GVC Companion Guide for Grade 5

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

Fifth Grade Focus and Tips
- ❖ Start the school year with growth mindset work doing Inspirational Week of Math tasks doing [Inspirational Week of Math tasks](#) from YouCubed.org at Stanford (listed as weeks but is actually year 1, 2, 3, 4… of its existence). Set classroom norms and excitement for a great year of mathematics ahead! 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.

- ❖ Consider the [Cognitively Guided Instruction Formative Assessment Tasks](#) to gauge where students are in their thinking at the start of the year. Can be administered in parts (e.g. 1-2 problems at a time) and it can also be given multiple times a year to show progression and progress.

- ❖ Establish structures and norms through sense-making routines. Sense-making routines/warm-ups are powerful structures to create student agency and access.
  - [Downey CGI resources by grade](#)
  - [learningfromchildren.org/listening-to-childrens-thinking/resources](#)
  - Dot Talks http://ntimages.weebly.com/
  - Number Strings https://numberstrings.com/
  - [Choral Counting](#)
  - Multiple Representations (Frayer Model: [sample images](#) consider application quadrant)

- Always, Sometimes, or Never | True-False … and why? | Give example(s) and/or counter-example(s) nrich.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
- Number Routines
- Counting Collections
- Data Talks

❖ Intentional Talk. Let's remember the **all-important share out opportunities**: variety of share outs and their templates
❖ Padlet of Sense Making Routines and Supports (thanks to SMMUSD MTLs–mathematics teacher leaders)
- Consider using kid lit books as part of math warm ups = a way to talk about shapes/positions (supporting concepts) Maths from Stories and Describe-Draw-Describe (DDD)

Throughout the Year:

❖ Introduce line plots at the beginning of the year when aggregating class data will support later learning when chapter 11 is addressed in its entirety. This could be displayed and referenced as the year progresses. Line plot integration can be incorporated with NGSS content when graphing data. Other examples: shoe size, age, number of siblings…

❖ Use Number Talks/Number Strings to reinforce computation strategies and relationships between operations. (This can include: true/false number sentences, equalities and inequalities, open number sentences, a sequence of equations that demonstrate specific consistencies, etc.)

❖ PLC Consideration: Each unit contains Performance Tasks and End of Unit Assessments which align with the adopted My Math resource. Please be aware that there are additional tasks and assessment items found in the Curriculum Resources Supplementary tab that can be used in addition to/in lieu of the assessments listed to *meet the goal(s) of the unit*.

❖ Illustrative Mathematics is a common core aligned resource. It is OpenUp Resources' base.

❖ Reference Math Milestones as examples of tasks that promote student thinking around the grade's big ideas.

Think Smart for Smarter Balance–MyMath assessments   **Spanish Versions**

Trimester 1

Students should build on **prior knowledge** of...	Students should **master**…	Students should be **developing** and will continue to work on…
Prime and composite numbers from previous grade	Division with two-digit divisors	Flexibility with composition and decomposition of numbers
Division with one-digit divisor	Place value to the thousandths place	Multiplication and division of whole numbers and fractions
Decimal fractions and decimal notation with denominators of 10 and 100	Decimal addition and subtraction	Fraction concepts as they relate to decimals
Place value understanding that and digit in one place represents ten times what it represents in the place to its right	Multi-digit whole number multiplication using algorithm	Properties of operations with decimals
Multi-digit whole number multiplication using variety strategies		Multiplying and dividing by the powers of 10 as it relates to place value

SMMUSD Interim Fall IAB: NBT (Number and Operations in Base Ten)

Things to be aware of:
- Focus on 5th grade standards. Prime factorization is not a 5th grade standard.
- Only the first two lessons of chapter 1 are used before moving to chapters 2 and 3
- Incorporate area and perimeter problems into Unit 2 (Multiplication)

Trimester 2

Students should build on **prior knowledge** of...	Students should **master**…	Students should be **developing** and will continue to work on…
Equivalent fractions	Coordinate plane plotting	Computation with decimals and fractions
Multiplication of a whole number by a fraction	Equivalent Fractions as a strategy to add and subtract fractions	Equal share problem types
Number patterns and sequences with a given rule	Fractions as division	Classifying shapes when working on area with fractions
Fraction decimals to the thousandths	Fractions and its relationship with decimals	Dividing unit fractions by whole numbers and whole numbers by unit fractions by using story context
Multiplication and division to solve word problems involving	Multiplication of a whole number or fraction by a fraction	

| multiplicative comparison using drawings and equations with a symbol for the unknown | Area of a rectangle with fractional side lengths

