TEACHER PREP REVIEW

Solving for Math Success

April 2025

National Council on Teacher Quality

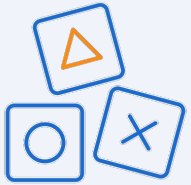
Teachers need to know how to do more than just follow the steps in math to get the right answer. They need to know why those steps work.

It’s like the difference between a basketball player and a coach. The player can follow directions and specialize in their role, but the coach needs to understand the bigger picture—the why behind every move.

Math matters.

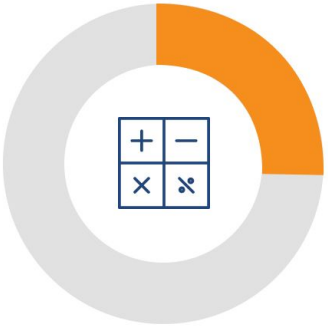
Elementary students with higher math scores tend to earn higher salaries as adults.[1]

Early math skills predict success in other subjects, like reading and science.[2] They also predict grade retention from grades K–8.[3]



Math knowledge builds on itself, meaning a student denied a solid foundation in math **may never catch up.**[4]

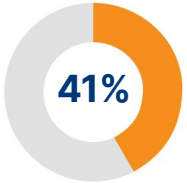
Far too many students don't have basic math skills.



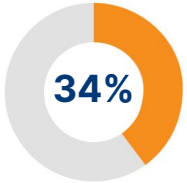
24%

of all 4th grade students are below basic on NAEP

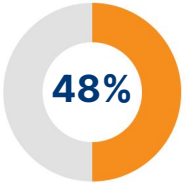
Students from historically marginalized groups suffer most from lack of access to strong math instruction.



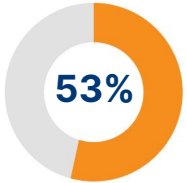
of Black students score below basic



of Hispanic students score below basic



of English language learners score below basic



of students with disabilities score below basic

Giving teachers the knowledge and skills they need to teach math effectively is fundamental for **improving life outcomes for all children** and **reversing historical patterns of inequity**.

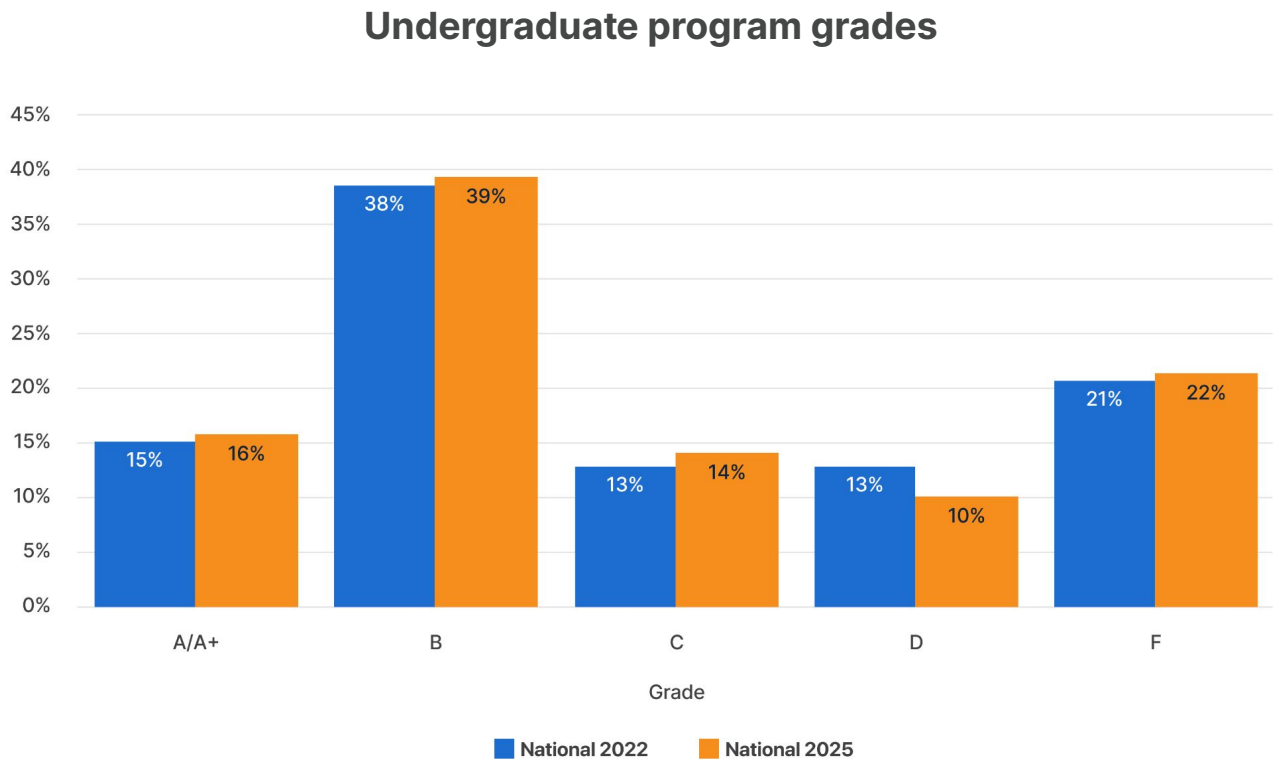
Teacher prep is a critical part of the solution to this math problem.

