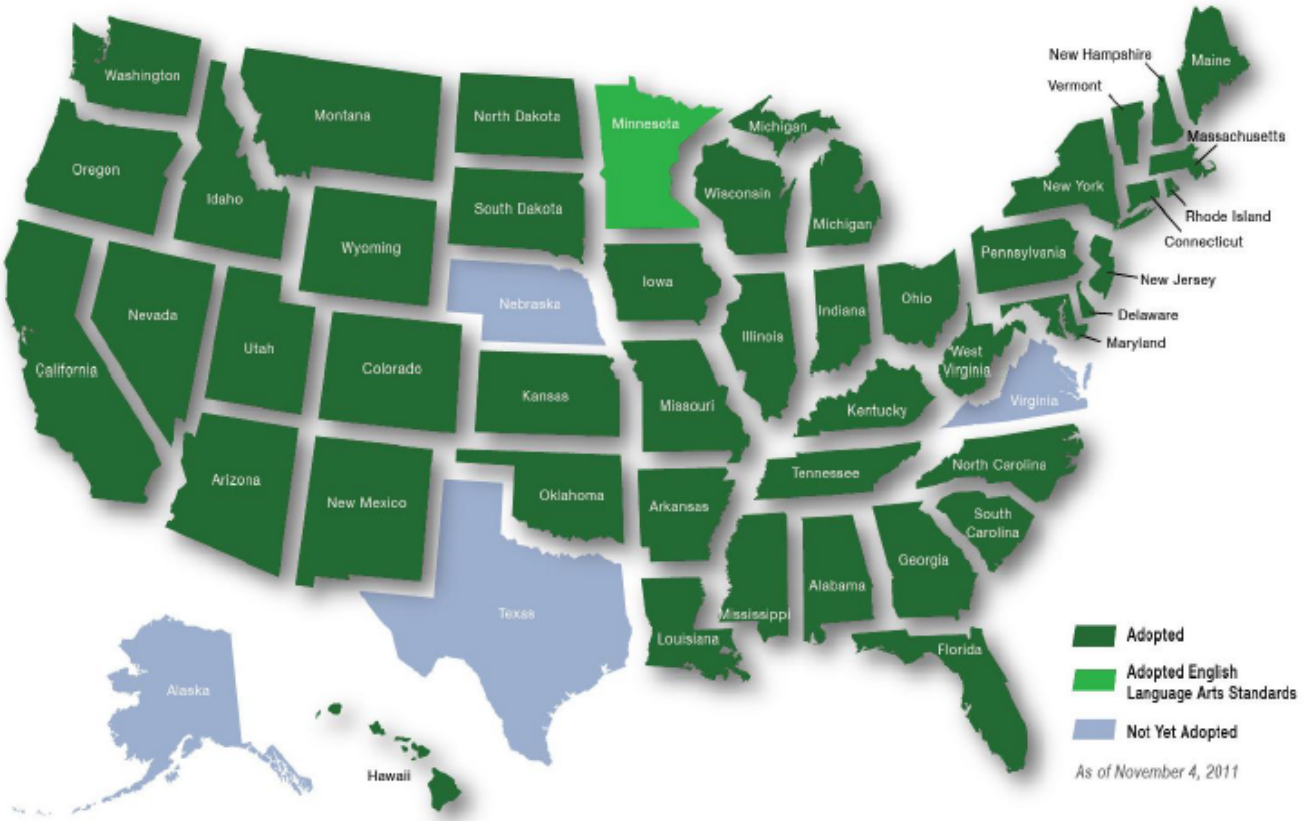
The Common Core State Standards

Considering Student Pathways through the CCSSM

David Foster
Silicon Valley Mathematics Initiative
www.svmimac.org

Common Core State Standards

- Define the knowledge and skills students need for college and career
- Developed voluntarily and cooperatively by states; more than 40 states have adopted
- Provide clear, consistent standards in English language arts/literacy and mathematics



Source: www.corestandards.org

Smarter Balanced Assessment Consortium

Optimism

"Optimism is an essential ingredient for innovation. How else can the individual welcome change over security, adventure over staying in safe places? A significant innovation has effects that reach much further than can be imagined at the time, and creates its own uses. It will not be held back by those who lack the imagination to exploit its use, but will be swept along by the creative members of our society for the good of all. Innovation cannot be mandated any more than a baseball coach can demand that the next batter hit a home run. He can, however, assemble a good team, encourage his players, and play the odds."

Robert N. Noyce

Silicon Valley Mathematics Initiative *Approximately 120 Members*

Albany USD
Alvord SD (Riverside County)
Antioch Unified SD
Aspire Charter School Network
Assumption School
Atlanta PS
Bayshore SD
Belmont-Redwood Shores SD
Berryessa SD
Bolinas – Lagunitas SD
Brisbane SD
Buckeye SD
Burlingame SD
Cambrian SD
Campbell Union HSD
Campbell Union ESD
Capistrano USD
Castro Valley USD
Carmel HS
Ceres USD
Charter Oak USD
Charter School of Morgan Hill
Chicago Public School
Chula Vista SD
Creative Arts Charter (SF)
Cristo Rey Network
Cotati – Rohnert Park
Covina Valley USD
CSU San Bernardino
Cupertino SD
Dade County Schools (GA)
Del Mar USD (San Diego Co)
Discovery Charter School
Dioceses of Santa Clara
East Side UHSD
Emery SD
Etiwanda SD
Evergreen SD
Gilroy USD
Glendora USD
Fairfield-Suisun USD
Franklin-McKinley SD
Fremont Union HSD
Fremont USD
Forsyth County School (GA)
Half Moon Bay
Hamilton County (Tn)
Hayward USD
Jefferson ESD
Jefferson HSD
Kentfield SD
Las Lomitas SD
La Honda-Pescadero Sd
Live Oak School Districts
Livermore Charter
Los Altos SD
Los Gatos SD
Menlo Park SD
Merced COE
Millbrae SD
Milpitas USD
Monterey Peninsula USD
Moreland SD
Moraga SD
Morgan Hill USD
Mountain SD
Mt. Diablo USD
Mountain View SD
National Council of La Raza
Novato USD
New Visions (NVPS)
Oakland Unified SD
Oak Grove SD
Oceanside SD
Ontario USD
Orinda SD
Pacifica SD
Pacific Grove HS
Pajaro Valley USD
Palo Alto USD
Pittsburgh USD
Portola Valley SD
Ravenswood City SD
Riverside COE
Redwood City Schools
Reed SD
Ross SD
Sacramento City USD
Salinas City Schools
San Bruno Park
San Carlos CLC
San Carlos SD
San Diego COE
San Diego UHSD
San Dieguito USD
San Francisco USD
San Jose Unified SD
San Mateo Foster City SD
San Mateo UHSD
San Ramon VUSD
Santa Ana USD
Santa Clara USD
Santa Cruz CSD
Saint Michael's School (Poway)
Saint Patrick's School (San Jose)
Saratoga
Scotts Valley USD
Santa Clara COE
Sequoia HSD
SMCOE County Court Schools
South Cook Service District
So. San Francisco
Sumter County (GA)
Tehama COE
The Nueva School
Union SD
University of Illinois, Chicago
Valley Christian (Dublin)
Valdosta City (GA)
Walnut Creek SD
Woodside SD

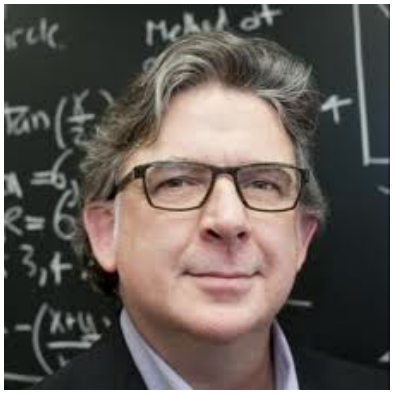
Common Core Standards:

A New Direction linking Instruction and Assessment

COMMON CORE
STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER

Three Central Authors

Common Core State Standards in Mathematics



Bill McCallum

Phil Daro

Jason Zimba

Charges given to the authors:

- All students College and Career Ready by 11th grade
- Internationally Benchmarked
- Make the standards “Fewer, Clear and Higher”

CCSS Mathematical Practices

OVERARCHING HABITS OF MIND

1. Make sense of problems and persevere in solving them
6. Attend to precision

REASONING AND EXPLAINING

2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others

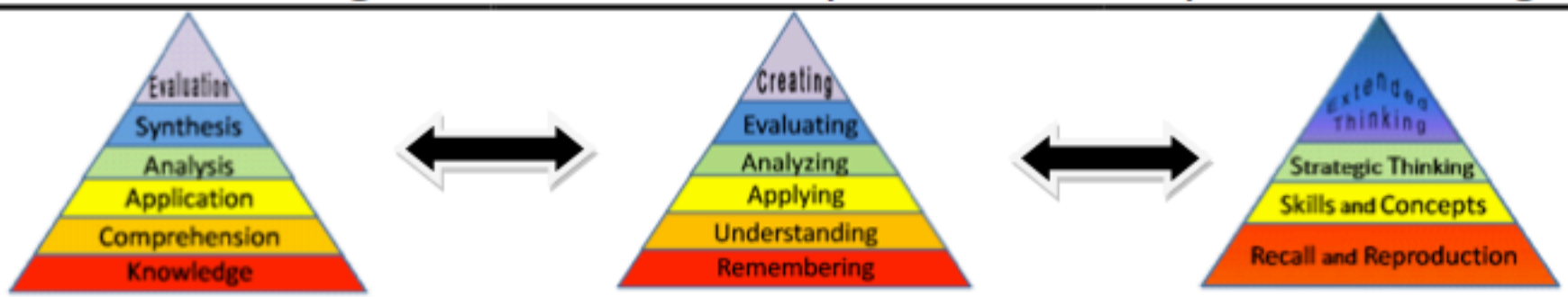
MODELING AND USING TOOLS

4. Model with mathematics
5. Use appropriate tools strategically

SEEING STRUCTURE AND GENERALIZING

7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

Levels of Thinking in Bloom's Taxonomy and Webb's Depth of Knowledge



Bloom's – Old Version (1956) | Bloom's - New Version (1990's) | Webb's DOK (2002)

Bloom's six major categories were changed from noun to verb forms in the new version which was developed in the 1990's and released in 2001. The knowledge level was renamed as remembering. Comprehension was retitled understanding, and synthesis was renamed as creating. In addition, the top two levels of Bloom's changed position in the revised version.

