



Upper School Math Program

Roundtable | School Committee
14 November 2017



Tonight's Purpose

Initiate discussions with the members of the School Committee about how we might enhance our Upper School math program to:

- provide equity and access to increase opportunity and achievement for all students and
- better align our math program with Massachusetts's newly revised standards and expectations.



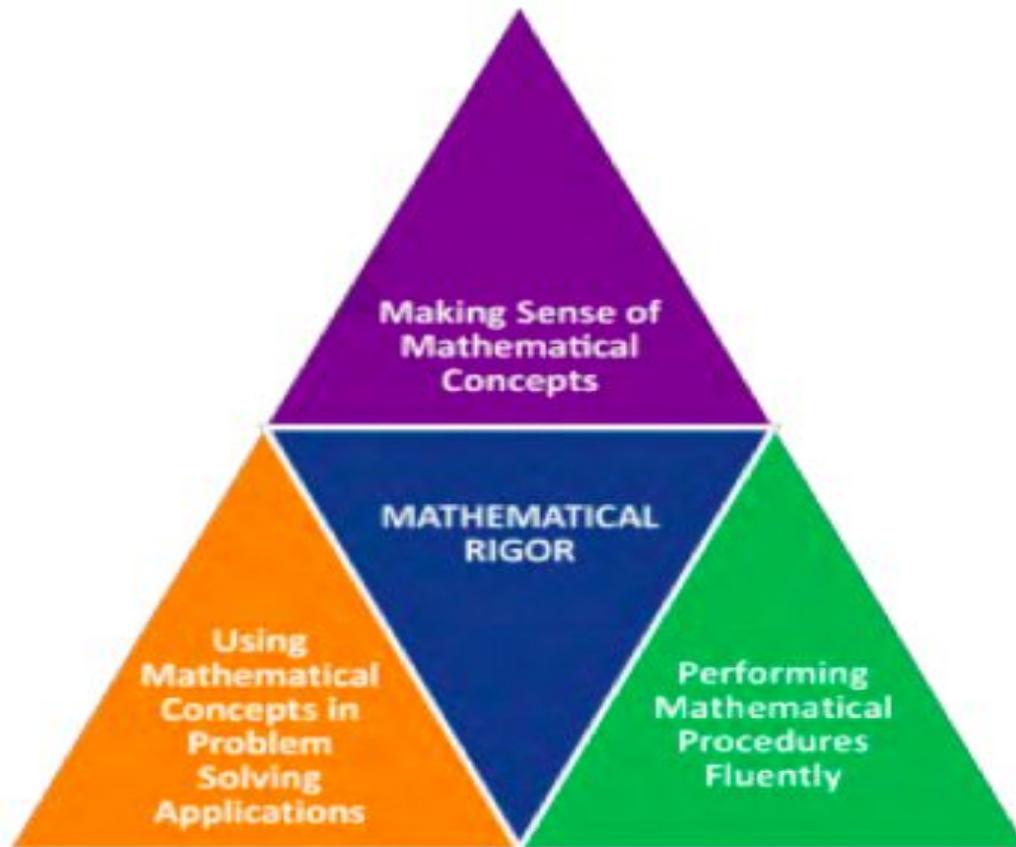
Desired Outcomes

- Shared understanding of our commitment to **equity and access**
- Shared understanding of which math standards and courses serve as the **gateway to college and career readiness** and how these have changed over time
- Shared understanding of the **challenges and inequities** in our current program

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**Gateway to
College &
Career
Readiness**

Key MA DESE Framework-Math Shifts in 2011, 2017



Making Sense of
Mathematical Concepts

Performing
Mathematical
Procedures Fluently

Using Mathematical
Concepts in Problem
Solving Applications

Shifts 2011, 2017

State Standards for Mathematics set rigorous standards for grades 6, 7, & 8.

- Topics previously taught in Algebra I now begin in gr 8
- 50% of the traditional Algebra I course (*linear functions and equations, systems of linear equations*) is now included in 8th grade content standards, along with serious work in statistics and geometry.
- The other half of the Algebra I topics (e.g., *polynomials, quadratic equation*) are in the high school content standards.

Shifts 2011, 2017 - Example

Year	Grade/Standard	Algebra Expectations
2000	<i>Grade 10/Algebra Course 10.P.8 A.I.P.12</i>	Solve everyday problems that can be modeled using <u>systems of linear equations</u> and inequalities.
2011	<i>Grade 8 (8.EE.8) 8.EE.8a 8.EE.8b 8.EE.8c</i>	Analyze and solve <u>pairs of simultaneous linear equations</u> .
2017	<i>Grade 8 (8.EE.8) 8.EE.8b (edited)</i>	Identifies “elimination and substitution” as strategies for <u>solving systems of equations in grade 8</u> .

Progression of Pre-K–8 Domains										
Domain	Grade Level									
	PK	K	1	2	3	4	5	6	7	8
Counting and Cardinality										
Operations and Algebraic Thinking										
Number and Operations in Base Ten										
Number and Operations – Fractions										
The Number System										
Ratios and Proportional Relationships										
Expressions and Equations										
Functions										
Measurement and Data										
Geometry										
Statistics and Probability										

Algebraic thinking since JK, big shift in 6–8

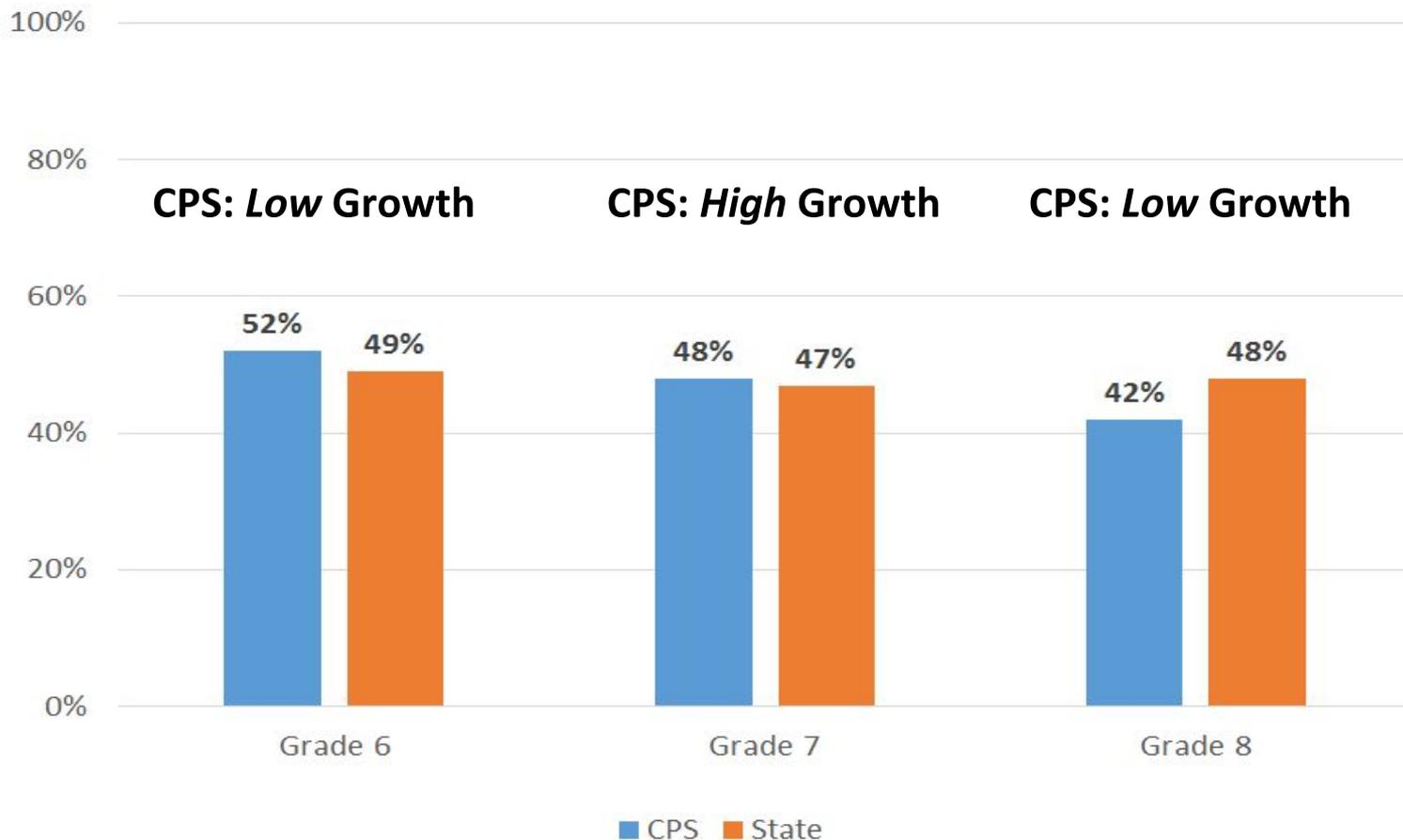
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Overview of Current Data



