UNIT PLANNING TEMPLATE

Math Unit Topic / Guiding Question: Decomposing/recomposing numbers to 10 / Change in quantity to 10 with concrete materials (Addition up to 10) / 2D Shapes

Rationale:

This unit builds on students' previous knowledge of understanding ways to make five, and explores how we can compose and decompose numbers and change quantities to 10. These are the numeracy foundations for understanding how to add and subtract. This unit will focus only focus on the **addition** of addends whose whose sum is up to 10. Through practice, students will learn to map concrete math materials to numerical equations and numbers.

A secondary part of the unit will also teach simple shapes and explore their properties. "This is a triangle. How many corners does it have?" Exploratory: "How can we make a square with two triangles?" Students will solve tangram puzzles and learn how to describe their shapes. "It's a *triangle*. It's a *big* triangle. It's a *small* triangle. etc."

Students will also practice counting the days of the month (up to 31) together. The B.C curriculum only requires kindergarten students to know how to count numbers up to 20, so this is an *extending* math activity. Students will not be expected to master counting beyond 20 and can be prompted by the teacher. The teacher will also model numbers up to 30 when doing transition countdowns.

The students in our class have various skill levels for numeracy. Some students struggle due to the inability to read or write numbers well. Within the highest level group, all students are at proficiency at the start of this unit. The numeracy abilities of students are not evenly divided between the four groups in class, as the groups are formed based on literacy ability. The lowest level group is lowest in all categories, so special care is given to provide support when doing activities or preparing worksheets such as reducing the number of questions and making the visual aids larger .

STAGE 1: Desired Results

Big Ideas	**Essential Questions**
UNDERSTAND Numbers represent quantities that can be decomposed into smaller parts. One-to-one correspondence and a sense of 5 and 10 are essential for fluency with numbers.	*How many ways can we make ten?* *I have 5 counters. How many **more** counters do we need to make ten?* *We know that 4 and 6 makes 10. What is another way to make ten?* *(Use a ten-frame to represent this).* *I have 3 [items] and I add 3 more [items], how many [items] do I have now?*

		Objects have attributes that can be described, measured, and compared. These Big Ideas emphasize composing and decomposing to 10, which is a foundational skill needed for addition and subtraction. Students are expected to describe shapes and comparing spacial relationships.	*How many corners does this shape have? Can you find something in the class that looks like this shape? How are these shapes the same? How are they different? (For example: Comparing a square and a rectangle).*

Core Competencies:

Communication	**Thinking**	**Personal & Social**
☐ Communicating ☐ Collaborating	☐ Creative Thinking ☐ Critical & Reflective Thinking	☐ Personal Awareness & Responsibility ☐ Positive Personal & Cultural Identity ☐ Social Awareness & Responsibility
Students collaborate in solving math problems, working in pairs, small groups or as a class. Solving tangram puzzles is done independently for assessments but learning about shapes and example puzzles is done in small groups. Scaffolding is done for lower level students, while higher level students are able to explore independently.	Students use creative thinking to solve tangram puzzles which can have more than one solution, or when finding various ways to make ten. Critical thinking is practiced when finding specific addends to make ten. Students get new ideas through play and explore different ways to make ten or solve tangram shape puzzles.	Class discussions about how to solve math problems, and being respectful to peers, such as waiting for one's turn to talk, not shouting out the answer so others can solve their math problem, etc. Students are encouraged to help peers whenever learning is formative. Students use "shapes breathing" to manage their stress, emotions.

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Learning Standards – Curricular Competencies:

Reasoning and analyzing
- Use reasoning to explore and make connections
- Develop mental math strategies (numeracy fluency for addition)
- Use Model mathematics in contextualized experiences
  (Using addend and sum template with "heart" counters, drawing pictures, etc.)

Understanding and solving

- Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving
- Visualize to explore mathematical concepts
- Develop and use multiple strategies to engage in problem solving (visual, oral, written, play)
  Examples of learning through play: Using Tangram puzzles, Sensory "pop-it" ten-frames, Ten-frame Mapping cards, whiteboard magnet Ten-frames, and the whiteboard "addition machine").

