

Bridging the Gap Between  
High School and College Mathematics  
in  
Maryland

**Maryland Mathematics Alignment Project  
(MMAP)**



STATS 2020: Revisioning Introductory Statistics for a New Generation

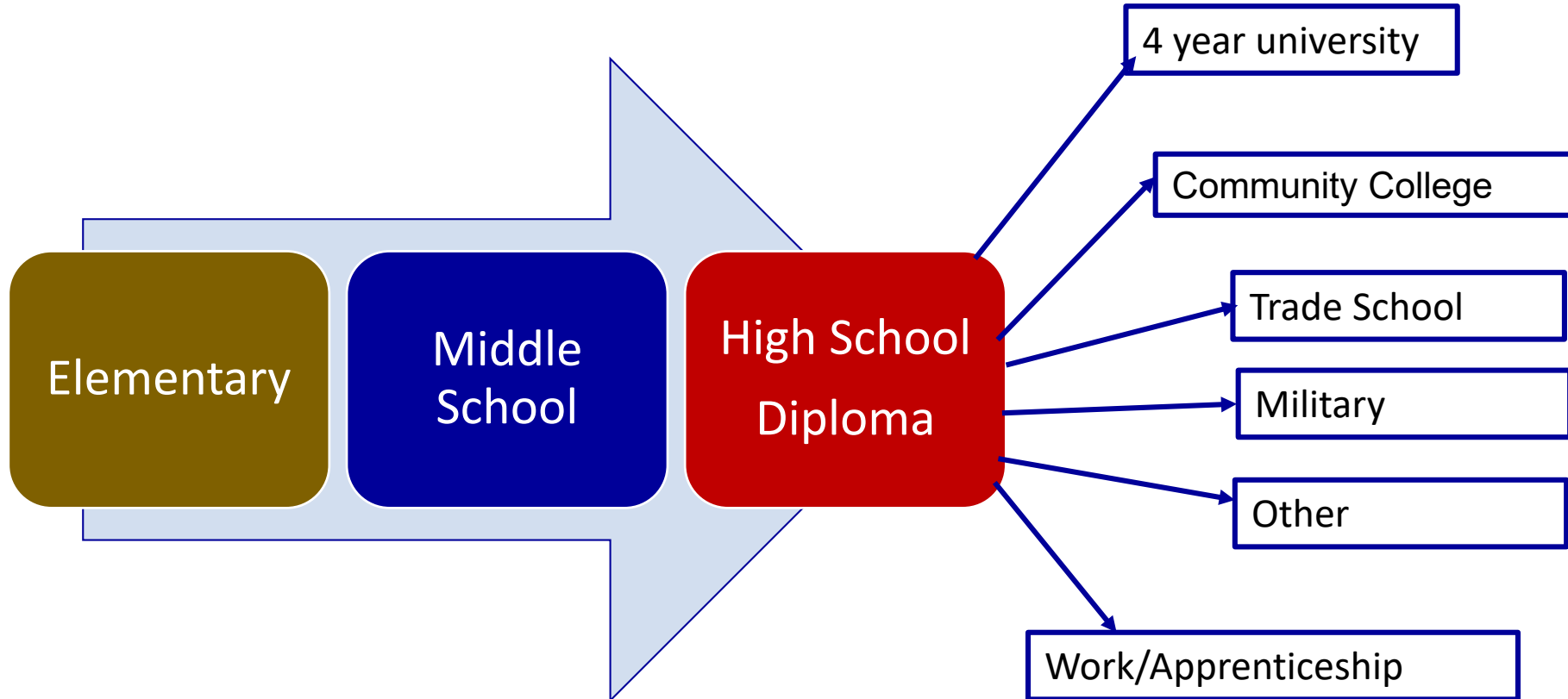
November 22, 2019

# Outcomes

Participants will:

- understand the Regulations and Statutes that impact Maryland mathematics program.
- become familiar with the goals of the Maryland Mathematics Alignment Project.

# K-12 Student Pathways



13A.03.02.09

### **.09 Diplomas and Certificates.**

B. To be awarded a Maryland high school diploma, a student shall:

- (1) Complete the **enrollment, credit, and service requirements** as specified in this chapter;
- (2) Complete **local school system requirements**; and
- (3) Meet the graduation **assessment requirements**

# Enrollment Requirements

## COMAR 13A.03.02.03

A. Beginning with students entering the 9th grade class of 2014—2015 school year, each student shall enroll in a mathematics course in each year of high school that the student attends, up to a maximum of 4 years of attendance, unless in the 5th or 6th year a mathematics course is needed to meet a graduation requirement.

