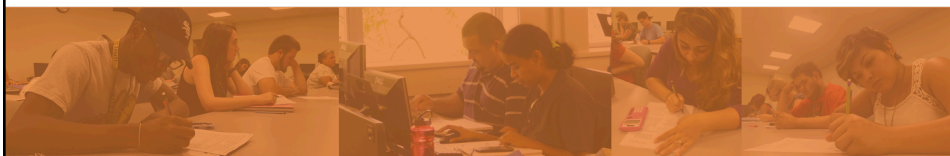




Supporting Multiple Pathways in HB 5 College Prep Math Courses

Susan May, Course Program Specialist
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About the Dana Center

— Equity — Access — Excellence —

2019

Dana Center by the Numbers



Major grant received from the Bill & Melinda Gates Foundation for our **Launch Years initiative**, which aims to improve student success in high school mathematics.

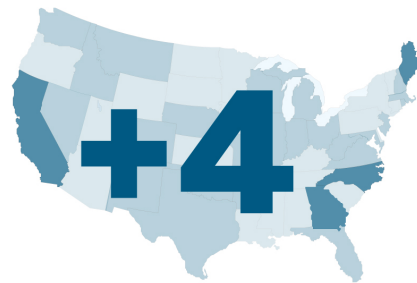
Dana Center by the Numbers

We provided professional development for **Department of Defense Education Activity** teachers, benefiting **88,500** students in **14** countries.

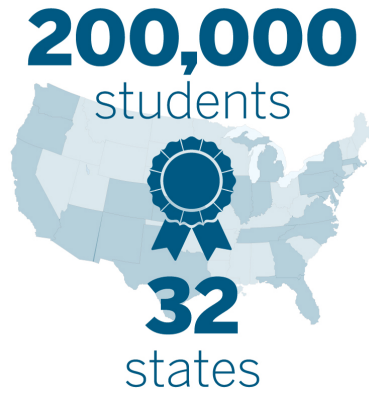


Dana Center by the Numbers

We launched “deep dive” work with higher education systems in **4 new states**, expanding DCMP’s footprint to **more than 30 states**.

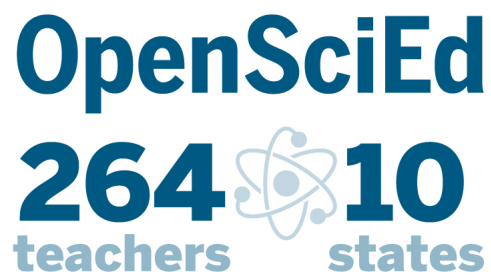


Dana Center by the Numbers



Nearly 200,000 students in 32 states were served by Dana Center–Agile Mind courses, recognized for their quality by multiple review panels including EdReports.

Dana Center by the Numbers



Received our support in field testing
new open education science
resources from OpenSciEd.

Dana Center by the Numbers



1,000
teacher-leaders

Nearly **1,000 Louisiana teacher-leaders and mentors** received **capacity-building support** from our professional learning facilitators.

Dana Center by the Numbers



**ONE
HUNDRED
THIRTY
FIVE**

Local, state, and national **organizations collaborated** with the Dana Center to ensure all students have **equitable access to an excellent education.**

Dana Center by the Numbers



Downloads of **free resources** for elementary and secondary classrooms from **Inside Mathematics**.

Dana Center by the Numbers



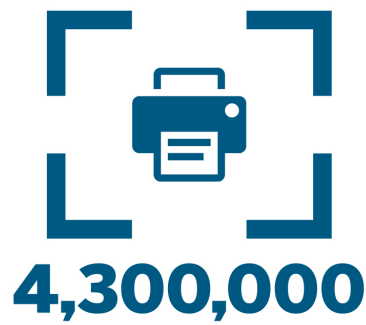
People who viewed **MathCuts**—**quick, engaging strategies** for K–6 classroom teachers—on Facebook.

Dana Center by the Numbers

We conducted
**150 professional
learning sessions**
for **K-12 math and
science** teachers and
administrators.