Number patterns and sequences with two rules

Write and interpret numerical expressions | |

Things to be aware of:
- Simplest form is not part of the standard and should not be a focal point for fraction work. Allowing students to submit answers without simplifying provides formative data around student thinking.
- Chapter 6 will be addressed later in January after Chapter 10 for fraction/decimal continuity. Fraction operations are addressed before decimal operations.
- Numerical expressions builds on 4.OA.A.2 where students are asked to create equations with symbols for the unknown

Trimester 3

Students should build on **prior knowledge** of...	Students should **master**…	Students should be **developing** and will continue to work on…
Computation with whole numbers and fractions Place value when converting measurement using the metric system Line plots using fractional data set Area and perimeter as an attribute of a two-dimensional shape	Volume as an attribute of a solid figure Using area/perimeter measures as a base to compute volume of a solid figure Line plots to display a data set of measurement in fractions of a unit and use operations of fractions to solve problems from the data Multiplication and division of whole numbers and fractions	Creating expressions and equations based o n tasks

Things to be aware of:
- Be sure to build on the understanding of volume as l x w x h where base = l x w and can be expressed as base x h. Students should have flexibility in their understanding of volume when given embedded information such as area as the base or one side length of a cube.

Strategies	Tools

● Direct Modeling
    ○ Concrete representation for each object that must be counted
    ○ Rote counting, cardinality, one-to-one correspondence
● Counting
    ○ Starts with one number and uses a concrete representation for the second value
    ○ Number Conservation
● Invented Algorithms (Relational Thinking)
    ○ More abstract thinking: concrete representations are not usually seen in these strategies
    ○ Using what I know to help me figure out what I don't know
    ○ Eg: Combining like units, incrementing, compensation
UCLA Mathematic Project, 2020
	● Fingers
	● Counters
	● Tally Marks
	● Hundreds Chart
	● Number Line
	● Ten Frames
	● Base-10 Blocks
	● Paper and Pencil
	● Number Bonds
	● Arrays
	● Calculators
	● Tape Models
	● Etc.

For Grade Five Mathematics, instructional time should focus on three Critical Areas:
(1) Developing fluency with addition and subtraction of fractions and developing understanding of the multiplication of fraction and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions).
(2) Extending division to two-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths and developing fluency with whole number and decimal operations.
(3) Developing understanding of volume.