2017 Math MCAS Results

% of Students Meeting/Exceeding Expectations 2017 Math MCAS



Grade 6 Math MCAS Results by Subgroup

	% of Students Meeting/Exceeding Expectations: 2017 Grade 6 Math MCAS							
	CPS	State	Somerville	Boston	Framingham	Waltham	Newton	Brookline
All Students	52	50	46	30	36	42	72	74
Students w/ Disabilities (123)	16	14	14	5	10	5	26	27
ELL And Former ELL (15)	47	23	19	20	14	10	54	59
Economically Disadvantaged (150)	33	28	33	21	16	24	36	34
Non-Economically Disadvantaged (261)	63	61	58	47	51	51	76	80
African Amer./Black (109)								
	30	25	33	16	14	37	23	36
Asian (38)								
	79	76	77	75	59	58	86	86
Hispanic/Latino (60)								
	32	27	31	20	15	23	48	59
Multi-Race, Non-Hisp./Lat. (36)								
	62	51	0	46	44	0	75	85
White (165)								
	66	57	0	57	47	56	74	77

The numbers in parentheses are the number of tested students in each subgroup in CPS.

Grade 7 Math MCAS Results by Subgroup

	% of Students Meeting/Exceeding Expectations: 2017 Grade 7 Math MCAS							
	CPS	State	Somerville	Boston	Framingham	Waltham	Newton	Brookline
All Students	48	47	44	31	40	44	74	74
Students w/ Disabilities (103)	19	11	12	5	9	4	30	29
ELL And Former ELL (16)	19	19	8	18	9	6	59	50
Economically Disadvantaged (153)	25	24	27	21	19	27	43	49
Non-Economically Disadvantaged (240)	64	57	61	48	53	55	77	78
African Amer./Black (120)								
African Amer./Black (120)	23	23	7	18	17	41	47	30
Asian (43)	63	74	67	73	70	58	89	80
Hispanic/Latino (61)	29	24	30	19	20	34	37	53
Multi-Race, Non-Hisp./Lat. (33)	64	49	36	42	53	0	80	83
White (130)	73	54	69	64	51	52	76	79

The numbers in parentheses are the number of tested students in each subgroup in CPS.

Grade 8 Math MCAS Results by Subgroup

	% of Students Meeting/Exceeding Expectations: 2017 Grade 8 Math MCAS							
	CPS	State	Somerville	Boston	Framingham	Waltham	Newton	Brookline
All Students	43	48	46	30	36	44	72	78
Students w/ Disabilities (95)	15	12	7	6	3	19	31	25
ELL And Former ELL (14)	7	17	6	13	13	13	65	76
Economically Disadvantaged (125)	16	26	30	19	20	34	51	44
Non-Economically Disadvantaged (225)	58	58	59	45	45	49	74	84
African Amer./Black (109)	10	24	53	15	12	35	38	25
Asian (38)	60	74	40	68	67	53	85	88
Hispanic/Latino (49)	29	27	32	20	21	30	63	62
Multi-Race, Non-Hisp./Lat. (25)	52	49	0	39	41	43	67	84
White (124)	70	54	60	56	43	54	72	85

The numbers in parentheses are the number of tested students in each subgroup in CPS.

Summary of 2017 MCAS Results

Average performance of some subgroups is below the state and comparison district averages

- Students with Disabilities
- English Language Learners
- Economically Disadvantaged
- African American/Black

Differences get larger from grade 6 to grade 8

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Current Work

Professional Learning and Educator Support

- Unpacking standards & revising curriculum maps using Understanding by Design
- Math coaching focused on Number Talks
- Revising interim assessments to monitor progress during the year
- Building teacher capacity to use formative measures to improve instruction
- US math department meetings
- US + HS teacher collaboration & alignment

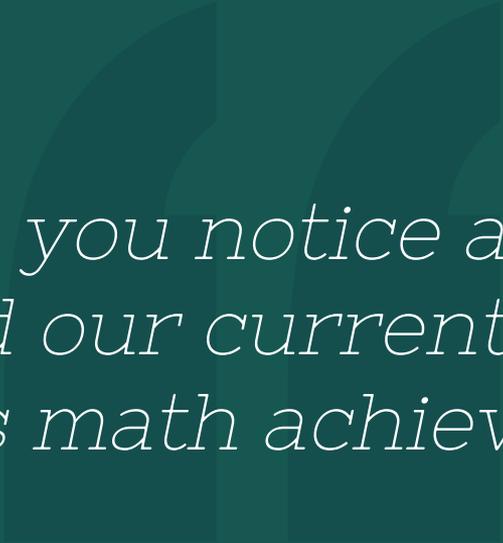
Student Support

- Growth mindset embedded into instruction
- Summer math programs designed to review and accelerate
- Expanded WIN (What Individuals Need) blocks
- Individual student support structures

Piloting New Models

7th grade AMP for All at CSUS

- Professional learning for educators
- Changing school culture re: math practice
- Use of special educators and math interventionists
- Student support through math intervention
- Student enrichment through math team
- Focus on growth mindset
- Family math nights