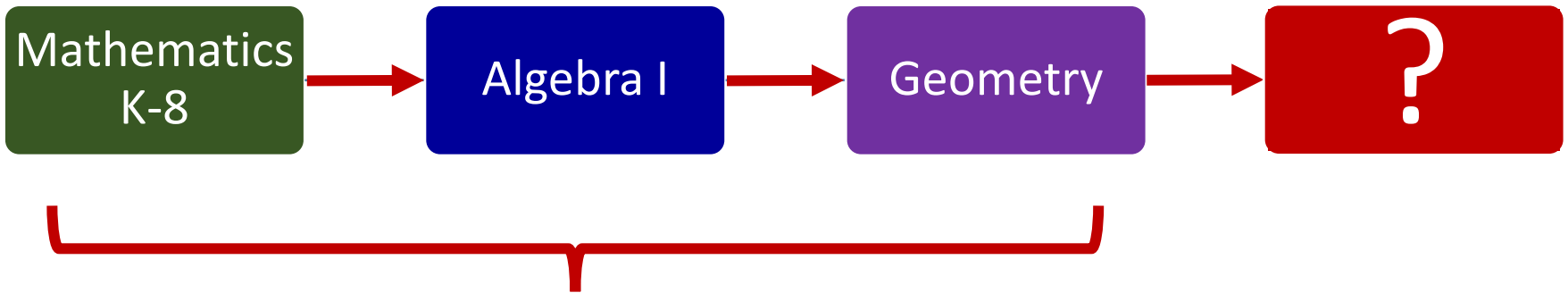
# Credit Requirements

## COMAR 13A.03.02.03

B. To be awarded a diploma, a student shall be enrolled in a Maryland public school system and shall have earned a minimum of 21 credits that include the following specified credits:

(3) **Mathematics** — three credits, including one with instruction in algebra aligned with the Maryland High School Assessment for algebra or one or more credits in subsequent mathematics courses for which Algebra I is a prerequisite, and one with instruction in geometry aligned with the content standards for geometry;

# Current Mathematics Pathways



All Maryland Students

# High School Task Force Recommendation

Increase the number of  
mathematics credits required to  
earn a Maryland diploma to 4  
credits





# Maryland Statute related to Mathematics Education

*Section 7-205.1. High school curriculum and graduation requirements.*

**d) Mathematics goals.** -- It is the goal of the State that all students achieve mathematics competency in Algebra II.



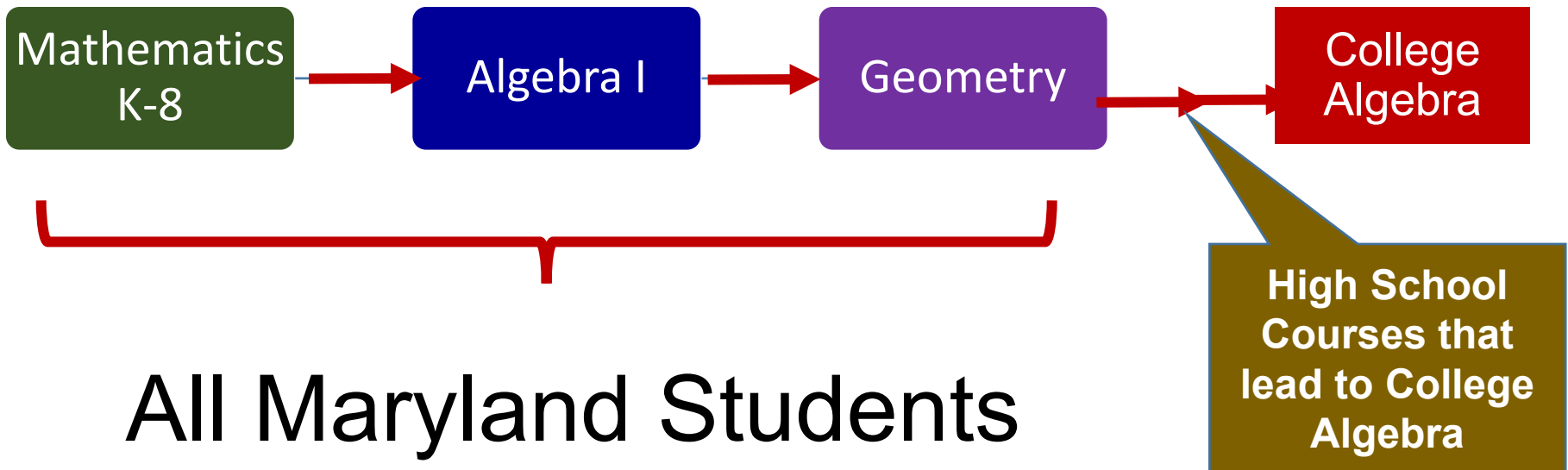
For the world we are preparing students to enter what should the high school mathematics program include?