Dana Center by the Numbers



Over **4.3 million pages** of our curricula,
assessments, or professional learning sessions are
published in-house and **sent around the world.**

Agenda

- **Dimensions of college readiness**
- **Naming barriers**
- **Trends in higher education**
- **Investigating multiple pathways**

Building Momentum

- **Academic knowledge and skills**
- **Noncognitive skills**
- **College cultural capital**

Building Student Momentum From High School Into College, Jobs for the Future, February 2016

Drivers that Create Barriers for Students in College



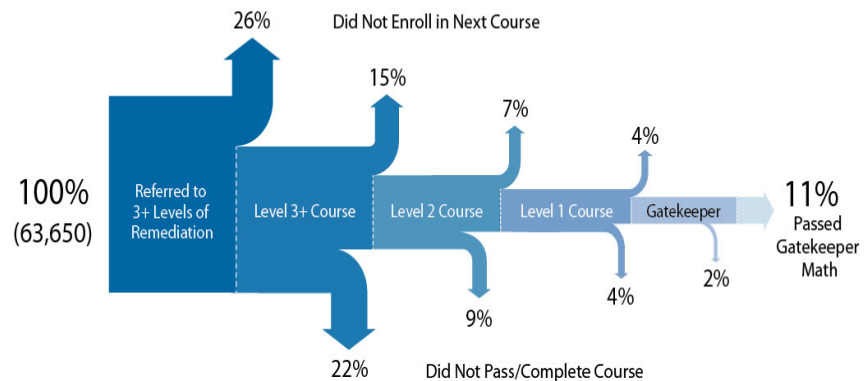
Mathematics is an obstacle to degree completion and equitable outcomes for millions of students. High failure rates are not due to students or faculty. The problem lies in how mathematics programs are structured.

Charles A. Dana Center. (2019). *The Case for Mathematics Pathways*. Austin, TX: Author.

https://dcmathpathways.org/sites/default/files/resources/2019-03/CaseforMathPathways_20190313.pdf

Mathematics Pathways Movement

Student Progression Through the Developmental Math Sequence²¹



“College ready” for what (math)?

Why Worry About Alignment?

Mathematical Association of America's 2004 CUPM Curriculum Guide

“Unfortunately, there is often a serious mismatch between the original rationale for a college algebra requirement and the actual needs of the students who take the course.”

Endorsed by

- American Mathematical Association of Two-Year Colleges
- American Mathematical Society
- American Statistical Association
- Society for Industrial and Applied Mathematics

College Algebra?

- College Algebra was originally intended to prepare students for calculus.
- In 2004, the Mathematical Association of America (MAA) called for the end of using College Algebra as a terminal mathematics course, citing a serious mismatch between the original rationale for College Algebra and the mathematical needs of students who take the course.

Charles A. Dana Center. (2016). *DCMP Call to action: The case for mathematics pathways*.
Austin, TX: Author.

<https://dcmathpathways.org/sites/default/files/resources/2016-11/The Case for Mathematics Pathways.pdf>

The Move to Mathematics Pathways

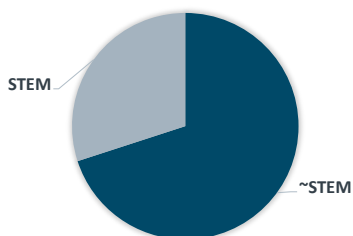
- In 2015, the MAA, along with four major mathematical professional associations, called for multiple mathematics pathways that are aligned to fields of study.
- Some colleges and universities have begun to respond by implementing math pathways, such as quantitative reasoning, statistics, technical mathematics (for certificate programs), and a redesigned algebraic-intensive/or Calculus pathway.

Charles A. Dana Center. (2016). *DCMP Call to action: The case for mathematics pathways*.
Austin, TX: Author.

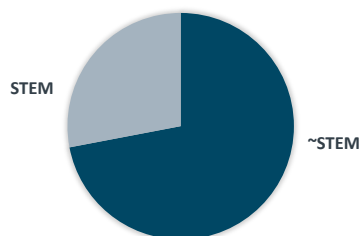
<https://dcmathpathways.org/sites/default/files/resources/2016-11/The Case for Mathematics Pathways.pdf>

Mathematics Pathways Movement

2-YEAR COLLEGE STUDENT ENROLLMENT INTO PROGRAMS OF STUDY



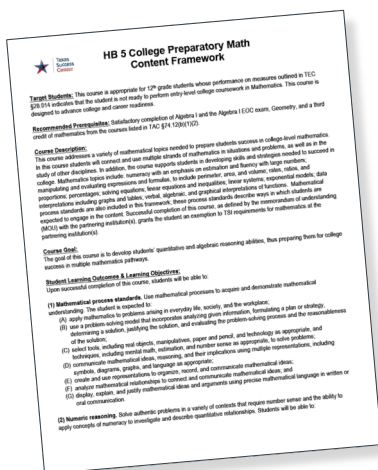
4-YEAR COLLEGE STUDENT ENROLLMENT INTO PROGRAMS OF STUDY



Burdman, P. (2015). *Degrees of freedom: Varying Routes to Math Readiness and the Challenge of Intersegmental Alignment*. Oakland CA: Learning Works and Policy Analysis for California Education.