Bloom's Taxonomy	Revised Bloom's Taxonomy
Knowledge	**Remembering**
Recall appropriate information.	
Comprehension	**Understanding**
Grasp the meaning of material.	
Application	**Applying**
Use learned material in new and concrete situations.	
Analysis	**Analyzing**
Break down material into component parts so that its organizational structure may be understood.	
Synthesis	**Evaluating**
Put parts together to form a new whole.	*Make judgments based on criteria and standards.*
Evaluation	**Creating** *(Previously Synthesis)*
Judge value of material for a given purpose.	*Put elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing.*

Norman L. Webb of Wisconsin Center for Educational Research generated DOK levels to aid in alignment analysis of curriculum, objectives, standards, and assessments.

Webb's Depth of Knowledge & Corresponding Verbs

**Some verbs could be classified at different levels depending on application.*

Recall and Reproduction *Correlates to Bloom's 2 Lowest Levels*

Recall a fact, information, or procedure.

arrange, calculate, define, draw, identify, list, label, illustrate, match, measure, memorize, quote, recognize, repeat, recall, recite, state, tabulate, use, tell who- what- when- where- why

Skill/Concept

Engages mental process beyond habitual response using information or conceptual knowledge. Requires two or more steps.

apply, categorize, determine cause and effect, classify, collect and display, compare, distinguish, estimate, graph, identify patterns, infer, interpret, make observations, modify, organize, predict, relate, sketch, show, solve, summarize, use context clues

Strategic Thinking

Requires reasoning, developing plan or a sequence of steps, some complexity, more than one possible answer, higher level of thinking than previous 2 levels.

apprise, assess, cite evidence, critique, develop a logical argument, differentiate, draw conclusions, explain phenomena in terms of concepts, formulate, hypothesize, investigate, revise, use concepts to solve non-routine problems

Extended Thinking *Correlates to Bloom's 2 Highest Levels*

*Requires investigation, complex reasoning, planning, developing, and thinking-probably over an extended period of time. *Longer time period is not an applicable factor if work is simply repetitive and/or does not require higher-order thinking.*

analyze, apply concepts, compose, connect, create, critique, defend, design, evaluate, judge, propose, prove, support, synthesize

Depth of Knowledge (DOK)

Low-Cognitive Demand

Level 1: Recalling and Recognizing

Student is able to recall routine facts of knowledge and can recognize shape, symbols, attributes and other qualities.

Level 2: Using Procedures

Student uses or applies procedures and techniques to arrive at solutions or answers.

Depth of Knowledge (DOK)

High-Cognitive Demand

Level 3: Explaining and Concluding

Student reasons and derives conclusions. Student explains reasoning and processes. Student communicates procedures and findings.

Level 4: Making Connections, Extending and Justifying

Student makes connections between different concepts and strands of mathematics. Extends and builds on knowledge to a situation to arrive at a conclusion. Students use reason and logic to prove and justify conclusions.

Common Core Big Ideas
Depth of Knowledge (DOKs)

	Mathematics		ELA/Literacy	
	DOK3	DOK4	DOK3	DOK4
Current Assessments	<2%	0%	20%	2%
New SBAC Assessments	49%	21%	43%	25%

Yuan & Le (2012); Herman & Linn (2013) from Linda Darling-Hammond, Assembly Hearing, 3.6.13

Goals of Assessment

"We must ensure that tests measure what is of value, not just what is easy to test. If we want students to investigate, explore, and discover, assessment must not measure just mimicry mathematics."

Everybody Counts

CST – Released Items Algebra 1

The total cost (c) in dollars of renting a sailboat for n days is given by the equation

$$c = 120 + 60n.$$

If the total cost was \$360, for how many days was the sailboat rented?

A 2

B 4

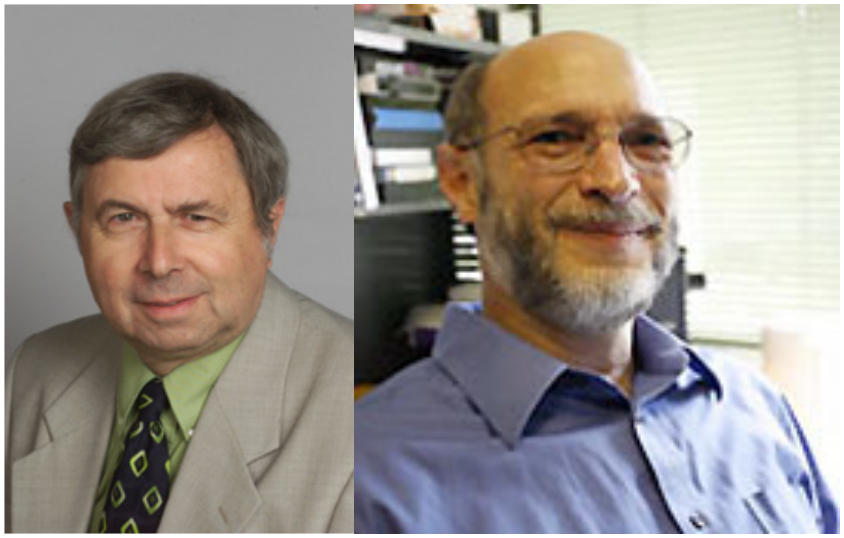
C 6

D 8

Smarter Balanced
Assessment Consortium

Smarter Balanced
Assessment Consortium

SMARTER BALANCE Assessment Consortia



MARS Team
Mathematics Assessment Resource Service

Stanford University
School of Education

Developed Content Specifications for SBAC

Content Specifications
for the Summative assessment of the
Common Core State Standards for Mathematics

DRAFT TO ACCOMPANY GOVERNING STATE VOTE ON ASSESSMENT CLAIMS

March 20, 2012

Developed with input from content experts and Smarter Balanced Assessment Consortium Staff, Work Group Members, and Technical Advisory Committee

Acknowledgements

Alan Schoenfeld, University of California at Berkeley and **Hugh Burkhardt**, Shell Centre, University of Nottingham served as principal authors of this paper. Sections of the document were also authored by **Jamal Abedi**, University of California at Davis; **Karin Hess**, National Center for the Improvement of Educational Assessment; **Martha Thurlow**, National Center on Educational Outcomes, University of Minnesota

Significant contributions and organization of this second draft were provided by **Shelbi Cole**, Connecticut State Department of Education, and **Jason Zimba**, Student Achievement Partners. The project was facilitated by **Linda Darling-Hammond** at Stanford University.

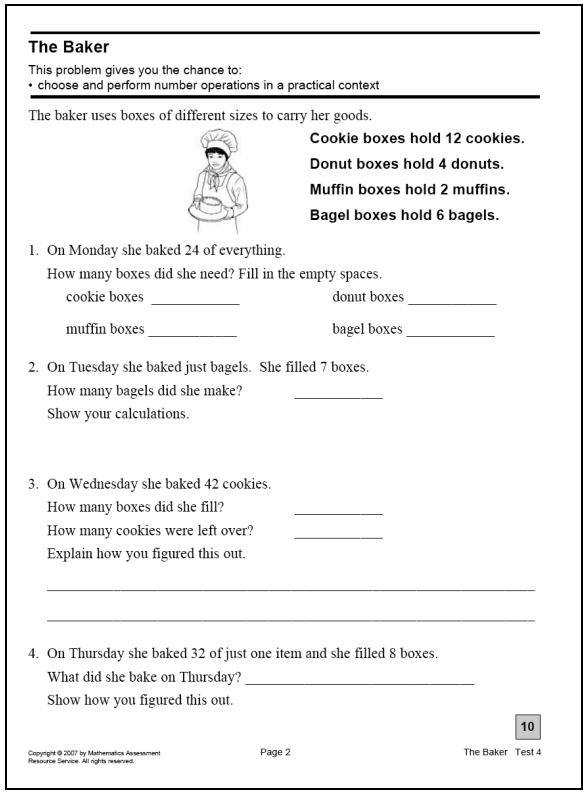
Others who offered advice and feedback on the document include:
Rita Crust, Lead Designer, Mathematics Assessment Resource Service
Past President, Association of State Supervisors of Mathematics
Brad Findell, Former Mathematics Initiatives Administrator, Ohio Department of Education
David Foster, Director, Silicon Valley Mathematics Initiative
Henry Pollak, Adjunct Professor, Columbia University, Teachers College,
Former Head of Mathematics and Statistics, Bell Laboratories
W. James Popham, Emeritus Professor, University of California, Los Angeles
Cathy Seeley, Senior Fellow, Charles A. Dana Center, The University of Texas at Austin
Malcolm Swan, Professor of Mathematics Education, Centre for Research in Mathematic Education,
University of Nottingham

Claims

Smarter Balanced
1. Concepts and Procedures: Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.
2. Problem Solving: Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies.
3. Communicating Reasoning: Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.
4. Modeling and Data Analysis: Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

Performance Assessments

To Inform Instruction And Measure Higher Level Thinking



The Baker

This problem gives you the chance to:
• choose and perform number operations in a practical context

The baker uses boxes of different sizes to carry her goods.