- Aspiring math teachers need to know how to teach math (i.e., pedagogical skills). They also need a deep understanding of key math content.
- Teacher prep programs can deliver this by devoting adequate time for math on both pedagogy and content.
- Effective math prep can increase teachers' content knowledge and confidence and improve their teaching.

Ultimately, better teacher prep leads to better student outcomes.

Summary of 2025 National Findings

Only 16% of undergraduate programs earned an A grade and 22% e arned an F.

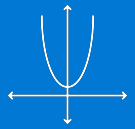


How does NCTQ grade programs?

- NCTQ looks for evidence that aspiring teachers learn (1) about each of the four key content topics, and (2) math pedagogy.
- Expert analysts review course descriptions and syllabi.

Numbers & Operations

Target: 45 hours



Algebraic Thinking

Target: 20 hours

Geometry & Measurement

Target: 25 hours

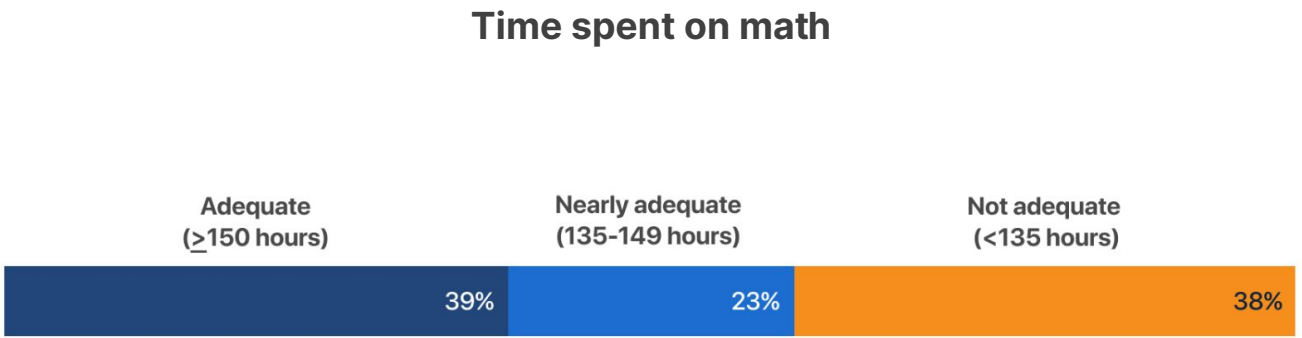
Probability & Statistics

Target: 15 hours

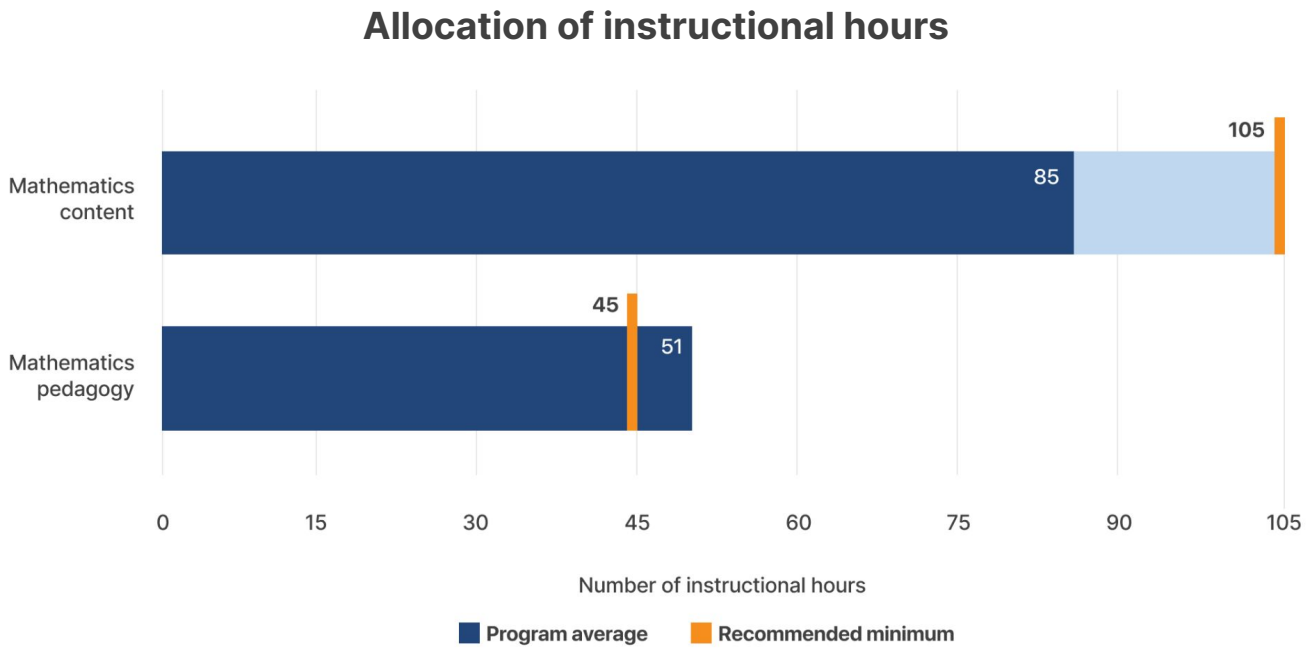
Math Pedagogy

Target: 45 hours

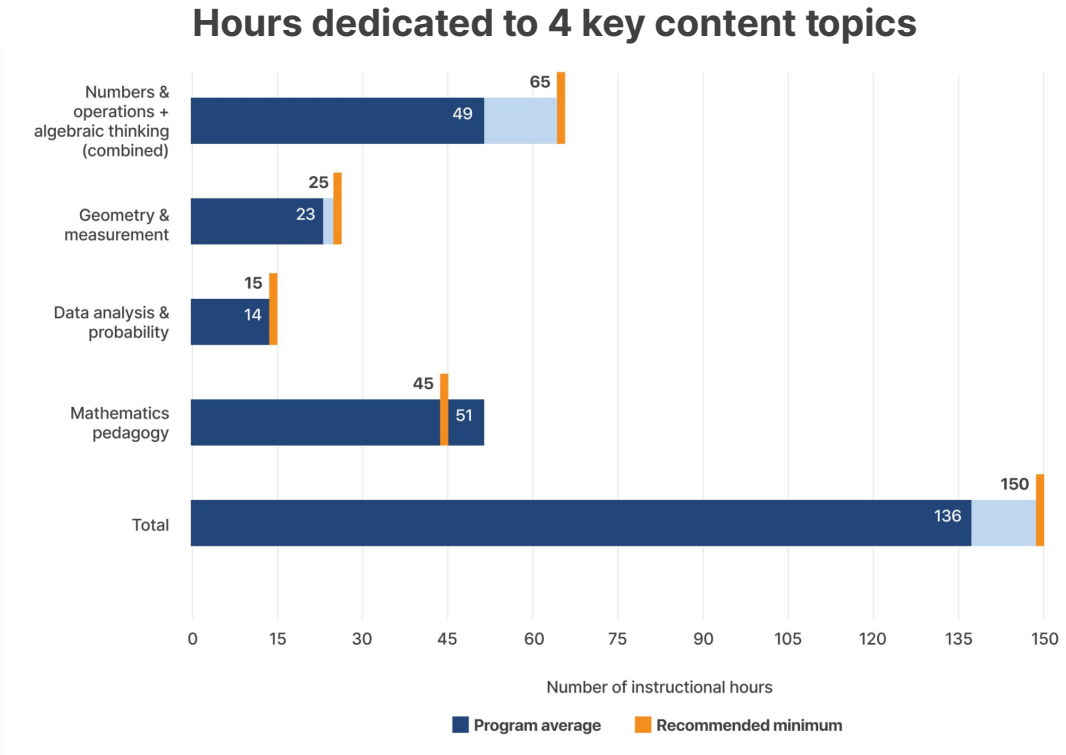
Nearly two-thirds of undergraduate programs allocate enough overall time to math—or fall just short.



