# GVC Companion Guide for Grade 3

## 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 - <u>Learning</u> 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

## Third Grade Focus and Tips

- Start the school year with growth mindset work doing Inspirational Week of Math tasks doing <u>Inspirational Week of Math tasks</u> 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 <u>Cognitively Guided Instruction Formative Assessment Tasks</u> 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.
- IMPORTANT TO NOTE: The first and second units introduce the concepts of multiplication and division = 3<sup>rd</sup> grade standards: My Math Chapters 4, 5, 6, 7, 8, and 9 (begin the year with chapter 4!) Chapters 1-3 can support review of place value, addition, subtraction but are not, on their own, part of the critical content standards for 3<sup>rd</sup> grade.
- All units of study need to be anchored with fractions and measurement.



- Use counting collections and choral counting (e.g., 4, 8, 12, 16, 20, .... and DISCUSSING and ANALYZING the patterns that students notice in the sequence) to help the students understand the concepts of multiplication and division and to aid in fluency.
- 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 <a href="http://ntimages.weebly.com/">http://ntimages.weebly.com/</a>
  - Number Strings <u>https://numberstrings.com/</u>
  - <u>Choral Counting</u>
  - Multiple Representations (Frayer Model: <u>sample images</u> consider application quadrant)
  - Always, Sometimes, or Never | True-False ... and why? | Give example(s) and/or counter-example(s) <u>nrich.maths-ASN</u> | <u>true/false routine</u>
  - <u>Same but Different</u>
  - <u>Number-Math Talks</u> <u>Making Number Talks Matter</u>
  - Error Analysis <u>"My Favorite No"</u> My favorite wrong answer/Error Analysis
  - Which one doesn't belong? (WODB) Which one doesn't belong?
  - <u>Academic Talk protocol(English learners++)</u> | <u>Partner A/Partner B (Academic Talk protocol)</u>
  - Estimation 180 | Estimysteries | Splat
  - <u>Open Middle</u> (open-ended questions)
  - Would You Rather
  - <u>Number Routines</u>
  - <u>Counting Collections</u>
  - <u>Data Talks</u>
- Intentional Talk. Let's remember the all-important share out opportunities: <u>variety of share outs</u> and their templates
- Padlet of <u>Sense Making Routines and Supports</u> (thanks to SMMUSD MTLs-mathematics teacher leaders)
- Consider using <u>kid lit books</u> as part of math warm ups = a way to talk about shapes/positions (supporting concepts) <u>Maths from Stories</u> and <u>Describe-Draw-Describe (DDD)</u>

## **Throughout the Year:**

- 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.)
- Problem solving is done throughout the school year using all problem types!
- The first unit introduces the concepts of multiplication and division = 3<sup>rd</sup> grade standards: My Math Chapters 4, 5, 6, 7, 8, and 9 (begin the year at chapter 4!). (Ch 1-3 can support review of place value, addition, subtraction but are not, on their own, part of the critical content standards for 3<sup>rd</sup> grade. Use number talks, mini lessons, games).
- <u>Illustrative Mathematics</u> is a common core aligned resource. It is OpenUp Resources' base.



• Reference <u>Math Milestones</u> 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 <b>prior</b> <b>knowledge</b> of	Students should <b>master</b>	Students should be <b>developing</b> and will continue to work on
Place Value and Number Sense Concepts Fair Sharing Concepts Problem Solving Number Relationships 2 <sup>nd</sup> Grade's Units of Study: Unit 1 - Numbers to 100, Addition & Subtraction within 20, Data Unit 2 – Numbers to 1,000, Addition & Subtraction within 100 Unit 3: Addition & Subtraction within 1,000 Unit 4: Geometry, Fractions, Arrays, Grouping & Sharing Unit 5: Measurement, Addition & Subtraction within 1,000 Unit 6: Time, Money, Addition & Subtraction within 1,000	Solve problems involving multiplication and division, understand properties of multiplication and the relationship between multiplication and division Represent and solve word problems involving multiplication and division Fluently multiply within 100 using relationship between multiplication and division or properties of operations Anchor all units with fractions and measurement!	Multiply and divide within 100 Rounding to the nearest 10 and 100 Fluently add and subtract within 1,000 using a variety of strategies (reinforce the relationship between addition and subtraction) Introduced in trimester 1 and continued in trimesters 2 and 3: 0 Unit fractions, measurement (metric system), reason with shapes and their attributes 0 Frontload time and measurement (metric system) 0 Solve word problems related to scaled pictures and bar graphs