Communicating and representing

- Communicate mathematical thinking in many ways
  Examples: concretely, symbolically, and by using spoken or written language to express, describe, explain, justify, and apply mathematical ideas. I wish to focus on practicing representing concrete math examples with numbers and symbols and vice-versa.

- Use mathematical vocabulary and language to contribute to mathematical discussions.
  Students are introduced to some specific math vocabulary (plus, equals, addend, sum)but will not be expected to master their use. Math language is simplified; "Two and two makes four./ Two plus two equals four." The terms "addend" and "sum" are introduced and only used as box labels for our addition template with hearts.

Connecting and reflecting

- Students share their mathematical thinking, collaborating with others. Solving math problems individually, as a collective class, and small groups/pairs. Using ten-frames students can create new math problems for peers to solve.

	KNOW	**Learning Standards - Content:** *Students are expected to know the following:* number concepts to 10

ways to make 5 or 10

- decomposing and recomposing quantities to 10
- Numbers can be arranged and recognized.
- making 10
- using concrete materials to show ways to make 10

change in quantity to 10, using concrete materials

single attributes of 2D shapes and 3D objects (shape names and counting how many corners they have, real world examples of shapes, an egg is an oval, a round clock is a circle, etc)

| First Peoples Principles of Learning | ☐ Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the ancestors.
☐ Learning is **holistic, reflexive,** reflective, **experiential**, and relational (focused on connectedness, on reciprocal relationships, and a sense of place).
☐ Learning involves recognizing the consequences of one's actions.
☐ Learning involves generational roles and responsibilities.
☐ Learning recognizes the role of indigenous knowledge.
☐ Learning is embedded in memory, history, and story.
☐ **Learning involves patience and time**.
☐ Learning requires exploration of one's identity.
☐ Learning involves recognizing that some knowledge is sacred and only shared with permission and/or in certain situations. | **Comments on how you will address the FPPL:**

Students will be given time during their learning centres to practice the math lesson learned in the previous week. Many of these activities are play based, such as card or board games. Counting is practiced daily during morning routines with the calendar (In February the whole class counted together to 28). Shapes breathing reviews various 2D shapes and has students physically draw them in the air while breathing in, holding and breathing out. Shapes breathing is introduced during the yoga block, but can be done whenever the class need to regulate and calm down. |

STAGE 2: Assessment Plan

Formative Assessment (Assessment as Learning and Assessment for Learning):

Observational assessment data can be collected throughout the topic for both assessment *as* learning and assessment *for* learning.
Observe and record the following:

Assessing shapes:
Can students recognize the shape names? Can they draw them in the air?
When using tangrams can they find another way to make other shapes using the shapes. (Example: two triangles can make a square)
Can students describe shapes? A rectangle is long, or wide.
Understanding descriptive language for shapes: Find the small triangle. Find the big triangle.
Can students use the 7 tangram shapes to represent something new?

Assessing Counting:
Note if any student cannot independently count to 20. Record the upper limit.
Note if any student can count independently *beyond* 20 (exceeding).
Note if students cannot map virtual items to numbers or pictorially understand how ten-frame can represent numbers.

Addition / Making or decomposing 10
Using formative student worksheets and through observation, note if students are able to map ten-frames as numbers or as representations of simple addition equations.

Observe and note the following:
Can students represent simple changes in quantities up to ten? (Mapping plus one, plus two and determining the sum using ten frame cards).
Can students find the missing addend given the sum and one addend? (This is observed for formative)

Summative Assessment (Assessment of Learning):

Addition - decomposing numbers to ten:
Can students find the missing addend given the sum and one addend?
(Students will write their answer on a worksheet while using the concrete manipulatives to guide them).

Can students map numbers or equations to ten frames or vice-versa? - Written Worksheets (independent)

Use student oral explanations during math centres and record any observations where students have difficulties in mapping numbers or equations
It is crucial to focus on oral assessments because some students are unable to write numbers well, and the act of writing can tax their working memory, patience and energy.