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
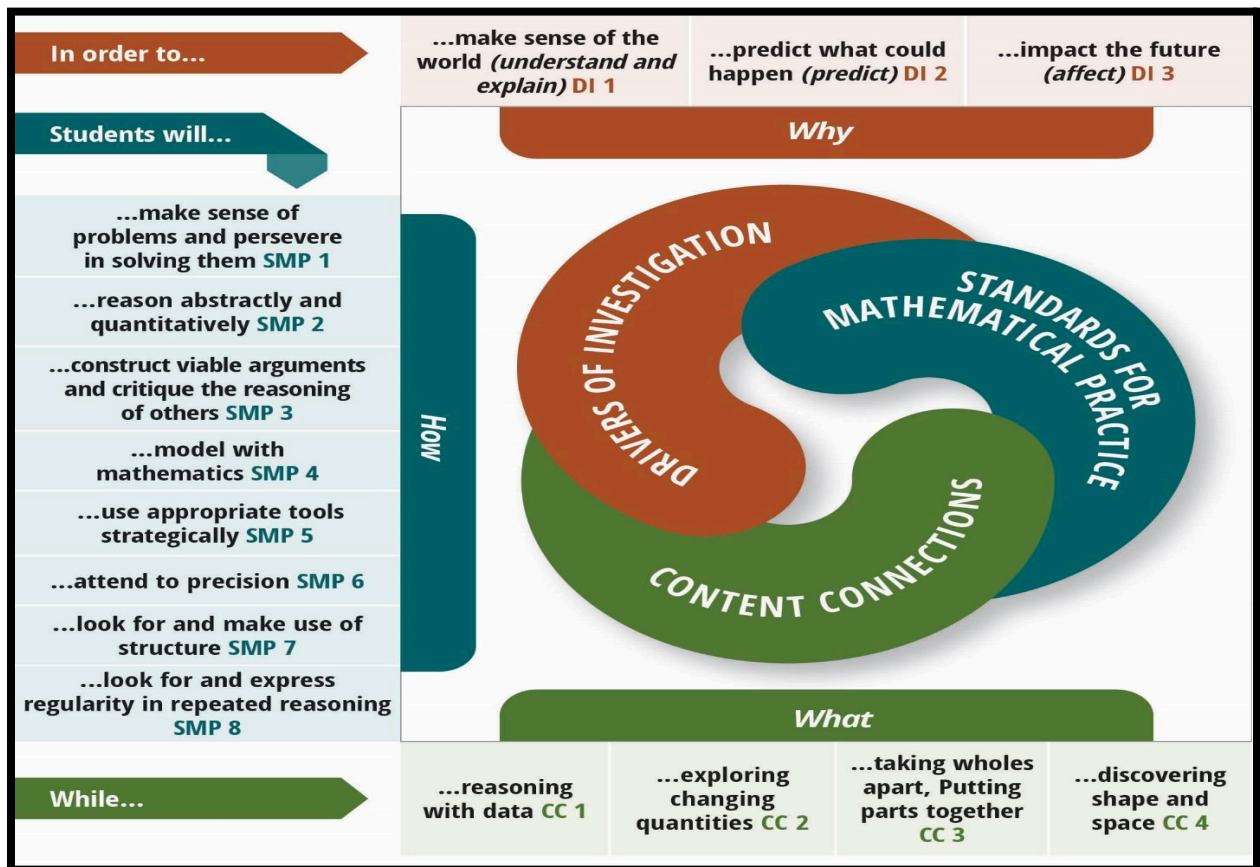MP4: Model with mathematics
MP5: Use appropriate tools
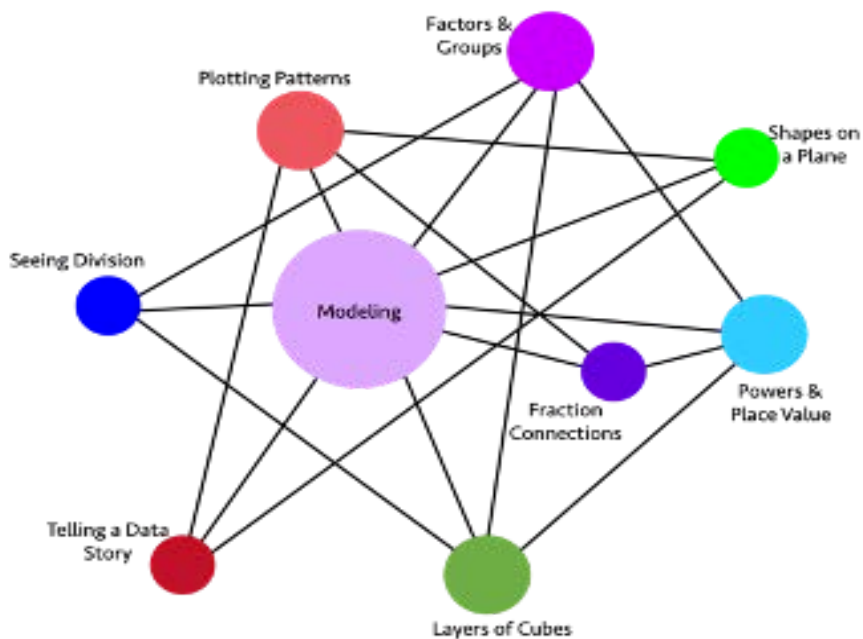MP6: Attend to precision
MP7: Look for and make use of structure
MP8: Look for and express regularity in repeated reasoning
Mathematical Practices 1-3-6 = connections to EL/ELD and NGSS standards: See 2013 Critical Areas for details of grade expectations

In order to...	...make sense of the world (understand and explain) DI 1	...predict what could happen (predict) DI 2	...impact the future (affect) DI 3	
Students will...		**Why**		
...make sense of problems and persevere in solving them SMP 1				
...reason abstractly and quantitatively SMP 2				
...construct viable arguments and critique the reasoning of others SMP 3		DRIVERS OF INVESTIGATION · STANDARDS FOR MATHEMATICAL PRACTICE · CONTENT CONNECTIONS		
...model with mathematics SMP 4	How			
...use appropriate tools strategically SMP 5				
...attend to precision SMP 6				
...look for and make use of structure SMP 7				
...look for and express regularity in repeated reasoning SMP 8		**What**		
While...	...reasoning with data CC 1	...exploring changing quantities CC 2	...taking wholes apart, Putting parts together CC 3	...discovering shape and space CC 4

