

GVC Companion Guide: Math Core 7

Guiding Philosophy, CGI, Cognitively Guided Instruction:

- ❖ We invite you to consider the following:
 - Students need space and time to make sense of mathematics.
 - Students need time to explain their thinking.
 - Take time to notice, strategically share, and celebrate diverse student thinking.
 - Use questioning to elicit, support, and extend thinking.
 - Facilitate student-centered discussions to deepen understanding and create spaces for sense-making.



Seven Guiding Principles of Cognitively Guided Instruction, CGI:

We tie these principles to the Social Justice Standards, learning for justice anti-bias framework - [Learning for Justice Website](#)

1. Every student comes to math class knowing some mathematics
 2. Every student is capable of extending their mathematical ideas
 3. Knowing the development of children's thinking helps you know how to support learning— "What am I working toward?"
 4. Details of children's thinking support instructional decision making
 5. Must challenge our assumptions about what students know and are able to do
 6. Must create space for the participation of each and honor the different ways in which students are participating
 7. Identity shapes participation, so want to position students competently
- Start the school year with growth mindset work doing Inspirational Week of Math tasks Start the school year with growth mindset work doing Inspirational Week of Math tasks from YouCubed.org at Stanford. Set classroom norms and excitement for a great year of mathematics ahead! Under Tasks & More <https://www.youcubed.org/week-inspirational-math/> (listed as weeks but is actually year 1, 2, 3, 4... of its existence) Consider using throughout the year with a big kick off week one using parts of any of the "weeks" provided. Work with your PLC to collaborate together on which to use when. Site offers numerous resources to support differentiation/enrichment and community communication.
 - Use number talks/sense making routines and mini lessons to bring back past math knowledge.
- Things to think about including:
- Number Strings <https://numberstrings.com/>
 - [Choral Counting](#)
 - Multiple Representations (Frayer Model: [sample images](#) consider application quadrant)
 - Graphing Stories: [Blog-why-how-samples](#); [Desmos Stories](#); [STEMlearning](#); [sample search](#)
 - Always, Sometimes, or Never | True-False ... and why? | Give example(s) and/or counter-example(s) [rich.maths-ASN](#) | [true/false routine](#)
 - [Same but Different](#)
 - [Number-Math Talks](#) | [Making Number Talks Matter](#)
 - Error Analysis "[My Favorite No](#)" – My favorite wrong answer/Error Analysis
 - Which one doesn't belong? (WODB) [Which one doesn't belong?](#)
 - [Academic Talk protocol\(English learners++\)](#) | [Partner A/Partner B \(Academic Talk protocol\)](#)
 - [Estimation 180](#) | [Estimysteries](#) | [Splat](#)
 - [Open Middle](#) (open-ended questions)
 - [Would You Rather](#)
 - [Data Talks](#)
 - Silent Board Games [How-To](#)
 - Claims-Evidence Writing ([graphic organizer support](#)) Problem-Evidence-Reasoning-Claim (PERC)
 - Mathematical Mindsets by Jo Boaler (Appendix A pgs. 217-268) [Appendix](#)



- Note “[Critical Areas of Instruction](#)” also aligned to content standards for seventh grade.
 - [OpenUp Resources](#) *[Math Milestones](#) ([7th grade](#)) **[UNIT IABS](#) for the year
- Problem solving is done throughout the course and used to launch/explore/summarize and to engage with and apply mathematical concepts.
- There has been an effort to ensure that we are aligned with the CA State Mathematics Standards and that the concepts are organized in a logical, fluid way, and that we have coherence in the course.

