special education services. However, students often receive relevant mathematics interventions from a wide array of school personnel, including their classroom teacher.

The IES Practice Guide *Assisting Students Struggling with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools* provides eight specific recommendations intended to help teachers, principals, and school administrators use Response to Intervention (RtI) to identify students who need assistance in mathematics and to address the needs of these students through focused interventions. The guide provides suggestions on how to carry out each recommendation and explains how educators can overcome potential roadblocks to implementing the recommendations.

The practice guide offers eight recommendations for identifying and supporting students struggling in mathematics. The recommendations are intended to be implemented within an RtI framework. Although the guide does not make recommendations for general classroom mathematics instruction, Recommendation 1 provides specific suggestions for conducting universal screening of all students effectively. Recommendations 2 through 8 focus on the most effective content and pedagogical practices that can be included in mathematics interventions for tiers 2 and 3.

Throughout the guide, the authors use the term “interventionist” to refer to those teaching the intervention. At a given school, the interventionist may be the general classroom teacher, a mathematics coach, a special education instructor, other certified school personnel, or an instructional assistant.

Recommendation 1 addresses the type of screening measures that should be used in tier 1. The authors note that there is more research on valid screening measures for students in kindergarten through grade 2, but there are also reasonable strategies to use for students in more advanced grades. The authors stress that no one screening measure is perfect and that schools need to monitor the progress of students who score slightly above or slightly below any screening cutoff score.

Recommendations 2 through 6 address the content of tier 2 and tier 3 interventions and the types of instructional strategies that should be used. Recommendations 7 and 8 address other considerations in implementing tier 2 and tier 3 interventions.

Recommendations

1. Screen all students to identify those at risk for potential mathematics difficulties and provide interventions to students identified as at risk.
2. Instructional materials for students receiving interventions should focus intensely on in-depth treatment of whole numbers in kindergarten through grade 5 and on rational numbers in grades 4 through 8. These materials should be selected by committee.
3. Instruction during the intervention should be explicit and systematic. This includes providing models of proficient problem solving, verbalization of thought processes, guided practice, corrective feedback, and frequent cumulative review.
4. Interventions should include instruction on solving word problems that is based on common underlying structures.

5. Intervention materials should include opportunities for students to work with visual representations of mathematical ideas and interventionists should be proficient in the use of visual representations of mathematical ideas.
6. Interventions at all grade levels should devote about 10 minutes in each session to building fluent retrieval of basic arithmetic facts.
7. Monitor the progress of students receiving supplemental instruction and other students who are at risk.
8. Include motivational strategies in tier 2 and tier 3 interventions.

Look in future issues of *Educator Update* for spotlights on individual recommendations.

Reference

Gersten, R., Beckmann, S., Clarke, B., Foegen, A., Marsh, L., Star, J. R., & Witzel, B. (2009). Assisting students struggling with mathematics: Response to Intervention (RtI) for elementary and middle schools (NCEE 2009-4060). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from <http://ies.ed.gov/ncee/wwc/publications/practiceguides/>.