

CENTRAL TEXAS

# MATH SUMMIT

## The Future of Math in Central Texas

Presented by E3 Alliance

November 17, 2023



The University of Texas at Austin  
Charles A. Dana Center

**E3 Alliance**<sup>SM</sup>  
Education Equals Economics

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# MATH SUMMIT

## Agenda



- Breakfast/ Welcome
- Opening Keynote- Dave Kung, UT Dana Center
- Celebrations
- Breakout Sessions
- Data Sharing
- Lunch and Closing Panel

# Keynote

*Dave Kung*

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MATH SUMMIT

# What's (Actually) the Point? Teaching Math in the 21<sup>st</sup> Century

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Dave Kung

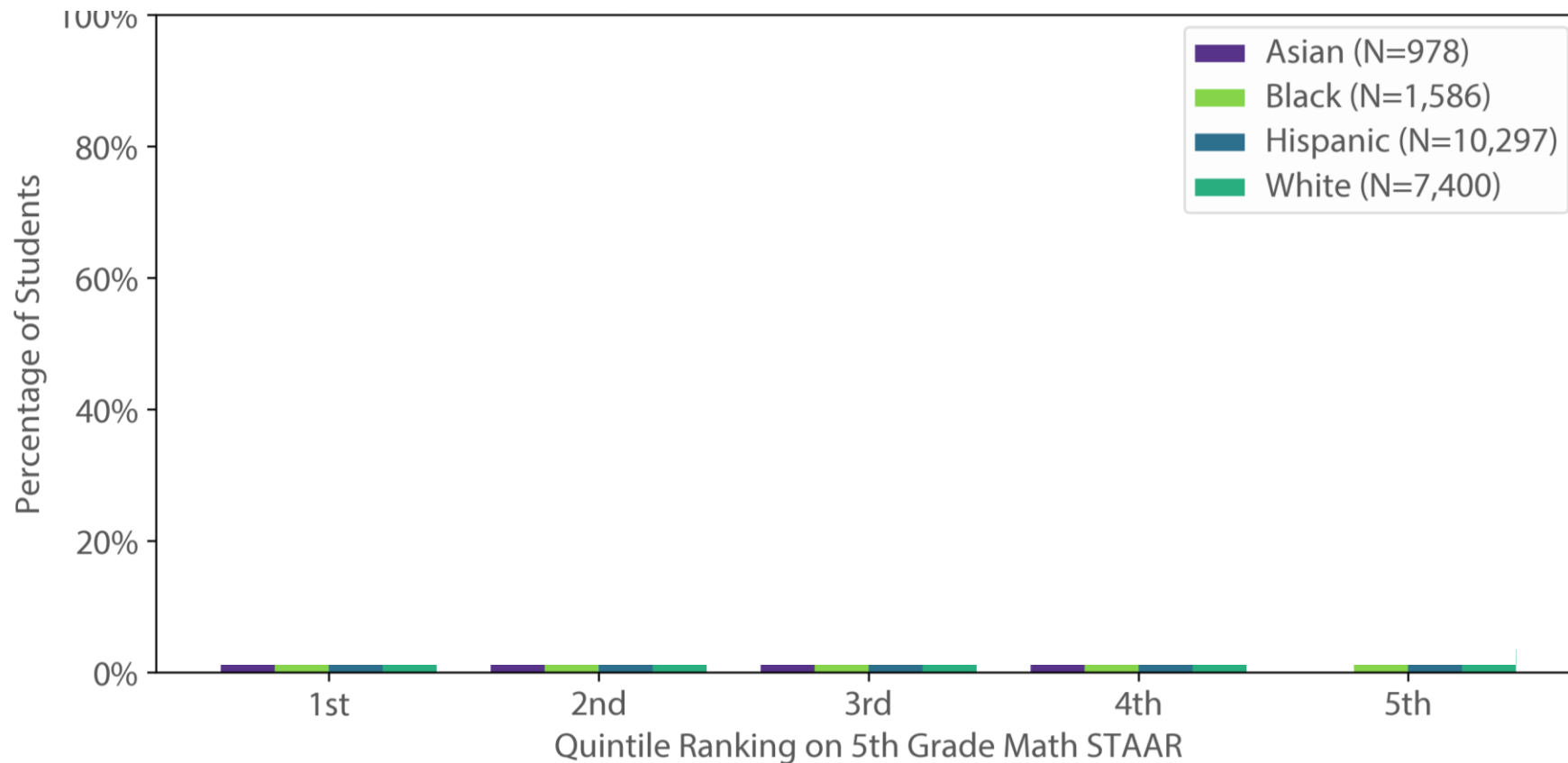
Director of Strategic Partnerships

Charles A. Dana Center, The University of Texas at Austin

— Equity — Access — Excellence —

# Barriers: Elementary → Middle

Access to 8<sup>th</sup> grade Algebra (based on 5<sup>th</sup> grade scores)

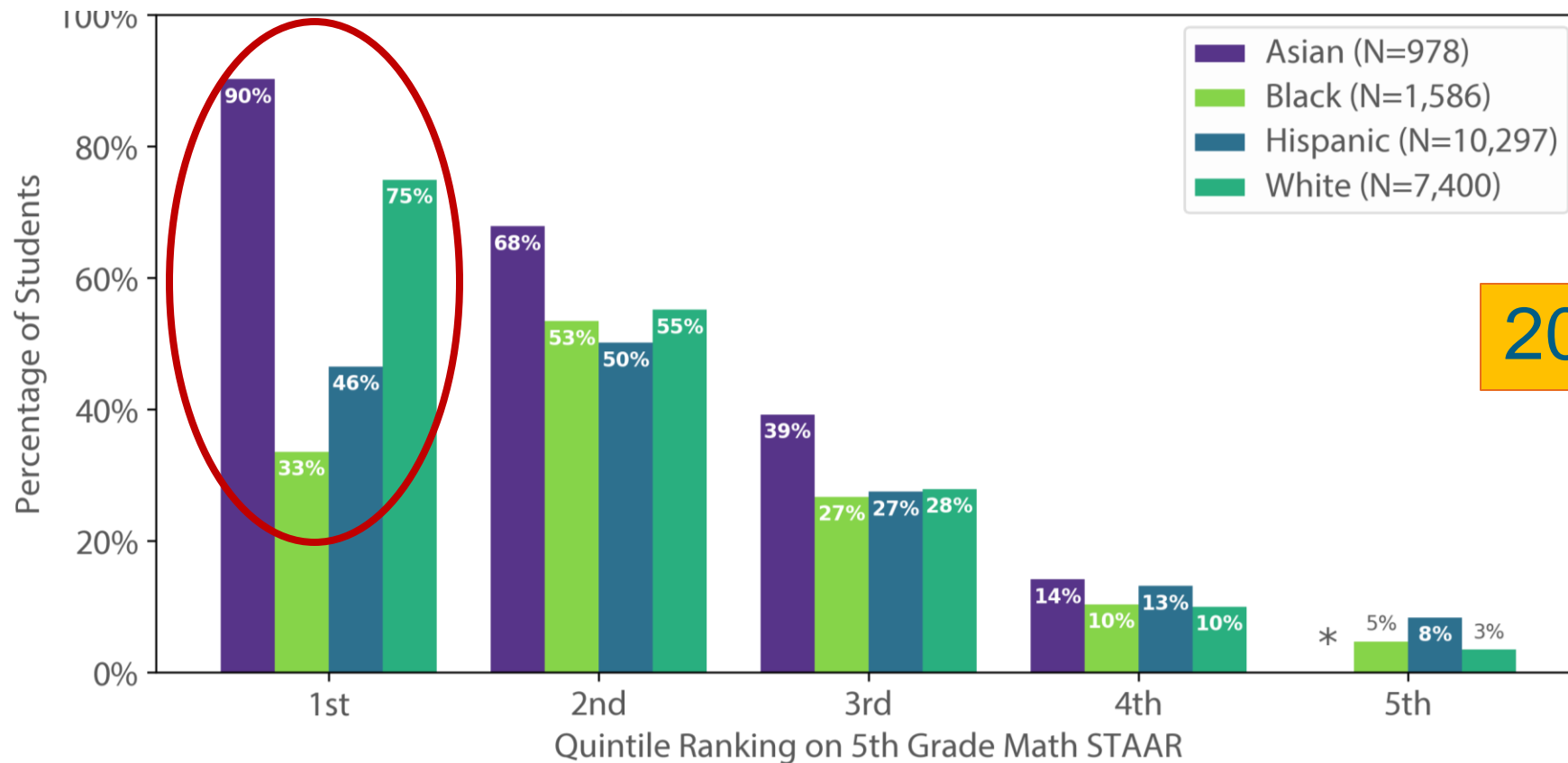


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# Barriers: Elementary → Middle