#### SMMUSD Fall FIAB (Focused on Multiplication & Division: Interpret, Represent, and Solve)

**\*\*Note Next Steps: Connections Playlist from Tools for Teachers that supports the interim** <u>https://smartertoolsforteachers.org/resource/307</u>

#### Things to be aware of:

- Start of the year (Unit 1) needs to be focused on 3rd grade standards for multiplication and division. These need to be reinforced consistently throughout the year. Emphasize arrays and area models to represent the problems. Anchor all units with fractions and measurement!
- Unit 2 continues multiplication and division with an emphasis on properties and relationships to aid with fluency. Continue to emphasize area models to aid with area concept that is formally introduced in Unit 5
- For place value, the focus is on rounding to the tens and hundreds within 1000—part of 2<sup>nd</sup> trimester.
- Addition and subtraction within 1000—part of 2<sup>nd</sup> trimester



• Reinforce addition and subtraction relationships and strategies while focusing on multiplication and division during 1<sup>st</sup> trimester.

## Trimester 2

Students should build on <b>prior knowledge</b> of	Students should master	Students should be <b>developing</b> and will continue to work on
Understand properties of multiplication Understand the relationship between multiplication and division	Round to the nearest 10 and 100 <b>Fractions:</b> Understand that fractions are numbers Understand and represent fractions on a number line Explain equivalent fractions Compare fractions by reasoning about their size Understand shapes and their attributes for categorization Partition shapes into equal areas	<ul> <li>Fluently add/subtract within 1000 using strategies based on place value, properties of operations, and relationships between addition and subtraction</li> <li>Tell time and write time to the nearest minute</li> <li>Introduced in trimester 2 and continued in trimester 3:</li> <li>Perimeter/Area: relate area to operations of multiplication and addition—supports conceptual understanding</li> <li>Measurement/Data: solve problems involving intervals of time</li> <li>Fractions: develop understanding of a faction and its place on a number line</li> </ul>

### \*\*SMMUSD Winter IAB for NF (Numbers and Operations—Fractions)

**\*\*Note Next Steps: Connections Playlist from Tools for Teachers that supports the interim** <u>https://smartertoolsforteachers.org/resource/224?expand=true</u>

Things to be aware of:

- For place value, the focus is on rounding to the tens and hundreds within 1000, connections to multiplication/division
- Addition and subtraction within 1000
- Reinforce and connect addition and subtraction relationships and strategies while reinforcing multiplication and division.
- Anchor all units with fractions and measurement!



# Trimester 3

Students should build on <b>prior knowledge</b> of	Students should <b>master</b>	Students should be <b>developing</b> and will continue to work on
Round to the nearest 10 and 100 Solve problems involving multiplication/division Multiply within 100 using relationship between multiplication	Perimeter/Area: Understand that perimeter is an attribute of a plane shape Relate area to operations of multiplication and addition Solve word problems related to scaled picture and bar graphs Measurement/Data: Solve word problems involving intervals	Use of equivalent fractions will be used in upper grades when adding and subtracting fractions Understanding value of and representation of fractions will support the number system and rational/proportional reasoning in upper grades
properties of operation	<ul> <li>Solve problems involving measurement</li> <li>Fluently: <ul> <li>Multiply within 100 using</li> <li>relationship between multiplication and division or properties of operations</li> </ul> </li> <li>Add and subtract within 1000 using strategies based on place value, properties of operations, and/or relationships between +/-</li> <li>Rounding to the nearest 10 and 100</li> <li>Tell time and write time to the nearest minute</li> </ul>	Use of arrays/area models when multiplying supports conceptual understanding and algebraic thinking in upper grades Area of 2D shapes will be used when understanding volume of 3D shapes in upper grades Algorithms used in upper grades will be better understood due to the conceptual understanding built in preceding grade level efforts ©

Things to be aware of:

- Three big concepts are taught this trimester: fractions, area, and perimeter. By anchoring all units with fractions and measurement throughout the year, better understanding can be achieved.
- It is important to note that MyMath does NOT thoroughly cover all the CA math content standards so supplementation is necessary and noted. OpenUp Resources can address what is missing and has a lens on equity and language development.
- Note that lesson order is not that of MyMath in an effort to be more standards aligned and instructionally sound. Begin at chapter 4!!!
- <u>Illustrative Mathematics</u> is a great resource for grade three mathematics. It is OpenUp Resources base.



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

#### For Grade Three Mathematics, instructional time should focus on four critical areas:

- (1) Developing understanding of multiplication and division and strategies for multiplication and division within 100.
- (2) Developing understanding of fractions, especially unit fractions (fractions with numerator 1).
- (3) Developing understanding of the structure of rectangular arrays and of area.
- (4) Describing and analyzing two-dimensional shapes.