Cookie boxes hold 12 cookies.
Donut boxes hold 4 donuts.
Muffin boxes hold 2 muffins.
Bagel boxes hold 6 bagels.

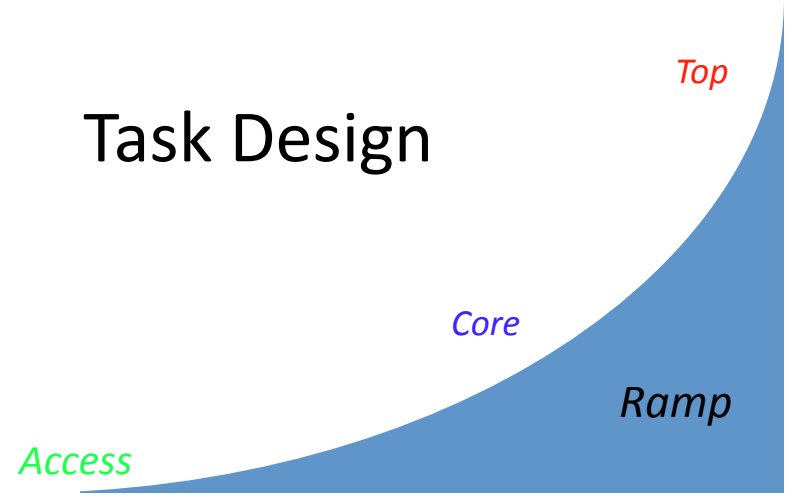
1. On Monday she baked 24 of everything.
   How many boxes did she need? Fill in the empty spaces.
   cookie boxes _____ donut boxes _____
   muffin boxes _____ bagel boxes _____

2. On Tuesday she baked just bagels. She filled 7 boxes.
   How many bagels did she make? _____
   Show your calculations.

3. On Wednesday she baked 42 cookies.
   How many boxes did she fill? _____
   How many cookies were left over? _____
   Explain how you figured this out.

4. On Thursday she baked 32 of just one item and she filled 8 boxes.
   What did she bake on Thursday? _____
   Show how you figured this out.

10



Entry level (access into task)

Core Mathematics - (meeting standards)

Top of Ramp (conceptually deeper, beyond)

- The Mathematics Assessment Resource Service (MARS) is an NSF funded collaboration between U.C. Berkeley and the Shell Centre in Nottingham England.
- The Assessments target grades 2- Geometry and are aligned with the State and NCTM National Math Standards.

SHELL CENTRE

BALANCED ASSESSMENT

MARS

Apprentice Task

CR 4: Baseball Jerseys

Bill is going to order new jerseys for his baseball team.

The jerseys will have the team logo printed on the front.

Bill asks 2 local companies to give him a price.

1. 'Print It' will charge $21.50 each for the jerseys.

   Using *n* for the number of jerseys ordered and *c* for the total cost in dollars, write an equation to show the total cost of jerseys from 'Print It'.

   _____

2. 'Top Print' has a Set-Up cost of $70 and then charges $18 for each jersey.

   Using *n* to stand for the number of jerseys ordered and *c* for the total cost in dollars, write an equation to show the total cost of jerseys from 'Top Print'.

   _____

3. Use the two equations from questions 1 and 2 to figure out how many jerseys Bill would need to order for the price from 'Top Print' to be less than from 'Print It'.
   Explain how you figured it out.

   _____

   _____

   _____

   _____

   _____

4. Bill decides to order 30 jerseys from 'Top Print'.
   How much more would the jerseys have cost if he had bought them from 'Print It'?
   Show all your calculations.

   _____

Baseball Jerseys

This problem gives you the chance to:

- work with equations that represent real life situations

Bill is going to order new jerseys for his baseball team.

The jerseys will have the team logo printed on the front.

Bill asks two local companies to give him a price.

1. 'Print It' will charge $21.50 each for the jerseys.

   Using n for the number of jerseys ordered, and c for the total cost in dollars, write an equation to show the total cost of jerseys from 'Print It'.

   c = 21.50 n

2. 'Top Print' has a one-time setting up cost of $70 and then charges $18 for each jersey.

   Using n to stand for the number of jerseys ordered, and c for the total cost in dollars, write an equation to show the total cost of jerseys from 'Top Print'.

   c = 18 n + 70

3. Bill decides to order 30 jerseys from 'Top Print'.
How much more would the jerseys cost if he buys them from 'Print It'?
Show all your calculations.

$35.00

21.5 x 30 = 645
18 x 30 + 70 = 610
645 – 610 = 35

4. Use the two equations from questions 1 and 2 to figure out how many jerseys Bill would need to buy for the price from 'Top Print' to be less than from 'Print It'.
Explain how you figured it out.

More than 20

I set up two equations, set them equal to each other and solved for the unknown.

21.5n > 18 n + 70, 3.5 n > 70, n > 20. So it will be cheaper for more than 20 jerseys.

Performance Exams

40,000 – 70,000 students per year since 1999

Students in grades 2 through 10th/11th grade are administered performance exams (5 apprentice tasks per exam).

Task 1: Candies		Rubric
The core elements of performance required by this task are: • work with fractions and ratios Based on these, credit for specific aspects of performance should be assigned as follows	points	section points
1. Gives correct answer: 2/3 or 6/9	1	1
2. Gives correct answer: 3 Shows work such as: 1 + 3 = 4 12 ÷ 4 = Accept diagrams.	1 1	2
3 Gives correct answer: 18 Shows work such as: 2 + 3 = 5 30 ÷ 5 = 6 6 x 3 = Accept diagrams.	2 1	3
4. Gives correct answer: 6 Gives a correct explanation such as: Anthony mixes a ratio of one cup of cream to two cups of chocolate. The ratio stays the same for different amounts. So I wrote the numbers in a chart like this 1 to 2 = a total of 3 2 to 4 = a total of 6 3 to 6 = a total of 9 Accept diagrams.	1 1	2
	Total Points	8

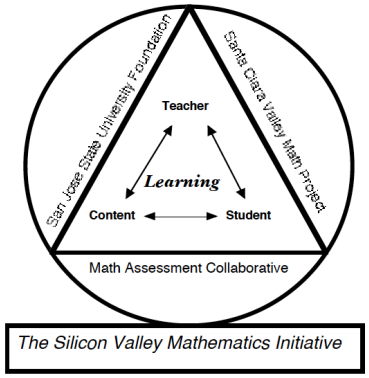
District scoring leaders are trained in using task specific rubrics

Student tests are hand scored by classroom teachers trained and calibrated using standard protocols.

Random sample of student papers are audited and rescored by SJSU math & CS students. (Two reader correlation >0.95)

EDUCATIONAL DATA SYSTEMS

Student results are collected, analyzed, and reported by an independent data contractor.



MAC vs. CST 2013

Silicon Valley Mathematics Initiative

Mathematics Assessment Collaborative

Performance Assessment Exam 2013

MAC vs CST 2013

	Below standards on MARS test	Meeting/exceeding on MARS test
Below standards on NCLB test	Accurately identified as struggling	Misidentified as struggling ("hidden gems")
Meeting/ exceeding on NCLB test	Misidentified as understanding ("false positives")	Accurately identified as understanding

2nd Grade	**MAC Below**	**MAC At/Above**	**Total**
CST Below	20.2%	2.2%	22.4%
CST At/Above	19.1%	58.5%	77.6%
Total	39.3%	60.7%	100%

Elementary Grades

3rd Grade	MAC Below	MAC At/Above	Total
CST Below	19.7%	2.6%	22.3%
CST At/Above	23.9%	53.8%	77.7%
Total	43.6%	56.4%	100%

4th Grade	MAC Below	MAC At/Above	Total
CST Below	21.4%	3.6%	25.0%
CST At/Above	16.2%	58.8%	75.0%
Total	37.6%	62.4%	100%

5th Grade	MAC Below	MAC At/Above	Total
CST Below	21.4%	1.8%	23.2%
CST At/Above	24.3%	52.5%	76.8%
Total	45.7%	54.3%	100%

Middle School

6th Grade	MAC Below	MAC At/Above	Total
CST Below	40.3%	0.7%	41.0%
CST At/Above	29.7%	29.3%	59.0%
Total	70.0%	30.0%	100%

7th Grade	MAC Below	MAC At/Above	Total
CST Below	40.6%	1.1%	41.7%
CST At/Above	26.3%	32.0%	58.3%
Total	66.9%	33.1%	100%

8th Grade	MAC Below	MAC At/Above	Total
CST Below	60.8%	1.0%	61.8%
CST At/Above	28.1%	10.1%	38.2%
Total	88.9%	11.1%	100%

High School

Course 1	MAC Below	MAC At/Above	Total
CST Below	43.6%	5.0%	48.6%
CST At/Above	15.6%	35.8%	51.4%
Total	59.2%	40.8%	100%