Assessing addition in this Math unit focuses on mapping equations pictorially with ten frames, or writing the sum or addend part of an equation represented by the ten-frame.

| | Alternative worksheets will be used to assess addition to 10 which use pictures, or have students draw the missing marbles needed to make ten.

Shapes
Can students using shapes to solve "guided" tangram puzzles. Students will be mapping the 7 shapes to puzzles that have "shape outlines."
The tangram heart project is an example of this. As this unit is just introducing the tangram puzzles, it is beyond the scope for students to solve the puzzle without any guiding outlines, as such learning such spatial skills takes time and ample practice. |
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Stage 3: Learning Plan

Date/Lesson	Learning Intentions	Instructional Activities (brief description here – lesson plans will be used to flesh out each lesson)
Jan30th - April 5th	*Daily Calendar Counting, Math centres for practicing previously taught math lessons.* *Shapes breathing is introduced the Feb. 6th practiced for a week. After it is done intermittently to calm the class like after their recess/lunch break. Students already have an expected yoga activity so the breathing shapes is a supplementary activity.*	Counting is done during our morning routine. The calendar days and the month's name are also taught (ELA support). Countdown using timers from 30 is also modeled by the teacher daily during transitions for centres. Shapes are practiced during math centres (trangram), science centre (magnet play), shapes breathing, ELA / SEL story books such as "Friendshapes" by Amy Krouse Rosenthal. (Read aloud link: https://www.youtube.com/watch?v=ktXVIZx0QAs)
Feb 3rd	*Introduce mapping equations (plus and equals symbols).* *Review ways to make five.* *Representing numbers to 10 with a Sensory pop-it ten-frame.*	**Canva presentation - introduction to math symbols (plus and equals) ways to make five.** **Pictorial representation for counting to five.** https://www.canva.com/design/DAFZfRj7R9U/Hz0ROvgPmvm4ApYIdx7Vrw/edit?utm_content=DAFZfRj7R9U&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton The purpose of this lesson is to assess the math levels of the students, review the ways to make five before exploring ways to make ten, and introduce the mathematical notations used for writing simple addition equations. 1 + 2 = 3. Showing this pictorially with apples, and with a virtual ten frame counter. Students use their Sensory "pop-it" ten frame to do the counting. Written worksheets are provided to practice writing numbers and demonstrating ways to make five. This lesson will

