

Higher Mathematics Course Pathways

Traditional vs. Integrated

Craig Schneider Ph.D.
SBUSD Secondary Math/Science TOSA

New Map New Destination



CCSS Mathematics: Key Instructional Shifts

Focus

Coherence

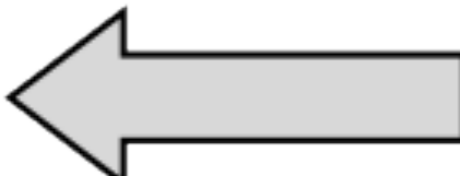
Rigor (Conceptual, Procedural and Application)


CCSS Mathematics: Key Instructional Shifts

Coherence

- Connecting Between Topics
- Seeing Mathematical Structure
- Making Sense of Mathematics
- K-12 Progression of Learning

Coherence

Kindergarten	1	2	3	4	5	6	7	8	HS
8 Mathematical Practices – Students must be given opportunities to develop these practices at all levels.									
	1 Make sense of problems and persevere in solving them.								
	2 Reason abstractly and quantitatively.								
	3 Construct viable arguments and critique the reasoning of others.								
	4 Model with mathematics.								
	5 Use appropriate tools strategically.								
	6 Attend to precision.								
	7 Look for and make use of structure.								
	8 Look for and express regularity in repeated reasoning.								
Content Domains from Kindergarten to Grade 8 – Progress to High School Conceptual Categories									
Counting and Cardinality (K)									Number and Quantity (HS)
Number and Operations in Base Ten (K – 5)						Ratios and Proportional Relationships (6 – 7)			
	Number and Operations Fractions (3 – 5)					The Number System (6 – 8)			
Operations and Algebraic Thinking (K – 5)						Expressions and Equations (6 – 8)		Algebra (content) (HS)	
							Functions (8)	Functions (HS)	
Geometry (K – 5)						Geometry (6 – 8)		Geometry (HS)	
Measurement and Data (K – 5)						Statistics and Probability (6 – 8)		Stats/Prob (HS)	





CCSS Higher Level Math Conceptual Categories

- Number and Quantity
- Algebra
- Functions
- Geometry
- Statistics and Probability
- Modeling*

Developing Higher Level Math Pathways

*CCSS math content standards are in
conceptual categories ...
Not separated into courses*

Traditional or Integrated?

Common Core Math Standards
At Every Grade Level K-8
Are Integrated

Not Your Father's Algebra I

(Based on Sample “Traditional” Pathway in CA Framework Draft)

Common Core Grade 8	<ul style="list-style-type: none">▪ Pre-Algebra▪ Some “1997 Geometry”▪ “1997 Algebra 1A”	Common Core Algebra 1	<ul style="list-style-type: none">▪ “1997 Algebra 1B”▪ “1997 Algebra 2A”▪ Some Statistics Topics
Common Core Geometry	<ul style="list-style-type: none">▪ More “1997 High School Geometry”▪ Transformational Geometry▪ “1997 Algebra 2” Probability	Common Core Algebra 2	<ul style="list-style-type: none">▪ “1997 Algebra 2B”▪ Introductory Trig▪ (sine, cosine)▪ Some AP Statistics



UCLA Department of Mathematics

The Philip C. Curtis Jr. Center for Mathematics and Teaching

“Basically, in my mind, it shows that the new ‘traditional’ courses are:

1. Poorly named, and
2. The new traditional courses are really at least semi-integrated.”

Heather Dallas

UCLA Mathematics Department

Director, The Philip C. Curtis Jr. Center for Mathematics and Teaching

CDE Mathematics Framework Committee member

California Academic Content Standards Commission member

CDE's Higher Level Math Information Flyer

It is a local school district decision whether to follow a traditional or integrated pathway, as well as if students begin taking higher mathematics courses during middle school or high school. Regardless of what decision each district makes, students must have learned the concepts and skills in the K–8 standards to be ready for the rigor of these courses.

“Integration allows students to build proficiency and see connections and interrelationships between each domain, each year.

“Students enrolled in either pathway should arrive at the same point by the end of their third year of higher mathematics instruction.”

CDE (June 2013)

Smarter Balanced Assessments

College & Career Readiness

All 11th Graders

“Progress Towards...” 3rd-8th Graders



Smarter Balanced Assessments

Claim #1 – Concepts & Procedures

Claim #2 – Problem Solving

Claim #3 – Communicating Reasoning

Claim #4 – Modeling and Data Analysis



Smarter Balanced Assessments *Are Integrated*



“Traditional” or Integrated?

Same CCSS standards, different order

- “Old Way” → Comfortable (in name only?) → Need to learn what’s new
- Our current “Traditional” textbooks are not CCSS aligned...supplementation is required
- New Way (to us) → Uncomfortable → Need to learn what’s new
- CCSS Math K-8 and Smarter Balanced Assessments for Grades 3-8 and II are integrated

Need to educate all stakeholders

Which Pathway on Our New Map
Best Preserves the Coherence of
Mathematics for Our Students?

