GVC Companion Guide: Second Grade

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

Second 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:

❖ BIG IDEAS for Grade 2: Number Sense, Place Value & Problem solving.

❖ Problem solving is done throughout the school year using all problem types. Problem solving (all types of addition, subtraction, multiplication, and division/fair sharing problems) should occur throughout the year on a weekly basis. Many of the skills, concepts, and strategies in the guides are embedded in rich problem solving experiences.

❖ 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.)

❖ Time, money, and measurement concepts should be front-loaded with number-sense routines/warm-ups.

❖ 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:

Unit 1 - Numbers to 100, Addition & Subtraction within 20, Data
Unit 2 – Numbers to 1,000, Addition & Subtraction within 100

Students should build on **prior knowledge** of…	Students should **master**…	Students should be **developing** and will continue to work on…
Skip counting by 5s and 10s Adding & Subtracting within 20 Place Value Number Relationships Problem Solving	Understand place value within 1,000 Skip count by 100s Compare 2, three-digit numbers using <, >, = Solve addition & subtraction word problems with numbers within 100 with unknowns in all positions (using drawings & equations) Draw picture/bar graphs with up to 4 categories; solve add, subtract and compare problems using information from the graph Understand odd/even concepts	Adding up to 4, two-digit numbers using multiple strategies Fluently adding and subtracting within 100 using properties of operations and number relationships Read and write numbers in multiple form to 1,000 Problem Solving (varying types of problems)

SMMUSD Fall Interim Assessment – Operations & Algebraic Thinking and Numbers & Operations in Base ten

TRIMESTER 2:

Unit 3: Addition & Subtraction within 1,000
Unit 4: Geometry, Fractions, Arrays, Grouping & Sharing

- **The standards call for students to understand arrays. Arrays are ONE way to solve regrouping problems and encourage teachers to allow students to explore multiple strategies.**
- **It is recommended that Fair Share problems be done before partitioning tasks.**

Students should build on **prior knowledge** of…	Students should **master**…	Students should be **developing** and will continue to work on…
Mentally finding ten more/ten less and 100 more/100 less of a three-digit number Adding and subtracting within 100 using properties of operations and number relationships	Adding up to 4, two-digit numbers using multiple strategies Working with equal groups of objects to gain foundation for multiplication Using addition to find the total number of objects arranged in	Adding and subtracting within 1,000 using multiple strategies. Explaining why addition and subtraction strategies work using place value and properties of operations Measurement Concepts

Place Value Number Relationships Problem Solving Partitioning circles and rectangles into halves & fourths	rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends Recognizing and drawing 2D & 3D shapes having particular attributes Partitioning circles and rectangles into 2, 3, or 4 equal shares & describe shares and the whole using halves, thirds, and fourths Recognizing that equal shares of identical wholes need not have the same shape	Time & Money Concepts

SMMUSD Winter Interim Assessment – Numbers & Operations in Base Ten

TRIMESTER 3:

Unit 5: Measurement, Addition & Subtraction within 1,000
Unit 6: Time, Money, Addition & Subtraction within 1,000

Students should build on **prior knowledge** of…	Students should **master**…	Students should be **developing** and will continue to work on…
Place Value Single-digit sums and differences (sums from memory by end of Grade 2) Adding/subtracting within 100 Adding & subtracting within 1,000 using multiple strategies Problem Solving	Adding & subtracting within 1,000 using multiple strategies Representing whole numbers as lengths on a number line; use the number line to solve addition & subtraction Measuring length using appropriate tools Measuring an object with different units and compare Estimating lengths (in, ft, cm, m) Creating a line plot based on measurement data Solving addition & subtraction words problems within 100 involving lengths Comparing lengths of two different objects using standard units	Place Value and Number Sense Concepts Fair Sharing Concepts Problem Solving Number Relationships

	Solving problems using money (coins, bills, $, cents) Telling and writing time to 5 minutes using digital and analog clocks and AM/PM	

Strategies	Tools

● Direct Modeling
  o Concrete representation for each object that must be counted
  o Rote counting, cardinality, one-to-one correspondence
● Counting
  o Starts with one number and uses a concrete representation for the second value
  o Number Conservation
● Invented Algorithms (Relational Thinking)
  o More abstract thinking: concrete representations are not usually seen in these strategies
  o Using what I know to help me figure out what I don't know
  o 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 Two Mathematics, instructional time should focus on five critical areas:

(1) Extending understanding of base-ten notation.
(2) Building fluency with addition and subtraction.
(3) Using standard units of measure.
(4) Describing and analyzing shapes.
(5) Problem solving (all types of addition, subtraction, multiplication, and division/fair sharing problems).