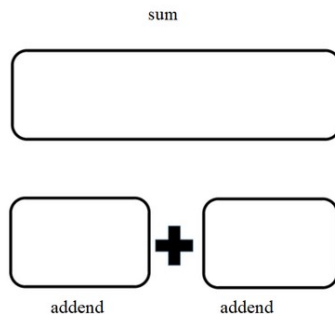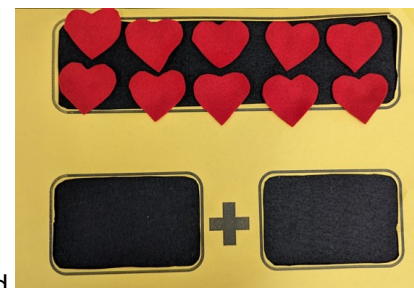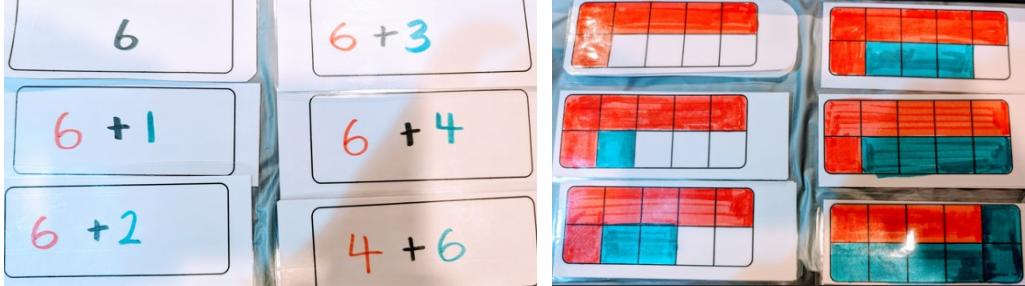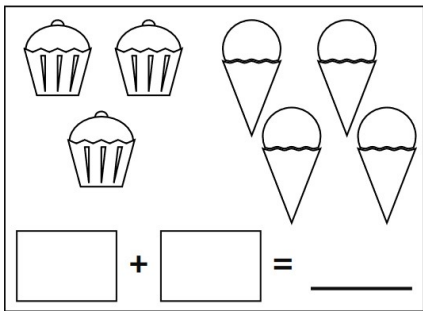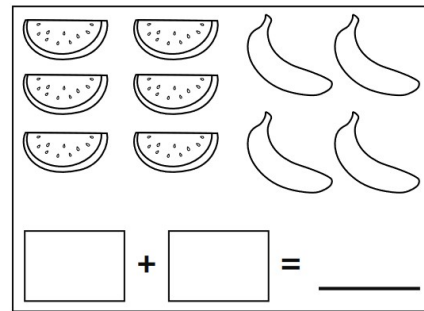|		
		assess the students' ability to read and write numbers and if they can independently add various numbers to equal five. This lesson also leads into an art block later that day. The art project shows an apple tree throughout the seasons. On the final season students are asked to draw additional apples on the tree to make ten apples. This picture already has 7 apples.
Feb 10th	*Valentine's themed Math lesson* *Decomposing numbers to 5 and 10* *Demonstrate change in quantity to 10 with concrete materials.*	Students will use a 3 box frame (1 sum and 2 addends) to decompose 5s/10s. The counters will be hearts to follow the Valentine's Day theme. How to use the 3 box frame will be modeled using a large felt board. After practicing, students will do it independently. They are given worksheets with equations to map to the 3 box frame. Students must first practice decomposing 5s with the counters independently. After which, they practice decomposing 10s and must fill in the missing addends for some equations. Teacher will check answers through observation before moving from decomposing 5s, to decomposing 10s. sum addend addend 3 box frame Class Felt board
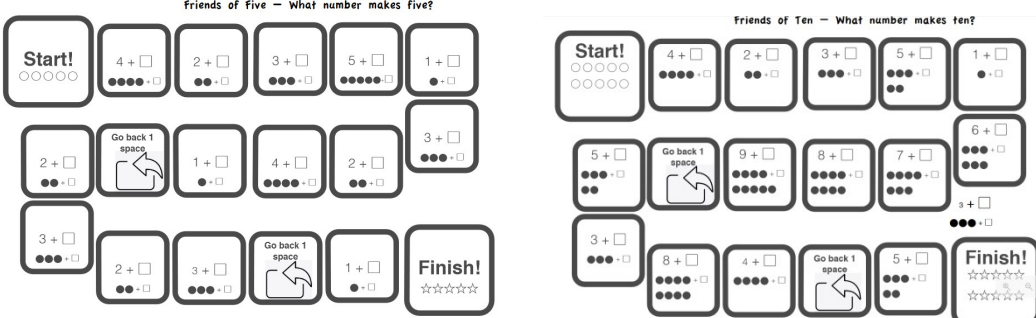
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Feb 10th *(Math Centre)*	*Introduction to Tangrams / Review shapes.*	*** This tangram activity is done as a teacher-led centre, and is supplementary to the Math instructional block. (It is a 12-15 minute experiential lesson block).** Students are given construction paper cutouts of the 7 shapes used in Tangram puzzles. They are asked to make squares, large triangles, etc., with the shapes provided. Students are provided animal-based puzzles to solve using the Tangram shapes. Puzzles start from the easiest to the most difficult. Difficult puzzles require students to *rotate* and *flip* pieces to solve them. This activity will lead into an Art block where students make a Valentine's card from a red Tangram puzzle. *Happy Valentine's Day!* *be my sweetheart*
Feb 17th	*Review Friends of Five / Ten.* *Continued practice of decomposing and recomposing to 10.*	**Some students need to limit the sum to 5 rather than 10. Mastering the process is needed.* *3 box frames, heart counters and worksheets to record student answers are given out for additional practice during the Math block.* Friends of five — What number makes five? Friends of Ten — What number makes ten? Math Centre students play a board game reviewing ways to make 5 or 10 (based on student math level)
Feb 24th	Introduction of Ten-Frames -- Addition up to 10	This lesson will introduce the ten-frame manipulative. This frame helps students with mapping equations that can add up to 10. Students are given flash cards to fill out that map from 0 to 10, and the equation (5 + 5). (Students use 2 colors to represent the two different addends in the ten frame)

