

Math Course Acceleration: Increasing Rigor & Advancing Virginia Students' Post-Secondary Futures

All Virginians have the right to a quality education, but access to a rigorous education varies greatly by county. While 60.7% of the Washington-Arlington-Alexandria metro area has attained a postsecondary credential, **117 of Virginia's 134 counties and metropolitan areas lag behind the national average of postsecondary educational attainment**ⁱ. Educational rigor is especially relevant in the post-pandemic landscape. In Virginia, 3rd through 12th grade math SOL exam pass rates for the 2023-24 academic year were 71%, which fell from the pre-pandemic average of 82% in 2018-19.ⁱⁱ

Improving educational outcomes for **all Virginians** will bolster our commonwealth's economy and create competitive workers for the futureⁱⁱⁱ, and **middle and high school course taking decisions are an essential crossroads where many students can set themselves up for future success**.

Impact of Math Course Enrollment

Student course enrollment is a strong predictor of student achievement, post-secondary education pathways, and future successes. **More specifically, math course taking patterns have positive effects on math achievement and post-secondary enrollment**. In Virginia, middle schoolers can enroll in high school level math courses such as Algebra I and Geometry, and making this choice has major implications for their future success.

Research supports that taking advanced math courses has a positive benefit for high school graduation, college enrollment, and college success.^{iv}

- In Virginia, of the population of students who earned advanced proficiency scores on their 5th grade SOL tests and took Algebra I in the 7th grade, 90% passed Algebra I and 80% earned an advanced high school diploma^v.
- In a study of math enrollment for community college students, they found that nearly 70% of community college students take a remedial math course^{vi}, and 92% of students enrolled in a repeat math course.

Examples of Math Course Acceleration Efforts

Other states and school districts have made attempts at accelerating math coursework for middle school students.

- In Texas, a bipartisan bill was passed mandating that all students who perform at a specific level on a state math assessment would be automatically enrolled in an advanced math course for their 6th grade year. Data from the Dallas Independent School District showed that **the number of students who enrolled in Algebra I for their 8th grade year doubled between 2018 to 2019**.^{vii}
- In North Carolina, the Wake County Public School System implemented Single Subject Acceleration, a policy where a predictive model was used to determine which students would succeed in higher level math based on previous grades and test scores. **Students made eligible for accelerated math through the predictive model were more likely to take Pre-Calculus later in their high-school careers**.^{viii}

There is evidence that data-driven decision making in course acceleration can be used to determine which students will succeed in advanced math courses.

- In Missouri, **7th grade math test scores were associated with 8th grade Algebra I achievement** as demonstrated through their end-of-year assessment.^{ix}

- In a set of California districts, diagnostic testing was used to place students in **Algebra I in 8th grade which predicted success in the higher-level course in 77% of cases.**^x

Recommendation

In Virginia, there is currently no policy or standard mandating how students are placed in math courses in middle school. **We recommend that schools use data to identify students who may be prepared or well supported to take upper-level math courses to increase the number of students taking Algebra I in middle school.**

Schools will have the flexibility how to determine enrollment into **Math 6 compacted courses and/or Algebra I in 7th or 8th grade** using data from standardized tests, such as:

- Math SOL tests in 5th and 6th grade
- Scores from the fall and/or winter Virginia Growth Assessments (VGAs)^{xi}
- Recommendations from families, community partners, and/or out-of-school organizations who work directly with youth

This recommendation is **not** intended to limit students who can take advanced courses. Rigorous coursework should be available for all students who are deemed ready based on a variety of metrics, including insights from teachers and families.

Other Resources

- Reading and Math SOL test outcomes in Virginia using data from the Virginia Department of Education: <https://virginiaequitycenter.github.io/vaequity-reading/>

Endnotes

ⁱ Lumina Foundation Stronger Nation Report: <https://www.luminafoundation.org/stronger-nation/report/#/progress/state/VA&state-area=metro&state-compare=&state-scale=1>

ⁱⁱ VDOE “Learning Needs Dashboard”: <https://www.doe.virginia.gov/data-policy-funding/data-reports/statistics-reports/learning-needs-dashboard>

ⁱⁱⁱ “The Economic Value of the Virginia Community College System”: https://www.vccs.edu/wp-content/uploads/2024/01/VCCS_FY22_EIS_ExecSum_Final.pdf

^{iv} “The Effects of High School Math Curriculum on College Attendance” by A. Aughinbaugh; “Advanced Math Course-taking: Effects on Math Achievement and College Enrollment” by S. Byun, M. J. Irvin, & B. A. Bell; “Completing Algebra II in High School: Does it Increase College Access and Success?” by J. Kim, J. Kim, S. L. Desjardins, & B. P. McCall; “Effects of High School Course-taking on Secondary and Postsecondary Success” by M. C. Long, D. Conger, and P. Iatarola; “Inside the Math Trap: Chronic Math Tracking from High School to Community College” by F. Ngo & D. Velasquez

^v “Algebra I and College Preparatory Diploma Outcomes among Virginia Students who Completed Algebra I in Grades 7-9” by Regional Educational Laboratory Appalachia: https://ies.ed.gov/ncee/rel/regions/appalachia/pdf/REL_2021038.pdf

^{vi} “Remedial Coursetaking at U.S. Public 2- and 4- year Institutions: Scope, Experiences, and Outcomes” by X. Chen; “Inside the Math Trap: Chronic Math Tracking from High School to Community College” by F. Ngo & D. Velasquez

^{vii} “How Texas plans to make Access to Advanced Math more Equitable”: <https://hechingerreport.org/how-texas-plans-to-make-access-to-advanced-math-more-equitable/>

^{viii} “Objective Course Placement and College Readiness: Evidence from Targeted Middle School Math Acceleration” by Shaun M. Dougherty, Joshua S. Goodman, Darryl V. Hill, Erica G. Litke, & Lindsay C. Page

^{ix} “What Grade 7 Foundational Knowledge and Skills are Associated with Missouri Students’ Algebra I Achievement in Grade 8?” by Regional Educational Laboratory Central: https://ies.ed.gov/ncee/edlabs/regions/central/pdf/REL_2020023_brief.pdf

^x “Using Assessment Data to Guide Math Course Placement of California Middle School Students” by C. Huang, J. Snipes, & N. Finkelstein: https://ies.ed.gov/ncee/rel/regions/west/pdf/REL_2014040.pdf

^{xi} VDOE “Growth Assessments”: <https://www.doe.virginia.gov/teaching-learning-assessment/student-assessment/virginia-sol-assessment-program/growth-assessments>