

10 KEY MATH PRACTICES

for All Middle and High Schools

with strong evidence of effectiveness from high-quality research

All middle and high school students can become proficient in mathematics if:

1. Teachers help students to solve mathematics problems by **using manipulatives and tools** to bridge concrete to abstract and symbolic understandings of mathematics.
2. Students are asked to **make their mathematics thinking transparent by talking about their solution process, drawing a picture, or making a graph** and using mathematically correct language (for example, using the terms “numerator” and “denominator” rather than “top number” and “bottom number” for fractions, telling how many groups of a divisor are in the dividend for division rather than saying 5 “goes into” 20 four times, or using the term “zero pairs” rather than “canceling out”).
3. Students are asked to **read and critique one another’s written responses** to problems.
4. Teachers present **“real-life” word problems** for students to solve daily.
5. Students are expected to **solve multiplication and division facts regularly** as a basis for working on rational numbers and algebraic problems.
6. Students are expected to **master the properties of operations** (order of operations; commutative, associative, and distributive properties; multiplicative identity property; multiplicative inverse property).
7. Students are given **solved problems** (correctly solved and incorrectly solved using common misconceptions) to analyze and discuss how the problems were solved and where the solution strategy broke down for incorrectly solved problems.
8. Teachers **differentiate mathematics instruction for diverse learners** (for example, struggling learners, English language learners, gifted students, and average achievers).
9. Teachers **verbalize** (think aloud, describe steps for a strategy) **explanations** of concepts and steps for solving problems.
10. Teachers **collect data regularly** to determine whether their students are benefiting from instruction and **use the data to make informed instructional decisions** for subsequent lessons.

10 KEYS



The Meadows Center
FOR PREVENTING EDUCATIONAL RISK
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