Semester 1:

Unit 1 & 2 Goals: • Students will develop an understanding that rational numbers consist of positive and negative numbers and zero • Students will locate and compare the values of rational numbers using a number line • Students will develop and use algorithms for adding, subtracting, multiplying and dividing rational numbers • Students will solve problems using rational numbers • Students will understand that the equality sign indicates two equivalent expressions

Unit 3 Goals: • Students will understand what it means for figures to be similar • Students will develop strategies for using similar figures to solve problems • Students will analyze resulting changes in area and perimeter after figures have been stretched or shrunk

Unit 4 Goals: Students will understand ratios, rates, and percent Students will make sense of surveys and scale recipes for different numbers of people Students will analyze prices for better deals and calculate commission, percent of change, simple interest, discount, markup, tip and tax Students will develop and use strategies for solving problems that require proportional reasoning

SEMESTER 1 Fall FIAB <i>The Number System</i>			
Unit 1	Unit 2	Unit 3	Unit 4
YouCubed Week of Inspirational Math CMP 3 Accentuate the Negative OpenUp Unit 5 Rational Number Arithmetic	CMP3: Moving Straight Ahead OpenUp U2: Introducing Proportional Relationships	CMP3: Stretching & Shrinking OpenUp U1: Scale Drawings	CMP3: Comparing and Scaling OpenUp U4: Proportional Relationships and Percentages 

SEMESTER 1

Students should build on prior knowledge of...	Students should master ...	Students should be developing and will continue to work on...
Solving operations and rational numbers Solving equations/inequalities, word problems, and distributive property Scale factors, perimeter, area,	Performing arithmetic operations with rational numbers Representing and interpreting equations and inequalities using word problems	Ratios, proportions, percent Proportional relationships, unit rates Data analyzation, sampling methods, and probability

volume, similarity Ratios, proportions, percent	Develop an understanding of proportional relationships. Students will graph proportional relationships and understand the unit rate informally as a measure of steepness.	Surface area and volume Area and circumference of circles.  SANTA MONICA-MALIBU UNIFIED SCHOOL DISTRICT
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Things to keep in mind:

“Comparing and Scaling” has been moved to After “Stretching and Shrinking”.

Rationale: Concepts in Comparing and Scaling are assessed in the Ratios and Proportions IAB that is given in February, along with parts of “Moving Straight Ahead”; therefore this sequence supports completing semester one in a way that looks ahead to the start of semester two.

SEMESTER 2 Winter FIAB Ratios and Proportions			
Unit 5	Unit 6	Unit 7	Unit 8
CMP 3: Shapes & Designs Filling & Wrapping OpenUp U7 - Angles, Triangles, and Prisms (Lessons 1-15) OpenUp U3 - Measuring Circles	CMP 3: Filling & Wrapping OpenUp U7 - Angles, Triangles, and Prisms (Lessons 11-16)	CMP 3: Samples & Populations - OpenUp U8 - Probability and Sampling	 CMP 3: What do you Expect? OpenUp U8 - Probability and Sampling OpenUp U9 - Putting It All Together

SEMESTER 2

Students should build on prior knowledge of...	Students should master ...	Students should be developing and will continue to work on...
Ratios, proportions and unit rates. Solving, reading and writing expressions, equations, and inequalities Finding equivalent expressions.	Unit rate conversions Recognize linear relationships by the constant rate of change between two variables in a contextual situation, a table, a graph, or an equation. Finding surface area and volume	Investigate chance processes and develop, use, and evaluate probability models. Drawing inferences about populations based on samples. Draw informal comparative inferences about two populations

Geometry specifically for 2-dimensional shapes.	of 3-dimensional shapes.	Geometry
Measures of central tendency	Finding the circumference and area of circles	Equations, inequalities, and expressions.
	Use random sampling to draw inferences about a population	Proportional relationships.
	Compare and make inferences about two populations.	
	Understand the basics of probability	

Things to keep in mind:

- In semester 2 the 2D geometry component from “Shapes and Design” scaffolds the concepts necessary for volume and surface area in “Filling and Wrapping” which follows.
- “Samples and Populations” **tasks can be incorporated throughout the year**, critical area #4. “What do you expect” brings back 6th grade ideas to support stats and probability understanding **and is again to be incorporated throughout the year**.

