



# PUSD Common Core Math Pathways

May 7, 2014



# PUSD Math

- The Piedmont Unified School District currently offers a rigorous mathematics program that provides a strong foundation in mathematical skills and concepts.
- Students meet and exceed the University of California/CSU A-G, as well as other high-performing college admissions requirements and score at high levels on standardized exams, including SAT, ACT, and AP tests.

# Central Principles of Common Core Math

- The central principles of the Common Core State Standards for Mathematics include focus, coherence and rigor, and are designed to develop all students' skills to be successful in college and the workplace.
- The two basic types of standards, **mathematical practice** and **mathematical content** support the goal of developing students who are resilient and powerful math thinkers, armed with a robust “tool box” of problem-solving and thinking strategies that they can apply to any math challenge.
- While the content standards differ at each grade level, the practice standards are the same for all grades k-8 and gain complexity and depth as students' progress through their school career.

# 8 Mathematical Practices

Standard for Mathematical Practice	Student Friendly Language
1. Make sense of problems and persevere in solving them.	I can try many times to understand and solve a math problem.
2. Reason abstractly and quantitatively.	I can think about the math problem in my head first.
3. Construct viable arguments and critique the reasoning of others.	I can make a plan, called a strategy, to solve the problem and discuss other students' strategies too.
4. Model with mathematics.	I can use math symbols and numbers to solve the problem.
5. Use appropriate tools strategically.	I can use math tools, pictures, drawings, and objects to solve the problem.
6. Attend to precision.	I can check to see if my strategy and calculations are correct.
7. Look for and make use of structure.	I can use what I already know about math to solve the problem.
8. Look for and express regularity in repeated reasoning.	I can use a strategy that I used to solve another math problem.

# Goals

- Our goal is to provide students with a smooth and appropriate transition from the 1997 California State Standards for Mathematics to the Common Core State Standards for Mathematics.
- Each Common Core State Standard in mathematics is an essential building block for future learning. Content cannot be “skipped”.
- Any new course pathway must provide students with the opportunity to meet and/or exceed the University of California/CSU A-G College Admissions requirements.
- Pathways must provide opportunities for multiple compression points (both at middle school and high school).
- Pathways must also provide opportunities for AP Calculus AB & BC.

# Students Currently in 5<sup>th</sup> Grade Math

Current 5<sup>th</sup> grade students will enroll in CC-6 Math.

Students currently in the 5<sup>th</sup> grade Math Enrichment Program across the three elementary schools will be clustered into 3 sections of CC-6 Math in 14-15. A 6<sup>th</sup> grade Math Enrichment & Assessment Specialist (0.2FTE) will support students and teachers with curriculum development, differentiation, and assessment practices for the CC-6 Math course.

As we evaluate the math program at PMS during the 2014-15 school year, we will develop a middle school compression course for 2015-16.

2013-14	2014-15	2015-16	2016-17
5 <sup>th</sup> Grade	CC-6 Math → ↓	CC-7 Math	CC-8 Math
	Compression course developed (using aligned multiple measures and benchmarks) and presented to the PUSD Board and Community during the 2014-15 school year	Compression Course Available (options to consider)	
		CC-7/CC-8A	CC-8B/Alg1
			or CC-8/Alg1

# Students Currently in 6<sup>th</sup> Grade Math

Current 6<sup>th</sup> grade students in 6<sup>th</sup> Grade Math will enroll in CC-7 Math. This pathway will provide students with a rigorous and challenging math experience that exceeds the UC/CSU A-G College Admissions requirement of Algebra 2.

**Students Currently in 6<sup>th</sup> Grade Math**

2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
6 <sup>th</sup> Grade Math	CC-7 Math	CC-8 Math	CC-Alg 1 or Math 1 (Integrated)*	CC-Geo or Math 2 (Integrated)*	CC-Alg2 or Math 3 (Integrated)*	Math Analysis
			High School Compression Course Available (options to consider)			
			Math 1A $\otimes$ (Integrated)*	Math 2A $\otimes$ (Integrated)*	Math 3A $\otimes$ (Integrated)*	AP Calculus AB
			CC- Alg1/Geo $\oplus$	CC- Geo/Alg2 $\oplus$	Math Analysis	AP Calculus AB
		Middle School Compression Course Available (options to consider)				
		CC-8/CC-Alg1 or CC-8/Math 1 (Integrated)*	CC-Geometry or Math 2 (Integrated)*	CC-Alg2 or Math 3 (Integrated)*	Math Analysis	AP Calculus AB

The diagram illustrates the progression of students currently in 6<sup>th</sup> grade math. A vertical arrow points from the 2014-15 'CC-7 Math' cell down to the 'Middle School Compression Course Available' section. From the 2015-16 'CC-8 Math' cell, two arrows branch out: one points down to the 'High School Compression Course Available' section, and another points right to the 'CC-Alg1/Geo $\oplus$ ' cell in the 'High School' section. A third arrow points from the 'High School' section down to the 'Middle School' section.