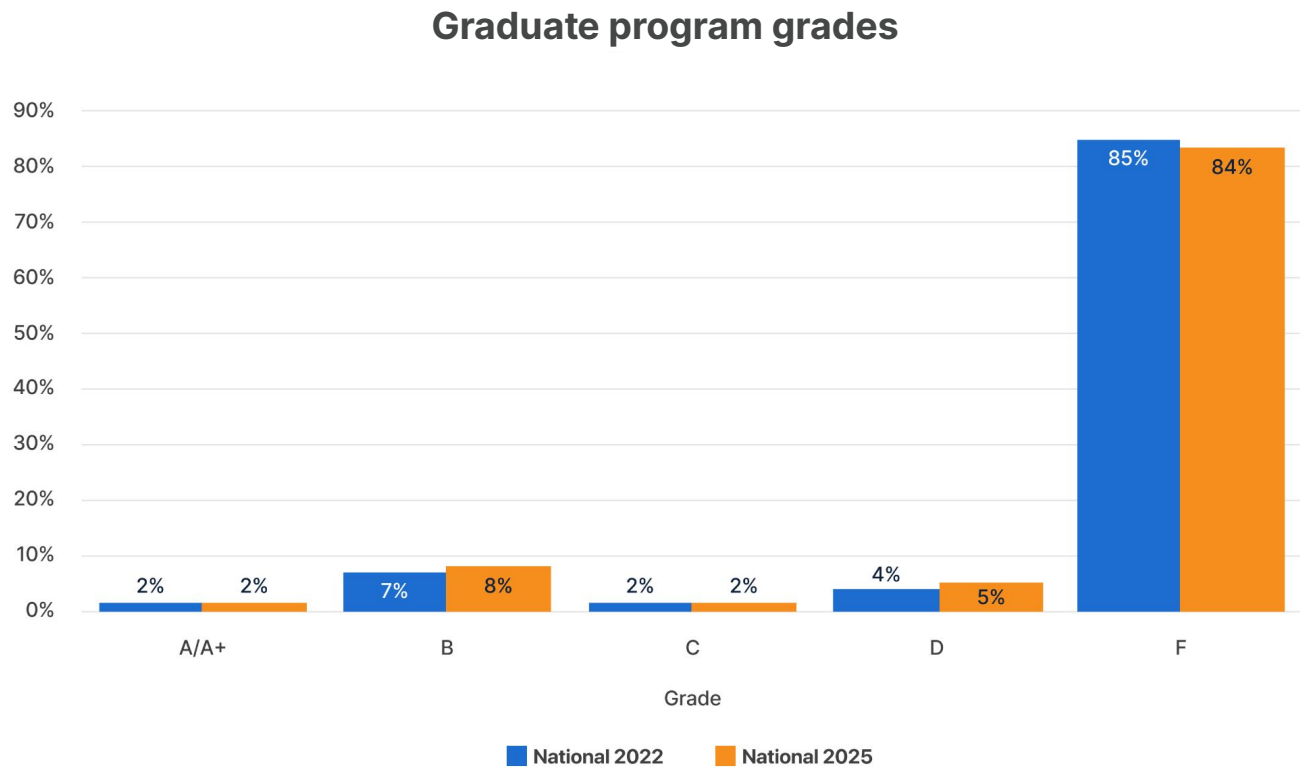
But many undergraduate programs fail to allocate enough instructional hours for math content.



