

GVC Companion Guide: Math Core 6

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 A](#)



- Note “[Critical Areas of Instruction](#)” also aligned to content standards for sixth grade.
 - [OpenUp Resources](#) *[Math Milestones](#) (6th grade)
 - **[UNIT IABS](#) for the year [Academic Vocabulary](#) [Youtube Videos](#)
- 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 Goal:** The focus of this unit is on the properties of whole numbers, especially those related to multiplication and division. Students will learn about factors, multiples, divisors, products, prime and composite numbers, common factors and multiples, the Distributive Property, and Order of operations.
- **Unit 2 Goal:** Students will deepen their knowledge of and comfort with fractions, in particularly with dividing fractions. In addition, they will learn to recognize fractions and decimals as numbers that can be located on the number line as well as compared, counted, partitioned and decomposed. Lastly, students will recognize ratios as comparisons of two numbers, find equivalent ratios, and use equivalence to solve problems.
- **Unit 3 Goal:** Students will focus on understanding and developing systematic ways to add, subtract, multiply, and divide fractions. They will investigate many interesting problem situations that help them develop algorithms for fraction computation. In addition, students will use number sense, benchmarks, and operation sense to estimate solutions, helping them decide if exact answers are reasonable.
- **Unit 4 Goal:** Students will gain an understanding of what it means to measure. They will study several types of measurements: perimeter, area, surface area, and volume. The problems are structured so that students can build a deep understanding of what it means to measure perimeter (length), area (squares), and volume (cubes) that will eventually lead them to development of formulas.

SEMESTER 1 Fall FIAB Division of Fractions by Fractions			
Unit 1	Unit 2	Unit 3	Unit 4
YouCubed Week of Inspirational Math CMP 3 Prime Time	CMP3: Comparing Bits & Pieces OpenUp Units 2-3	CMP3: Let's Be Rational OpenUp Unit 4	CMP3: Covering and Surrounding Geometry OpenUp Unit 1 

SEMESTER 1

Students should build on prior knowledge of...	Students should master ...	Students should be developing and will continue to work on...
NS - Dividing Fractions	Operations of Fractions	Statistics - finding the “average”
Ratios/Unit Rates/Equivalent Fractions	Area, Perimeter, Surface Area, Volume, & Nets	Operations with decimals/rational numbers



Proportional Relationships	Solve one-step equations	Coordinate Graph/ordered pairs
Comparing Rational Numbers w/ absolute value	Rates & Unit Rates	Percent
GCF/LCM Fact Families Inequalities	 SANTA MONICA-MALIBU UNIFIED SCHOOL DISTRICT	

District FIAB in October will be Division of Fractions by Fractions

Interdisciplinary/Inquiry based projects to consider:

Geometry Unit - Creating a floor plan for your bedroom and determining the area. Create 2 composite furniture pieces to add to your floor plan & determine the area to the furniture.

Geometry Unit - Create a monument to acknowledge a significant group. Determine the Volume & Surface Area. Look at the material used to construct the monument to determine the cost & (in science) look into the weather of where the monument will be able to last.

Geometry Unit - PBL - Lunchbox Project or Build Aquarium



Semester 2

- **Unit 5 Goal:** Students will engage in problems that will help them develop algorithms for adding, subtracting, multiplying, and dividing decimals. They will explore percent in the contexts of tips, taxes, and discounts. The students will use prior knowledge to make sense of decimal by interpreting decimals as fractions and extending place value concepts. More work and understanding of Percent.
- **Unit 6 Goal:** Students will explore ways of representing a changing situation: with a description in words, with a data table, with a graph, and with equations. They will write symbolic expressions as a shorter, faster way to give a summary of the relationship between two variables. Students will use informal reasoning to find values for x and y when given a value for the other.
- **Unit 7 Goal:** Students will construct line plots, dot plots, frequency charts, ordered-value bar graphs, histograms, and box-and-whisker plots. They will interpret patterns they see in these charts. Students will learn to compute the measures of central tendency, range, interquartile range, and the mean absolute deviation in order to describe and make predictions about the data.