# Students Currently in 6<sup>th</sup> Grade Pre-Algebra

Current 6<sup>th</sup> grade students in Pre-Algebra will enroll in CC-8 Math. This pathway will provide students with a rigorous and challenging math experience that exceeds the UC/CSU A-G College Admissions requirement of Algebra 2.

**Students Currently in 6<sup>th</sup> Pre-Algebra**

2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
6 <sup>th</sup> Grade Pre- Algebra	CC-8 Math	CC-Alg 1 or Math 1 (Integrated)*	CC-Geometry or Math 2 (Integrated)*	CC-Alg 2 or Math 3 (Integrated)*	Math Analysis	AP Calculus AB
		Compression Course Available (options to consider)				
		Math 1A⌘ (Integrated) *	Math 2A⌘ (Integrated)*	Math 3A⌘ (Integrated)*	AP Calculus AB	AP Calculus BC
		CC- Alg1/GeoⓉ	CC- Geo/Alg2Ⓣ	Math Analysis	AP Calculus AB	AP Calculus BC



# Students Currently in 7<sup>th</sup> Grade

- Current 7<sup>th</sup> grader students will enroll in either CC-8 Math or Algebra 1 (1997). The CC-8 pathway is recommended and will provide students with a rigorous and challenging math experience that exceeds the UC/CSU A-G College Admissions requirement of Algebra 2. The Algebra 1 (1997) pathway is not Common Core aligned.

**Students Currently in 7<sup>th</sup> Grade Pre-Algebra**

2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
7 <sup>th</sup> Grade Pre- Algebra	CC-8 Math	CC- <del>Alg</del> 1 or Math 1 (Integrated)*	CC-Geo or Math 2 (Integrated)*	CC-Alg2 or Math 3 (Integrated)*	Math Analysis
		High School Compression Course Available (options to consider)			
		Math 1A <sup>Ⓢ</sup> (Integrated)*	Math 2A <sup>Ⓢ</sup> (Integrated)*	Math 3A <sup>Ⓢ</sup> (Integrated)*	AP Calculus AB
		CC-Alg1/Geo <sup>Ⓢ</sup>	CC- Geo/Alg2 <sup>Ⓢ</sup>	Math Analysis	AP Calculus AB
	Algebra 1 (1997)	Geometry (1997)	Algebra 2 (1997)	Math Analysis	AP Calculus AB

# Integrated or Traditional

- \* The Traditional Pathway has historically been taught in the United States and includes Algebra I, Geometry, and Algebra II. The Integrated Pathway is aligned to the mathematics curriculum taught throughout the world (including those countries with the highest success rates in mathematics). Both the new California Framework for Mathematics and the University of California System (UC) support the adoption of either of these pathways for high school students. CCSSM for grades six, seven, and eight are prerequisites for either of these two pathways and are standard across the state.
- The Integrated Pathway's approach is used in most of the other developed countries of the world, and international test results show its value. While these course titles may be unfamiliar, the scope and sequence of these three courses offer the same content as the Traditional Pathway. The Integrated Pathway includes concepts of Algebra, Functions, Geometry, and Statistics throughout each of the three courses instead of being taught in isolation.

# Compression Courses

- During the 2014-15 school year, the PMS, PHS, and MHS math teachers will investigate compression course options for students, beginning in 2015-16. The following provides information about each compression option:
- ⌘ This Integrated Math Pathway compresses Algebra 1, Geometry, Algebra 2, and Math Analysis standards into 3 courses – Math 1A, Math 2A, and Math 3A. Students completing this 3-year compression pathway will be ready for either AP Calculus AB or Statistics.
- ⓘ This Traditional Math Pathway compresses Algebra 1, Geometry, and Algebra 2 standards into 2 courses - CC-Alg1/Geo and CC-Geo/Alg2.
  - Dr. Hung Hsi Wu, Mathematics Professor at UC Berkeley, advocates for this progression in his paper entitled, *Syllabi of High School Courses According to the Common Core Mathematics Standards*, H. Wu - August 4, 2011
  - [http://math.berkeley.edu/~wu/Syllabi\\_Grades9-10.pdf](http://math.berkeley.edu/~wu/Syllabi_Grades9-10.pdf)

# Next Steps

- The PUSD math team will use the inquiry process and collect data on student performance and success in multiple ways. This will include benchmark assessments, student work, and grade and attendance data, amongst other information.
- We will also be in close communication with comparable and neighboring middle schools and high schools to look at longitudinal data, share resources and the learning from our experiences to continue our refinement and improvement of the math program. Additionally, PUSD will be focused on the continued development and communication of our Common Core transition with parents and the community.
- We have recently joined the Silicon Valley Math Initiative as an opportunity to collaborate with comparable school districts and receive support and professional development in the areas of differentiation, curriculum development, and assessment.

# Decision Points

## Decision Points

- Traditional or Integrated model of Math Pathway for the 2015-16 school year.
- Define the compression pathway(s) for middle school students during the 2015-16 school year.
- Define the compression pathway(s) for high school students during the 2015-16 school year.
- Review and adopt textbooks and supplemental materials the 2015-16 school year.