Anatomy of the Framework

Understanding the architecture and content



College Prep Math Framework

- Organized around student learning goals and objectives
- Reflects modern mathematics
 - Applying mathematical processes
 - Numeric reasoning
 - Proportional reasoning
 - Algebraic reasoning
 - Probabilistic reasoning
 - Quantitative reasoning

A Closer Look at the Framework

Consider these student outcomes:

- 3A
- 3C
- 6D

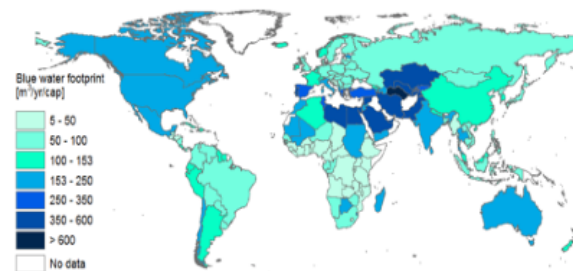
What classroom activities would support students in meeting the outcomes at the level necessary for college readiness?

Ratios in Water Use

Lesson 4, Part C, Ratios in water use

Theme: Civic Life

In previous lessons, you analyzed how quickly Earth's population is growing. Rapid population growth could impact **sustainability**—that is, Earth's ability to continue to support human life.



Credit: Waterfootprint.org¹

A Closer Look at the Framework

Consider these student outcomes:

- 3A
- 3C
- 6D

How did the model lesson support students in meeting the outcomes at the level necessary for college readiness?

An Overview of the Course

Transition to College Mathematics, Version 2 Course Outline 2019-20

Unit 1 (4 weeks)

- **Lesson 1: Building the foundations for our success**
 - Building the foundations for our success – *Student success focus*
- **Lesson 2: Getting started**
 - How big is a billion -- *Quantitative reasoning, large numbers*
 - Building a learning community -- *Student success focus*
 - How big is a billion (cont.) -- *Quantitative reasoning, large numbers*
 - Building a learning community (cont.) -- *Student success focus*
- **Lesson 3: Working in groups and Creating success teams**
 - Working in groups – *Student success focus*
 - Creating success teams – *Student success focus*
- **Lesson 4: Ratios and numbers**
 - Doubling population -- *Large numbers, doubling, rates, Introduction to note taking*
 - Scientific notation -- *Representing numbers in scientific notation, converting back to standard notation*
 - Ratios in water use -- *Large numbers, ratios, scientific notation*
 - Analyzing water footprints -- *Scientific notation, ratios*

Looking at Multiple Pathways

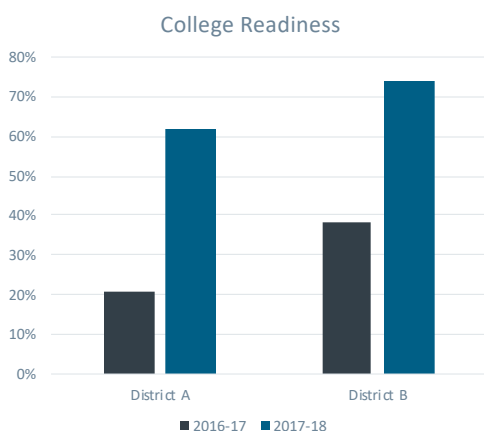
- **What do you notice?**
- **What excites you?**
- **What do you have questions about?**

Model Course Implementation

2016-17 and 2017-18 academic years

- **Cohort 1: 2016-2017**
 - 353 students
 - 10 school districts
 - 4 institutions of higher education
 - 61% of students college ready
- **Cohort 2: 2017-2018**
 - 1,066 students
 - 32 school districts
 - 8 institutions of higher education
 - 52% of students college ready

Stories from the field



Examples of two districts in our study that showed significant gains in college readiness after implementing *Transition to College Mathematics*.

Student voices

- “This class has helped me learn how to think and put a plan into action before giving [up] or saying I can't do something.”
- “I've been able to interact and by interacting I learn new strategies and things I've never learned before that make processes simpler and more understandable.”
- “It has showed me problem solving skills and has convinced me that I can get smarter.”
- “I've learned real world math that I know I will use in the future.”
- “It has taught me that I am smarter than I thought.”

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