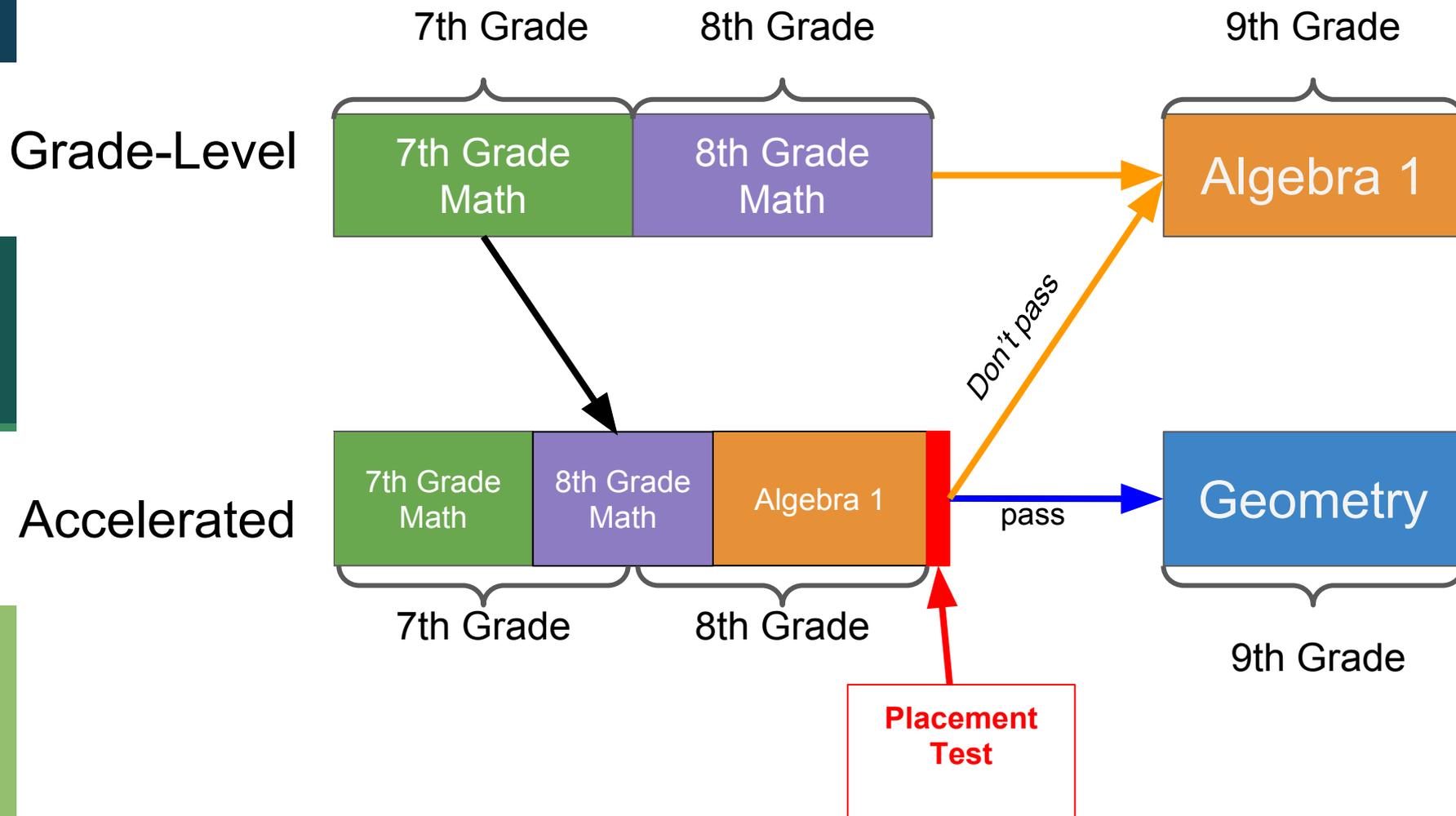
What do you notice about the data and our current work to address math achievement?

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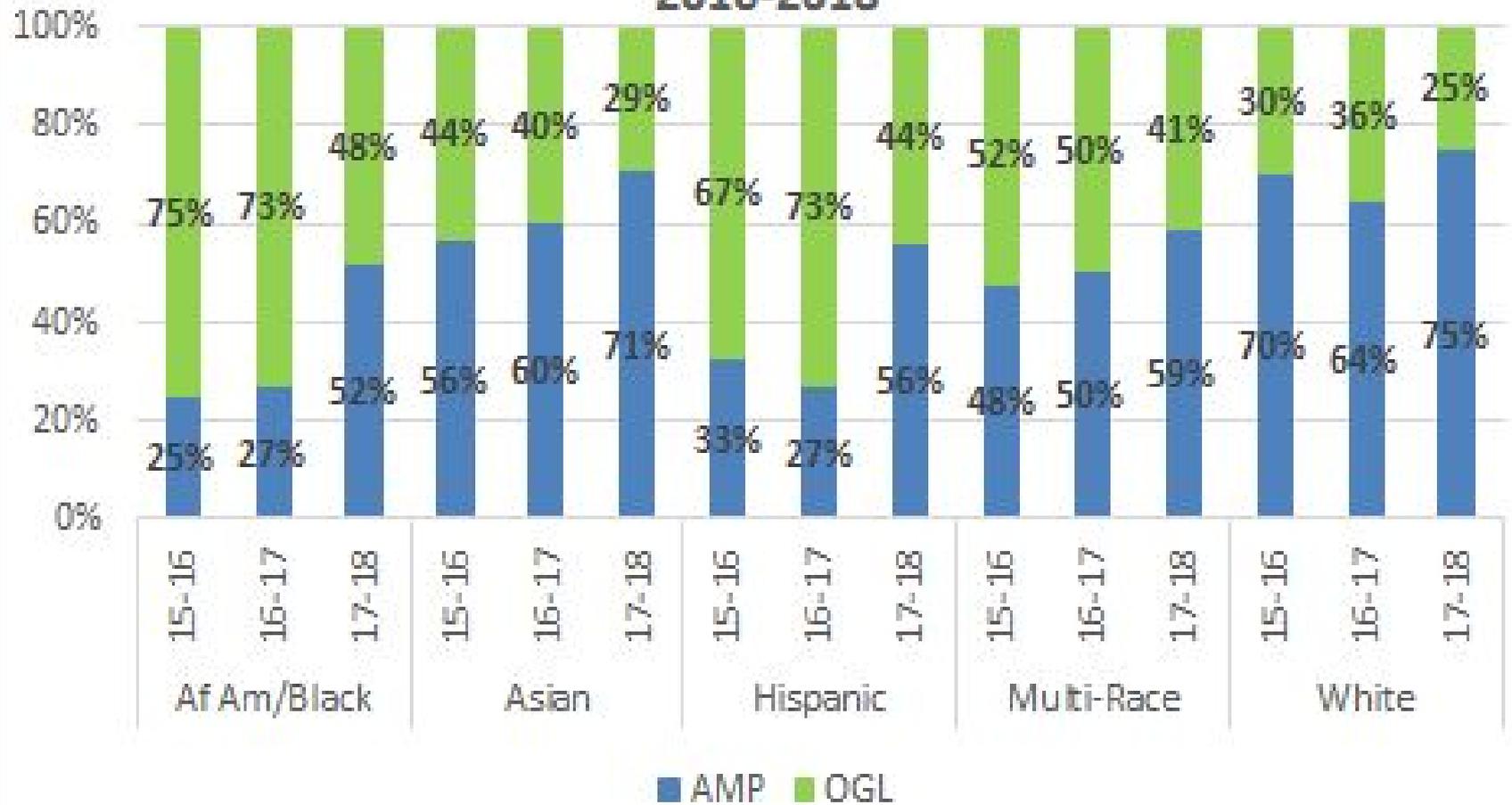
Math Pathways