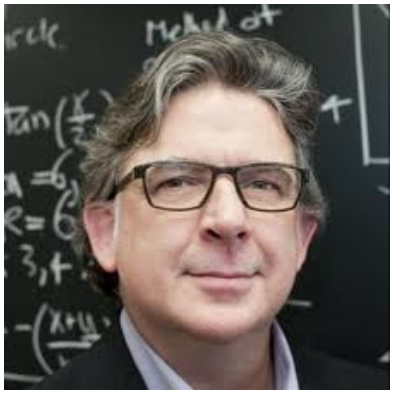
Course 2	MAC Below	MAC At/Above	Total
CST Below	54.7%	0.0%	54.7%
CST At/Above	33.0%	12.3%	45.3%
Total	87.7%	12.3%	100%

Course 3	MAC Below	MAC At/Above	Total
CST Below	56.9%	0.0%	56.9%
CST At/Above	32.3%	10.8%	43.1%
Total	89.2%	10.8%	100%

Student Pathways

Three Central Authors

Common Core State Standards in Mathematics



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Charges given to the authors:

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- Internationally Benchmarked
- Make the standards “Fewer, Clear and Higher”

Domains K–8

Counting & Cardinality						Ratios & Proportional Relationships		
Operations and Algebraic Thinking						The Number System		
Number and Operations in Base Ten						Expressions and Equations		
			Fractions					Functions
Measurement and Data								
Geometry						Geometry		
						Statistics and Probability		
K	1	2	3	4	5	6	7	8

Mathematics Standards for High School

Arranged by conceptual cluster (NOT by course):

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

Two Mathematics Pathways

Two Regular Sequences:

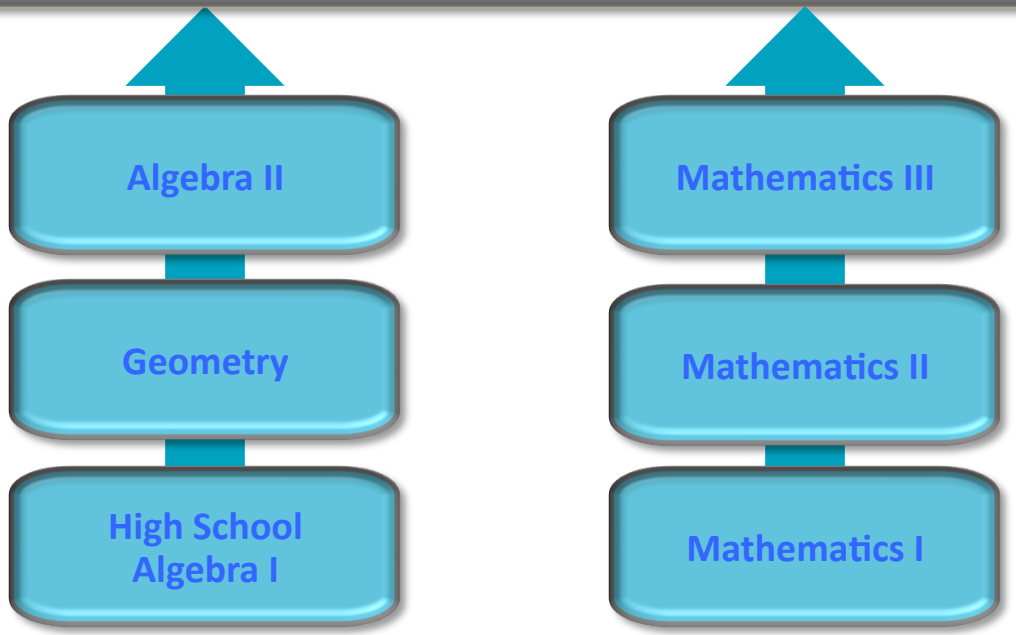
Traditional Pathway

- 2 Algebra courses,1 Geometry course, with Probability and Statistics interwoven

International Pathway

- 3 courses that attend to Algebra, Geometry, and Probability and Statistics each year

Courses in higher level mathematics: Precalculus, Calculus*, Advanced Statistics, Discrete Mathematics, Advanced Quantitative Reasoning, or courses designed for career technical programs of study.



Traditional Pathway
Typical in U.S.

International Pathway
Typical outside of U.S.

Credentialing

- Multiple Subject Credential with a Supplementary Authorization
  - Can only teach mathematics to students in grades 9 and below
  - Can teach any mathematics content

- Single Subject Teaching Credential with a Math Supplementary
  - Can teach mathematics to students in grades K-12
  - Mathematics content is from grade 9 or below courses

- Subject Matter Authorization
  - Can teach mathematics to students in grades K-12
  - Mathematics content is from grade 9 or below courses

A-G Requirements

Board of Admissions and Relations with Schools (BOARS)
Statement on High School Mathematics Curriculum Development under the Common Core State Standards

April 2013

Consistent with past policy and practice for course approval, BOARS reiterates its full support for either the integrated pathways or the traditional pathways, as stated in the A-G Guide's section on Mathematics ("c"). It is BOARS' expectation that courses developed in accordance with either sequence will receive subject area "c" approval provided that they satisfy the course requirements for area "c" presented in the A-G Guide and that they support students in achieving the Standards of Mathematical Practice given in the CCSSM:

http://senate.universityofcalifornia.edu/committees/boars/BOARSonCCSSMathCourseDevelopment.pdf

CALIFORNIA DEPARTMENT OF EDUCATION
NEWS RELEASE

TOM TORLAKSON
State Superintendent
of Public Instruction

California Adopts Modified Math Standards to Restore Local Decision Making

Required by Legislation, Move Allows Progress Toward Common Core

The move rescinds action by the prior Board in 2010, which adopted standards that contained a unique Grade 8 Algebra I course inconsistent with the published *Common Core State Standards for Mathematics*.

Torlakson recommended the unique Grade 8 Algebra I course be replaced with Algebra I and Mathematics I courses based upon the *Common Core State Standards for Mathematics*.

Date: Wed, 16 Jan 2013

Mathematics Education Should Not Be a Race.

Racing contributes to understanding that is "a mile wide and an inch deep."

The California Algebra Experiment

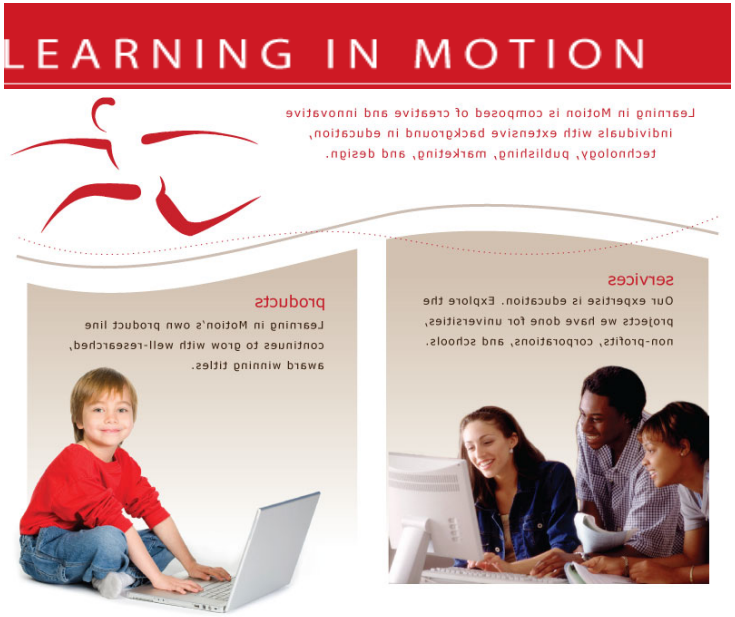
- In 2012, 59% of all eighth grade students took the CST Algebra 1 exam and more than half were not successful. Even more will repeat the class again in high school.
- In 9th grade, 49% of the students took CST Algebra 1 exam and 75% of those students did not pass.
- Research studies indicate nearly 65% of the students who were placed in Algebra in eighth grade are placed in the same level of Algebra in ninth grade.
- About 46% of the students who were successful in Algebra in the eighth grade (B- grade and Proficient) and who were placed again in Algebra in ninth grade were less successful in their second experience.

It is not Algebra for All, it is Algebra Forever.