SEMESTER 2 Winter IAB The Number System		
Unit 5	Unit 6	Unit 7
CMP 3: Covering and Surrounding Investigate 4 Decimal Operations OpenUp Unit 3	CMP 3: Variables & Patterns OpenUp Unit 6	CMP 3: Data About Us OpenUp Unit 8



SEMESTER 2

Students should build on prior knowledge of...	Students should master ...	Students should be developing and will continue to work on...
Proportions.	Dividing Decimals	Solving 2 step Equations (& multipstep)
Decimal Operations	Variables	Graphing
Distributive Property	Solving Equations	Proportional Reasoning
Writing Expressions & Equations	Solve 1 step Inequalities.	Fraction & Decimal Operations
Coordinate Grid/Graphing	Measures of Centers - Mean, Median & Mode	Area of Triangles
Bar Graphs	Variability (MAD; IQR)	
Benchmark of Fractions and Decimals	Tables and Graphs	
	Graphical Representations - Dot Plots, Box & Whisker Plots, Frequency tables	



District IAB in February will be The Number System

For the 6th grade math course, instructional time should focus on four [critical areas](#):

- (1) Connecting ratio and rate to whole number multiplication and division, and using concepts of ratio and rate to solve problems.**
- (2) Completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers.**
- (3) Writing, interpreting, and using expressions and equations**
- (4) Developing understanding of statistical thinking.**

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

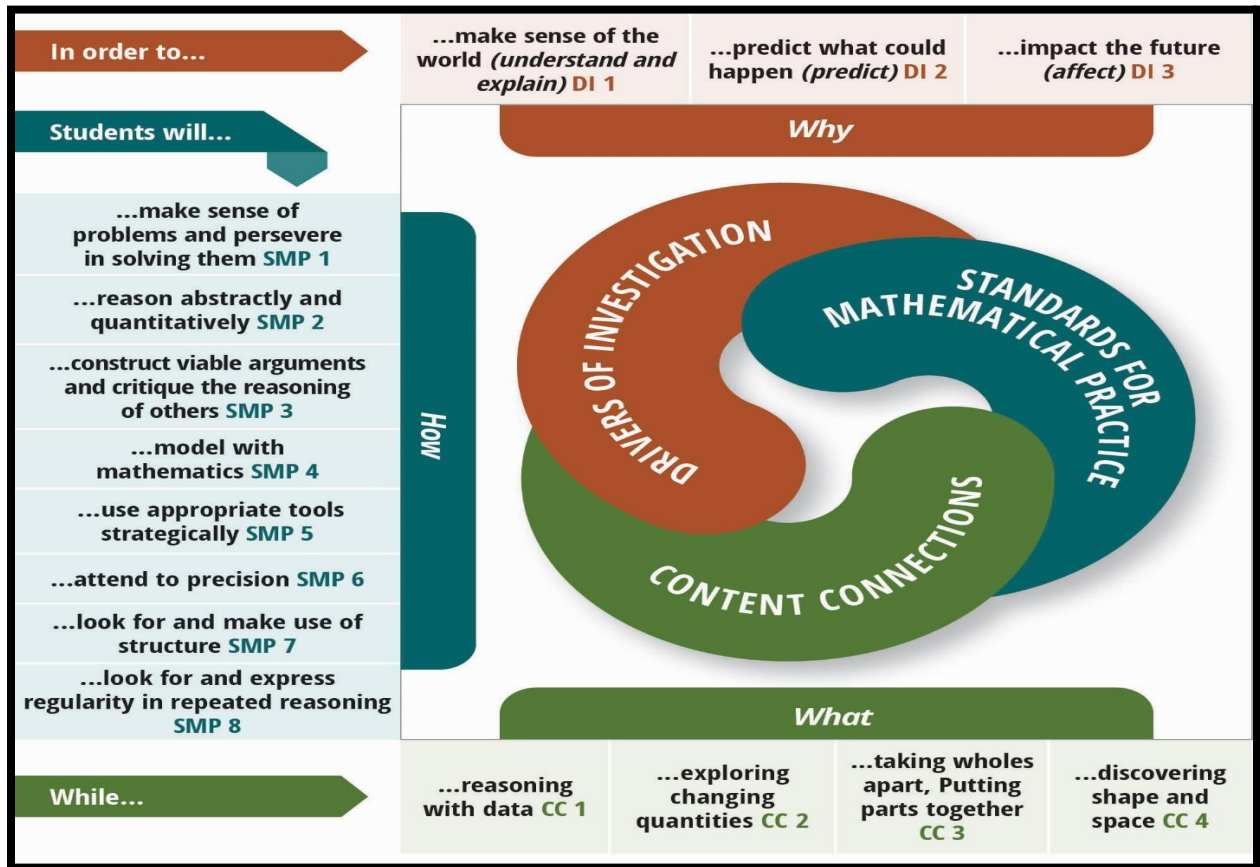
MP6: Attend to precision

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 SIX **BIG IDEAS** from 2023 CA MATH FRAMEWORK chapter 7



