



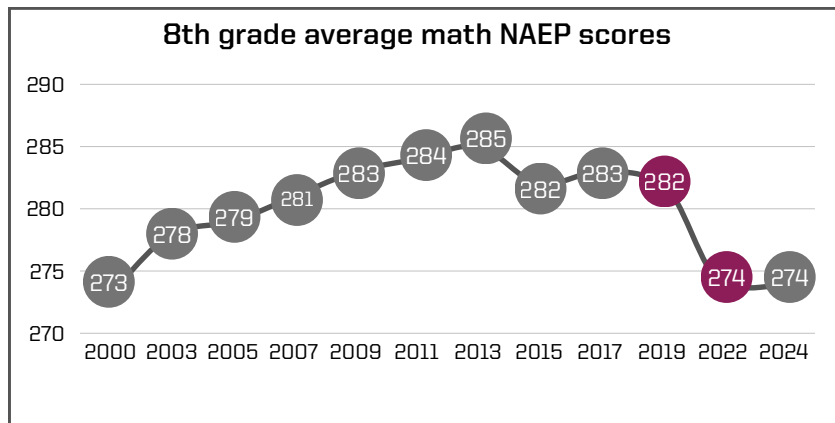
How can schools support early learners struggling with numeracy?

Based on research by Nelson and colleagues, 2026

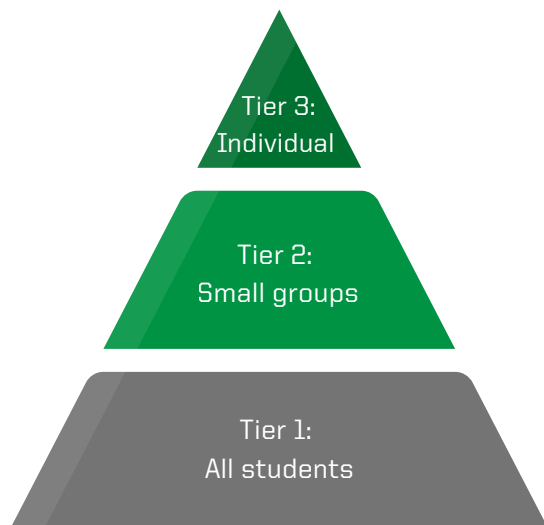
Findings from Nelson and colleagues' 2026 meta-analysis of 112 studies show **large benefits** of high-quality Tier 2 & 3 numeracy interventions in grades PreK-1.

Math achievement across the U.S. sharply declined from 2019-2022.

While some states are making progress, scores remain well below pre-pandemic levels on average.



Early math knowledge is a stronger predictor of later achievement outcomes than early language, literacy, and attention skills.ⁱ The preschool – Grade 1 period is a critical window for schools to intervene.ⁱⁱ



Tier 2 and 3 intervention, sometimes called tutoring, involves identifying students at risk of falling behind or who are already behind and providing them with extra support.

This study focused on programs in Tiers 2 and 3.

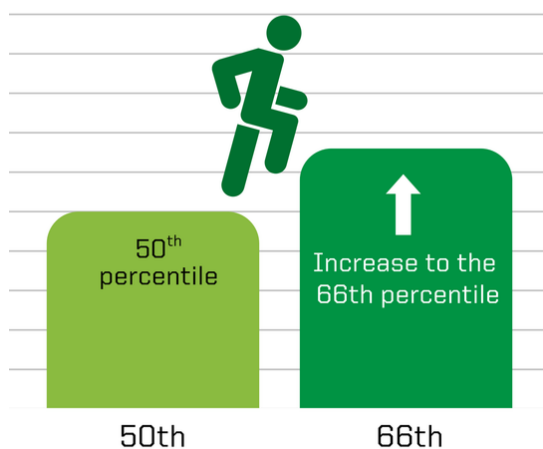
High-quality numeracy interventions are a promising approach for increasing math achievement with early learners.

In the present study, researchers compiled all the available high-quality evidence testing the effectiveness of Tier 2 and 3 numeracy interventions in grades PreK-1.

Key Finding #1

Across 112 studies of more than 21,000 students, the average effect was large and positive: 0.40 standard deviation units [95% CI (0.33, 0.47)].

A student in the 50th percentile would move to the 66th percentile with this size of effect.



96%

There is a 96% chance using these interventions will improve math achievement for students at your school, assuming students and schools are similar to those included in this analysis.

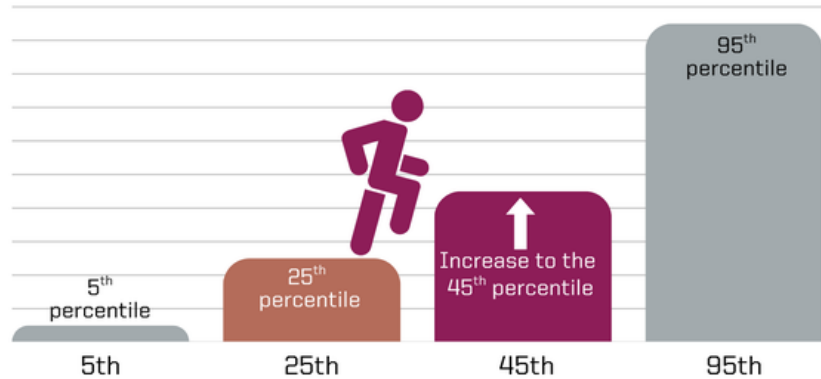
Recommendation #1

Pass legislation requiring schools to offer high-quality Tier 2 and 3 math intervention in grades PreK-1.