New K-12 Math Curriculum Inspired by The Common Core State Standards

BILL & MELINDA GATES *foundation*

PEARSON FOUNDATION

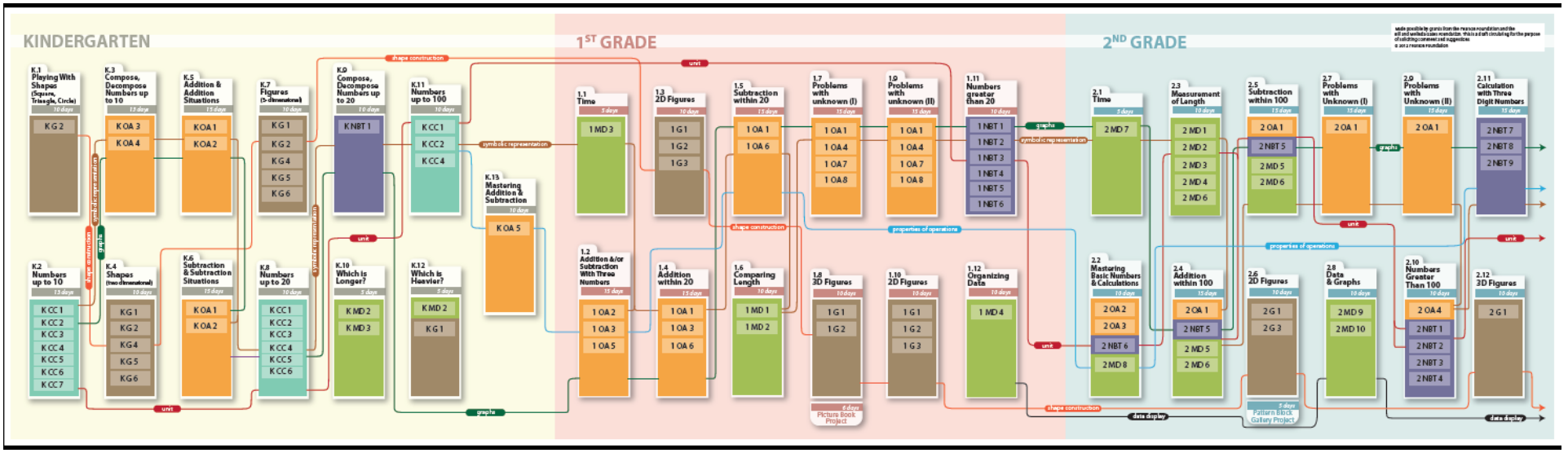


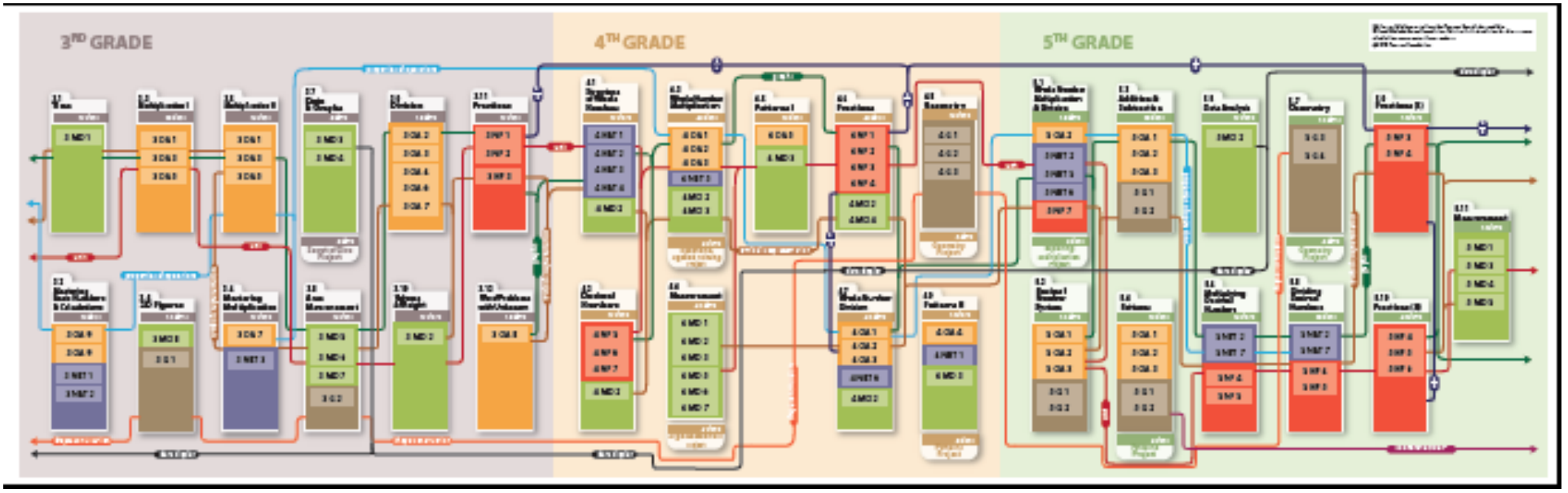
The Gates Foundation and the Pearson Foundation are funding a large scale project to create a system of courses to support the ELA and Mathematics CCSS. These will be a modular, electronic curriculum spanning all grade levels. A Santa Cruz based company, Learning In Motion, is working to write the lessons.

Think in Terms of Units

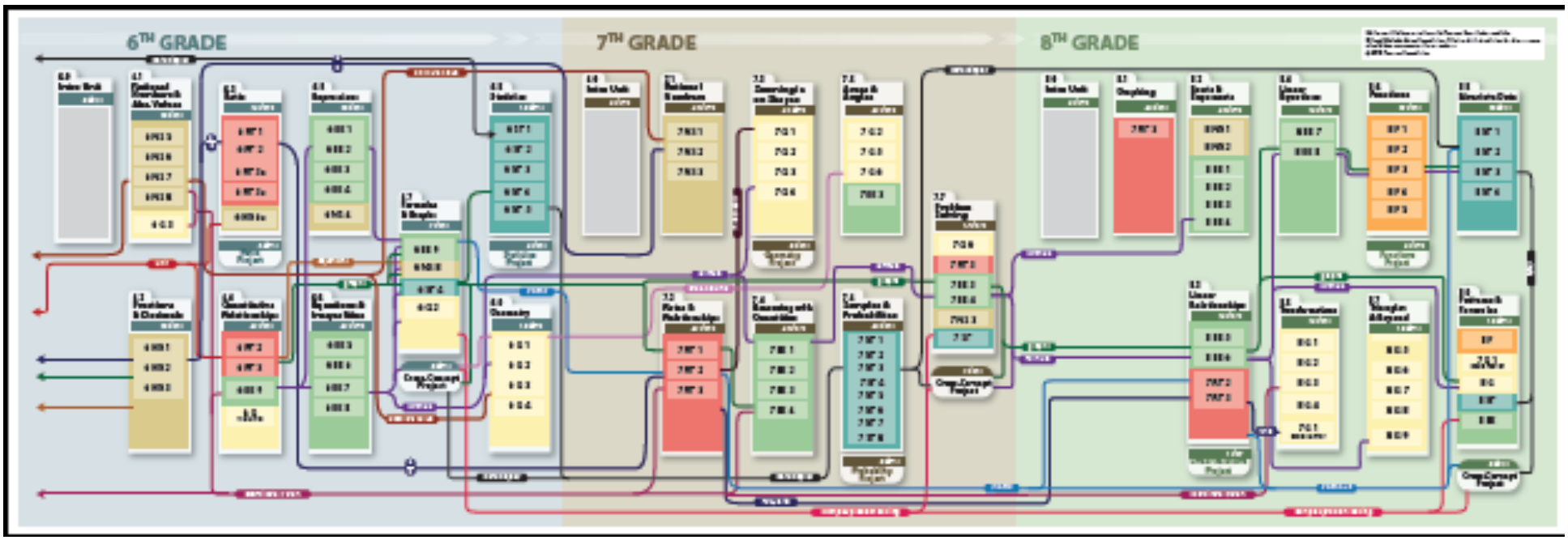
Phil Daro has suggested that it is not the lesson or activity, but rather the **unit** that is the "optimal grain-size for the learning of mathematics". Hence that was the starting point for our Scope and Sequence.

Developers of High School:
Patrick Callahan, Dick Stanley,
David Foster, Brad Findell,
Phil Daro, and Marge Cappo