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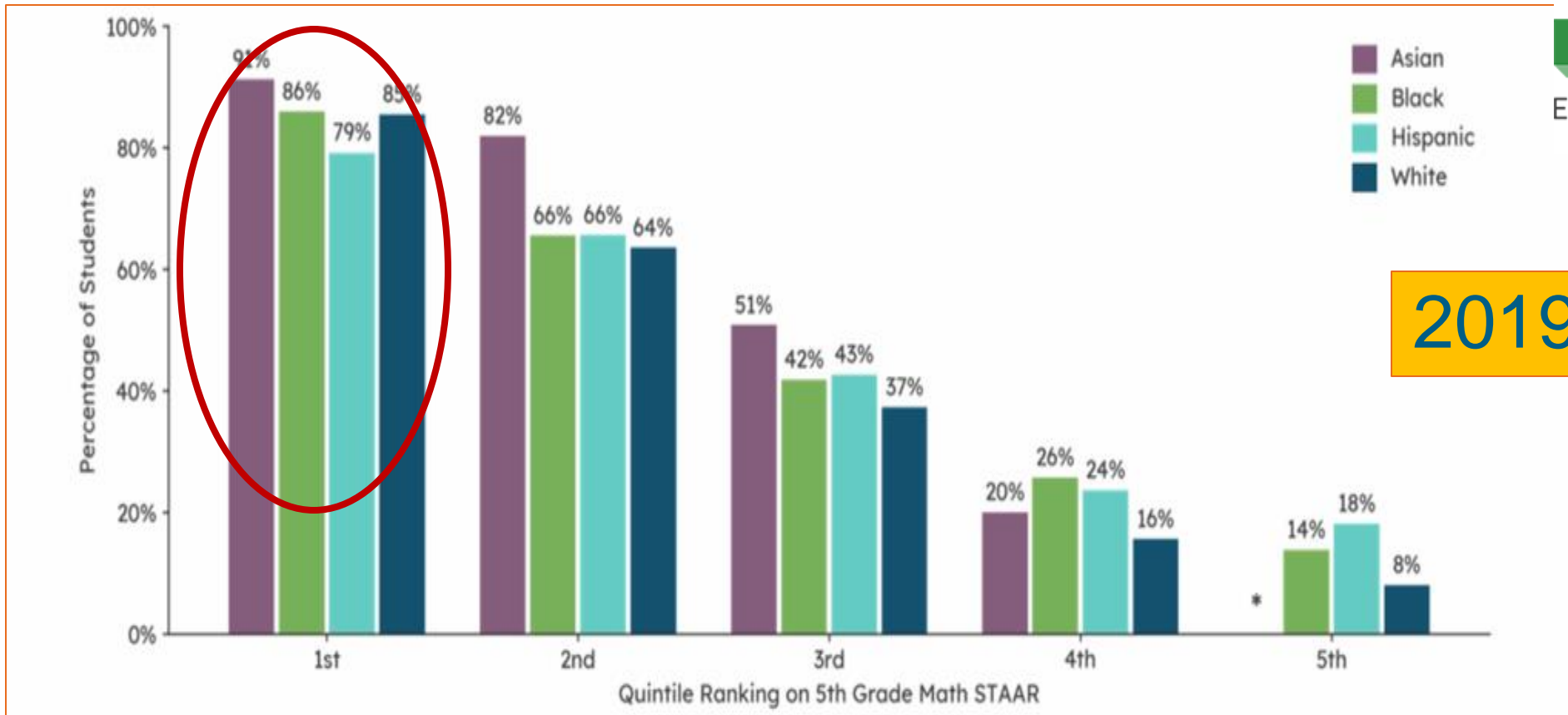


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2014 data

# Case Study: Elementary → Middle

Access to 8<sup>th</sup> grade Algebra (based on 5<sup>th</sup> grade scores)

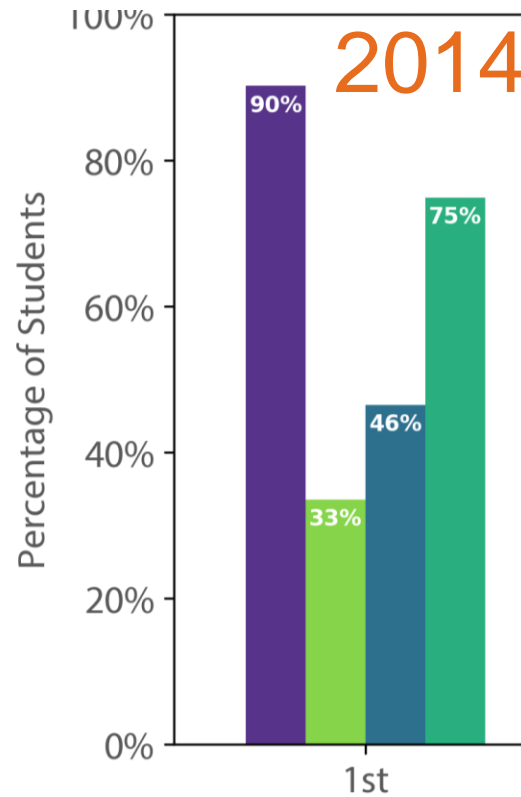


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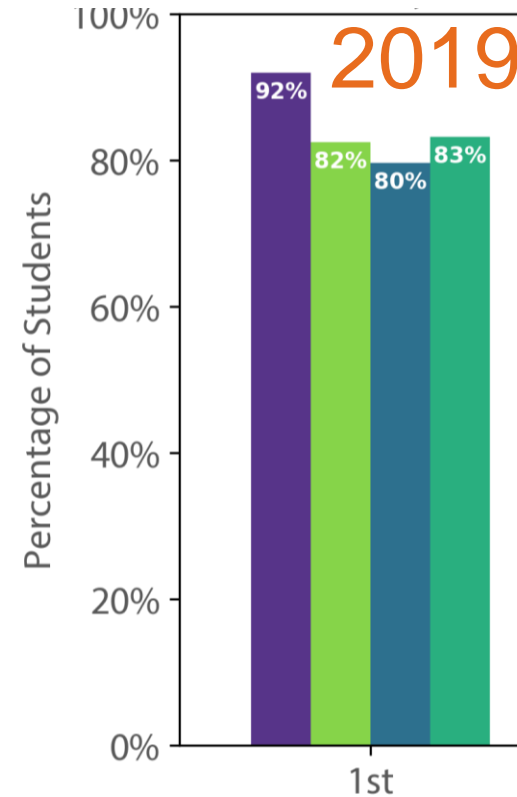
2019 data

# Case Study: Elementary → Middle

Access to 8<sup>th</sup> grade Algebra (based on 5<sup>th</sup> grade scores)



Placement: Opt In



Opt Out





## Case Study: Elementary → Middle

### Texas SB 2124 (2023 Session)

Barrier: At critical transitions where decisions are made, underresourced students lose out.

Solution: Make the default what's best for everyone.

COMMITTEE SUBSTITUTE FOR S.B. No. 2124

By: Middleton

A BILL TO BE ENTITLED  
AN ACT

relating to an advanced mathematics program for public school students in middle school.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

SECTION 1. Subchapter B, Chapter 28, Education Code, is amended by adding Section 28.029 to read as follows:

Sec. 28.029. MIDDLE SCHOOL ADVANCED MATHEMATICS PROGRAM.