March 3rd	Practice Ten-Frames -- Addition up to 10.	Students work in pairs to map equations and solve for the sum for quantities up to 10, using a whiteboard magnetic ten frame with counters and magnet numbers and symbols (+ / =). One student constructs the first addend while the other student constructs the second addend. The class collectively can solve for the sum. Worksheet excerpt (Students use 2 colors to represent the two different addends in the ten frame): Addition Using Ten Frames 2 + 3 = 4 + 5 =
March 6th- 10th *Math Centre*	*Decomposing 10s, Change in Quantities up to 10 Using ten frame flash cards. Building Numeracy Fluency / Formative Assessment*	6 6 +3 6 +1 6 + 4 6 +2 4 + 6
March 10th	*Summative Assessment*	Review using whiteboard ten-frame magnets. Students work individually on two Math worksheets. One uses a pictorial representation for addition. Example: ☐ + ☐ = ____ ☐ + ☐ = ____ One uses Ten Frames with a missing addend that add up to ten. The following is a student example: (Note: the first equation is explicitly modeled as this is a lower level student.)

$2 + \underline{8} = 10$ $6 + \underline{} = 10$

$5 + \underline{} = 10$ $3 + \underline{} = 10$
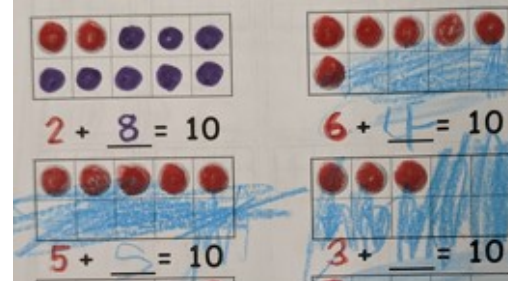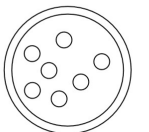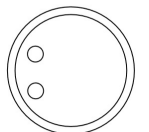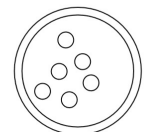
March 17th	Alternative - Summative Assessment	Introduction of the whiteboard Addition Machine. The class is divided into pairs and each pair must use the device to model equations given to them in numeric form (e.g.: 2 +3) and solve for the sum. The class can aid in solving the equation if the student pair's answer is incorrect. An alternative summative worksheet which is similar to the Spring Math assessment is used. **Marbles Tens** Directions: Draw more marbles to make ten. Write the number to complete the equation. $7 + \underline{} = 10$ $2 + \underline{} = 10$ $6 + \underline{} = 10$
		(insert more rows as needed)

|	**Resources needed:**
	Classroom resources - Various Math worksheets for formative and summative assessments, Smart TV (canva), whiteboard, markers, colored pencils. **Math Resources:** **Counting Dinosaur Math Game for Centres.** **Math Flash cards (addition) for Centres.** **Writing number worksheets for Centres.** **Virtual-Ten Frames:** **https://toytheater.com/two-color-counter-ten-frame/**

(I used this virtual ten frame site to make practice worksheets and ten frame mapping cards)
https://www.coolmath4kids.com/manipulatives/ten-frame