KINDERGARTEN
1ST GRADE
2ND GRADE


3RD GRADE
4TH GRADE
5TH GRADE

Middle School Curriculum



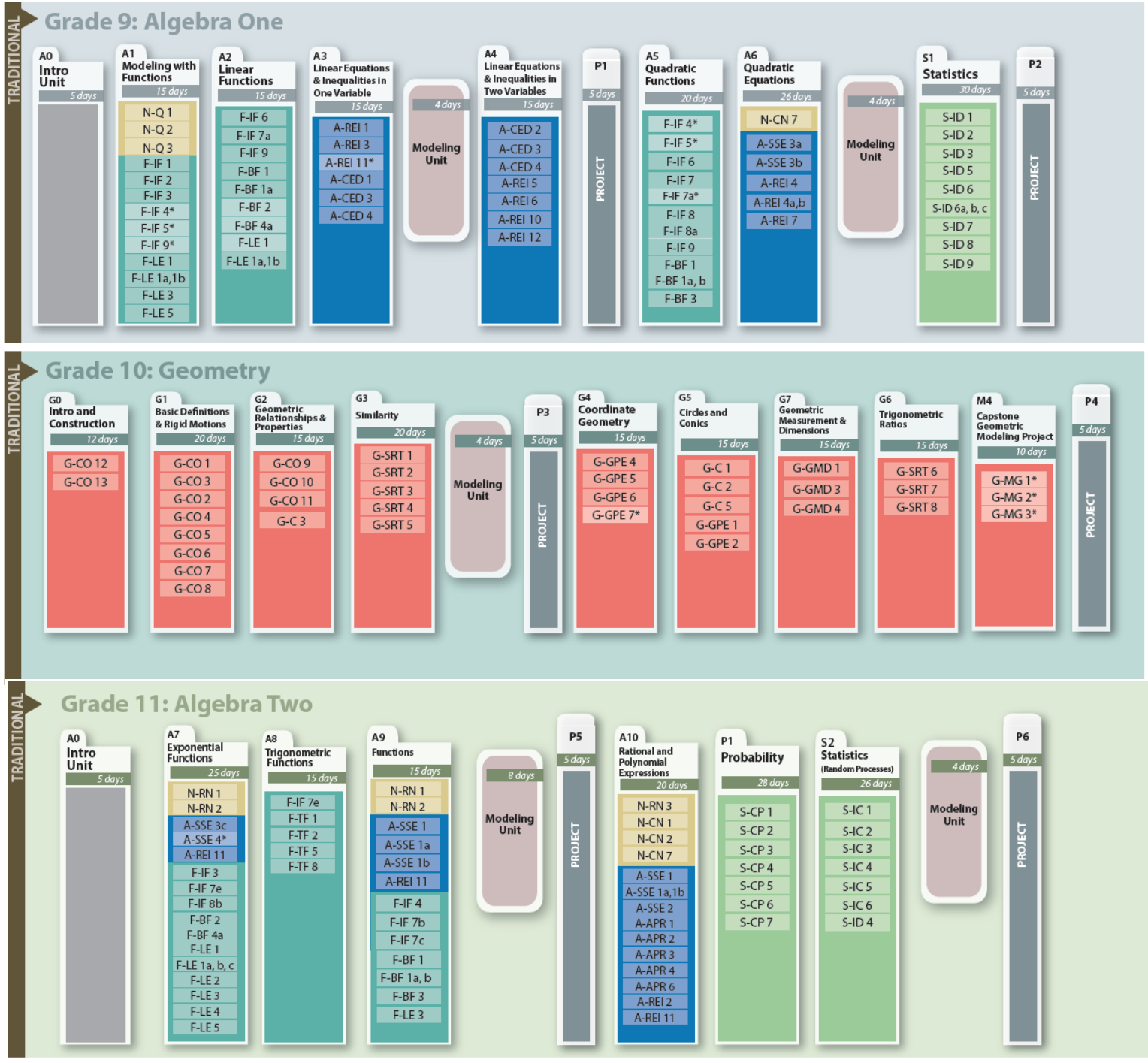
CCSS High School Units

High School Algebra Units:
A0 Introductory Unit
A1 Modeling with Functions
A2 Linear Functions
A3 Linear Equations and Ineq in One Var
A4 Linear Equations and Ineq in Two Var
A5 Quadratic Functions
A6 Quadratic Equations
A7 Exponential Functions
A8 Trigonometric Functions
A9 Functions
A10 Rational and Polynomial Expressions

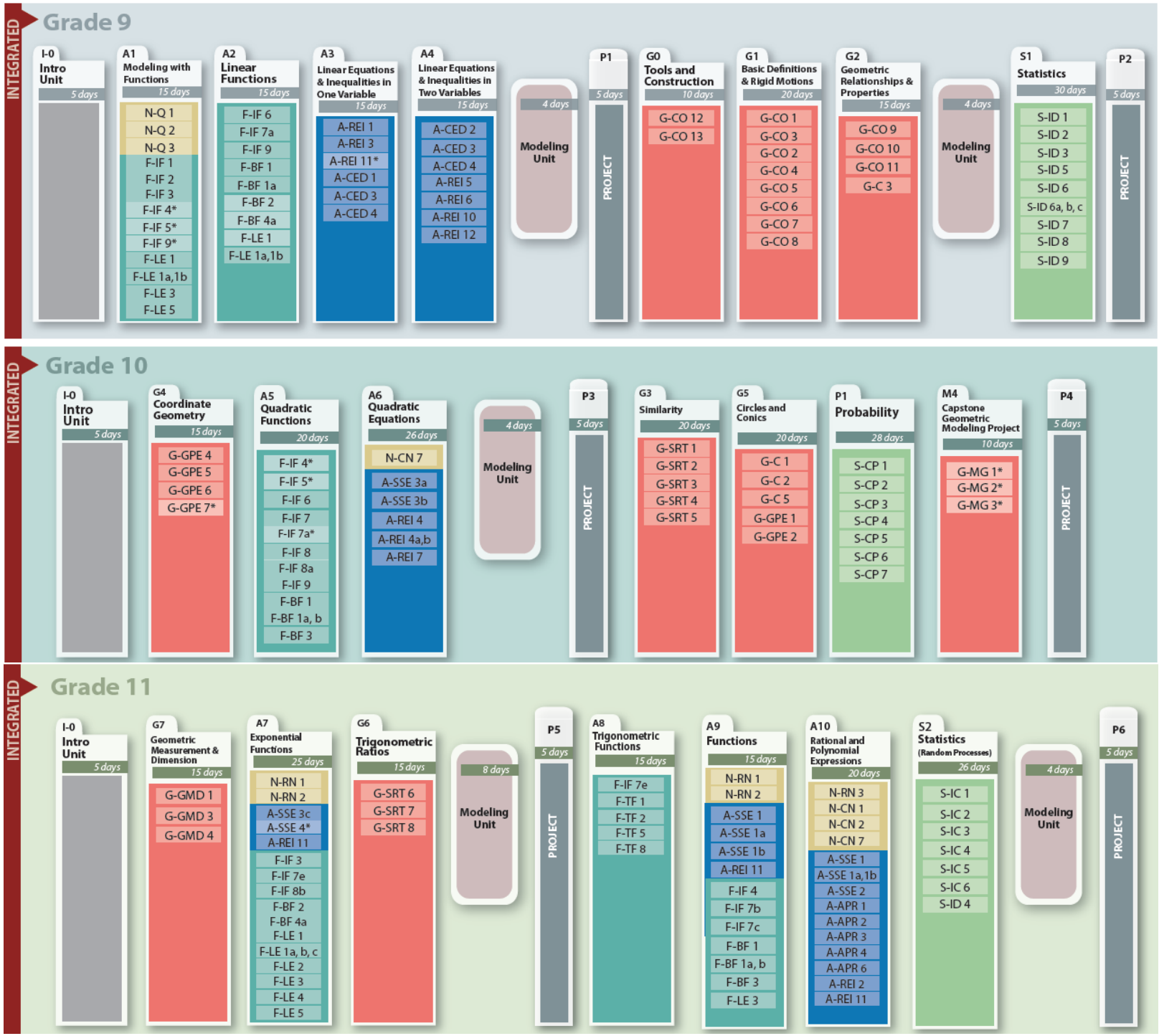
High School Geometry Units:
G0 Introduction and Construction
G1 Basic Definitions and Rigid Motions
G2 Geometric Relationships and Properties
G3 Similarity
G4 Coordinate Geometry
G5 Circle and Conics
G6 Trigonometric Ratios
G7 Geometric Measurement and Dimension
M4 Capstone Geometric Modeling Project

High School Prob & Stat Units:
P1 Probability
S1 Statistics
S2 Statistics (Random Process)

TRADITIONAL US



INTERNATIONAL



Curriculum and Implementation Effects on High School Students' Mathematics Learning From Curricula Representing Subject-Specific and Integrated Content Organizations

Douglas A. Grouws, James E. Tarr, Óscar Chávez,
Ruthmae Sears, Victor M. Soria, and Rukiye D. Taylan
University of Missouri

This study examined the effect of 2 types of mathematics content organization on high school students' mathematics learning while taking account of curriculum implementation and student prior achievement. The study involved 2,161 students in 10 schools in 5 states. Within each school, approximately 1/2 of the students studied from an integrated curriculum (Course 1) and 1/2 studied from a subject-specific curriculum (Algebra 1). Hierarchical linear modeling with 3 levels showed that students who studied from the integrated curriculum were significantly advantaged over students who studied from a subject-specific curriculum on 3 end-of-year outcome measures: Test of Common Objectives, Problem Solving and Reasoning Test, and a standardized achievement test. Opportunity to learn and teaching experience were significant moderating factors.

What is the Common Core Middle School Curriculum?