Pathways in Upper School

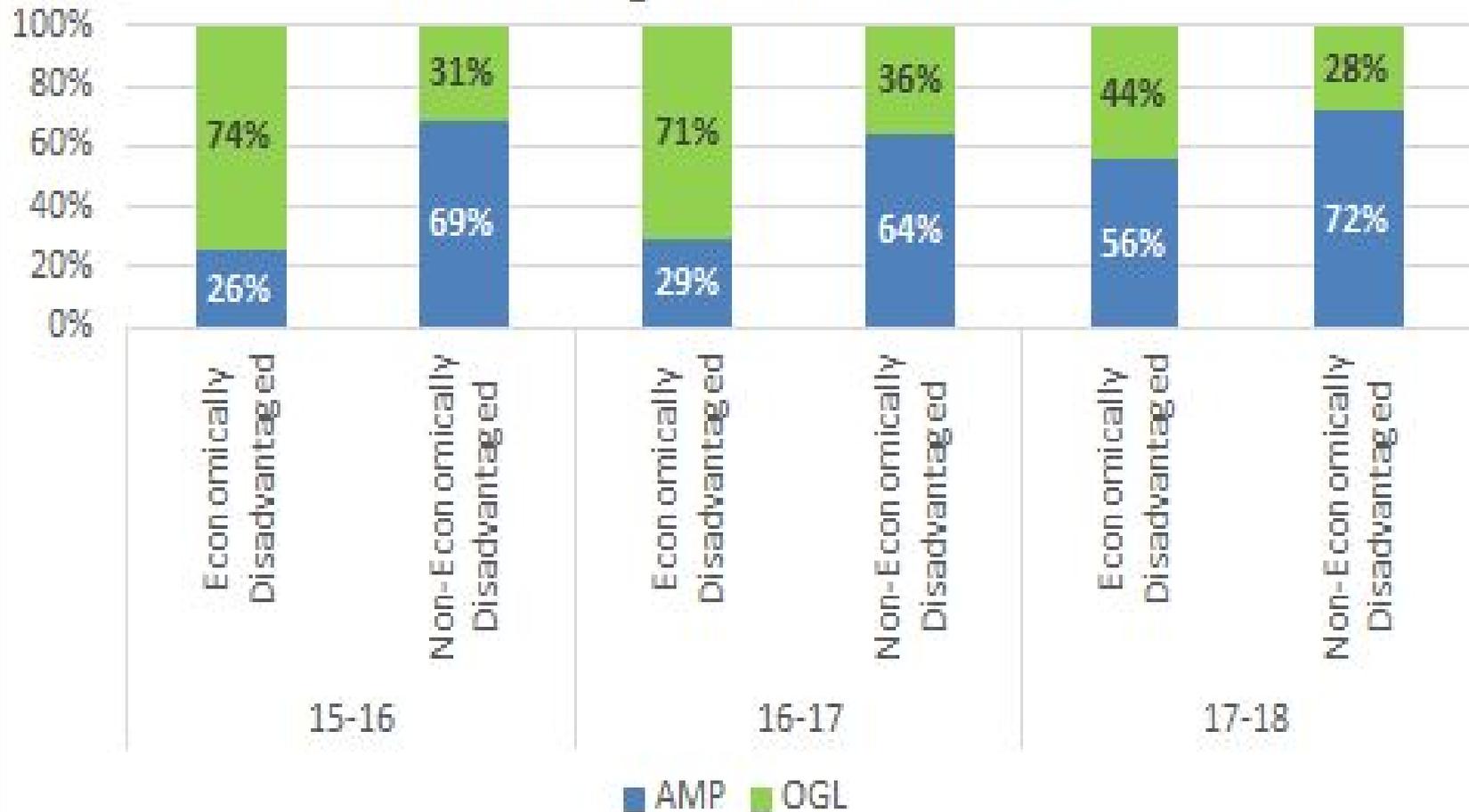
Current Two-Tiered Structure



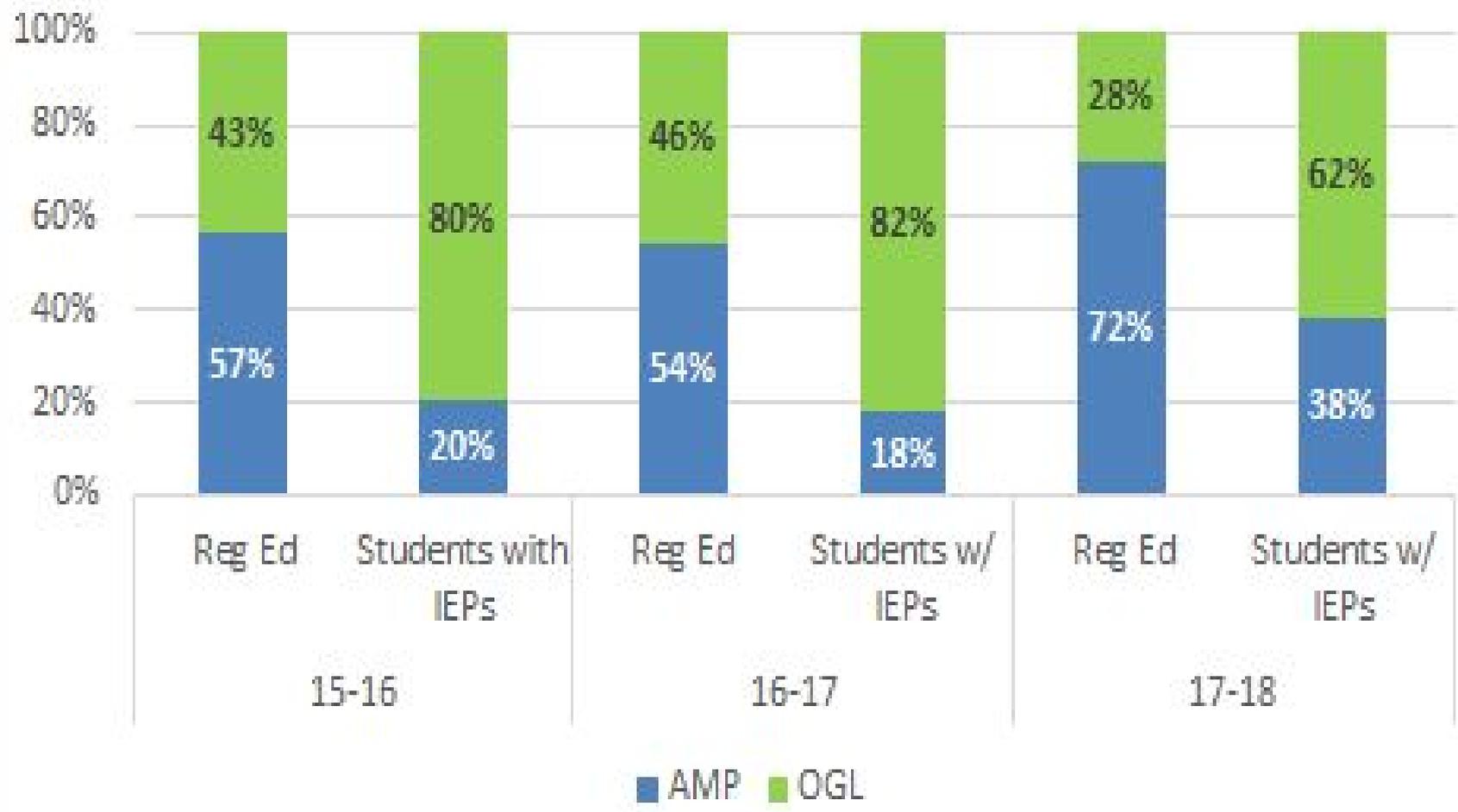
Grade 7 Math Course Enrollment by Race/Ethnicity: 2016-2018