## The time is right to change the course of mathematics instruction.

How can we make high school math relevant to all students—especially those who have been historically underserved—given the dynamic nature of industry demands and post-secondary reforms? Currently, upper high school math is a burial ground for thousands of our students’ aspirations. Too often the math is not aligned to or applicable for the needs of post-secondary programs of study or the workforce. What can we do to help our students? **We must change the equation and modernize high school math.**

*Doug Sovde  
Dana Center*

# Previous Mathematics Pathways



# COMAR 13B.06.01.03.C(4)



Turning  
Point

## ORIGINAL COMAR LANGUAGE (13B.06.01.03)

General education programs of public institutions shall require - *(4) One course in mathematics at or above the level of college algebra*

## New COMAR LANGUAGE (13B.06.01.03) **April 2015**

General education programs of public institutions in Maryland shall require at least:

*(5) One course in mathematics, having performance expectations demonstrating a level of mathematical maturity beyond the MCCRSM (including problem-solving skills, and mathematical concepts and techniques that can be applied in the student's program of study).*



# Background

The University System of Maryland

## **First in the World Maryland Mathematics Reform Initiative**

(FITW MMRI)

The initiative resulted in the development and implementation of multiple high-quality mathematics pathways for students that are relevant for their chosen career path.

## **Pathways**

- Traditional mathematics pathway leading to calculus
- Statistics
- Quantitative Literacy

# Background

## Forum

*Conference Board of Mathematical Sciences (CBMS)*

## *High School to College Mathematics Pathways: Preparing Students for the Future*

## Issues Addressed

- Changing role of mathematics in the economy.
- Broader understanding of how mathematics will be used in the future.
- Evaluating current mathematical pathways into and through college-level mathematics.

# MMAP Task Force Membership

## Leadership Team

- Deputy Superintendent – MSDE
- Vice Chancellor- University System of Maryland
- Coordinator of Mathematics- MSDE
- 2-year and 4-year Mathematics Educators
- LSS Mathematics Educators

## Task Force Membership

- IHE Admissions and Advising
- IHE Leadership
- LSS Superintendent
- Maryland Business Roundtable
- Governor's Office
- Maryland State BOE
- Counselor
- Teacher
- Parent
- Student
- Baltimore City





# Maryland Mathematics Alignment Project (MMAP) Overview

## Problem Statement

Too many students who go to Maryland's institutions of higher education upon graduating from Maryland's public schools are not prepared to take credit-bearing college-level mathematics courses.

## Goal

To increase the number of students who place directly into and successfully complete a college-level, credit bearing mathematics course upon enrolling in a Maryland Institution of Higher Education within two years of their graduation from a Maryland public school.