Reference <u>Math Milestones</u> 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 <u>Critical Areas</u> for details of grade expectations





#### GRADE THREE BIG IDEAS from 2023 CA MATH FRAMEWORK chapter 6





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

Fractions of Shape & Time directly connects to: Square Tiles, Fractions as Relationships, Unit
 Fractions Models, Represent Multivariable Data

Measuring directly connects to: Number Flexibility to 100 for All Four Operations, Analyze
 Quadrilaterals, Represent Multivariable Data

Patterns in Four Operations directly connects to: Number Flexibility to 100 for All Four
 Operations, Unit Fraction Models, Analyze Quadrilaterals, Represent Multivariable Data

Square Tiles directly connects to: Fractions as Relationships, Number Flexibility to 100 for All
 Four Operations, Fractions of Shape & Time

Fractions as Relationships directly connects to: Square Tiles, Fractions of Shape & Time, Unit
 Fraction Models

Unit Fraction Models directly connects to: Fractions as Relationships, Patterns in Four
 Operations, Fractions of Shape & Time, Represent Multivariable Data

Analyze Quadrilaterals directly connects to: Number Flexibility to 100 for All Four Operations,
 Patterns in Four Operations, Measuring

Represent Multivariable Data directly connects to: Unit Fraction Models, Number Flexibility to
 100 for All Four Operations, Patterns in Four Operations, Measuring, Fractions of Shape & Time

Number Flexibility to 100 for All Four Operations directly connects to: Square Tiles, Analyze Quadrilaterals, Represent Multivariable Data, Measuring, Patterns in Four Operations.

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 Big Ideas Grade Three Content Standards		
Connections	big ideas	Grade Three Content Standards
Reasoning with Data	Represent Multivariable Data	MD.3, MD.4, MD.1, MD.2, NBT.1: Collect data and organize data sets, including measurement data; read and create bar graphs and pictographs to scale. Consider data sets that include three or more categories (multivariable data) for example, when I interact with my puppy, I either call her name, pet her, or give her a treat.
Reasoning with Data and Taking Wholes Apart, Putting Parts Together and Discovering Shape and Space	Fractions of Shape and Time	<b>MD.1, NF.1, NF.2, NF.3, G.2:</b> Collect data by time of day, show time using a data visualization. Think about fractions of time and of shape and space, expressing the base unit as a unit fraction of the whole.
Reasoning with Data	Measuring	MD.2, MD.4, NBT.1: Measure volume and mass, incorporating linear measures to draw and represent objects in two-dimensional space. Compare the measured objects, using line plots to display measurement data. Use rounding where appropriate.
Exploring Changing Quantities	Patterns in Four Operations	NBT.2, OA.8, OA.9, MD.1: Add and subtract within 1000 - Using student generated strategies and models, such as base 10 blocks. e.g., use expanded notation to illustrate place value and justify results. Investigate patterns in addition and multiplication <u>tables</u> , and use operations and color coding to generalize and justify findings.
Production -	N1	
Exploring Changing Quantities	Number Flexibility to 100 for All Four Operations	OA.1, OA,2, OA.3, OA.4, OA.5, OA.6, OA.7, OA.8, NBT.3, MD.7, NBT.1: Multiply and divide within 100 and justify answers using arrays and student generated visual representations. Encourage number sense and number flexibility - not "blind" memorization of number facts. Use estimation and rounding in number problems.
Taking Wholes Apart, Putting Parts Together	Square Tiles	<b>MD.5, MD.6, MD.7, OA.7, NF.1:</b> Use square tiles to measure the area of shapes, finding an area of n squared units, and learn that one square represents 1/nth of the total area.



Content Connections	Big Ideas	Grade Three Content Standards
Taking Wholes Apart, Putting Parts Together	Fractions as Relationships	<b>NF.1, NF.3:</b> Know that a fraction is a relationship between numerators and denominators – and it is important to consider the relationship in context. Understand why 1/2=2/4=3/6.
Taking Wholes Apart, Putting Parts Together and Discovering Shape and Space	Unit Fraction Models	NF.2, NF.3, MD.1: Compare unit fractions using different visual models including linear models (e.g., number lines, tape measures, time, and clocks) and area models (e.g., shape diagrams encourage student justification with visual models).
Discovering Shape and Space	Analyze Quadrilaterals	MD.8, G.1, G.2, NBT.1, OA.8: Describe, analyze, and compare quadrilaterals. Explore the ways that area and perimeter change as side lengths change, by modeling real world problems. Use rounding strategies to approximate lengths where appropriate.

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)