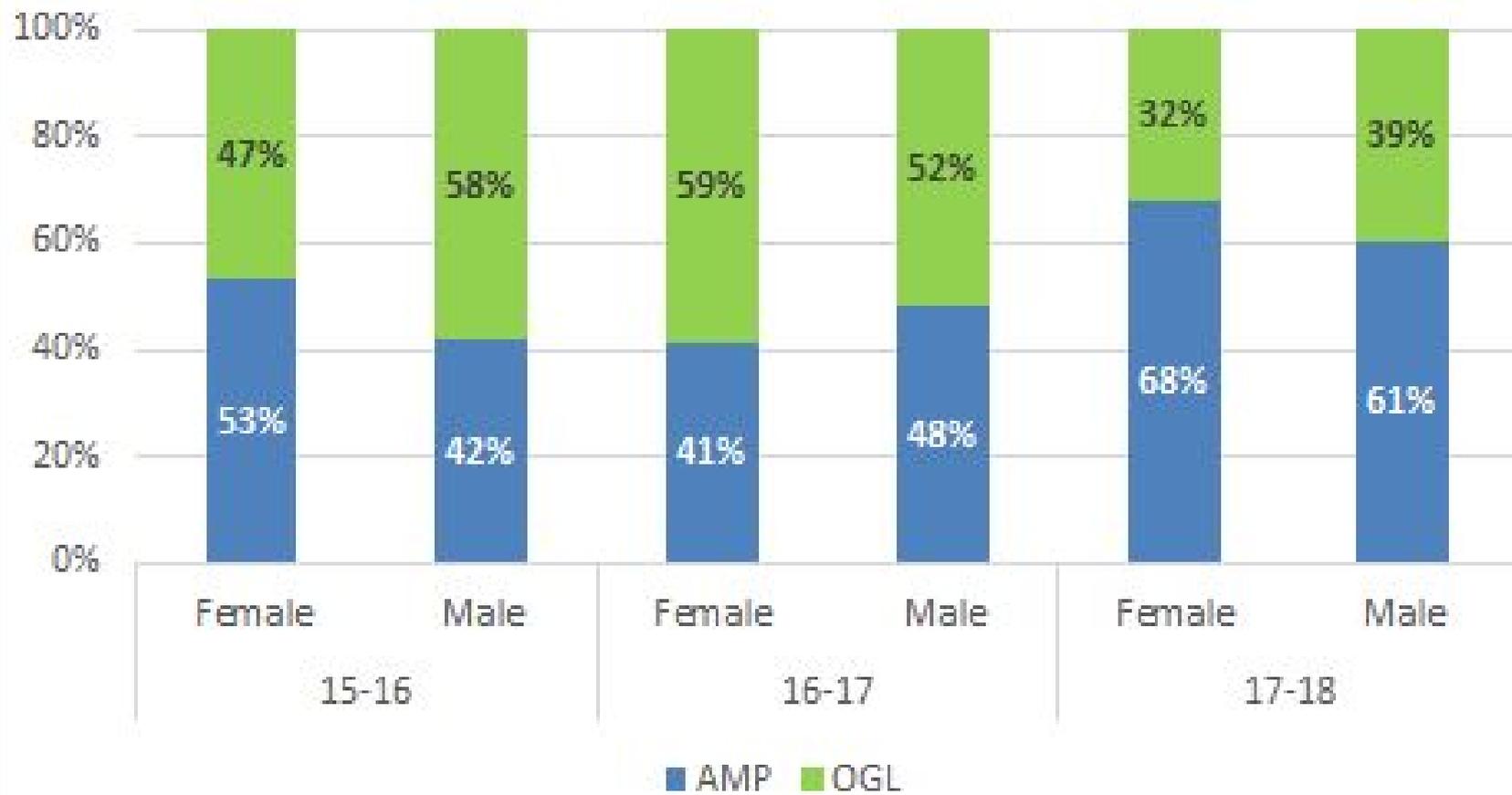
Grade 7 Math Course Enrollment by Economically Disadvantaged Status: 2016-2018



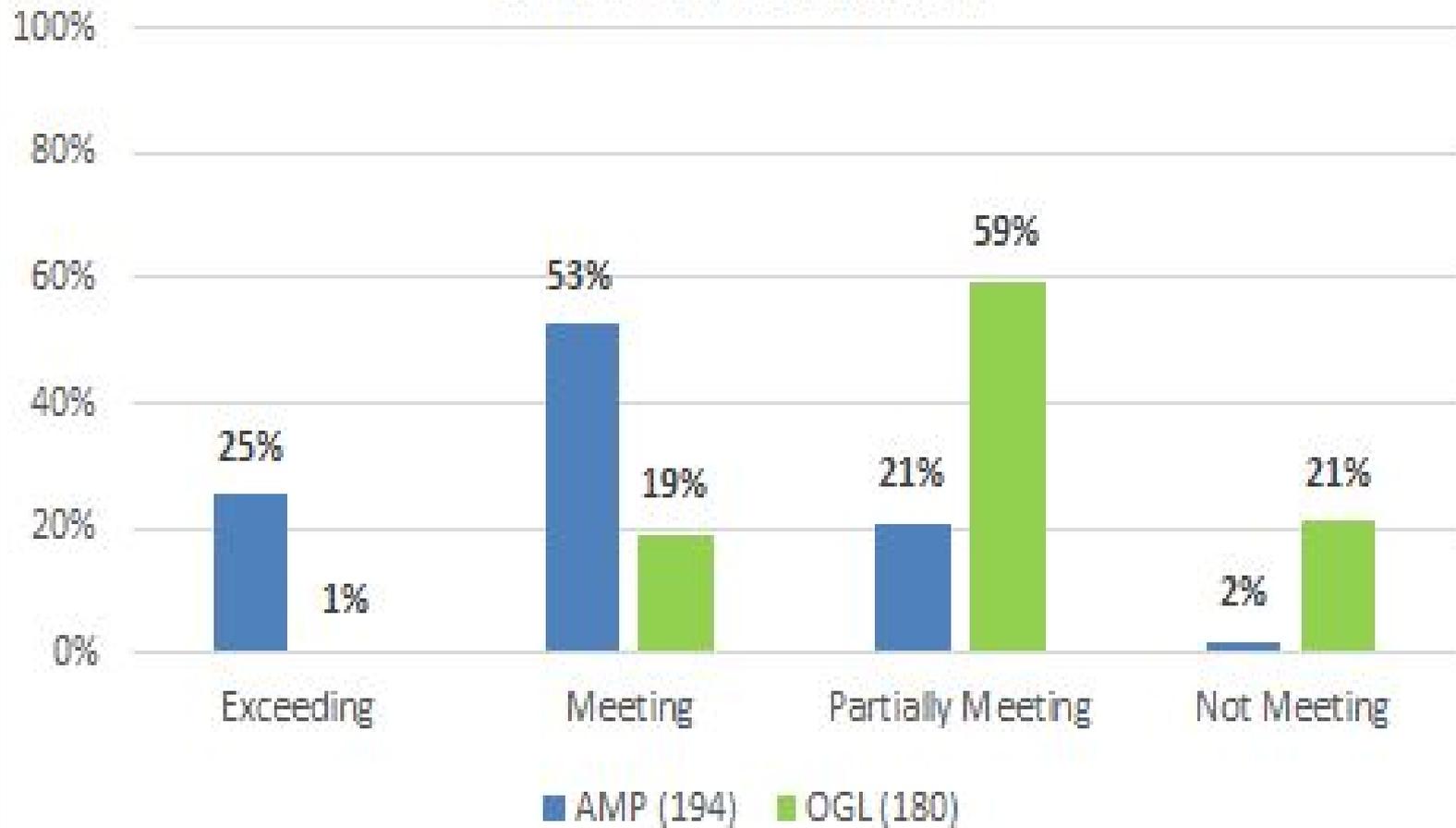
Grade 7 Math Course Enrollment by Special Education Status: 2016-2018



