

# Mathematics Pathways

## Promoting Student Agency and Success

The Charles A. Dana Center believes that all students should have access to high-quality mathematics pathways that prepare them for success in college, career, and life. Math pathways provide students with the agency to choose a math course of study based on their interests and career goals, and to enable them to evaluate, use, and make sense of mathematics in the world. This opportunity for choice typically occurs in the third or fourth year of high school and upon entering college; the option is based on the course content and its alignment with their program of study. While some students are well served by the current math structures, math pathways provide opportunities for each and every student, including those who have been traditionally underserved, to succeed in mathematics.

Ensuring students have access to high-quality math pathways significantly enhances their educational outcomes and future career prospects. Research shows that individuals with postsecondary certificates or degrees earn higher wages. Completing four years of math in high school, taking math courses aligned with their major, or avoiding remedial courses increase the likelihood of students' earning postsecondary certificates or degrees. High-quality math pathways aligned between high school and postsecondary education enable a smooth transition for students, reduce course repetition when transferring between institutions, and help students see the relevance of mathematics. Math pathways can dismantle existing barriers and promote motivation, engagement, and joy in math learning.

**The Dana Center works with states, systems, and districts to implement high-quality math pathways that have the following characteristics:**

1. **Alignment between secondary and postsecondary systems.** Through the Launch Years Initiative, the Dana Center brings together high school systems, postsecondary systems, communities, students, workforce, and other stakeholders to develop aligned math pathways in high school and in postsecondary education. The Dana Center supports educational systems in examining policies, including high school math offerings, graduation and admissions requirements, postsecondary placement policies, and corequisite practices to identify and remove barriers to access and success and to support students regardless of their prior math background.

2. **Alignment to disciplinary and workforce needs.** The Dana Center facilitates interdisciplinary discussions to identify the appropriate math pathway for broad career/field clusters. The Center works with systems, instructional designers, and faculty to ensure that students are mathematically prepared for current and future demands of their fields and that all math pathways are rigorous and allow for lifelong math learning as demanded by career trajectories. The Center also works with policy makers to ensure that each pathway is accepted equally in transfer agreements, ensuring students do not have to retake courses in which they had previously demonstrated competency, and that pathways are designed to be flexible for students who change majors.
3. **Ensuring student progress toward completion.** All students should engage in “on-level” math content. In high school, students should be able to enroll in appropriate grade-level courses with support, as needed, to ensure that they successfully progress in their math courses and successfully earn their diploma. In postsecondary education, students should be able enroll directly in the appropriate gateway course aligned with their areas of study and, if needed, are provided with just-in-time corequisite support to promote successful completion of the course and preparation for any subsequent courses.
4. **Student-centered communication and advising.** To allow students to make well-informed decisions, the Dana Center supports the development of communications materials to increase student, community, and family awareness of the considerations associated with each pathway option. Advising students into the appropriate math pathway according to their interests, rather than students’ perceived ability, is a key component of effective math pathways design. The Dana Center collaborates with postsecondary institutions in developing holistic support structures that provide additional skills and life supports for students.
5. **Use of evidence-based curriculum and pedagogy.** There is ample evidence that educational outcomes are optimized when students engage with high-quality instructional materials through a variety of effective instructional strategies. The Dana Center provides instructional materials for three postsecondary pathways, frameworks for fourth-year high school math courses, and supports teachers in identifying and adapting high-quality instructional materials. The Center also facilitates pedagogical training for high school and postsecondary math teachers focused on social–emotional and mindset work, and student engagement and collaboration with contextualized mathematics.

When all students have the opportunity to choose math pathways that are based on their goals and interests . . .

- Education systems will be more accessible and provide every student with opportunities for success.
- Math will no longer be a barrier to high-quality education.
- Math courses that students take in high school will be aligned to courses they take in postsecondary education and will expose them to math in relevant and engaging contexts.
- Fewer students will be required to take college algebra when they are not in a program that requires calculus.
- All students will master critical thinking, problem solving, and other skills that enable them to participate effectively in society.
- More students will earn postsecondary certificates or degrees.
- State economies will thrive with employees who are well equipped with the mathematical skills needed to be successful.
- The population of STEM professionals will reflect the demographics of each state and the national population.
- An individual's education, salary, and economic opportunities cannot be predicted by their zip code and/or familial wealth.

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