For the Core 7th course, instructional time should focus on four [critical areas](#):

- (1) Developing understanding of an applying proportional relationships
- (2) Developing understanding of operations with rational numbers and working with expressions and linear equations.
- (3) Solve problems involving scale drawings and informal geometric constructions, and working with two- and three- dimensional shapes to solve problems involving area, surface area, and volume.
- (4) Drawing inferences about populations based on samples.

Reference [Math Milestones](#) as examples of tasks that promote student thinking around the grade’s big ideas.

[Standards for Mathematical Practices](#) = the how-to of the content standards

MP1: Make sense of problems and persevere in solving them

MP2: Reason abstractly and quantitatively

MP3: Construct viable arguments and critique the reasoning of others

MP4: Model with mathematics

MP5: Use appropriate tools

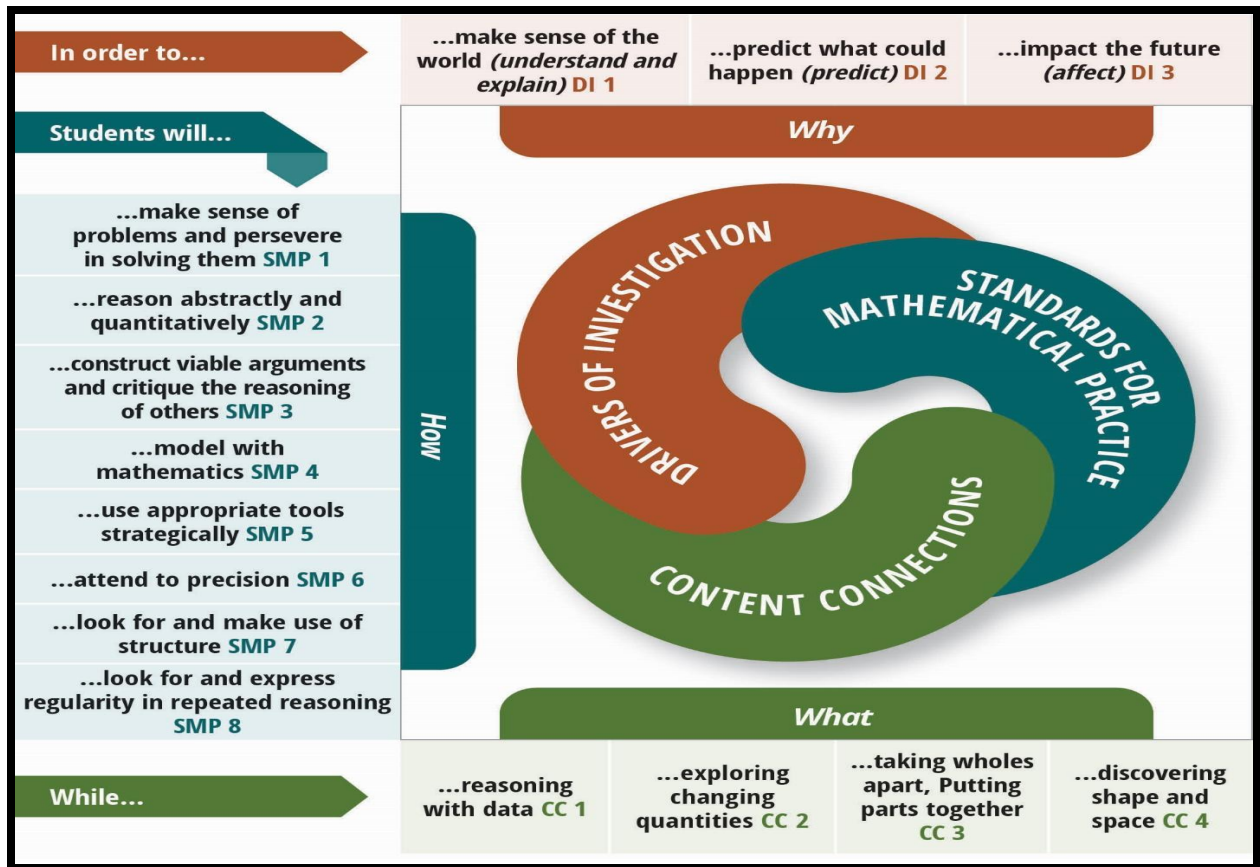
MP6: Attend to precision

MP7: Look for and make use of structure

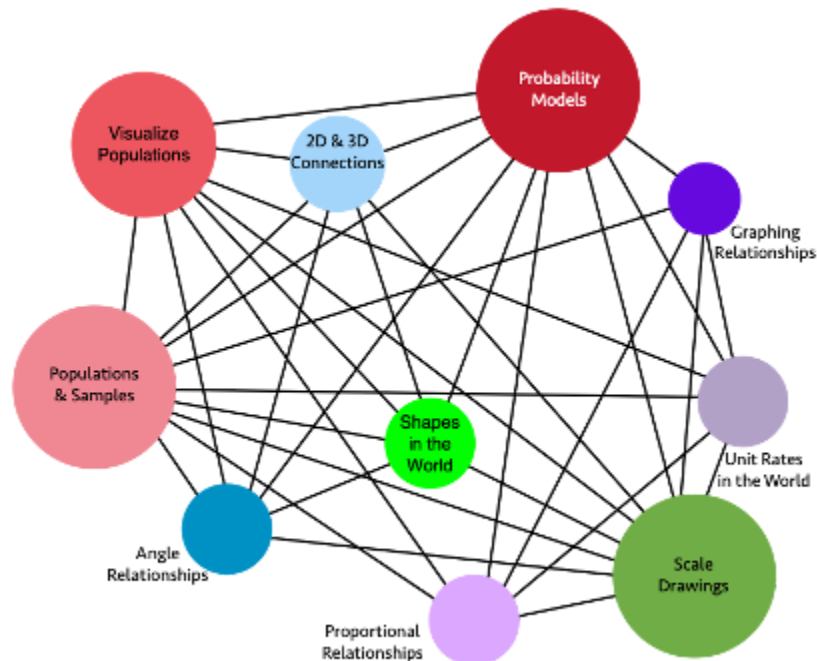
MP8: Look for and express regularity in repeated reasoning

Mathematical Practices 1-3-6 = connections to EL/ELD and NGSS standards: See [Critical Areas](#) for details of grade expectations





MATH CORE SEVEN **BIG IDEAS** from 2023 CA MATH FRAMEWORK chapter 7



- Angle Relationships directly connects to: Scale Drawings, 2D & 3D Connections, Populations & Samples, Proportional Relationships, Shapes in the World, Visualize Populations, Probability Models

- Scale Drawings directly connects to: 2D & 3D Connections, Graphing Relationships, Populations & Samples, Unit Rates in the World, Proportional Relationships, Visualize Populations, Probability Models, Angle Relationships