(a) To increase the number of students who complete advanced mathematics courses in high school, each school district and open-enrollment charter school shall develop an advanced mathematics program for middle school students that is designed to enable those students to enroll in Algebra I in eighth grade.

(b) Under the program, subject to Subsection (c), a school district or open-enrollment charter school shall automatically enroll in an advanced mathematics course each sixth grade student who performed in the top 40 percent on:

# What's (actually) the point of . . . teaching math?

(Implicit) goal of math classes:

Graduate

Get through Chapter 5.

Create slow versions of graphic calculators

Create slow, inefficient versions of  
Wolfram Alpha

Create slow, inefficient, flesh & bone  
versions of ChatGPT (with worse grammar).

# What's (actually) the point of . . . teaching math?

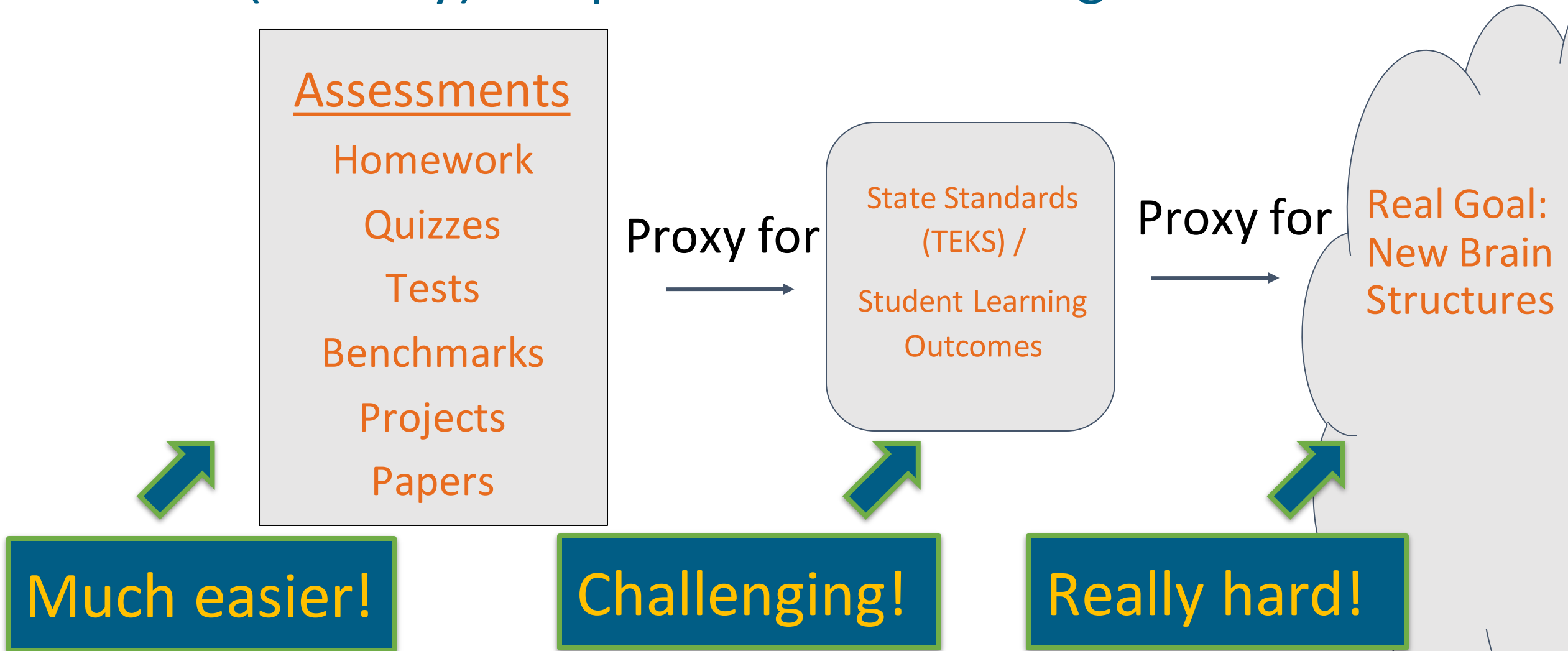
Real (mostly unstated) goal:

Help students create new structures in their brains.

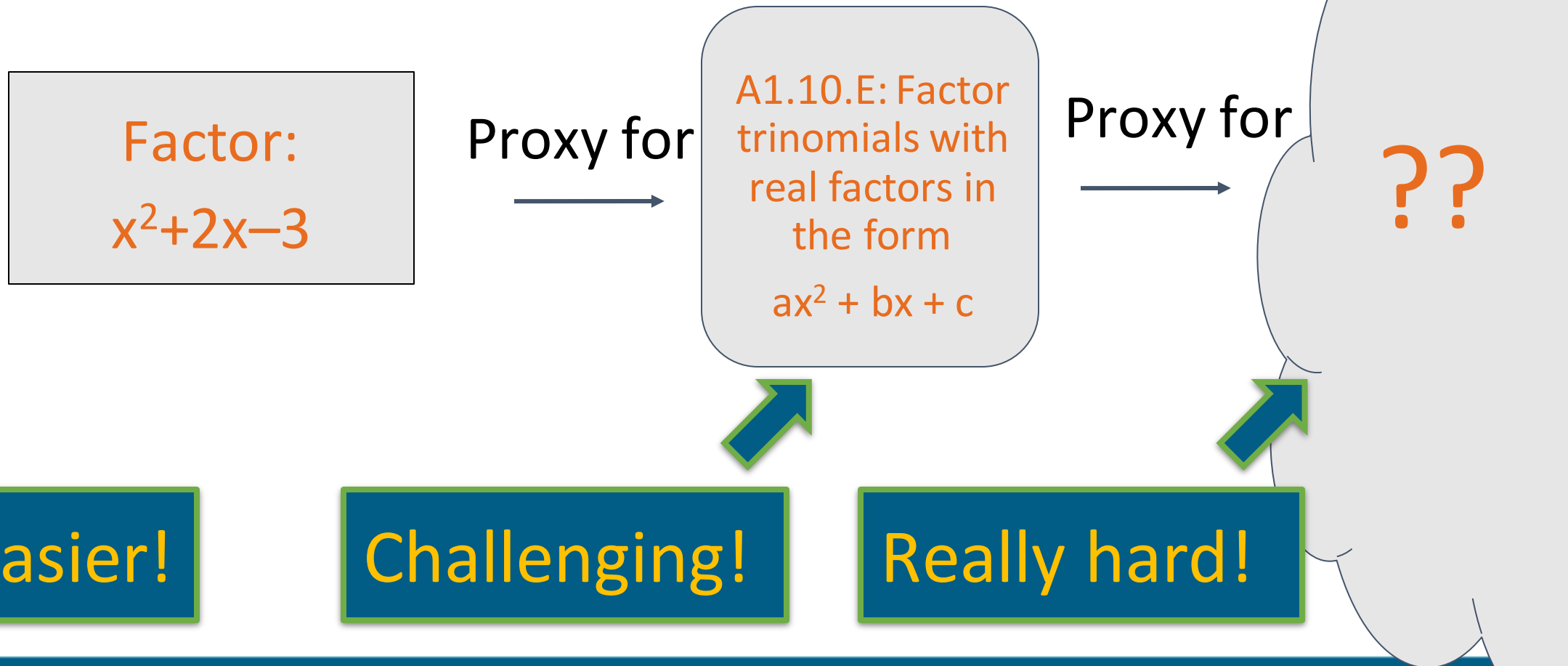
The whole point of education is to change your mind:  
to make your mind better than it used to be.