The [National Conference of State Legislatures](#) offers summaries of exemplar legislation from a variety of states. Note that these states also provide resources for teacher professional development in early math instruction and student screening, along with coordinated efforts across early childhood and K-12 education, all which are necessary for overall intervention success.

Key Finding #2

A student at high risk of math difficulties (<25th percentile) would improve 20 percentile points (0.53 standard deviation units, 95% CI [0.31, 0.76]).



Recommendation #2

Require schools to implement math screening in the earliest grades to identify students at risk.

Provide guidance and tools to schools to support these efforts. Resources on screening include the National Center on Intensive Intervention's [Academic Screening Tools Chart](#) and [Vanderbilt's IRIS Center resource on math screening](#).

Key Finding #3

The average delayed intervention effect (measured from 2 weeks to 2 years post intervention) was 0.31 standard deviation units [95% CI (0.201, 0.421)], equivalent to a student in the 50th percentile moving to the 62nd percentile. This estimate was significantly lower than the effect of interventions immediately after students completed them, suggesting **a one-time intervention is insufficient for long-term improvement.**

Recommendation #3

Require schools to develop coordinated, long-term multi-tiered systems of support in math and provide guidance on how to do this in way that is sustainable.

Sustainability requires high-quality teacher training, along with continuous progress monitoring to identify students no longer needing services (and therefore preserving funding and resources for students who do). The [Center on Multi-Tiered Systems of Supports](#) offers useful guidance.

FAQs from the Field

How can schools better identify who is struggling with early numeracy?

We can't answer that with this review, but here are a few resources that do address high-quality screening and assessment measures:

- National Center on Intensive Intervention's [Academic Screening Tools Chart](#)
- [Vanderbilt's IRIS Center resource on math screening](#)

Can schools use programs outside of published curriculum materials?

Yes. Most of the interventions in this review were not part of a formal Tier 1 math curriculum. These findings show that high-quality Tier 2 & 3 interventions are still beneficial for students.

With all the things that make up early math, why does this brief only focus on numeracy?

This review focuses on early numeracy skills because of the strong link between developing foundational skills in number in the early grades and success with many other areas of mathematics.^{v,vi} Key early numeracy skills that schools can focus on in intervention include: counting, cardinality, numeral identification, comparison of quantities, number line skills, and composing and decomposing numbers.

While focusing on number skills in early math is key, experts also recommend providing students with learning and practice opportunities in other mathematics domains including geometry, measurement, and spatial thinking.^{vii,vii}

FAQs from the Field

How can I tell if a program's effect size is meaningful or not?

Standardized effect sizes can be difficult to interpret, since standard deviation units are not an intuitive measure. Researchers have looked across hundreds of studies to offer benchmark sizes for academic achievement outcomes:

- < 0.05 standard deviations = small effect
- 0.05 to < 0.20 standard deviations = medium effect
- 0.20 or more standard deviations = large effect

Effect size isn't everything: decision-makers should also consider how well a program fits with the needs of their students and schools, such as the requirements for training, costs, and cultural relevance of the programs.

Are there other types of programs that can support math skills, like art or music-based programming?

This review didn't include these types of programs, but researchers are exploring other approaches including music and physical activity as they relate to numeracy skills. There has not been a systematic review of this literature to date.^{iii, iv}



Which intervention is the best?

We don't know.

The findings from this review can't point to the benefits of one program over another. However, below are examples of programs included in this review that have accessible curricula and are rated in well-respected and high-quality U.S.-based evidence clearinghouses: the What Works Clearinghouse (WWC) and Evidence for ESSA.^{ix} We consider these trusted sources for evaluating these programs individually for effectiveness.

Evidence clearinghouses, such as Evidence for ESSA (ESSA) and the What Works Clearinghouse (WWC) compile available effectiveness data for individual programs. Researchers evaluate the quality of the evidence and designate ratings for the level of evidence that supports a program. The scales differ from one clearinghouse to another, but still offer a useful tool for assessing if a program has been formally evaluated and what the evidence tells us about its effectiveness. For more details on how they make these determinations, visit their websites linked below.

