

Examining educational inequities: How do Algebra I and high school outcomes differ for students who complete Algebra I in grades 7, 8, or 9?

Completing Algebra I in middle school offers students the opportunity to take more advanced mathematics courses in high school, with the aim of increasing the number of students who graduate with a college preparatory diploma.* Ensuring all students have access to Algebra I in middle school, coupled with effective teaching practices, can increase equity in the education system.

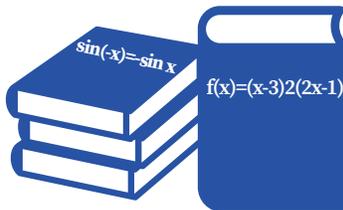
*Virginia's more rigorous Advanced Studies diploma, a college preparatory diploma, requires students to successfully complete courses research shows students need to enroll and succeed in college.

Complete Algebra I in middle school



ALGEBRA I

Complete more advanced courses in high school



ADVANCED MATHEMATICS

Graduate high school prepared for college



Education leaders in the Regional Educational Laboratory Appalachia Student Success in Mathematics partnership were interested in learning more about the students who complete Algebra I in grades 7–9 and their outcomes.

Read the full study *Algebra I and College Preparatory Diploma Outcomes among Virginia Students Who Completed Algebra I in Grades 7–9* at <https://ies.ed.gov/ncee/edlabs/projects/project.asp?projectID=4577>.

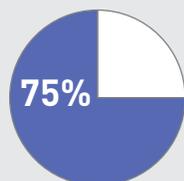
Three-quarters (75%) of Virginia's high-scoring students completed Algebra I in grades 7 or 8 (middle school).

High-scoring students in grade 5 mathematics*	Completed Algebra I in grade 7	Completed Algebra I in grade 8	Completed Algebra I in grade 9
37,898	24%	51%	25%

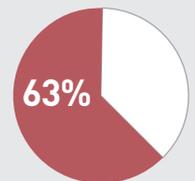
*High-scoring students earned advanced proficient scores on the state's grade 5 mathematics assessment.

Data suggest a **gap in access** to Algebra I in middle school for high-scoring, economically disadvantaged students.

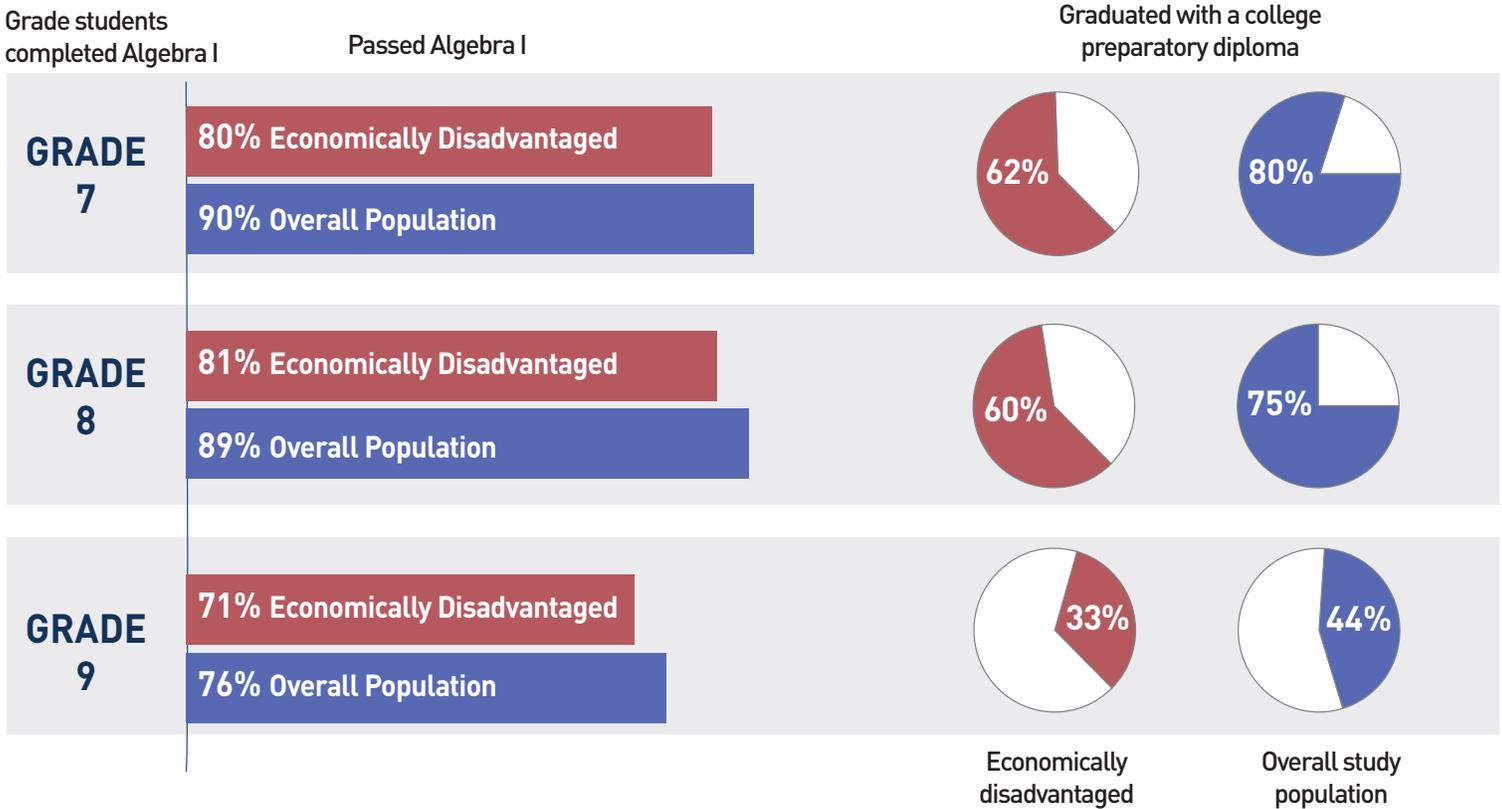
75% of high-scoring students from the overall study population completed Algebra I in middle school.