GRADE FIVE BIG IDEAS from 2023 CA MATH FRAMEWORK chapter 6

The graphic illustrates the connections and relationships of some fifth-grade mathematics concepts. Direct connections include the following:

· Factors & Groups directly connects to: Powers & Place Values, Layers of Cubes, Modeling, Seeing Division

· Shapes on a Plane directly connects to: Telling a Data Story, Modeling, Plotting Patterns

· Powers & Place Value directly connects to: Layers of Cubes, Fraction Connections, Modeling, Factors & Groups

· Layers of Cubes directly connects to: Powers & Place Value, Factors & Groups, Modeling, Seeing Division

· Telling a Data Story directly connects to: Shapes on a Plane, Modeling, Plotting Patterns

· Seeing Division directly connects to: Layers of Cubes, Modeling, Factors & Groups

· Plotting Patterns directly connects to: Telling a Data Story, Modeling, Fraction Connections, Shapes on a Plane

· Fraction Connections directly connects to: Powers & Place Value, Modeling, Plotting Patterns

Modeling directly connects to: Plotting Patterns, Factors & Groups, Shapes on a Plane, Powers & Place Value, Fraction Connections, Layers of Cubes, Telling a Data Story, Seeing Division.

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 Connections	Big Ideas	Grade Five Content Standards
Reasoning with Data	**Plotting Patterns**	**G.1, G.2, OA.3, MD.2, NF.7:** Students generate and analyze patterns, plotting them on a line plot or coordinate plane, and use their graph to tell a story about the data. Some situations should include fraction and decimal measurements, such as a plant growing.
Reasoning with Data and Exploring Changing Quantities and Discovering Shape & Space	**Telling a Data Story**	**G.1, G.2, OA.3:** Understand a situation, graph the data to show patterns and relationships, and to help communicate the meaning of a real-world event.
Exploring Changing Quantities	**Factors and Groups**	**OA.1, OA.2, MD.4, MD.5:** Students use grouping symbols to express changing quantities and understand that a factor can represent the number of groups of the quantity.
Exploring Changing Quantities	**Modeling**	**NBT.3, NBT.5, NBT.7, NF.1, NF.2, NF.3, NF.4, NF.5, NF.6, NF.7, MD.4, MD.5, OA.3:** Set up a model and use whole, fraction, and decimal numbers and operations to solve a problem. Use concrete models and drawings and justify results.
Exploring Changing Quantities and Taking Wholes Apart, Putting Parts Together	**Fraction connections**	**NF.1, NF.2, NF.3, NF.4, NF.5, NF.7, MD.2, NBT.3:** Make and understand visual models, to show the effect of operations on fractions. Construct line plots from real data that include fractions of units.
Taking Wholes Apart, Putting Parts Together	**Seeing Division**	**MD.3, MD.4, MD.5, NBT.4, NBT.6, NBT.7:** Solve real problems that involve volume, area, and division, setting up models and creating visual representations. Some problems should include decimal numbers. Use rounding and estimation to check accuracy and justify results.
Taking Wholes Apart, Putting Parts Together	**Powers and Place Value**	**NBT.3, NBT.2, NBT.1, OA.1, OA.2:** Use whole-number exponents to represent powers of 10. Use expanded notation to write decimal numbers to the thousandths place and connect decimal notation to fractional representations, where the denominator can be expressed in powers of 10.
Discovering Shape and Space	**Layers of Cubes**	**MD.5, MD.4, MD.3, OA.1, MD.1:** Students recognize volume as an attribute of three-dimensional space. They understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. They decompose three-dimensional shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes.
Discovering Shape & Space and Exploring Changing Quantities	**Shapes on a Plane**	**G.1, G.2, G.3, G4, OA.3, NF.4, NF.5, NF.6:** Graph 2-D shapes on a coordinate plane, notice and wonder about the properties of shapes, parallel and perpendicular lines, right angles, and equal length sides. Use tables to organize the coordinates of the vertices of the figures and study the changing quantities of the coordinates.

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)