[What Works Clearinghouse Evidence Ratings \(WWC\)](#)

[Evidence for ESSA Evidence Ratings \(ESSA\)](#)

Ratings color coding:

Reviewed:
Strong Evidence

Reviewed:
Moderate Evidence

Reviewed:
Promising Evidence

Reviewed: No
discernable effects

No studies met inclusion
requirements

Program not reviewed

Program profiles

Program	Clearinghouse Rating:	Cost and Training:
Building Blocks	WWC: <u>Moderate</u> ESSA: <u>No studies met criteria</u>	Around \$1,000 for materials depending on which components are purchased; training occurs via in-person or virtual training.
DreamBox	WWC: <u>Promising</u> ESSA: <u>Strong</u>	\$30 per student per year. School/site license, based on number of students enrolled at the school/site, starts at \$7,900.
Galaxy Math	WWC: <u>Strong</u> ESSA: <u>Strong</u>	Cost includes manuals (between \$75-90 depending on the type of supplemental materials) and salary costs of one-to-one paraprofessional. Training is provided through American Institutes for Research (AIR).
The Great Race	WWC: <u>Promising</u> ESSA: <u>Not Reviewed</u>	Costs include printing materials and the purchase of small die or spinner and game pieces.
KPALS Math	WWC: <u>No discernible effects</u> ESSA: <u>No significant positive outcomes</u>	\$75 for manual and materials. Training is provided through AIR.
My Math Academy	WWC: <u>Not Reviewed</u> ESSA: <u>Strong</u>	The pricing structure for My Math Academy is based on annual subscriptions per student or per site/school. Educator and parent/caretaker access is included with the purchase of student licenses.

Program profiles

Program	Clearinghouse Rating:	Cost and Training:
Number Rockets	WWC: Not Reviewed ESSA: Strong	Book 1 costs \$40 and contains teacher scripts Book 2 costs \$55 and contains supplemental materials. Optional – Number Rockets flash cards cost \$25. Training is provided through AIR.
Number Sense Intervention	WWC: Promising ESSA: Not Reviewed	\$40 for the manual. Training requirements are not specified.
NumberShire	WWC: Promising ESSA: No studies met criteria	This app can be purchased for free through the App Store for iPhone .
Whole Numbers Foundations	WWC: Not Reviewed ESSA: Strong	Level K: \$540 per school Level 1: \$695 per school Training is optional for an additional fee.

Other programs included in the review that have not been rated by a clearinghouse:

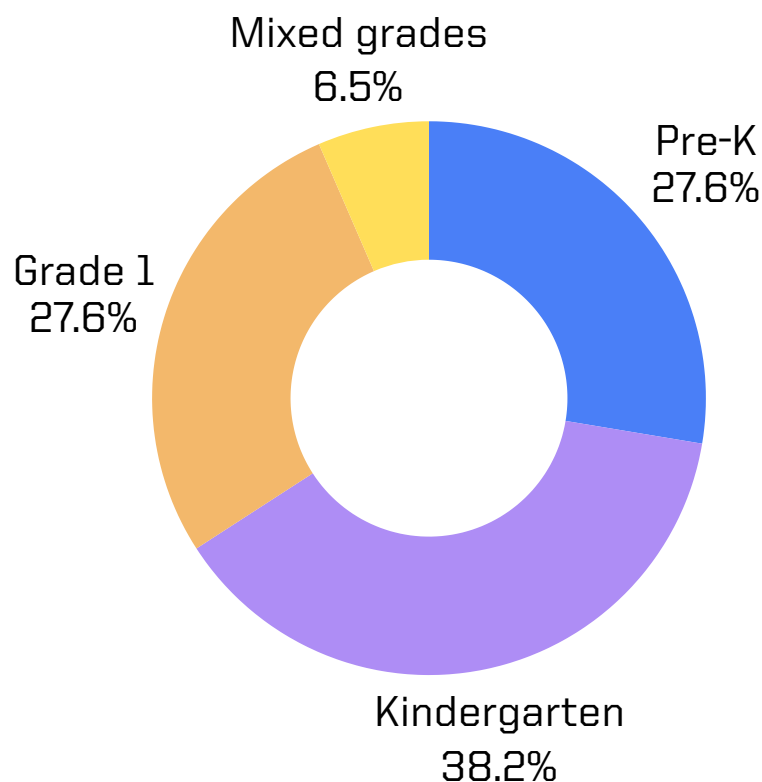
KinderTek	Michiana Daily MathTracks K & 1
MathemAntics	Treasure Path Game & Counting Cards Game
Math Shelf	Touch Math

Additional Resources

- [Grades K-1 Implementation Guide](#)
- [Teaching math to young children from the REL](#)
- [IES Math Summit](#)
- [NCSL](#)
- [CCSSO](#)

Schools and students included in this review:

- Published between 2006 and 2025
- 23 different countries, with 51% of studies (n = 57) being conducted in the United States.
- Participants in the United States were identified as Hispanic (25.0%), White (24.2%), Black (20.1%), multi-racial (1.6%), Asian (1.5%), other (1.7%), Native Hawaiian or Pacific Islander (<1%), American Indian or Alaskan Native (<1%); race or ethnicity was not reported for 25.4% of the students.



- Among participants in the United States, 30.5% were identified as being from low SES backgrounds, and 14.8% were identified as dual language learners. Studies conducted outside of the United States rarely reported any information about students' demographics.

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