63% of high-scoring, economically disadvantaged students completed Algebra I in middle school.



Lower percentages of high-scoring, economically disadvantaged students passed Algebra I and earned a college preparatory diploma compared with the overall study population, regardless of when they completed Algebra I. **This suggests a need to address inequitable success in high school.**



We all have a role in achieving equitable access and success.



Classroom Teachers

- Hold high expectations for all students.
- Provide equitable, rigorous, and challenging mathematics learning experiences for everyone.
- Employ effective, evidence-based teaching practices, including visual representations and engaging students in multiple problem-solving strategies.^{i, ii}



School and District Education and Policy Leaders

- Consider the placement criteria used to determine when students are eligible to take Algebra I. Maximize the use of objective measures (e.g., performance on a standardized test) instead of subjective measures that have potential for personal perspectives, opinions, and biases (e.g., letters of recommendation).ⁱⁱⁱ
- Beyond written policy, examine how course placement happens in practice (e.g., guidance counseling conversations, teacher recommendations).



State Agency and Policy Leaders

- Conduct similar studies in other states in mathematics and across disciplines to determine the extent of challenges in achieving equitable access and success.
- Provide guidance to local policy leaders related to graduation requirements, course pathways, and high expectations for coursetaking and college preparatory diploma attainment.

ⁱ Boaler, J. (2015). *Mathematical mindsets: Unleashing students' potential through creative math, inspiring messages and innovative teaching*. John Wiley & Sons Jossey-Bass.

ⁱⁱ Woodward, J., Beckmann, S., Driscoll, M., Franke, M., Herzig, P., Jitendra, A., et al. (2012). *Improving mathematical problem solving in grades 4 through 8: A practice guide* (NCEE No. 2012-4055). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance. Retrieved June 2, 2020, from http://ies.ed.gov/ncee/wwc/publications_reviews.aspx#pubsearch/

ⁱⁱⁱ Kibler, A. K., Elreda, L. M., Hemmler, V. I., Arbeit, M. R., Beeson, R., & Johnson, H. E. (2019). Building linguistically integrated classroom communities: The role of teacher practices. *American Educational Research Journal*, 56(3), 676–715.

Vanlommel, K., & Schildkamp, K. (2019). How do teachers make sense of data in the context of high-stakes decision making? *American Educational Research Journal*, 56(3), 792–821.