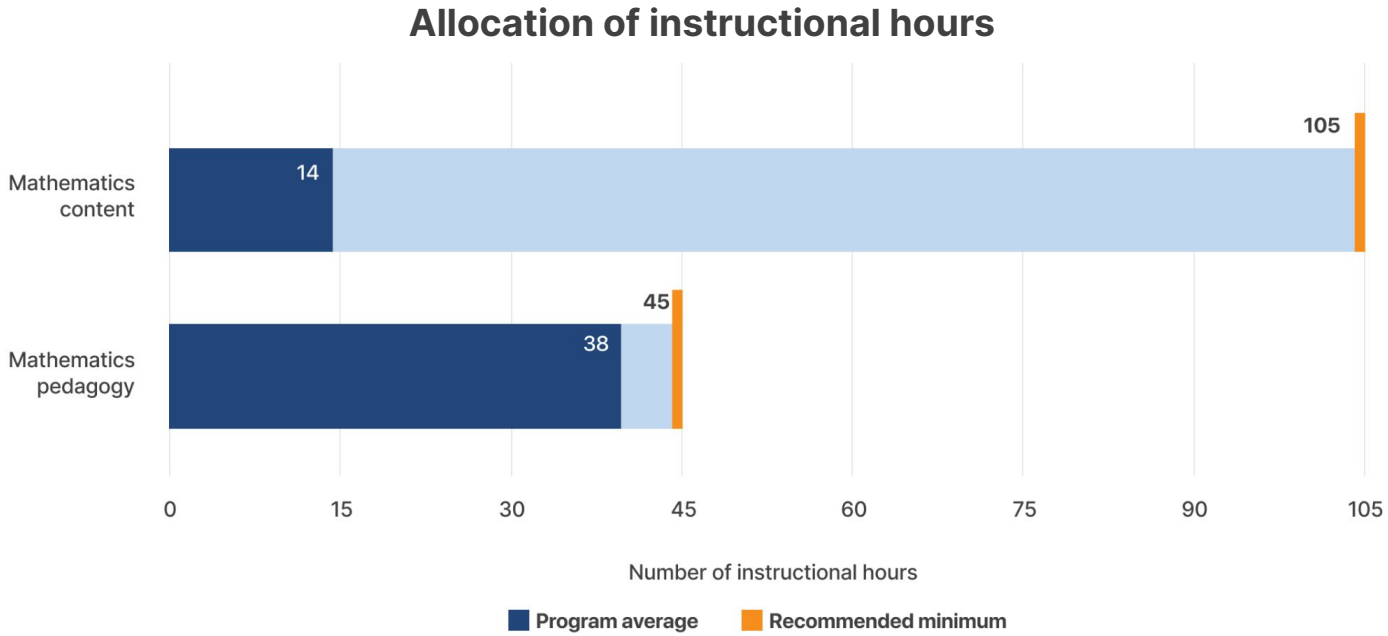
In particular, undergraduate programs are not dedicating enough time to numbers & operations and algebraic thinking.



Graduate programs, which prepare teachers for the *exact same job*, perform far worse—84% earn an F grade.



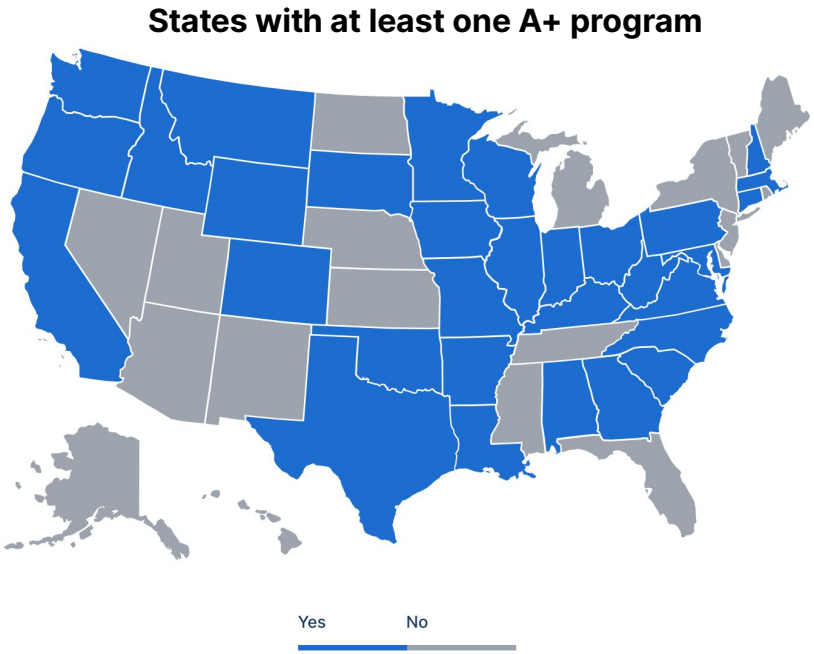
On average, graduate programs dedicate just 14 hours—less than one course credit—to math content.