Customized Ten-frame Mapping cards (Laminated)- **representing numbers and simple addition up to ten.**
Write the number or equation and map them using color coding:
Red for the first addend and blue for second addend.
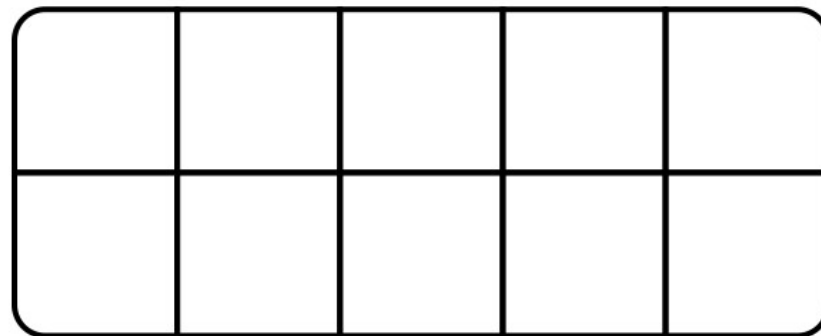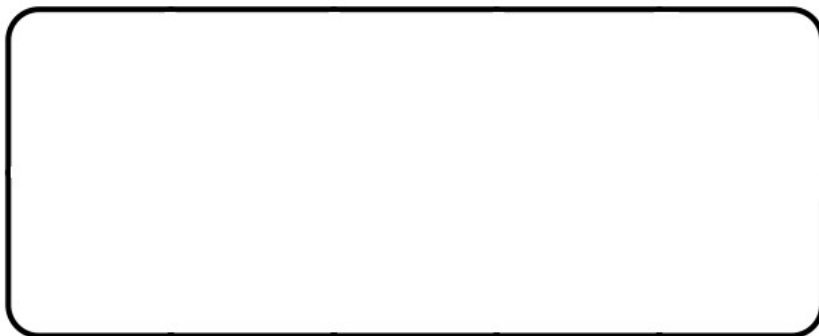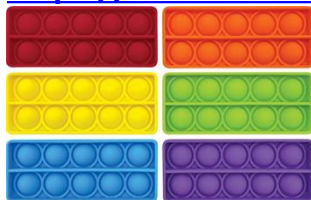
Here is the template.

Magnetic Travel Tangram Puzzles Book
https://www.amazon.ca/dp/B09PND7W5S

Montessori Math Workbook (Practice writing numbers and simple addition to 5)
https://www.amazon.ca/dp/B09RM4BWD3

Sensory Ten Frame (helps with physically mapping numbers and doing addition up to ten)
https://www.amazon.ca/Push-Bubble-Frame-Fidget-Sensory/dp/B09KX5H12Z

Learning Resources - Magnetic Ten Frame Set

https://www.amazon.ca/Learning-Resources-LER6644-Magnetic-Ten-Frame/dp/B00AQURHDW

Learning Resources - Addition Machine

https://www.educationstation.ca/catalogue/magnetic-addition-machine_217033/

* *Additional custom made materials* - heart tokens for math counters, felt heart-shaped counters, sum and addend template, tangram paper pieces and puzzles.
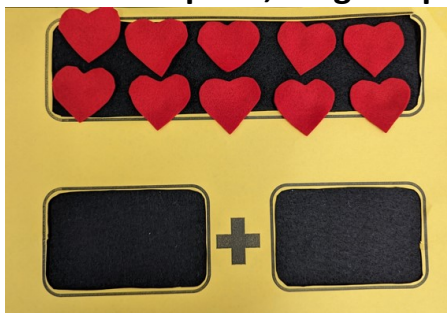
(Sum box with Addend boxes)
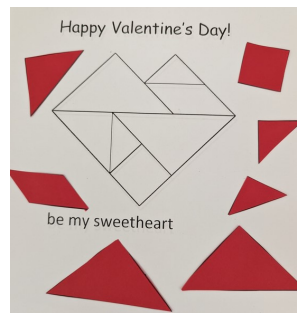
Tangram Pieces to make a Valentine's heart.

Interdisciplinary connections:
(e.g. How did you weave ELA, Social Studies, Science, Math, Fine Arts, and/or ADST together in this instructional sequence?)

Cross-curricular:

ELA - names of the shapes (Tangram puzzles have a "square, triangle and a parallelogram.")

    Alternative ways to orally ask to solve an equation. (Two and two makes four. / Two plus two equals four.)