– Matt Boelkins

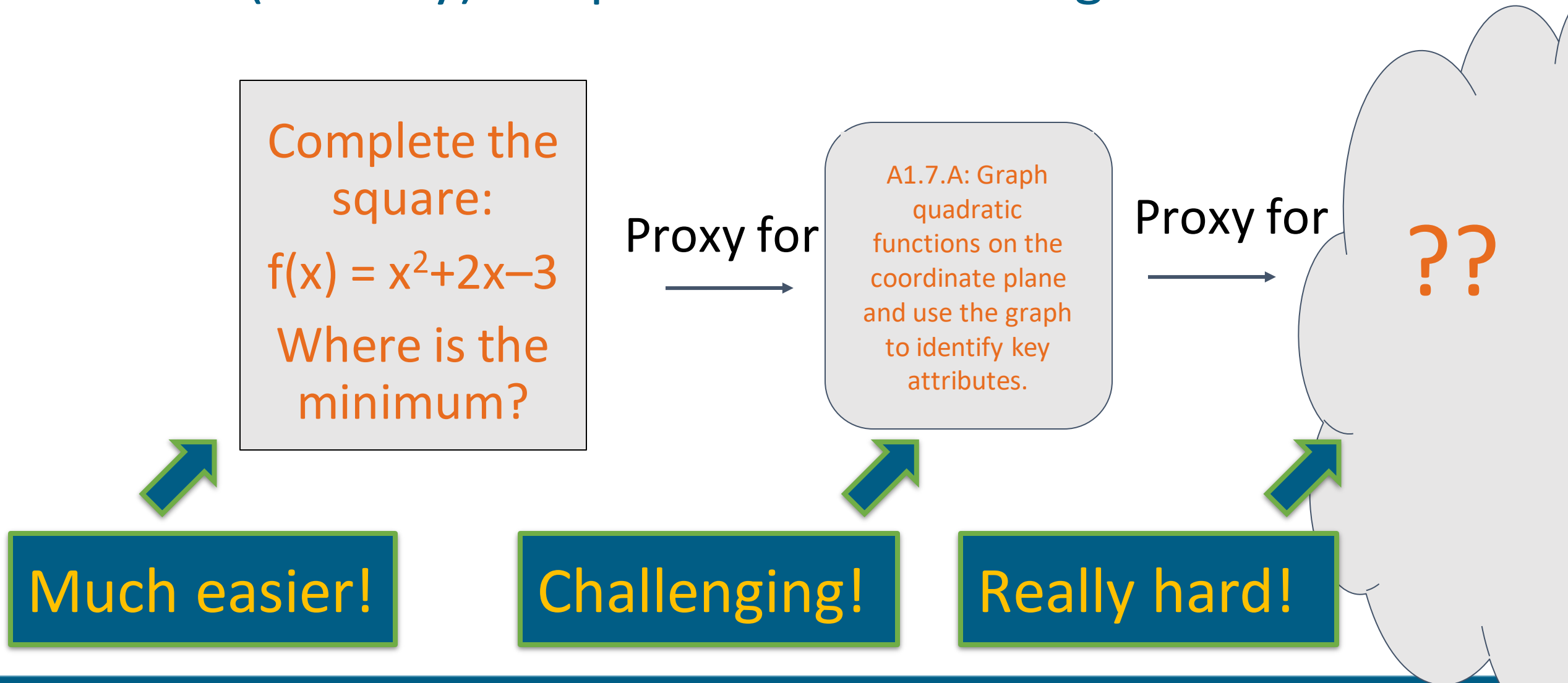
# What's (actually) the point of . . . teaching math?



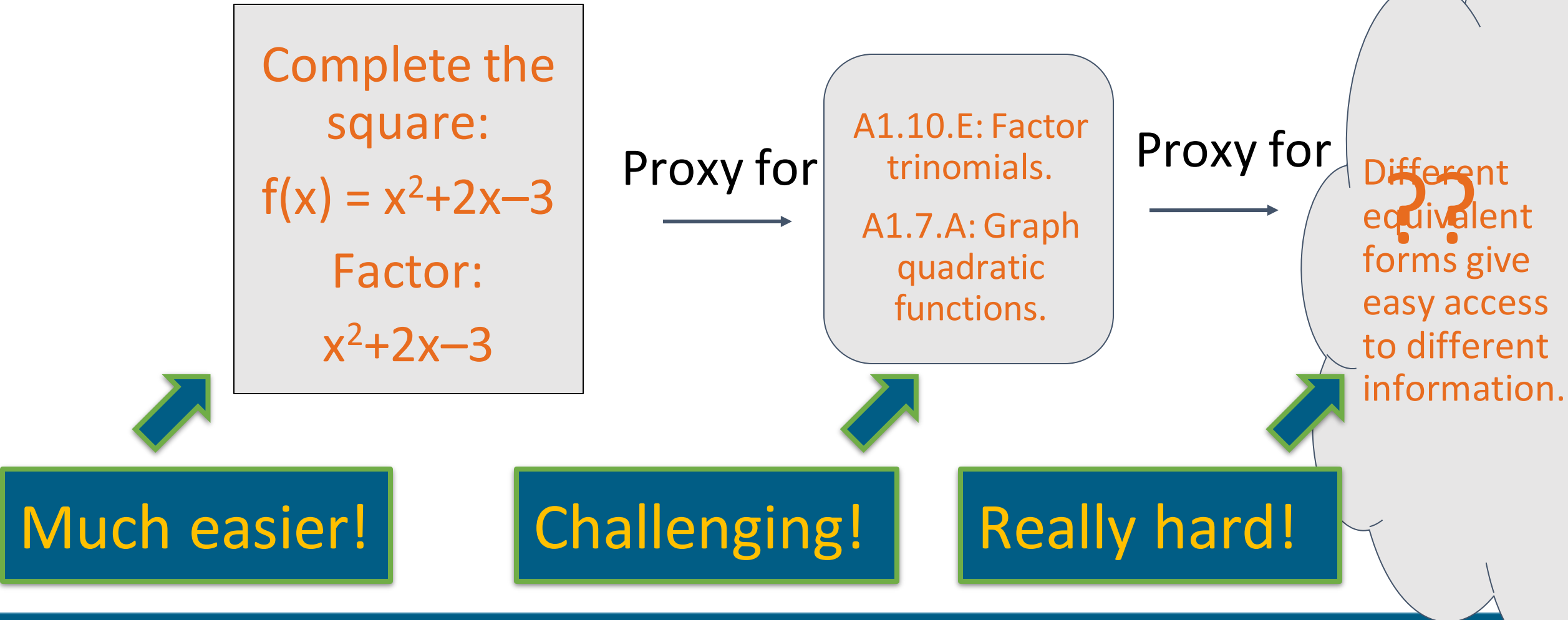
# What's (actually) the point of . . . teaching math?



# What's (actually) the point of . . . teaching math?



# What's (actually) the point of . . . teaching math?



# What's (actually) the point of . . . teaching math?

$$\int_0^3 x^2 dx = ?$$
$$\frac{d}{dx} \int_0^x e^{t^2} dt = ?$$

Proxy for

Understand  
the  
Fundamental  
Theorem of  
Calculus.

Proxy for

Why change  
(derivatives)  
and  
accumulation  
(integrals)  
are inverse  
processes

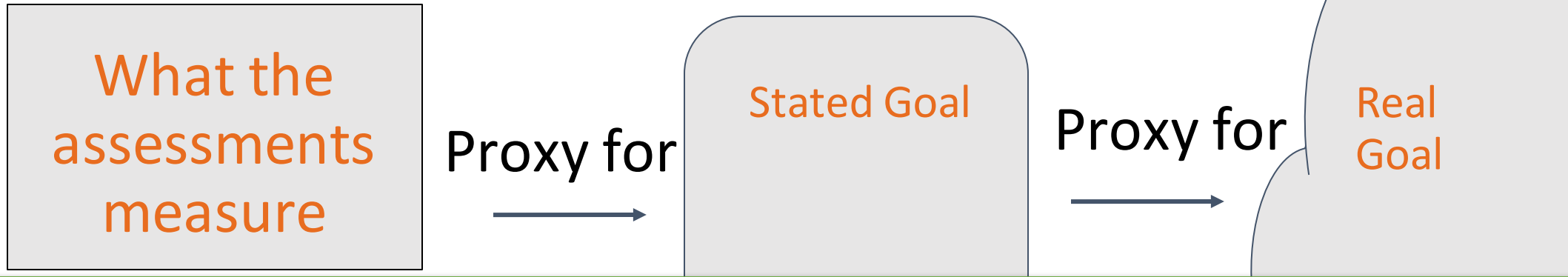
Much easier!

