

Research-Based Math Teaching Strategies



The Editorial Team
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mathematical concepts more accessible and engaging for students of all ages.

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Adapting these numeracy strategies to the needs of individual students can have a significant impact in helping them build a strong foundation in math and set them up for ongoing success.

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Design Project

Hi Abhi,

I was very happy to meet you today! The plan was reviewed by my team, we can start immediately. How will this affect the timeline?

-Isabelle

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Basic math teaching tactics



Repetition

A simple strategy teachers can use to improve math skills is repetition. By repeating and reviewing previous formulas, lessons, and information, students are better able to comprehend concepts at a faster rate.

According to Professor W. Stephen Wilson from Johns Hopkins University, the core concepts of basic math must be mastered before students are able to move into a more advanced study. Repetition is a simple tool that makes it easier for students to master the concepts without wasting time. According to the University of Minnesota, daily re-looping or reviews will bring the previous lesson back into the spotlight and allow teachers to build on those previous skills.

Timed testing

When teachers are moving beyond the simple concepts of numbers into addition, subtraction, multiplication and division, it is

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Mathematics is not limited to learning from a textbook, lessons, or testing strategy. Students have different learning styles and need to have lessons that help improve all styles of learning to get the best results.

Group work is a simple strategy that allows students to work and problem-solve with a buddy. When a teacher has provided the basic instruction, it's helpful to split the class into pairs or groups to work on problems.

Since the pairs are working as a team, the students can discuss the problems and work together to solve the issues. The goal of pair work is to teach students critical thinking skills that are necessary for future math problems and real life.

Manipulation tools

The use of blocks, fruits, balls, or other manipulation tools help students learn the basics of place value, addition, subtraction, and other areas of basic math. According to [Kate Nonesuch](#) on the National Adult Learning Database of Canada, manipulation tools help slow down the process of problem solving so that students are able to fully understand the information.

Manipulation tools make it easier for students to learn and understand basic skills. These are ideal when students learn best through hands-on experience and building, rather than traditional lessons and repetition.

Math games

Reinforcing the information learned in class is not always the easiest task for teachers, AD make the lesson interesting and encourage students to remen

Depending on the class size, computer availability, and the lesson being taught, games c for the particular skills or can opt to use class games to make the lesson more fun. Teach into games to help students learn the materia



- **Algebraic expressions and equations.** Graduating students should be able to understand, manipulate, and solve algebraic expressions and equations.
- **Functions.** Seniors should be able to understand and work with linear, quadratic, and exponential functions.
- **Geometry.** By the completion of 12th grade, students should have a working knowledge of geometric concepts such as points, lines, angles, triangles, quadrilaterals, circles, and three-dimensional shapes.
- **Trigonometry.** Graduates should be fluent in trigonometric functions and able to solve problems involving angles and lengths in triangles.
- **Statistics and probability.** Graduating seniors should be able to understand and analyze simple statistical data and the concepts involved in the calculation of probabilities.
- **Calculus.** Though mastery of this subject is generally beyond the scope of secondary education, graduating seniors should have a functional understanding of calculus concepts such as limits, derivatives, and integrals.

Early education: research-based math instruction for kindergarten

The youngest students are at the onset of their math literacy, and teaching strategies for kindergarten math must be developmentally appropriate. Start with imparting basic ideas such as counting and number recognition before moving on to more advanced concepts.

It is well established that **younger students are concrete learners** and can more easily grasp mathematical concepts through hands-on and visual approaches. The use of manipulatives, such as counting bears of different colors, can be used to teach basic counting and sorting concepts.

Unifix or linking cubes are effective methods for teaching the fundamentals of counting, addition, and subtraction. Similarly, the use of base ten blocks efficiently introduces students to the concepts of units, tens, and hundreds.

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Encouraging students to work together on math activities in pairs or small groups can help them develop problem-solving skills and the ability to communicate mathematical concepts.

Ongoing support and reinforcement of new ideas are essential to help kindergarten students retain what they have learned. Regular and consistent review of learned material can reveal whether individual students need additional instructions or practice.

Essential mathematics topics for primary school: research-based strategies for grades 1-6

Continuing elementary math strategies should build on what early childhood students have already learned. Games and real-world examples continue to be effective, as are hands-on and interactive activities involving manipulatives. These should gradually become more complex and involve more functions with variable solutions.

Activities should be combined with visual aids like pictures and diagrams. These visual aids help introduce students to abstract representations of concepts that they first encountered via concrete methods.

The use of repetition and review becomes developmentally appropriate and can help students comprehend and retain essential functions more rapidly.

Young students develop at different rates and respond better to various approaches. Numeracy strategies in the classroom should draw on an assortment of methods during early primary education.

The continued use of manipulatives and visual aids is most effective when employed alongside classroom instruction. Technology-based instruction, which often involves online math games, can further help keep students engaged and actively learning.

Ongoing primary education: research-based math strategies

Middle school typically refers to grades 6-8, though some schools may include Grade 9 students.



Linking mathematical concepts to the real world remains an effective teaching method. However, real-world examples should reflect the growing sophistication and abilities of older primary school students. Budgeting and financial planning exercises help reinforce concepts such as decimals and percentages.

Games and activities continue to help engage middle school students but should reflect their increased capabilities. More complex card or board games can help students practice new math skills. Virtual games using technology-based methods are similarly effective.

Collaborative learning furthers critical thinking and problem-solving skills. One excellent way to keep students involved is by encouraging them to work in pairs or small groups using educational apps or online resources.

Ongoing review of learned material is essential to greater understanding and retention. Students should be provided with individual support and tailored practice to reinforce concepts that may be challenging.

Secondary education: research-based math strategies for high school students

As students progress through high school and prepare for a university education, independence and individual responsibility become essential. Encouraging students to take ownership of their ongoing education and math studies will help enable them to successfully meet the expectations and demands placed on them in higher education.

Provide opportunities for the personal exploration of mathematical concepts through individual study and solo projects. This can be especially effective when coupled with collaborative efforts, such as having students review each other's work and discuss any errors or differences in understanding.

Using increasingly complex real-world situations, such as statistical analysis of sports or finance, emphasizes the utility of mathematical concepts in everyday life. Similarly, algebra teaching strategies incorporating technology such as loan calculators and online stock trading simulations increase engagement and retention of learned concepts for secondary school students.

Intervention strategies for learners experiencing barriers in mathematics

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A math intervention strategies list should include tools that address the needs of individual students. Visual aids like graphs and diagrams and adaptive software that responds to a particular student's performance are effective techniques. Students who need to solidify their understanding of specific topics or improve individual skills will benefit from additional practice opportunities.

For students struggling with previously introduced concepts, reviewing the material using different approaches, examples, and explanations can be helpful. The most effective math intervention strategies will vary depending on each student's specific needs and learning style. Students may require different approaches to find what works best for their challenges.

Final thoughts: a tailored approach to individual needs

There are many proven, research-based **strategies for teaching math**. Approaches involving the incorporation of real-world examples to make concepts more relatable and the use of technology and online resources to enhance learning remain effective throughout primary and secondary education. Of course, these should be adapted to ensure they're developmentally appropriate for students as they progress.

Overall, teachers should encourage students to persevere through the challenges they may face in understanding math concepts while promoting a growth mindset and providing ongoing support. The ultimate key to success lies in balancing traditional and modern methods and using various approaches to suit each student's individual needs and learning styles.

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