6th Grade CCSSM Curriculum

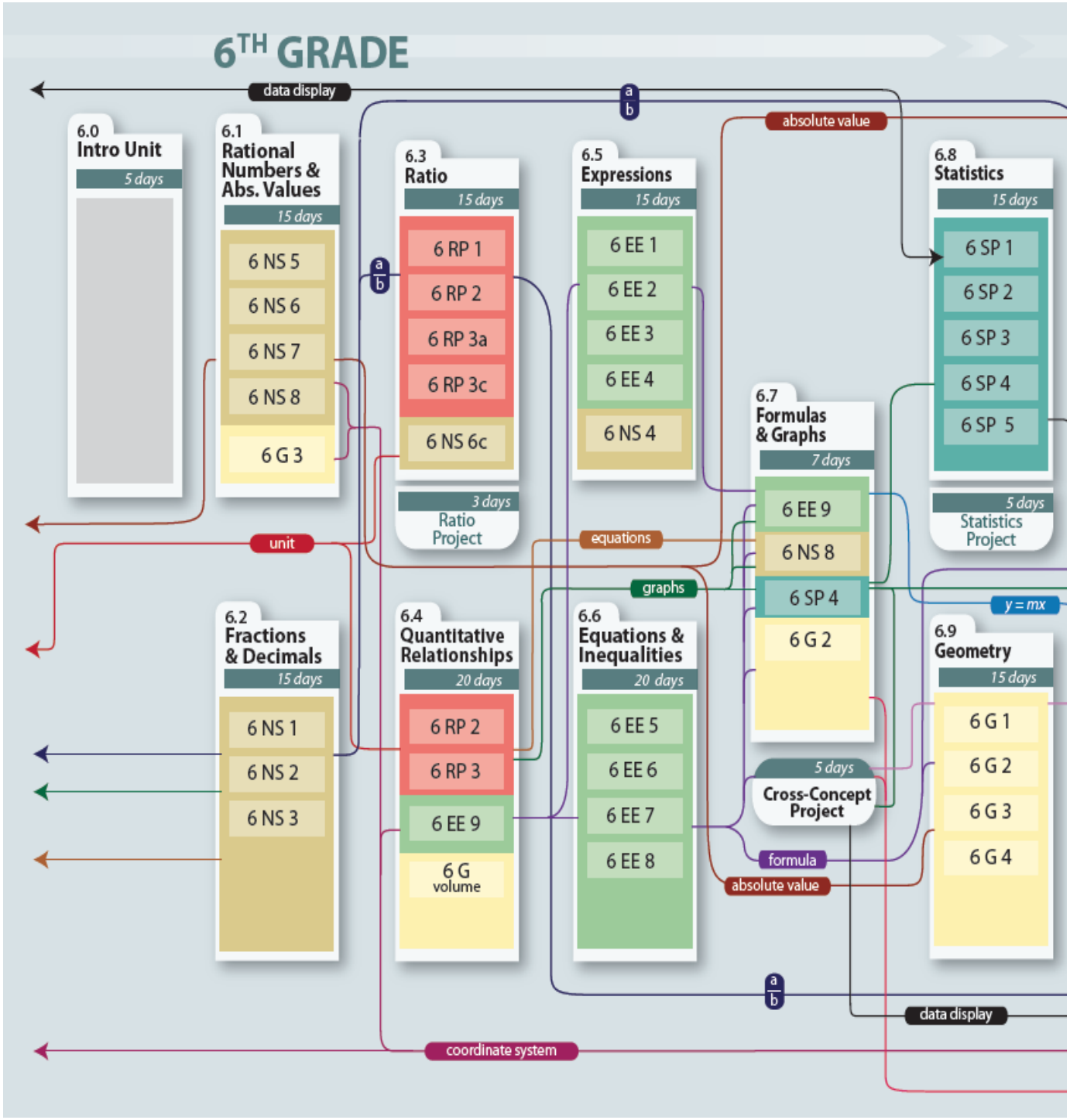
Integer and their operations

Division of Fractions

Ratio and proportional reasoning

Expression, Equations and Inequalities

Statistics



Seventh Grade CCSSM Curriculum

Properties of rational numbers, percents, discounts, markups, etc.