Art - Tangram heart for Valentine's Day. Drawing additional apples to make 10.

    For the summative assessment worksheet - drawing additional marbles to represent the remaining amount to make ten

    (I.e.: the unknown addend to make ten).

Physical and Health Education: Daily physical exercise (D.P.A.) - Students will practice "shapes breathing" during their yoga daily activities.

Socials - doing polls and then *counting* votes and modelling the results with a pictograph in Canva.

Science - using magnets and metal balls, students were asked to make 2D shapes and for a challenge to see if they could make a 3D cube from two squares.

Reflection

How did the unit go? How do I know?
Based on the written math worksheets, and physical modelling with ten-frames for solving the math problems, I can see that most of the class is ready to begin subtraction but not all.

This kindergarten class is divided into 4 groups representing academic levels or in some cases (behavioral / language) support needs. In the lowest level group, some students struggle to do more than 4 math questions without assistance. They will need additional time to practice addition of up to ten.

For the decomposing and changing quantities of 10:
For the two higher level groups, they could successful complete this entire math unit and perform addition up to ten using ten frames. The highest level group (red group) can do so with great numeracy fluency both written and orally. In the second highest level, some of the students still need to continue to build numeracy fluency and develop their mental math skills. That said, this group could solve the problems independently, they just needed a lot more time to solve or map equations. All students in the lowest group need more practice counting independently up to twenty (they all needed prompts once we were counting from twelve). This group can map ten-frames based on numbers and simple equations where the addends are "plus one or plus two." Beyond adding two, becomes confusing unless physically modeled (not just visually with squares or dots on a ten frame). For my final assessment, I reduced the number of questions for the lower level students but they still needed one-on-one assistance and took the majority of the time during the math block to complete the assessment worksheet. The second lowest group (blue) has one student who is exceeding at ten-frame math addition as he was able to map sums beyond ten (8 + 6 = 14). In that same group, we have one special needs student, who does not participate in Math with the exception of counting with calendars during morning routine.

For shapes:
All students have a good understanding of the basic shapes (circle, square, rectangle and triangle). For the highest level group, some students can even remember the specialized shapes like rhombus/diamond and parallelogram. This assessment was oral based or visual. For future practice, I suggest students do a "shapes worksheet booklet" to practice drawing the shapes and associating shapes with real life objects. (An egg is an oval, a pizza or a wheel is a circle, etc).

Where to next?

All of my students need to continue practice writing and reading numbers. Many students are writing numbers backwards or using incorrect stroke order (about half the class). The majority of students can read the numbers, but there are still a few who cannot. For one student, this could be linked to some sort of learning disorder as she also has trouble reading letters and sounding them out. Having students to continue to make shapes with magnets reinforces their learning. For addition up to ten, I feel a little more time is needed so that *all* group levels can become proficient in it.

For the next step, I recommend introducing the **number line** manipulative. This manipulative will also be useful for teaching *subtraction* which is also the next progression for representing changes in quantities up to 10. Once subtraction is mastered, then financial literacy can also be introduced.

Finally, before moving on to subtraction, students should continue to practice with alternatives forms of the last summative worksheet. This is the assessment worksheet that asks students to draw additional marbles to solve to ten. To do so they must count how many marbles already exist. It is important to differentiate the worksheet so that the lower level students have less questions to complete (as to not overtax them) and the question difficulty gradually increases.

The reason recommend to practice this worksheet is that its assessment is similar to the school district assessment. Their assessment does not ask students to read or write numbers to test their understanding but instead uses visual "dots" and oral answers. Example: "How many dots are there? How many more do we need to make ten? If I add two more dots, how many do we now I have?"

As we have an ELL student in our class, it would be helpful to either have a translation of these assessment questions in her first language (Spanish), or to have everyone practice using this questioning format prior to taking the test. We can also use physical modeling or customized new forms of the summative worksheet to practice.

That said, students becoming familiar with numbers (able to read and write them), and being proficient with ten-frames and number lines will help them greatly when they eventually transition to higher grades.