Challenging!

Really hard!



Activity: Fill in each of the gray areas.



Discussion: Pick a key topic in a course you teach/oversee.  
How does it show up on an assessment?  
What's the official goal (SLO / TEKS)?  
What's the real goal – the desired brain structures?

# What's (actually) the point of . . . teaching math?

Homework  
Quizzes  
Tests  
Benchmarks  
Projects  
Papers

Proxy for



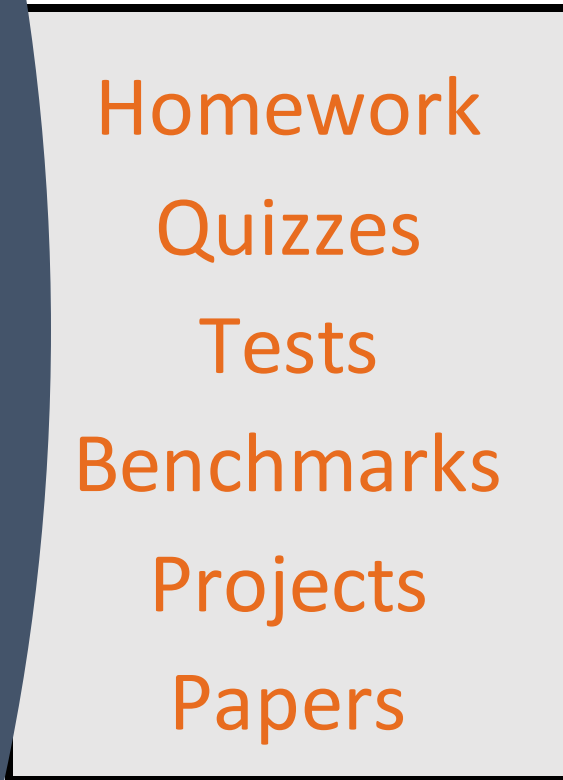
Student  
Learning  
Outcomes

Proxy for



Real Goal:  
New Brain  
Structures

# What's (actually) the point of . . . teaching math?



Proxy for  
→



Proxy for  
→



Wolfram Alpha

# What's (actually) the point of . . . teaching math?

work  
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ects  
ers

Proxy for



Student  
Learning  
Outcomes

Proxy for



Real Goal:  
New Brain  
Structures

What's (actually) the point of . . . teaching math?

ChatGPT / AI

Proxy for



Student  
Learning  
Outcomes

Proxy for



Real Goal:  
New Brain  
Structures

# What's (actually) the point of . . . teaching math?

Homework  
Quizzes  
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Proxy for



Student  
Learning  
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Proxy for



Real Goal:  
New Brain  
Structures



Explicitly focus here!

# What's (actually) the point of . . . teaching math?

Homework  
Quizzes  
Tests  
Benchmarks  
Projects  
Papers

Proxy for  
→

Understand  
the  
Fundamental  
Theorem of  
Calculus.

Proxy for  
→

Why change  
(derivatives)  
and  
accumulation  
(integrals)  
are inverse  
processes

# What's (actually) the point of . . . teaching math?

$$\int_0^3 x^2 dx = ?$$
$$\frac{d}{dx} \int_0^x e^{t^2} dt = ?$$

Proxy for



Understand  
the  
Fundamental  
Theorem of  
Calculus.

Proxy for



Why change  
(derivatives)  
and  
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processes

A story about Dave's Calc teaching...

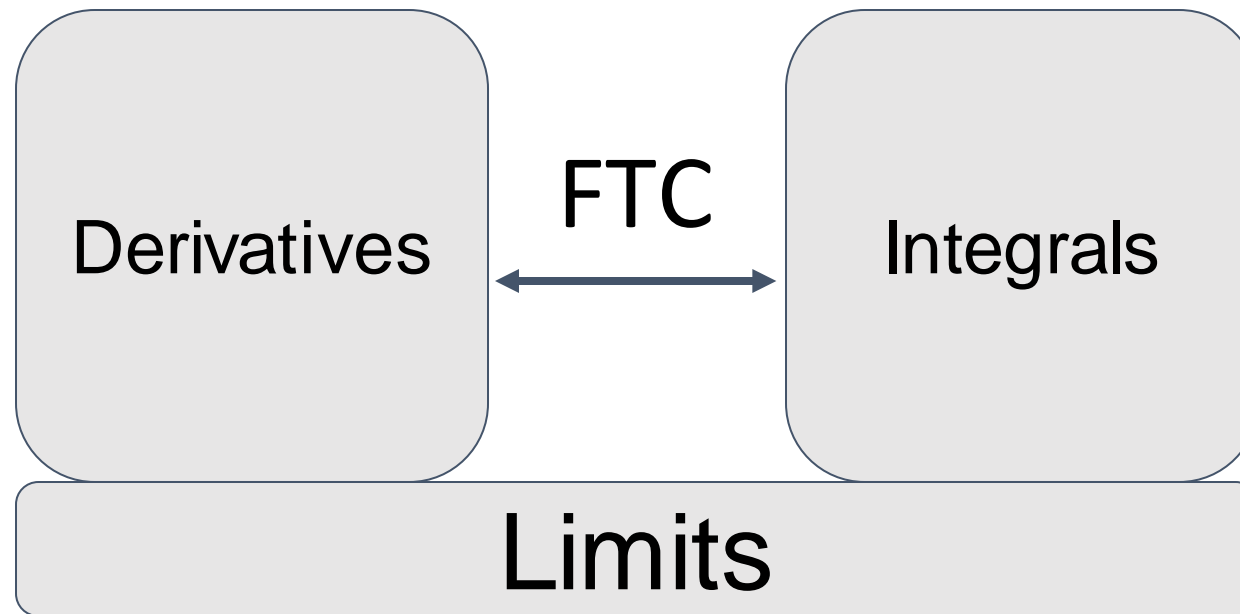


# What's (actually) the point of . . . teaching math?

## How are the following concepts related?

- Limit
- Derivative
- Integral
- Fundamental Theorem of Calculus (FTC)

# What's (actually) the point of . . . teaching math?

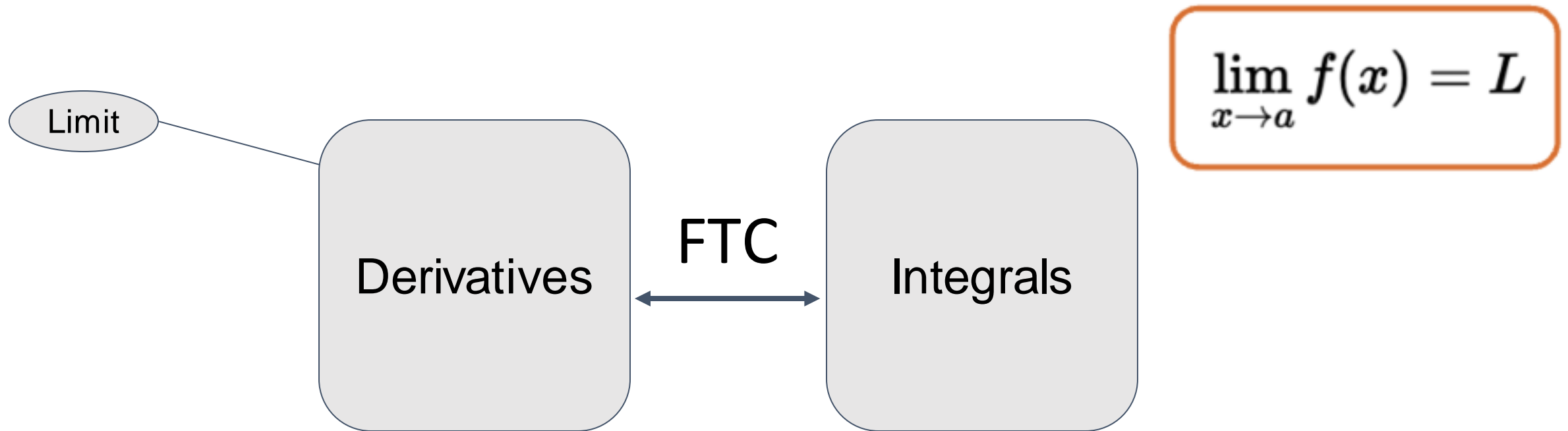


# What's (actually) the point of . . . teaching math?

## How do successful students think the following concepts are related?

- Limit
- Derivative
- Integral
- Fundamental Theorem of Calculus

# What's (actually) the point of ... teaching math?



Why was this their picture?