- Graphing Relationships directly connects to: Populations & Samples, Unit Rates in the World, Proportional Relationships, Probability Models, Scale Drawings
- 2D & 3D Connections directly connects to: Scale Drawings, Angle Relationships, Probability Models, Proportional Relationships, Visualize Populations, Shapes in the World, Populations & Samples
- Populations & Samples directly connects to: 2D & 3D Connections, Scale Drawings, Angle Relationships, Probability Models, Proportional Relationships, Visualize Populations, Shapes in the World, Unit Rates in the World, Graphing Relationships
- Unit Rates in the World directly connects to: Populations & Samples, Graphing Relationships, Scale Drawings, Proportional Relationships, Probability Models, Visualize Populations
- Shapes in the World directly connects to: Populations & Samples, 2D & 3D Connections, Proportional Relationships, Scale Drawings, Angle Relationships, Probability Models, Visualize Populations
- Visualize Populations directly connects to: 2D & 3D Connections, Scale Drawings, Angle Relationships, Probability Models, Proportional Relationships, Populations & Samples, Shapes in the World, Unit Rates in the World
- Probability Models directly connects to: 2D & 3D Connections, Scale Drawings, Angle Relationships, Proportional Relationships, Visualize Populations, Shapes in the World, Unit Rates in the World, Graphing Relationships, Populations & Samples
- Proportional Relationships directly connects to: 2D & 3D Connections, Scale Drawings, Angle Relationships, Probability Models, Populations & Samples, Visualize Populations, Shapes in the World, Unit Rates in the World, Graphing Relationships

