GVC Companion Guide: Transitional Kindergarten (TK)
Guiding Philosophy, CGI, Cognitively Guided Instruction:

- ❖ We invite you to consider the following:
  - ● Play environments should be purposefully designed to support math thinking
  - ● 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 differentiated and open-ended 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

TK Focus and Tips

- ❖ TK classrooms should be mathematically rich environments with ample opportunities for hands-on mathematical experiences, discourse, modeling of mathematical thinking, nurturing students' mathematical explorations and introduction to vocabulary
- ❖ Students should learn primarily through play and exploration
- ❖ Class time should focus on skills and habits of the mind: problem solving, persistence, and reasoning rather than mastery of concepts introduced. TK students benefit from routines, practice and repetition when solidifying mathematical understanding and building skills
- ❖ A balance of exploratory math experiences with explicit math allows for engagement in thoughtful math discourse
- ❖ Problem posing and differentiated questioning during play workshop should take place regularly

Resources:

- ❖ Embed mathematics throughout the TK day. Use the one-pager sheet and its links for planning out routines and games: One-pager
- ❖ Use Play Workshop to engage in mathematical thinking: Play Workshop: Problem Posing
- ❖ Take note of the Early Mathematics Learning Trajectories to build on prior knowledge and set goals for students: Learning Trajectories

❖ Anchor instruction with the TK Math Standards in mind:
  TK Math Critical Areas
❖ TK Math Assessment is given three times a year (fall, winter, spring):
  TK Mathematics Assessment

❖ 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)

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

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.
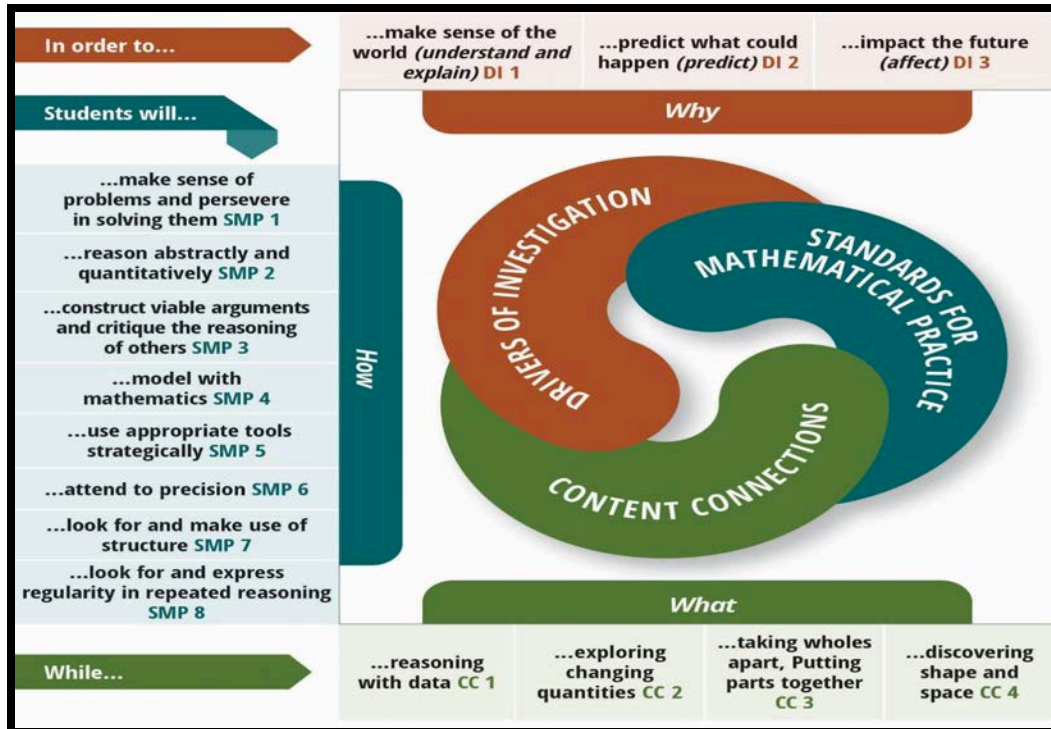
TRANSITIONAL KINDER BIG IDEAS from 2023 CA MATH FRAMEWORK chapter 6
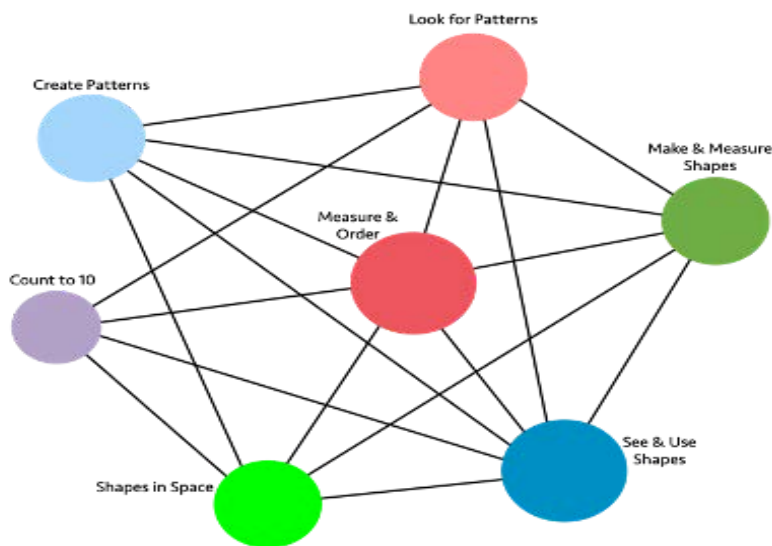
The graphic illustrates the connections and relationships of some transitional-kindergarten mathematics concepts. Direct connections include:

· Look for Patterns directly connects to: Create Patterns, Count to 10, Measure & Order, See & Use Shapes, Make & Measure Shapes

· Make & Measure Shapes directly connects to: Look for Patterns, Create Patterns, Measure & Order, Shapes in Space, See & Use Shapes

· See & Use Shapes directly connects to: Make & Measure Shapes, Look for Patterns, Measure & Order, Create Patterns, Count to 10, Shapes in Space

· Shapes in Space directly connects to: See & Use Shapes, Make & Measure Shapes, Measure & Order, Create Patterns, Count to 10

· Count to 10 directly connects to: Shapes in Space, See & Use Shapes, Measure & Order, Look for Patterns

· Create Patterns directly connects to: Look for Patterns, Make & Measure Shapes, See & Use Shapes, Measure & Order, Shapes in Space

Measure & Order directly connects to: Look for Patterns, Make & Measure Shapes, See & Use Shapes, Shapes in Space, Count to 10, Create Patterns.

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	Transitional Kindergarten Content Standards
Reasoning with Data and Exploring Changing Quantities	Measure and Order	AF1.1, M1.1, M1.2, M1.3, NS2.1, NS2.3, NS1.3, G 1.1, G2.1 NS1.4, NS1.5, MR1.1, NS1.1, NS1.2: Compare, order, count, and measure objects in the world. Learn to work out the number of objects by grouping and recognize up to four objects without counting.
Reasoning with Data and Taking Wholes Apart, Putting Parts Together	Look for patterns	AF2.1, AF2.2: NS1.3, NS1.4, NS1.5, NS2.1, NS2.3, G1.1, M1.2: Recognize and duplicate patterns - understand the core unit in a repeating pattern. Notice size differences in similar shapes.
Exploring Changing Quantities	Count to 10	NS1.4, MR1.1, AF1.1, NS2.2: Count up to 10 using one to one correspondence. Know that adding or taking away one makes the group larger or smaller by one.
Taking Wholes Apart, Putting Parts Together	Create patterns	AF2.2, AF2.1, M1.2, G1.1, G1.2, G2.1: Create patterns - using claps, signs, blocks, shapes. Use similar shapes to make a pattern and identify size differences in the patterns.

Content Connections	Big Ideas	Transitional Kindergarten Content Standards
Taking Wholes Apart, Putting Parts Together and Discovering Shape and Space	See and use shapes	G1.1, G1.2, NS2.3, NS1.4, MR1.1: Combine different shapes to create a picture or design and recognize individual shapes, identifying how many shapes there are.
Discovering Shape and Space	Make and measure shapes	G1.1, M1.1, M1.2, NS1.4: Create and measure different shapes. Identify size differences in similar shapes.
Discovering Shape and Space	Shapes in space	G2.1, M1.1, MR1.1: Visualize shapes and solids (2-D and 3-D) in different positions, including nesting shapes, and learn to describe direction, distance, and location in space.

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)