# What's (actually) the point of . . . teaching math?

- Homework
- Quizzes
- Tests
- Benchmarks
- Projects
- Papers

**Definition of Limit:**  
“A limit is the end result of an infinite process.”

Why for

Why change (derivatives) and accumulation (integrals) are inverse processes

# What's (actually) the point of . . . teaching math?

Let go of topics that don't help reach the real goal:

- Long division
- Rationalizing denominators
- Synthetic division
- Techniques of integration
- Computation w/o thinking

Discussion: In the same fall course . . .  
What topics could/should you let go of (if you can)?

# What's (actually) the point of . . . teaching math?

Homework  
Quizzes  
Tests  
Benchmarks  
Projects  
Papers



## Teaching methods:

- Lecture
  - Practice
  - I do, we do, you do.
- Implicit goal: Mimicry  
(replaceable w/ tech.)

Real Goal:  
New Brain  
Structures

# What's (actually) the point of ... teaching math?

What teaching practices lead to the real goal?

- Engage
  - Attend
  - Get students talking, explaining.
  - Attend to identity.
- Common threads:
1. Focus on students (not math).
  2. Center student thinking.

Real Goal:  
New Brain  
Structures



# What's (actually) the point of . . . a career teaching math?

## Challenge:

What are you going to do to:

1. Shift focus from math to students?
2. Center student thinking?

# Thanks!

[david.kung@austin.utexas.edu](mailto:david.kung@austin.utexas.edu)  
@dtkung (on Blue Sky)

# Celebrations and goals

*Jennifer Saenz*

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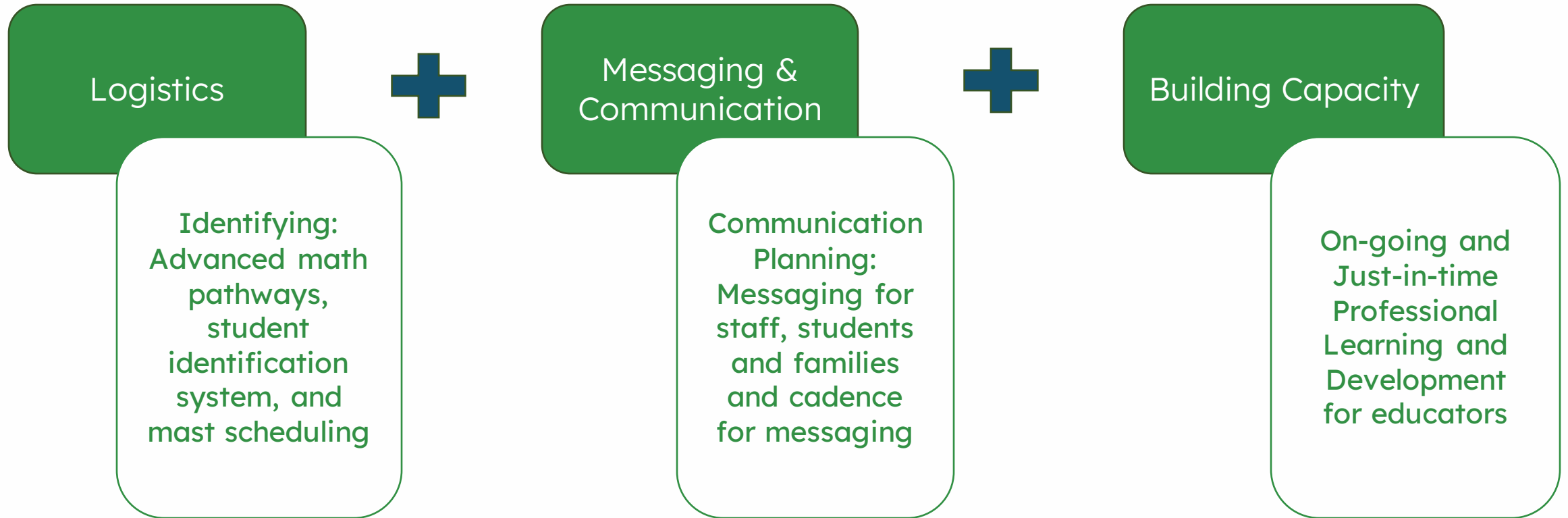
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# Advanced Math Opt-Out Policy: SB 2124

- Automatically enrolls students with demonstrated proficiency into 6th grade accelerated math courses
- Parent or student can choose to opt-out
- Increase access to Algebra 1 in 8th grade
- Increase the likelihood of postsecondary success, credential attainment, and higher earning

Approximately **60,000** students in 2023 would now be placed on an advanced math pathway due to the passing of SB 2124.

# Successful SB2124 Implementation



# Transforming Systems

Year 1	Year 2	Year 3
<ul style="list-style-type: none"><li>• 6th grade high performing students placed in accelerated math</li><li>• Capacity building</li></ul>	<ul style="list-style-type: none"><li>• 8th grade Algebra I credentialed teachers</li><li>• Resources and support for student success</li><li>• Advanced math driven culture</li></ul>	<ul style="list-style-type: none"><li>• Completion of 4 years of math in high school</li><li>• Successfully complete college aligned math course (Dual Credit, OnRamps)</li><li>• Credentialed faculty</li></ul>

“Since [creating an opt-out policy for advanced math], our enrollment in middle school advanced mathematics courses and 8th-grade Algebra grew by 29%, allowing over 200 additional students to thrive with a more appropriate, rigorous, and challenging curriculum.”

**Derek McDaniel**  
Hays CISD



# Who is involved?

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- Austin Community College
- Concordia University
- Huston-Tillotson University
- Southwestern University
- St. Edward's University
- Temple College
- Texas State University
- The University of Texas at Austin
- Austin ISD
- Bastrop ISD
- Del Valle ISD
- Eanes ISD
- Elgin ISD
- Hays CISD
- Hutto ISD
- Lake Travis ISD
- Leander ISD
- Lockhart ISD
- Manor ISD
- Pflugerville ISD
- Round Rock ISD
- San Marcos CISD
- Taylor ISD
- Charles A. Dana Center at The University of Texas at Austin
- E3 Alliance
- Michael & Susan Dell Foundation

# CTXMAT Regional Goals: PK-12

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Students take a math course their senior year of high school that best prepares them for a successful transition to higher education/career.

- Increase equitable representation of students completing Algebra 1 in 8th grade
- Increase students taking math all 4 years of high school
- Increase 12th graders completing college-aligned math
- Decrease 12th graders in below grade-level courses
- Course taking reflects range of aligned mathematics pathways
- Equitable enrollment and success by race/ethnicity, gender, and income

# CTXMAT Regional Goals: Higher Education

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Higher education institutions ensure students take math courses best aligned to success in their degree/career expectations.

