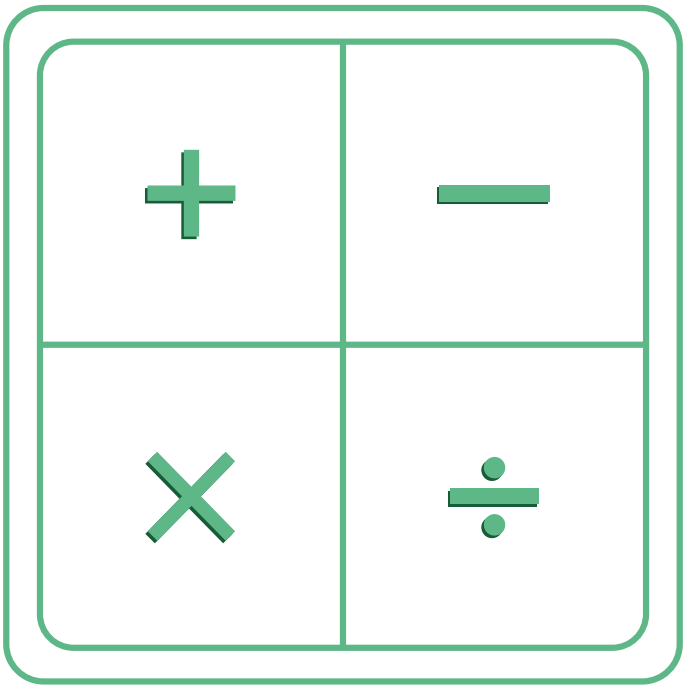
MIDDLE SCHOOL MATTERS INSTITUTE

George W Bush Institute

The Meadows Center for Preventing Educational Risk

# What should we consider when teaching students with math difficulty?




Here is a lesson planning checklist to accompany the "Ask the Expert" video: intensiveintervention.org/video-resource/what-should-we-consider-when-teaching-students-math-difficulty

When teaching students with math difficulty, it is important to do all of the following:

1. Use systematic and explicit instruction.
2. Teach vocabulary and symbols.
3. Use the concrete-representational-abstract (CRA) framework.
4. Build fluency with basic math facts and with computational algorithms.
5. Use effective questioning and feedback.
6. Conduct an error analysis to inform instruction.

## 1. Use Systematic and Explicit Instruction

Systematic instruction helps students with math difficulty to build on their skills, starting with easier skills and progressing to more difficult skills. Be sure to:

- ❑ Provide an advanced organizer.
  - ❍ Here is what we are doing today.
  - ❍ Here is why it is important.
- ❑ Review prior skills that relate to the new skill.
- ❑ Model different concepts and procedures.
- ❑ Lead students in guided practice, providing immediate feedback.
- ❑ Provide students with time for independent practice.

## 2. Teach Vocabulary and Symbols

It is important to focus on the language we use in math, including math vocabulary and symbols. Be sure to:

- ❑ Be very precise with your vocabulary.
  - ❍ Say "denominator" instead of "bottom number."
  - ❍ With the number 5.6, say "five and six tenths," not "five point six."
- ❑ Give students plenty of time to practice with new vocabulary terms.
- ❑ Make sure students understand the explicit meanings of symbols.
  - ❍ Explain each symbol in a meaningful way.

## 3. Use the Concrete-Representational-Abstract (CRA) Framework

This framework provides a scaffold for students to fully understand mathematical concepts by building from a hands-on, tactile knowledge to a representational understanding, and finally to the abstract concept. Be sure to:

- ❑ Allow students to use hands-on, three-dimensional materials to solve problems (Concrete).
- ❑ Provide two-dimensional, pictorial representations of objects to solve problems either on paper or virtually (Representational).
- ❑ Move to the corresponding numbers and symbols (e.g., equations) to solve problems (Abstract).

## 4. Build Fluency

Building fluency makes everything in mathematics easier. For students with math difficulty, it is essential that teachers work to explicitly build fluency of math facts and procedural algorithms. Fluency activities can be done each day for a short amount of time. Be sure to:

- ❑ Use different activities such as:
  - ❍ Timed activities
  - ❍ Flashcards
  - ❍ Cover-copy-compare
  - ❍ Tape problems
- ❑ Provide time for modeling, guided practice, and independent practice (gradual release).

## 5. Use Effective Questioning and Feedback

Asking thought-provoking questions and providing appropriate feedback are powerful tools for student learning. Be sure to:

- ❑ Ask questions that encourage:
  - ❍ Reversibility: the teacher gives an answer and the students work backward.
  - ❍ Flexibility: is there another way to solve the problem?
  - ❍ Generalizations: how does this relate to other things we have learned?
- ❑ Provide immediate, appropriate feedback.
  - ❍ Affirmative feedback when students are correct
  - ❍ Corrective feedback when students are wrong
- ❑ Be sure to pinpoint the mistake and help students learn from it.

## 6. Conduct an Error Analysis

Conducting error analyses can help you see where students are making mistakes, thus helping you adapt your instruction. Be sure to:

- ❑ Review why students solved problems incorrectly.
- ❑ Look for patterns of errors.
- ❑ Use student mistakes to inform instructions.

To help build these skills and ensure these practices are in place, a classroom observation/coaching protocol and form can be found here: greatmiddleschools.org/explicit-instruction-math