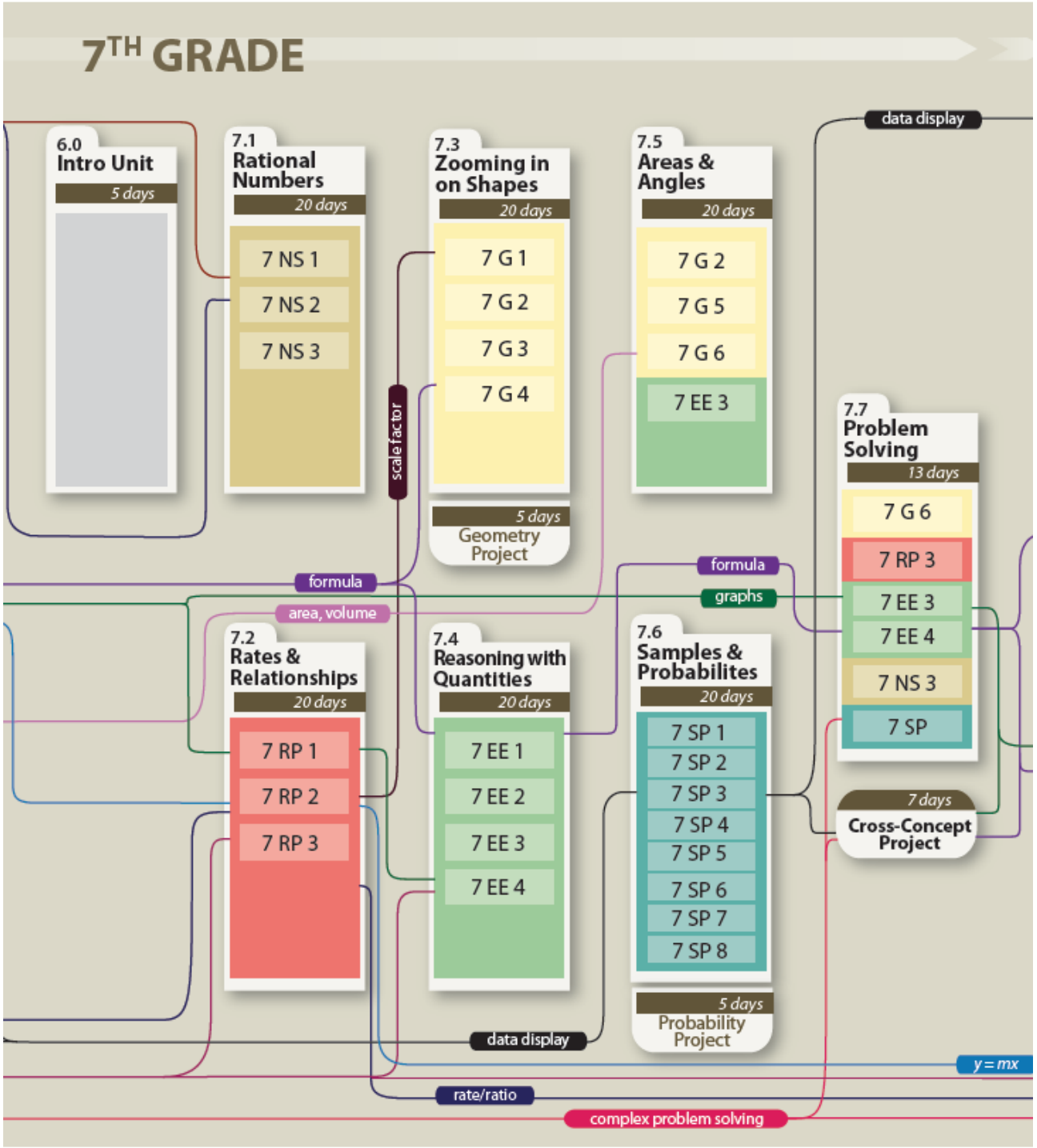
Rate and problems solving using rate

Similarity, proportional reasoning

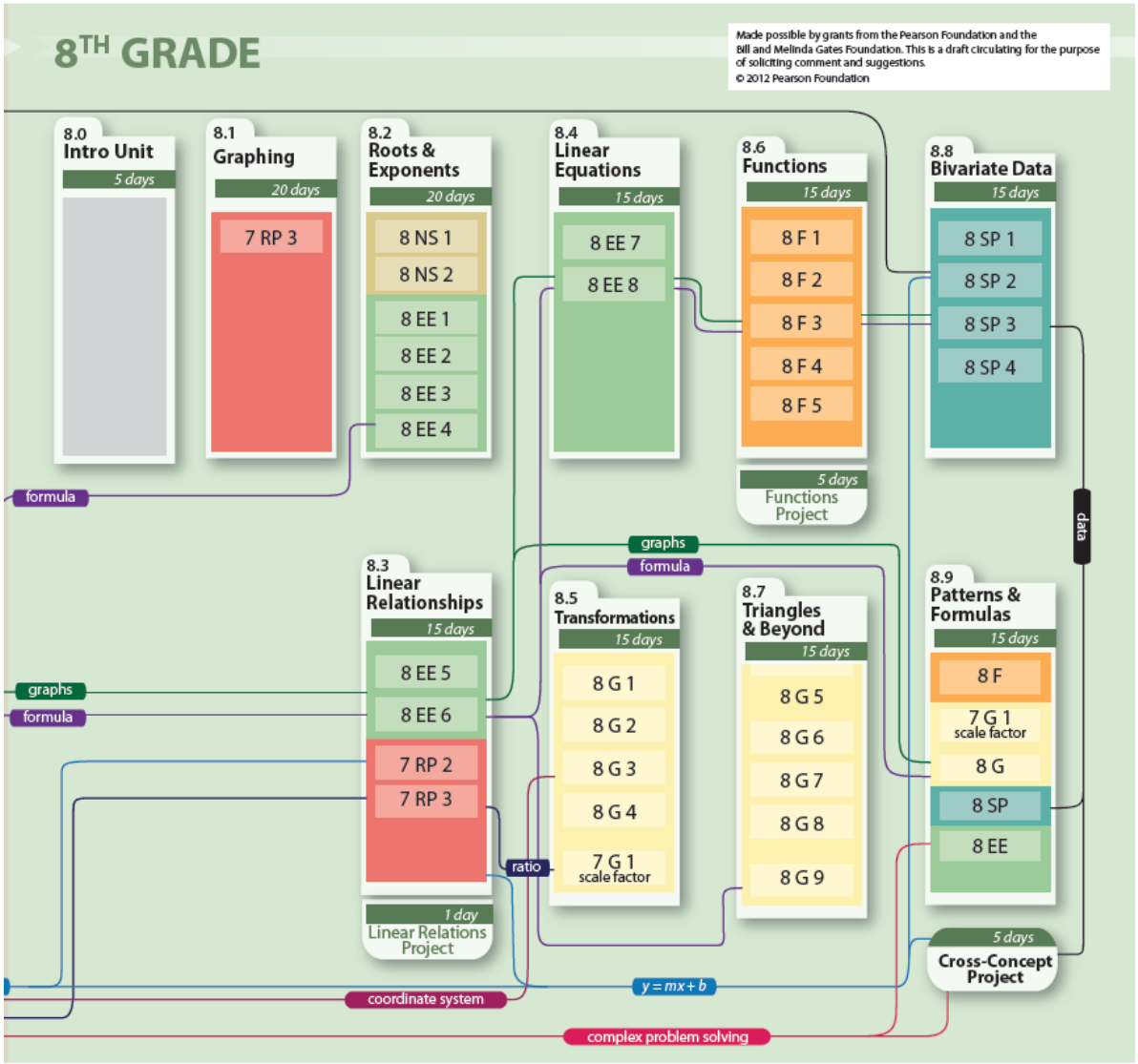
Algebraic Modeling with Equations

Probability

Geometry: Angles, Volume, Surface Area, 3-D shapes



CCSSM 8th Grade are HS Standards

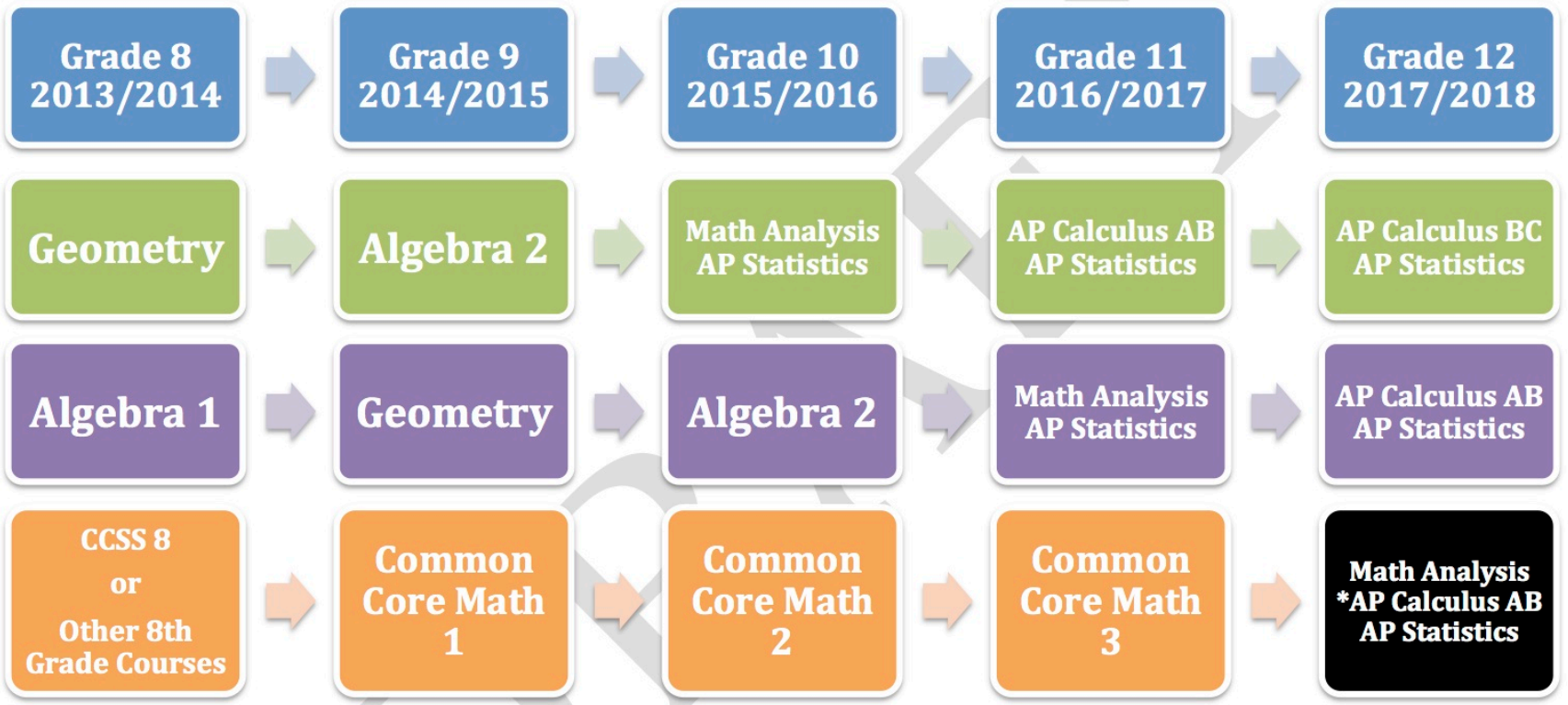


- Algebra/ Functions 67%
- Geometry (Transformations and Triangle Proofs) 20%
- Bivariate Data 10%
- Cross-Concept Project 3%

Pathways through East Side UHSD

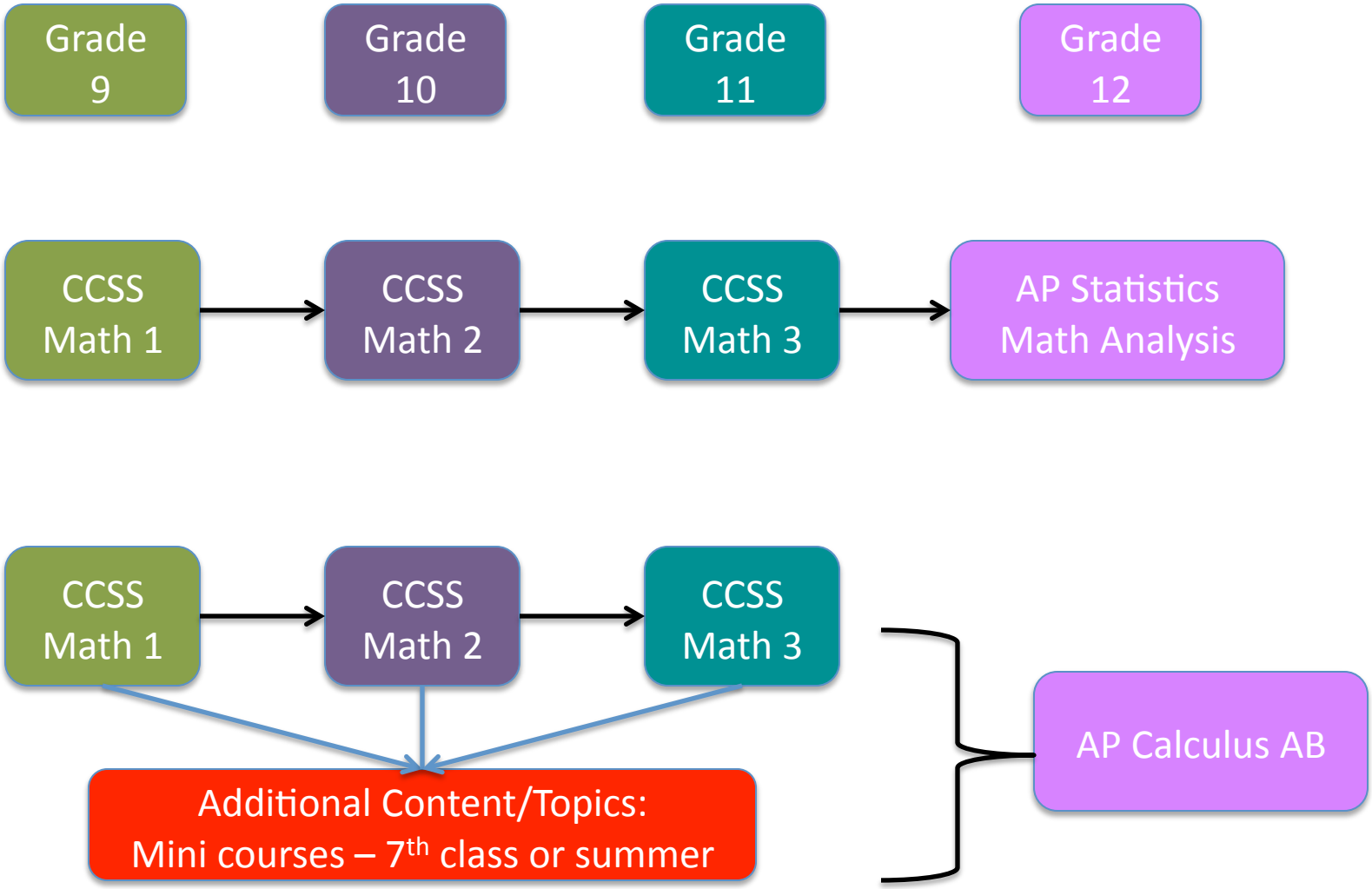
Every *student graduates prepared for college and career, empowered to thrive in a global society.*

East Side Union High School District
Common Core Math Pathway Implementation
2013/2014 8th Grade Students



- *Requires completing additional math curriculum in order to bypass Math Analysis and go directly to AP Calculus.
- Current 8th grade students in math courses above Geometry will matriculate into the next level course, as in past.
- Current 8th grade students in Algebra 1 will be able to choose to follow the Common Core Math pathway.
- Current 7th grade students in Algebra 1 that will take Geometry in 8th grade in 2014-15 will continue to enroll in Algebra 2 in 9th grade.

ESUHSD Proposed Acceleration Models



** Additional Content + full summer course acceleration would allow students to enter AP Calculus BC during 12th grade.*

Inside Mathematics Website

http://www.insidemathematics.org

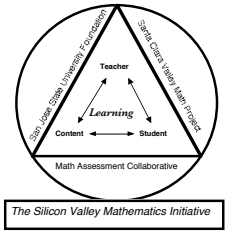
Mathematics Assessment Pro

UC Berkeley & Shell Centre for Mathematical Education

MARS Team
Mathematics Assessment Resource Service

http://map.mathshell.org/materials/lessons.php

Silicon Valley Mathematics Initiative



http://www.svmimac.org