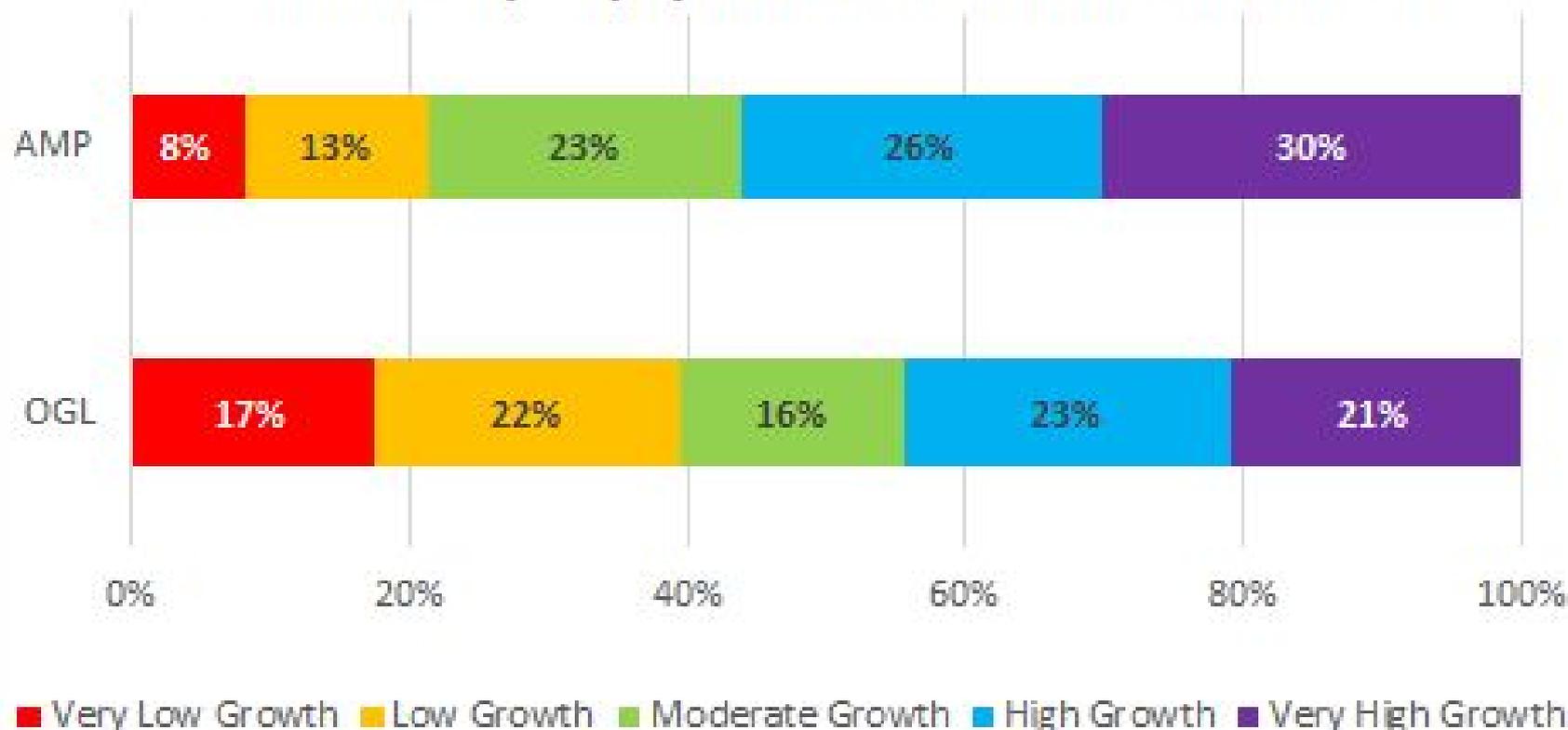
Grade 7 Math Course Enrollment by Gender: 2016-2018



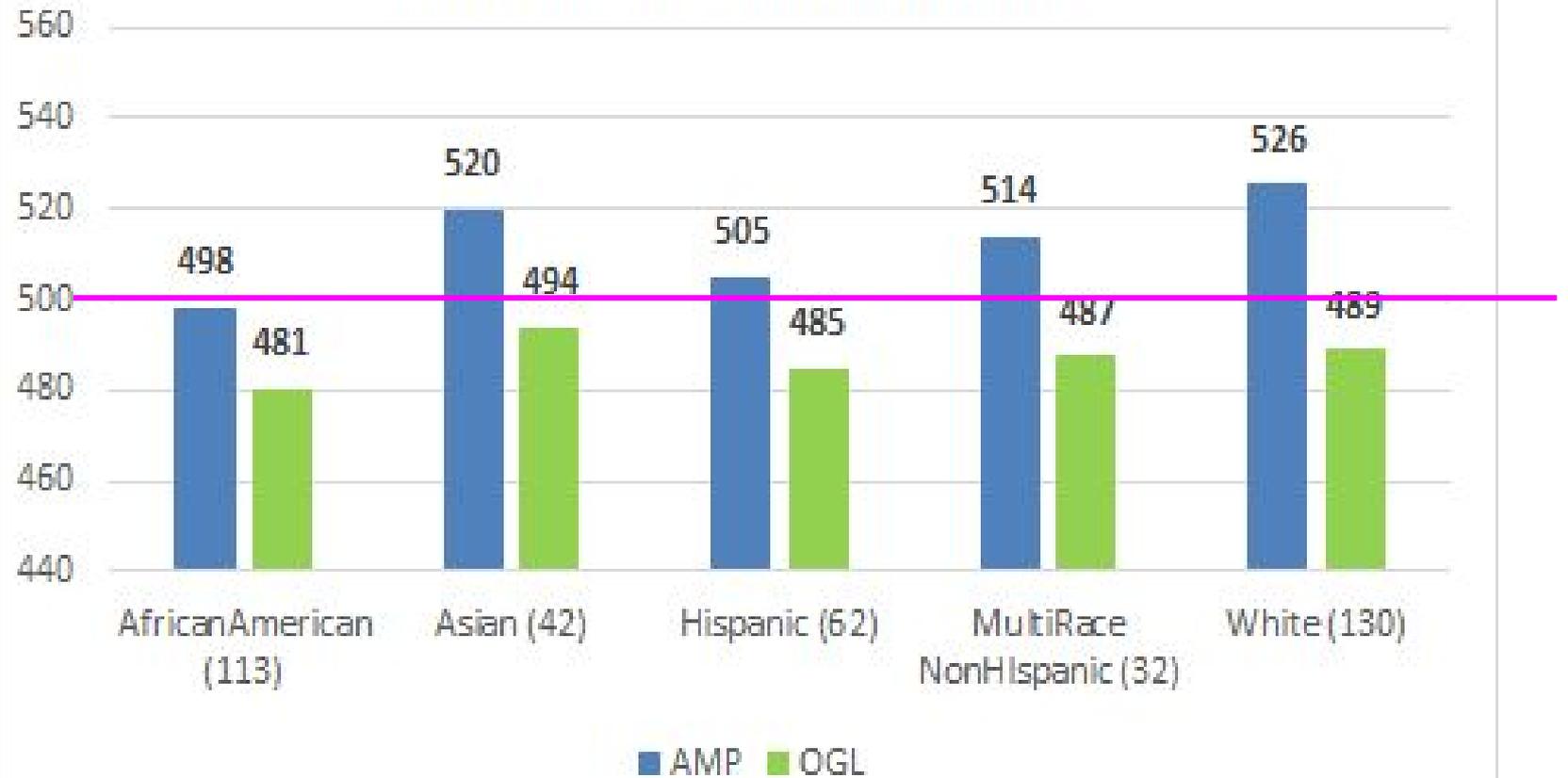
2017 Math MCAS Results by Math Course Enrollment: Grade 7



Distribution of 2017 Math MCAS Student Growth Percentiles (SGP) by Math Course Enrollment: Grade 7