CONTENT CONNECTIONS ~ BIG IDEAS ~ CONTENT STANDARDS

CC1~reasoning with data CC2~exploring changing quantities

CC3~taking wholes apart, putting parts together CC4~discovering shape and space

Content Connection	Big Idea	Grade Seven Content Standards
Reasoning with Data	Populations and Samples	SP.1, SP.2, RP.1, RP.2, RP.3, NS.1, NS.2, NS.3, EE.3: Study a population by taking random samples and determine if the samples accurately represent the population. - Analyze and critique reports by examining the sample and the claims made to the general population - Use classroom simulations and computer software to model repeated sampling, analyzing the variation in results.
Reasoning with Data	Visualize Populations	SP.3, SP.4, NS.1, NS.2, NS.3, EE.3: Draw comparative inferences about populations - consider what visual plots show, and use measures of center and variability Students toggle between the mathematical results and their meaningful interpretation with their given context, considering audiences, implications, etc.
Reasoning with Data	Probability Models	SP.5, SP.6, SP.7, SP.8, RP.1, RP.2, RP.3, NS.1, NS.2, NS.3, EE.3: Develop a probability model and use it to find probabilities of events and compound events, representing sample spaces and using lists, tables, and tree diagrams. - Compare observed probability and expected probability. - Explore potential bias and over-representation in real world data sets, and connect to dominating narratives and counter narratives used in public discourse.
Exploring Changing Quantities	Proportional Relationships	EE.2, EE.3, RP.1, RP.2, RP.3: Explore, understand, and use proportional relationships: - using fractions, graphs, and tables.
Exploring Changing Quantities	Unit Rates in the World	RP.1, RP.2, RP.3, EE.1, EE.2, EE.3, EE.4: Solve real world problems using equations and inequalities, and recognize the unit rate within representations.
Exploring Changing Quantities	Graphing Relationships	EE.4, RP.1, RP.2, RP.3: Solve problems involving proportional relationships that can lead to graphing using geometry software and making sense of solutions.
Taking Wholes Apart, Putting Parts Together and Discovering Shape and Space	2-D and 3-D Connections	G.1, G.2, G.3, NS.1, NS.2, NS.3: Draw and construct shapes, slice 3-D figures to see the 2-D shapes. Compare and classify the figures and shapes using area, surface area, volume, and geometric classifications for triangles, polygons, and angles. Make sure to measure with fractions and decimals, using technology for calculations

Content Connection	Big Idea	Grade Seven Content Standards
Taking Wholes Apart, Putting Parts Together and Discovering Shape and Space	Angle Relationships	G.5, G.6, NS.1, NS.2, NS.3: Explore relationships between different angles, including complementary, supplementary, vertical, and adjacent, recognizing the relationships as the measures change. For example, angles A and B are complementary. As the measure of angle, A increases, the measure of angle B decreases.
Discovering Shape and Space and Exploring Changing Quantities	Scale Drawings	G.1, EE.2, EE.3, EE.4, NS.2, NS.3, RP.1, RP.2, RP.3: Solve problems involving scale drawings and construct geometric figures using unit rates to accurately represent real world figures. (Use technology for drawing)
Discovering Shape and Space and Exploring Changing Quantities	Shapes in the World	G.1, G.2, G.3, G.4, G.5, G.6, NS.1, NS.2, NS.3: Solve real life problems involving triangles, quadrilaterals, polygons, cubes, right prisms, and circles using angle measures, area, surface area, and volume.

Drivers of Investigation. Unifying reasons that both elicit curiosity and provide the motivation for deeply engaging with authentic mathematics.

D1~make sense of the world (understand and explain)

D2~predict what could happen (predict)

D3~impact the future (affect)