- Variability in Data directly connects to: The Shape of Distributions, Relationships Between Variables
- The Shape of Distributions directly connects to: Relationships Between Variables, Variability in Data
- Fraction Relationships directly connects to: Patterns Inside Numbers, Generalizing with Multiple Representations, Model the World, Relationships Between Variables
- Patterns Inside Numbers directly connects to: Fraction Relationships, Generalizing with Multiple Representations, Model the World, Relationships Between Variables
- Generalizing with Multiple Representations directly connects to: Patterns Inside Numbers, Fraction Relationships, Model the World, Relationships Between Variables, Nets & Surface Area, Graphing Shapes
- Model the World directly connects to: Fraction Relationships, Relationships Between Variables, Patterns Inside Numbers, Generalizing with Multiple Representations, Graphing Shapes
- Graphing Shapes directly connects to: Model the World, Generalizing with Multiple Representations, Relationships Between Variables, Distance & Direction, Nets & Surface
- Nets & Surface directly connects to: Graphing Shapes, Generalizing with Multiple Representations, Distance & Direction
- Distance & Direction directly connects to: Graphing Shapes, Nets & Surface Area
- Relationships Between Variables directly connects to: Variability in Data, The Shape of Distributions, Fraction Relationships, Patterns Inside Numbers, Generalizing with Multiple Representations, Model the World, Graphing Shapes



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 Six Content Standards
Reasoning with Data	Variability in Data	SP.1, SP.5, SP.4: Investigate real world data sources, ask questions of data, start to understand variability - within data sets and across different forms of data, consider different types of data, and represent data with different representations.
Reasoning with Data	The Shape of Distributions	SP.2, SP.3, SP.5: Consider the distribution of data sets - look at their shape and consider measures of center and variability to describe the data and the situation which is being investigated.
Exploring Changing Quantities	Fraction Relationships	NS.1, RP.1, RP.3: Understand fractions divided by fractions, thinking about them in different ways (e.g., how many $\frac{1}{3}$ are inside $\frac{2}{3}$?), considering the relationship between the numerator and denominator, using different strategies and visuals. Relate fractions to ratios and percentages.
Exploring Changing Quantities	Patterns Inside Numbers	NS.4, RP.3: Consider how numbers are made up, exploring factors and multiples, visually and numerically.
Exploring Changing Quantities	Generalizing with Multiple Representations	EE.6, EE.2, EE.7, EE.3, EE.4, RP.1, RP.2, RP.3: Generalize from growth or decay patterns, leading to an understanding of variables. Understand that a variable can represent a changing quantity or an unknown number. Analyze a mathematical situation that can be seen and solved in different ways and that leads to multiple representations and equivalent expressions. Where appropriate in solving problems, use unit rates.
Exploring Changing Quantities	Relationships Between Variables	EE.9, EE.5, RP.1, RP.2, RP.3, NS.8, SP.1, SP.2: Use independent and dependent variables to represent how a situation changes over time, recognizing unit rates when it is a linear relationship. Illustrate the relationship using tables, 4 quadrant graphs and equations, and understand the relationships between the different representations and what each one communicates.

Content Connection	Big Idea	Grade Six Content Standards
Taking Wholes Apart, Putting Parts Together	Model the World	NS.3, NS.2, NS.8, RP.1, RP.2, RP.3: Solve and model real world problems. Add, subtract, multiply, and divide multi-digit numbers and decimals, in real-world and mathematical problems - with sense making and understanding, using visual models and algorithms.
Taking Wholes Apart, Putting Parts Together and Discovering Shape and Space	Nets and Surface Area	EE.1, EE.2, G.4, G.1, G.2, G.3: Build and decompose 3-D figures using nets to find surface area. Represent volume and area as expressions involving whole number exponents.
Discovering Shape and Space	Distance and Direction	NS.5, NS.6, NS.7, G.1, G.2, G.3, G.4: Students experience absolute value on numbers lines and relate it to distance, describing relationships, such as order between numbers using inequality statements.
Discovering Shape and Space	Graphing Shapes	G.3, G.1, G.4, NS.8, EE.2: Use coordinates to represent the vertices of polygons, graph the shapes on the coordinate plane, and determine side lengths, perimeter, and area.

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)