# MMAP Overview

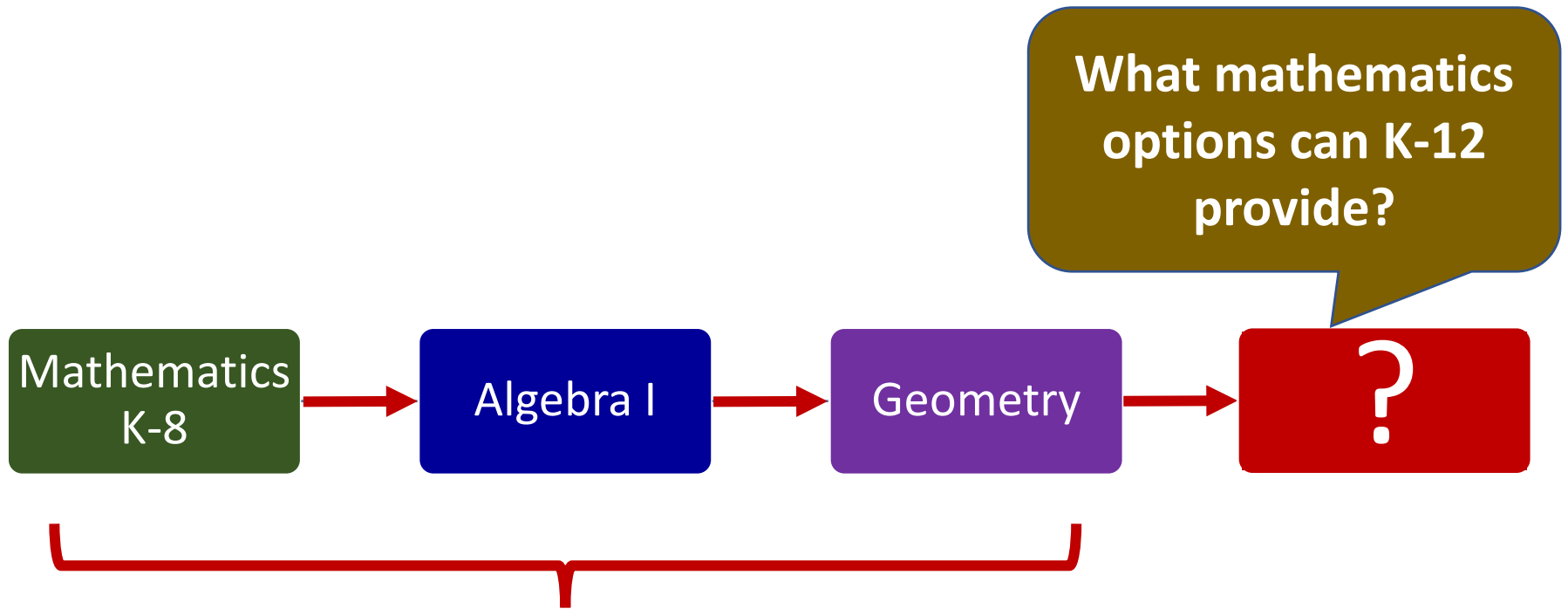
## Area of Work

Develop additional mathematics pathway options for high school students who have met their Maryland mathematics graduation requirements by aligning post-secondary and K-12 content expectations and practices.

## Issues that need to be addressed

- Curriculum Standards
- Messaging/Advising/Counseling
- Instructional Practices
- Policies/Procedures
- Placement Practices
- Methods for Dealing with Anticipated Risks

# Current Mathematics Pathways



All Maryland Students

# Sample Mathematics Pathways

## Overview

Grade 9	Grade 10	Grade 11	Grade 12	Post-secondary General Education Mathematics Course
Algebra I	Geometry	Algebra II	Precalculus	Calculus
			HS Statistics	College Statistics
		Bridge to Algebra II	Algebra II	College Algebra
				Precalculus
				College Statistics
			HS Statistics	Quantitative Literacy
				College Statistics
			Quantitative Literacy	
		Applied Mathematics	Mathematical Modeling	Quantitative Literacy

# Examples of Possible Mathematics Course Taking Sequences

## Pathway leading to Calculus

Grade	Option 1	Option 2	Option 3	Option 4
5	Math 5	Math 5	Math 5	Math 5/6
6	Math 6	Math 6	Math 6/7	Math 7/8
7	Math 7	Math 7	Math 7/8	Algebra I
8	Math 8	Math 8	Algebra I	Geometry
9	Algebra I	Algebra I	Geometry	Algebra II
10	Geometry	Geometry	Algebra II	Precalculus
11	Bridge to Algebra	Algebra II	Precalculus	<b>Calculus I</b>
12	Algebra II	Precalculus	<b>Calculus I</b>	Statistics and or Calculus II
Post- secondary Year 1	College Algebra	<b>Calculus I</b>	Calculus II	Calculus III

# Sample Mathematics Pathways

## Pathway leading to Statistics

Grade	Option 1	Option 2	Option 3
6	Math 6	Math 6	Math 6/7
7	Math 7	Math 7	Math 7/8
8	Math 8	Math 8	Algebra I
9	Algebra I	Algebra I	Geometry
10	Geometry	Geometry	Algebra II
11	Bridge to Algebra II	Algebra II	Precalculus
12	HS Statistics		
Post-secondary General Education Mathematics Course	<b>College Statistics</b>		

# Sample Mathematics Pathways

## Pathway leading to Quantitative Literacy

Grade	Option 1	Option 2	Option 3
6	Math 6	Math 6	Math 6/7
7	Math 7	Math 7	Math 7/8
8	Math 8	Math 8	Algebra I
9	Algebra I	Algebra I	Geometry
10	Geometry	Geometry	Algebra II
11	Bridge to Algebra II	Algebra II	Precalculus
12	New course that serves as a pre-requisite to college level Quantitative Literacy		
Post-secondary General Education Mathematics Course	<b>Quantitative Literacy</b>		

## Opportunities

- Reduce number of students needing developmental mathematics coursework.
- Increase in degree completion.
- Provide students with coursework more relevant to intended major.

## Risks

- Tracking
- Equity Issues
- Challenges associated with changing majors



# Next Steps

- Invite a variety of stakeholders to serve on the MMAP Task Force to:
  - Inform
  - Advocate
  - Help with messaging

# Next Steps

- Develop a curriculum framework for a high school Statistics course that serves as a prerequisite to a college level Statistics course.
- Explore options for a third pathway course.

# Next Steps

- Examine placement practices
- Have discussions about the USM admission policy.

# Questions

Debby Ward

*Coordinator of Mathematics*

*Maryland State Department of Education*

[Debra.ward@Maryland.gov](mailto:Debra.ward@Maryland.gov)