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# Assisting Students Struggling with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools

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## Checklist for carrying out the recommendations

### Recommendation 1. Screen all students to identify those at risk for potential mathematics difficulties and provide interventions to students identified as at risk.

- As a district or school sets up a screening system, have a team evaluate potential screening measures. The team should select measures that are efficient and reasonably reliable and that demonstrate predictive validity. Screening should occur in the beginning and middle of the year.
- Select screening measures based on the content they cover, with an emphasis on critical instructional objectives for each grade.
- In grades 4 through 8, use screening data in combination with state testing results.
- Use the same screening tool across a district to enable analyzing results across schools.

### Recommendation 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.

- For students in kindergarten through grade 5, tier 2 and tier 3 interventions should focus almost exclusively on properties of whole numbers and operations. Some older students struggling with whole numbers and operations would also benefit from in-depth coverage of these topics.
- For tier 2 and tier 3 students in grades 4 through 8, interventions should focus on

in-depth coverage of rational numbers as well as advanced topics in whole number arithmetic (such as long division).

- Districts should appoint committees, including experts in mathematics instruction and mathematicians with knowledge of elementary and middle school mathematics curricula, to ensure that specific criteria are covered in-depth in the curriculum they adopt.

### Recommendation 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.

- Ensure that instructional materials are systematic and explicit. In particular, they should include numerous clear models of easy and difficult problems, with accompanying teacher think-alouds.
- Provide students with opportunities to solve problems in a group and communicate problem-solving strategies.
- Ensure that instructional materials include cumulative review in each session.

### Recommendation 4. Interventions should include instruction on solving word problems that is based on common underlying structures.

- Teach students about the structure of various problem types, how to categorize problems based on structure, and how to determine appropriate solutions for each problem type.
- Teach students to recognize the common underlying structure between familiar and unfamiliar problems and to transfer known solution methods from familiar to unfamiliar problems.

**Recommendation 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.**

- Use visual representations such as number lines, arrays, and strip diagrams.
- If visuals are not sufficient for developing accurate abstract thought and answers, use concrete manipulatives first. Although this can also be done with students in upper elementary and middle school grades, use of manipulatives with older students should be expeditious because the goal is to move toward understanding of—and facility with—visual representations, and finally, to the abstract.

**Recommendation 6. Interventions at all grade levels should devote about 10 minutes in each session to building fluent retrieval of basic arithmetic facts.**

- Provide about 10 minutes per session of instruction to build quick retrieval of basic arithmetic facts. Consider using technology, flash cards, and other materials for extensive practice to facilitate automatic retrieval.
- For students in kindergarten through grade 2, explicitly teach strategies for efficient counting to improve the retrieval of mathematics facts.

- Teach students in grades 2 through 8 how to use their knowledge of properties, such as commutative, associative, and distributive law, to derive facts in their heads.

**Recommendation 7. Monitor the progress of students receiving supplemental instruction and other students who are at risk.**

- Monitor the progress of tier 2, tier 3, and borderline tier 1 students at least once a month using grade-appropriate general outcome measures.
- Use curriculum-embedded assessments in interventions to determine whether students are learning from the intervention. These measures can be used as often as every day or as infrequently as once every other week.
- Use progress monitoring data to re-group students when necessary.

**Recommendation 8. Include motivational strategies in tier 2 and tier 3 interventions.**

- Reinforce or praise students for their effort and for attending to and being engaged in the lesson.
- Consider rewarding student accomplishments.
- Allow students to chart their progress and to set goals for improvement.