

# Higher Mathematics Course Pathways

Traditional vs. Integrated

# 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)	



Kentucky Department of Education



# Developing Higher Level Math Pathways

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



# CCSS Higher Level Math Conceptual Categories

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

# 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)

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



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 standards as integrated, 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
  - Need to educate all stakeholders
- Same standards as traditional, different order
  - 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

***How is the Coherence of Mathematics Best Preserved for Students?***