Programs Leading the Way

83 programs earn an A+ grade.

31 states
have at least one A+ program.



Explore the A+ programs

Spotlight: Regent University

1. Regent University improved to an **A+ grade** from a D in 2022.
2. Developed **two new math courses** specifically for teacher candidates.
3. Candidates now complete **four math courses** that integrate content and pedagogy.

Learn more about Regent's approach

> "We're preparing our candidates to be teachers who meet the needs of their students through our cornerstone values of excellence, innovation, and integrity. That means we have a responsibility to continually assess our program and make changes when necessary."

Dr. Cheryl Gould
Department Chair

Spotlight: University of Montana

1. Montana's undergraduate and graduate programs both earned **A+ grades**.

2. Candidates in both programs complete **5 math courses**: 3 courses to build content knowledge followed by 2 courses on pedagogy.

Learn more about University of Montana's approach

> "It's one thing to have math content knowledge and another to understand how to teach it. We believe our program provides our teacher candidates the right mix of opportunities to build their content knowledge, learn research-based pedagogy, and apply their knowledge and skills in clinical settings."

Mike Perry
Associate Dean

Recommendations

Key Actions for TEACHER PREP PROGRAMS

- ✔ Dedicate at least 150 instructional hours to mathematics, with the necessary time to address content knowledge and pedagogy.
- ✔ Graduate programs unable to dedicate additional instruction hours to math should require a math content test as a condition of admission.
- ✔ Build partnerships with nearby districts to create feedback loops specific to elementary mathematics instruction.
- ✔ Ensure student teaching placements occur with cooperating teachers who have demonstrated knowledge of mathematics content.

Key Actions for STATE POLICYMAKERS

- ✔ Set clear expectations for teacher prep programs and hold them accountable for producing teacher candidates who are prepared to teach math.
- ✔ Revise policies that prevent prep programs from dedicating additional instructional hours for mathematics instruction
- ✔ Require that all elementary teacher prep programs dedicate adequate course time to mathematics.
- ✔ Require all elementary teacher candidates to pass a strong mathematics licensing test.

Links to Key Resources

View the full report: *Teacher Prep Review: Solving for Math Success*

Download state-specific summary data: Elementary Math State Profiles

View, sort, and filter all program scores: *Teacher Prep Review program grades*

Review our methodology: Teacher Prep Review: Elementary Mathematics Technical Report

Learn about the research behind strong math policy and instruction: Research Summary: Elementary Math

Read about state policies that impact math instruction in teacher prep

State of the States: Five Policy Levers to Improve Math Instruction

Endnotes

1. Werner, K., Acs, G., & Blagg, K. (202 4). *Comparing the long-term impacts of different child well-being improvements.* Urban Institute. https://www.urban.org/sites/default/files/2024-03/Comparing_the_Long-Term_Impacts_of_Different_Child_Well-Being_Improvements.pdf.

2. Claessens, A., & Engel, M. (2013). How important is where you start? Early mathematics knowledge and later school success. *Teachers College Record, 115*(6), 1-29.

3. Claessens, A., & Engel, M. (2013).

4. Claessens, A., & Engel, M. (2013); Watts, T. W., Duncan, G. J., Siegler, R. S., & Davis-Kean, P. E. (2014). The groove of growth: How early gains in math ability influence adolescent achievement. *Society for Research on Educational Effectiveness*; Siegler, R. S., Duncan, G. J., Davis-Kean, P. E., Duckworth, K., Claessens, A., Engel, M., & Chen, M. (2012). Early predictors of high school mathematics achievement. *Psychological Science, 23*(7), 691-697; Duncan, G. J., & Magnuson, K. (2011). The nature and impact of early achievement skills, attention skills, and behavior problems. *Whither Opportunity,* 47-70.