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

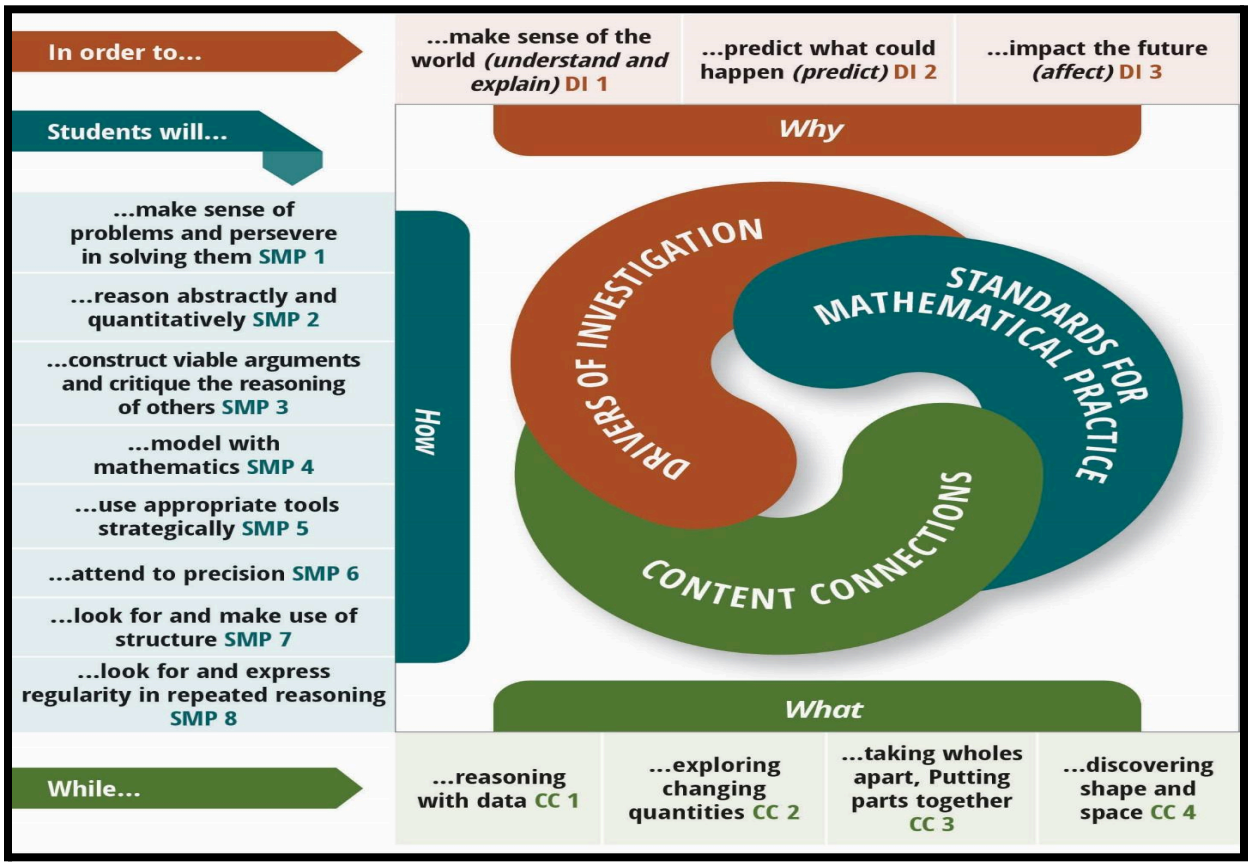
MP5: Use appropriate tools

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



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 Two Content Standards
Reasoning with Data	**Measure and Compare Objects**	**MD.1, MD.2, MD.3, MD.4, MD.6, MD.9:** Determine the length of objects using standard units of measures, and use appropriate tools to classify objects, interpreting and comparing linear measures on a number line.
Reasoning with Data	**Represent Data**	**MD.7, MD.9, MD.10, G.2, G.3, NBT.2:** Represent data by using line plots, picture graphs, and bar graphs, and interpret data in different data representations, including clock faces to the nearest 5 minutes.

Content Connections	Big Ideas	Grade Two Content Standards
Exploring Changing Quantities	**Dollars and Cents**	**MD.8, MD.5, NBT.1, NBT.2, NBT.5, NBT.6, NBT.7, NBT.9:** Understand the unit values of money and compute different values when combining dollars and cents. Connect these money values to place values and to 2-digit and 3-digit methods of adding and subtracting and explain such methods using drawings as needed.
Exploring Changing Quantities and Discovering Shape and Space	**Problem Solving with Measure**	**NBT.7, NBT.1, MD.1, MD.2, MD.3, MD.4, MD.5, MD.6, MD.9, OA.1:** Solve problems involving length measures using addition and subtraction.
Taking Wholes Apart, Putting Parts Together	**Skip Counting to 100**	**NBT.1, NBT.3, NBT.7, NBT.9, OA.4, G.2:** Use skip counting, counting bundles of 10, and expanded notation to understand the composition and place value of numbers up to 1,000. This includes ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing. Use these place values to develop understanding with 3-digit adding and subtracting.
Taking Wholes Apart, Putting Parts Together	**Number Strategies**	**MD.5, NBT.5, NBT.6, NBT.7, OA.1, OA.2:** Add and subtract two-digit numbers, within 100, without using algorithms—instead encouraging different strategies and justification. Compare and contrast the different strategies using models, symbols, and drawings.
Discovering Shape and Space	**Seeing Fractions in Shapes**	**G.1, G.2, G.3, MD.7:** Divide circles and rectangles into equal shares and know them to be standard unit fractions. Identify and draw 2D and 3D shapes, recognizing faces and angles.
Discovering Shape and Space	**Squares in an Array**	**OA.4, G.2, G.3, MD.6:** Partition rectangles into rows and columns of unit squares to find the total number of square units in an array.

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)