- Increase students completing a gateway mathematics course in the 1st year
- Course taking in gateway mathematics reflects the range of mathematics pathways aligned to programs of study
- Increase equitable enrollment and success by race/ethnicity, gender, and income

# Breakout Sessions

- *House Bill 8, Related Policy, Resources, and Implementation Updates--Room 8105*
- *Creating Math Pathways for Equity--Room 8106*
- *Action Research: Transforming Educator Practice and Student Success --Room 8110*



# Data Dive: Aligning Successful Math Transitions

- *Dr. Andrea Jacks*
- *Lauren Thomas*

# Data.E3Alliance.org

Let's dive into data together!

1. Navigate to [data.e3alliance.org](https://data.e3alliance.org)
2. Scroll down to click on Math Summit Banner
3. On the Math Summit page:
  - Use the left hand navigation to select your district
  - Or explore Central Texas data



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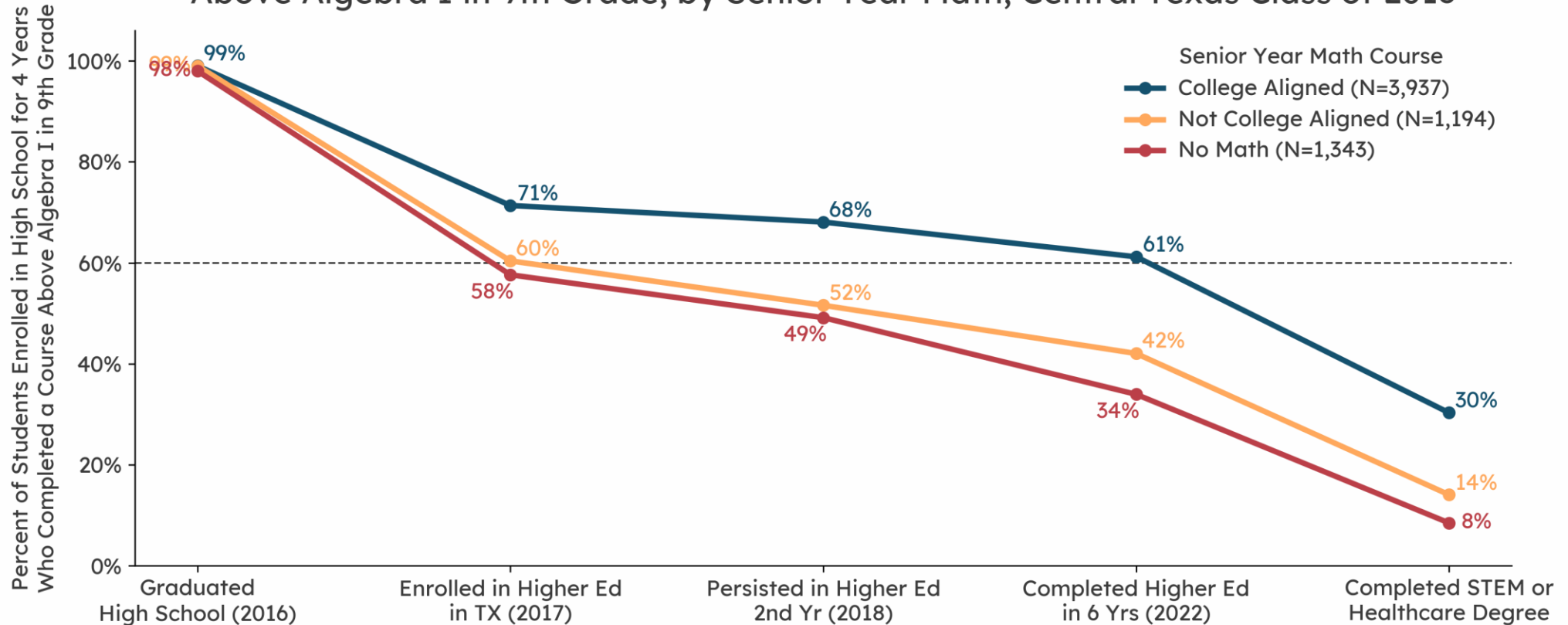
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# Extending the Math Pathway: Middle School to Senior Year and Beyond

# Middle School and Senior Year Math Impact Postsecondary Outcomes

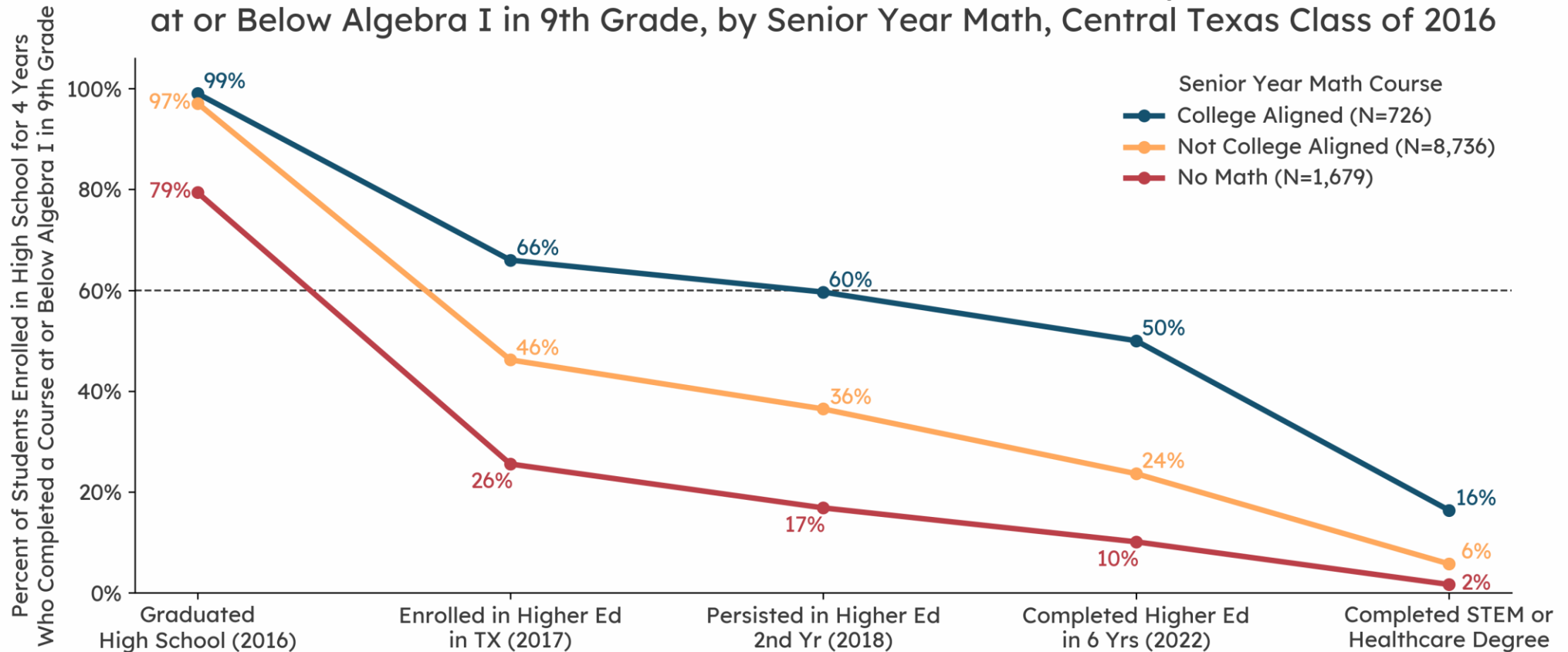
Outcomes of Students Enrolled in HS for 4 Years Who Completed a Course Above Algebra I in 9th Grade, by Senior Year Math, Central Texas Class of 2016





# Senior Year College-Aligned Math Improves Outcomes

Outcomes of Students Enrolled in HS for 4 Years Who Completed a Course at or Below Algebra I in 9th Grade, by Senior Year Math, Central Texas Class of 2016



# Turn & Talk

- Pull up your data- "9th grade"...
- Chat with a partner at your table.

- What do you see in the data that relates to your district or institution?
- What is exciting or makes you curious about what you see in the data?