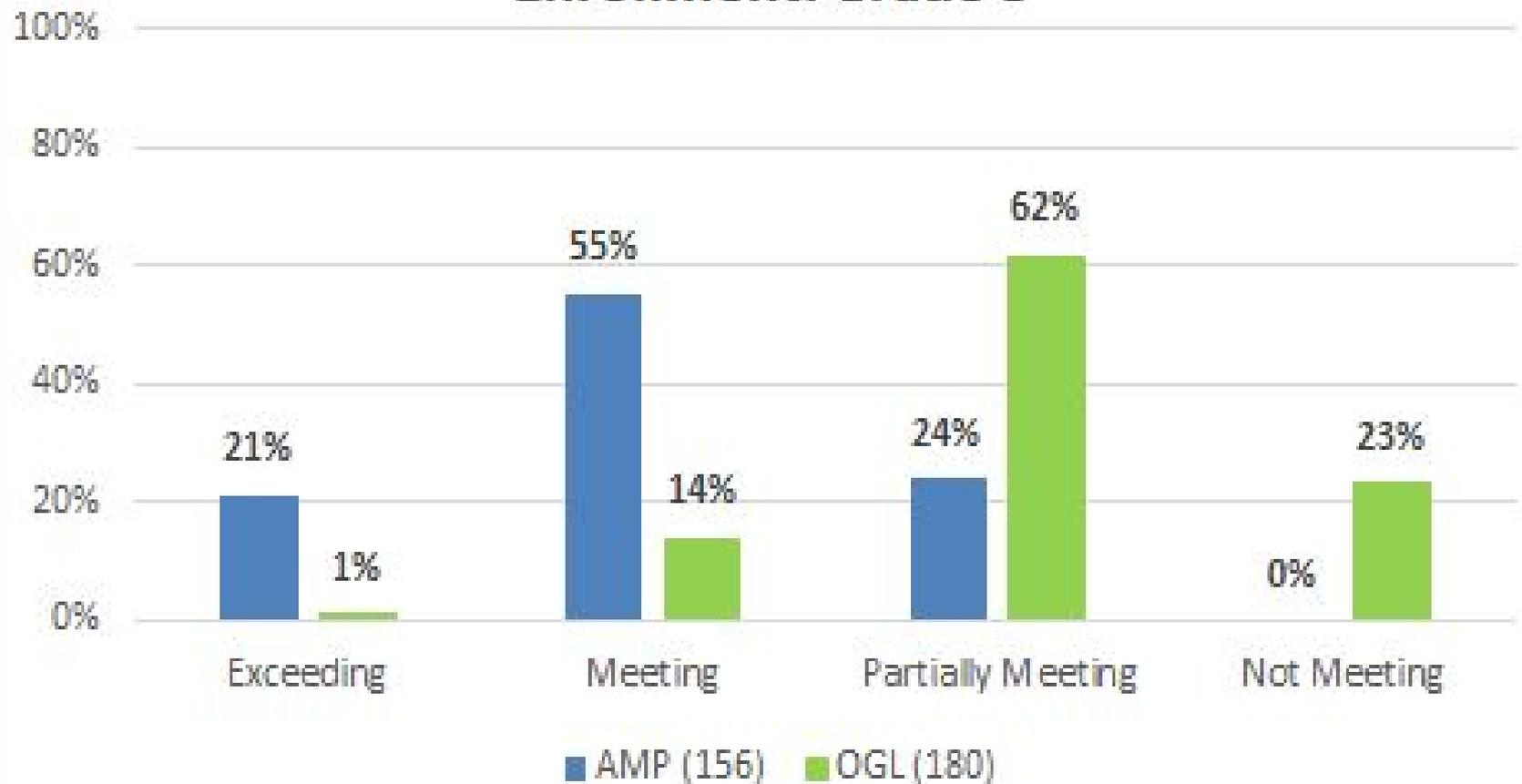


2017 Math MCAS Scaled Scores by Race/Ethnicity and Math Course Enrollment: Grade 7

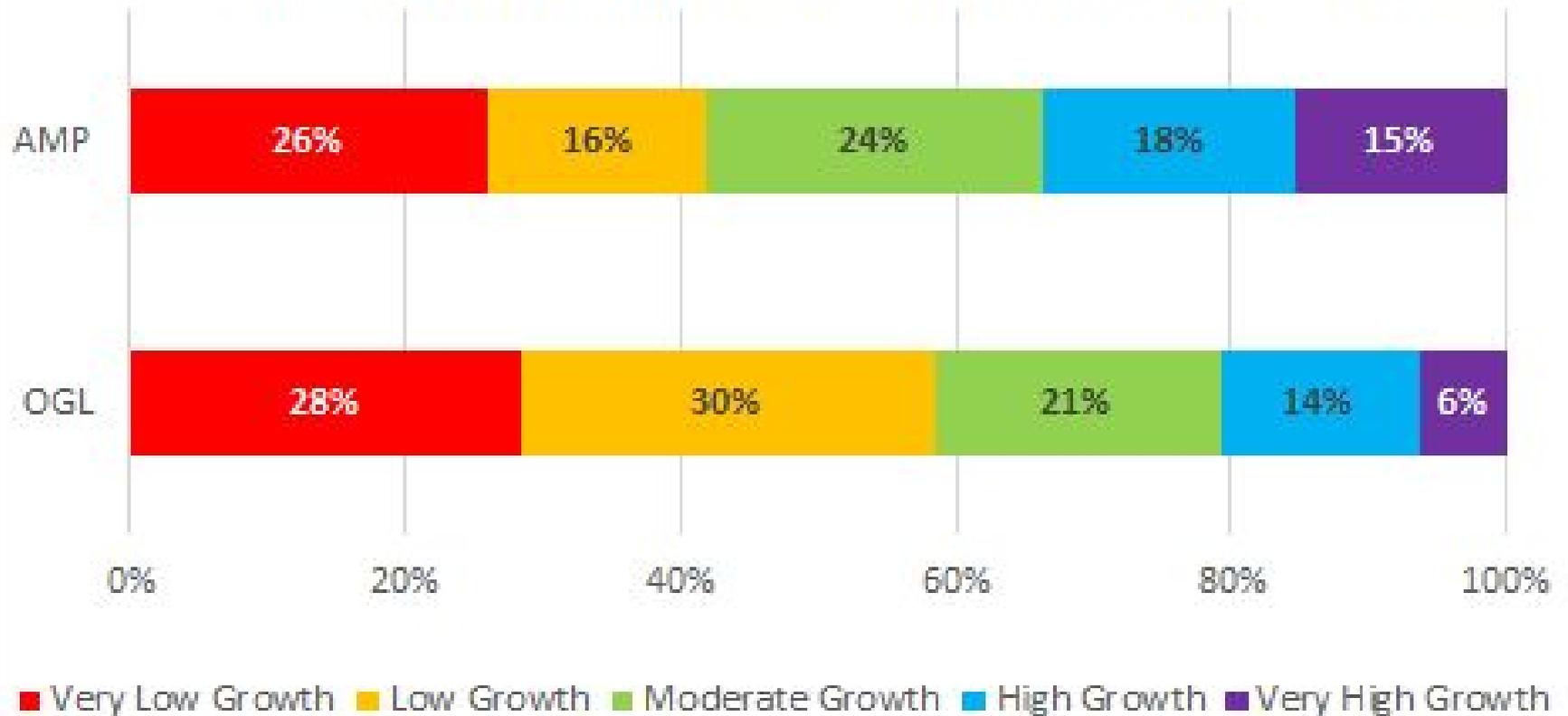


500 = Meeting Expectations

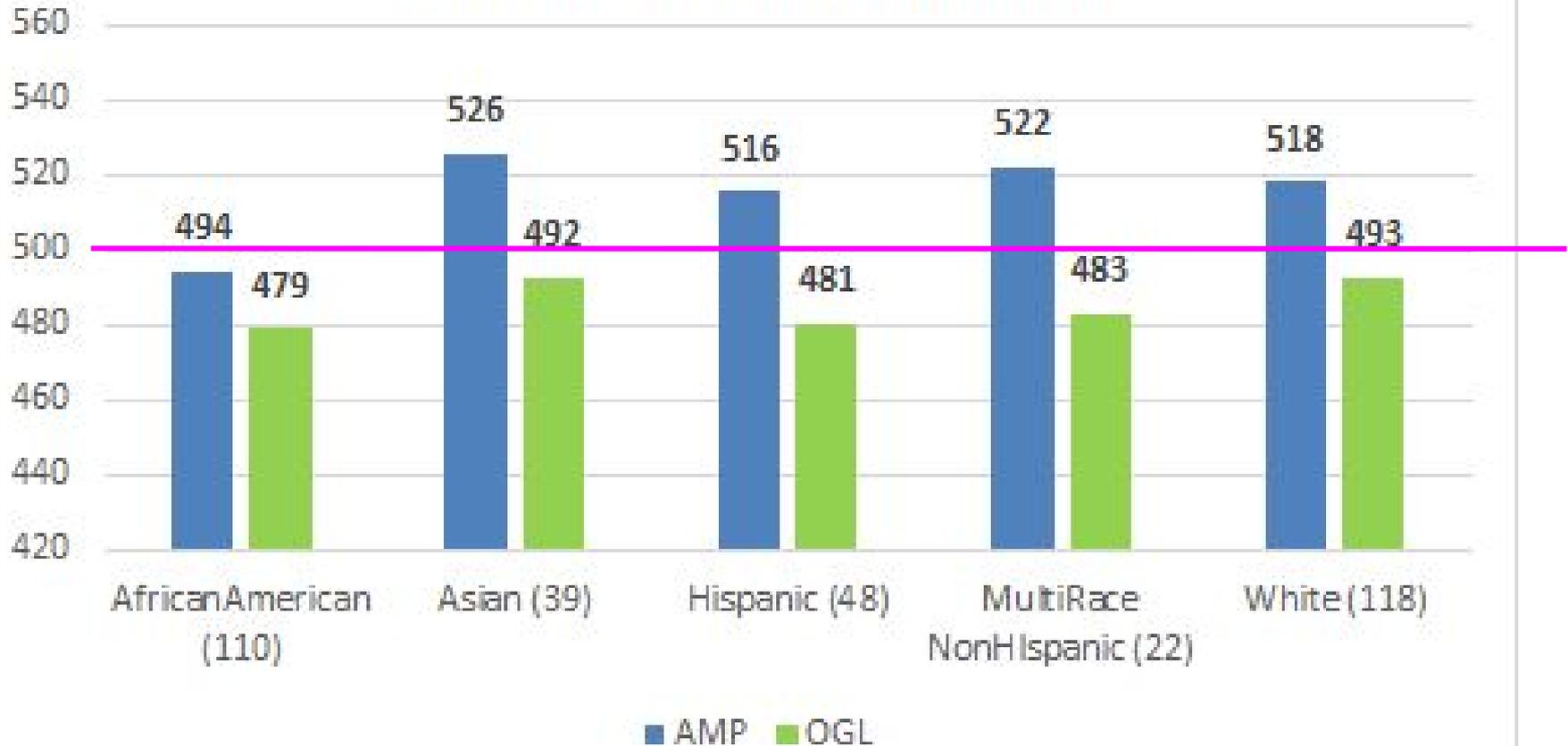
2017 Math MCAS Results by Math Course Enrollment: Grade 8



Distribution of 2017 Math MCAS Student Growth Percentiles (SGP) by Math Course Enrollment: Grade 8



2017 Math MCAS Scaled Scores by Race/Ethnicity and Math Course Enrollment: Grade 8



500 = Meeting Expectations

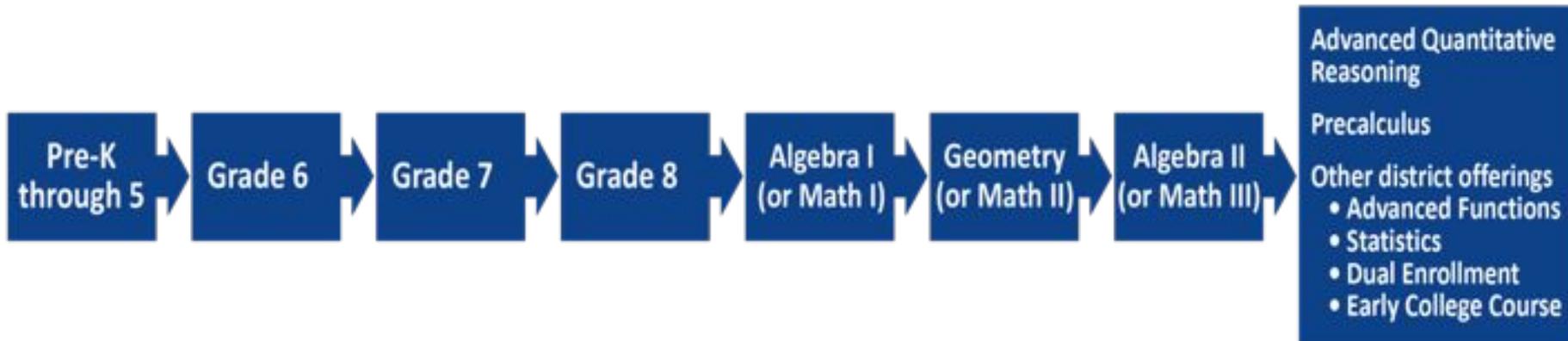
Guidance from MA DESE on Math Pathways



As we examine possible pathways, we want them to:

- Prepare all students to graduate from high school ready for college and career mathematics
- Include options for students to accelerate in high school in order to complete an AP course

College and Career Ready for All Pathway



Acceleration Options in MA framework

Figure 2–4: Three accelerated pathways leading to Calculus

Figure 2:

Compacting in Middle School



Figure 3:

Doubling Up in High School



Figure 4:

Enhanced Pathway in High School



Acceleration Considerations

- Clarifying our goal: is our goal “enrollment in Algebra I in grade 8” or the “completion of college readiness”?
- Acceleration *at any time* requires compacting the curriculum (e.g. 3 yrs of math content in 2 yrs), not skipping content. That compaction looks different in MS than HS.
- Unintended consequences for students

Current CRLS Math Pathway

Support and acceleration opportunities built into our high school schedule/program:

- **4x4 block** schedule allows for doubling up
- “**Math Move Up**” enables students to move from College Prep math to Honors math during the school year
- **Summer Math Preview Program** provides underrepresented students exposure to content before taking class



Unintended Consequences for Our Students and Educators

Impact on:

- student perception of self, particularly students of color
- mathematical mindsets of students



Unintended Consequences for Our Students and Educators

Impact on:

- Class scheduling and class composition
- Less opportunity for students to present and/or challenge diverse styles of thinking



Perspectives of Our Educators



Next Steps

Understand
impact/results of
current system

Evaluate
current
work

Conduct
more
research
on ways
to
improve

Enhance
program
to meet
needs of
all
students

Began January 2017

Spring 2018

(identify budget implications)

Discussion