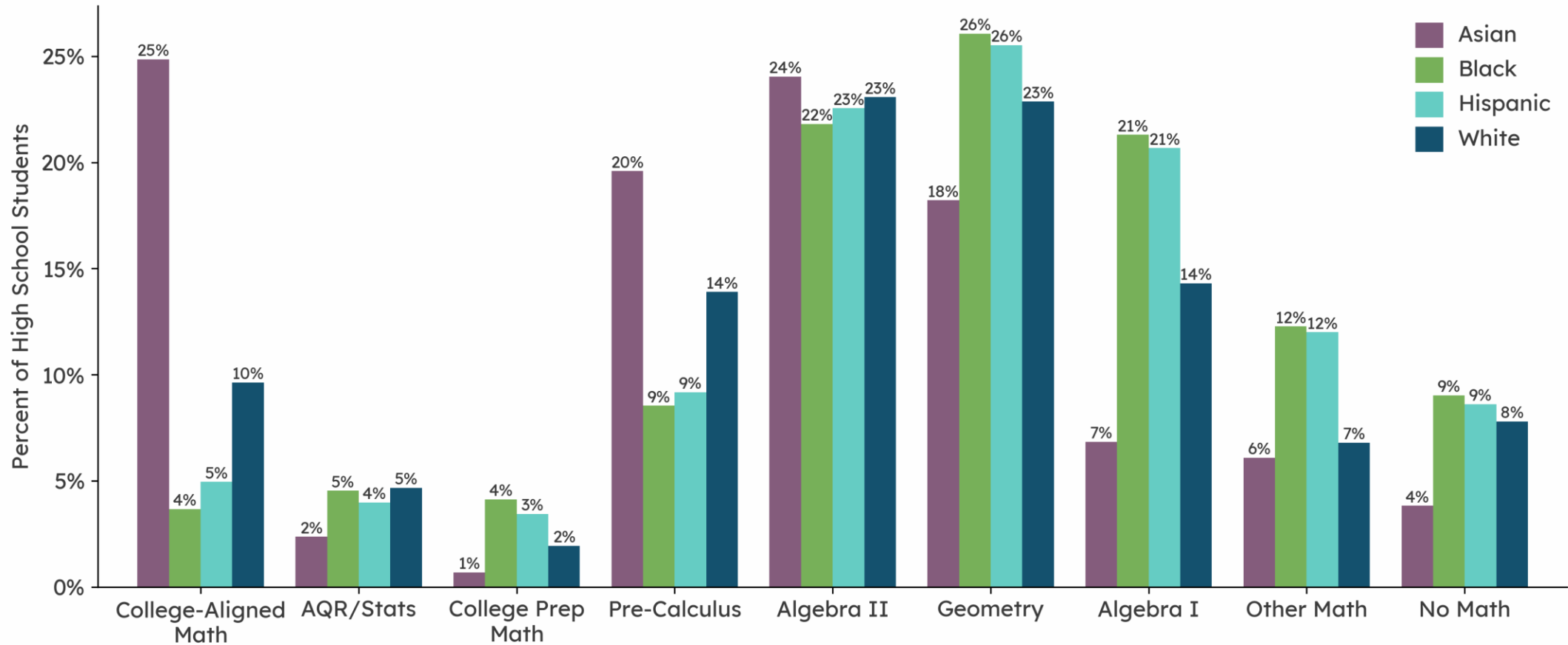
# Annual Snapshot: Math Enrollment

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# Math Course Enrollment Varies by Race

High School Math Course Enrollment by Race/Ethnicity, Central Texas, 2021-2022



# Table Talk

Pull up your data- "Math Course Enrollment"

- Chat with others at your table.

- What does the representation of the demographics in your college-aligned math course taking tell you?
- What about other courses?

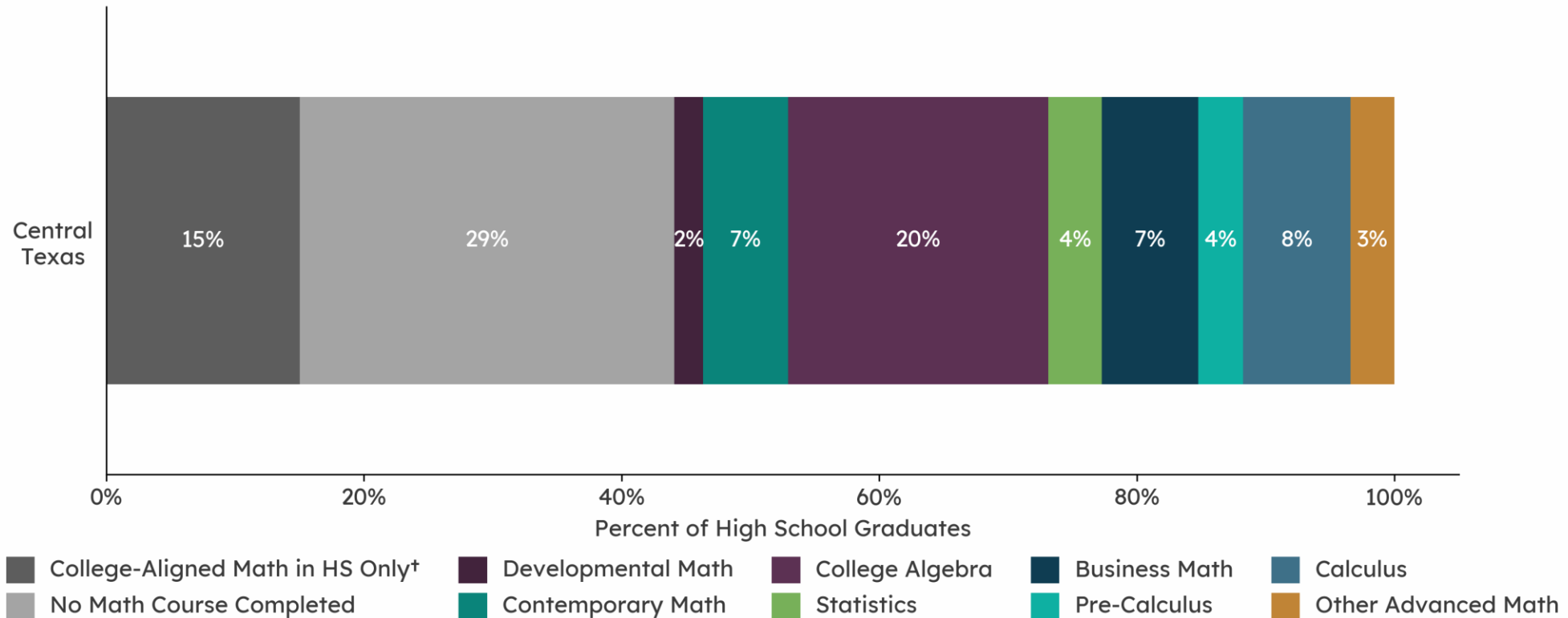
# The Next Step in Math Alignment

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# 44% of Shared CTX Students Don't Complete Math in their First Year of Postsecondary

First-Year Postsecondary Math Course Completion, 2020 Central Texas High School Graduates Enrolling in Central Texas IHEs



<sup>†</sup>A college-aligned math course includes any AP, IB, or Dual Credit math course

Source: E3 Alliance analysis of TEA and THECB data at the UT Austin Education Research Center

**How might we partner as a region  
to better support our shared  
students in math transitions?**



# Panel- Secondary to post-secondary transitions for student success

- *Kambra Bolch, Texas State University*
- *Carolynn Reed, Austin Community College*
- *Alicia Westcot, Leander ISD*

*Moderated by Kyle Seipp, E3 Alliance*

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# Survey



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# Post-conference Sessions

- *Data Dive: Deeper Look into Successful Math Transitions--Room 8105*
- *Math Peer Learning Network (PLN) Districts Only -- Room 8110*

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Thank you.



**E3 Alliance**<sup>SM</sup>

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