Teaching-Learning Plan

Team Members

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Lesson Date:

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Instructor:

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Grade Level:

Kindergarten

1. Title of Lesson

Numbers Greater Than 20

2. Research Theme
The long-term goals of our students

Teach scholars to make sense of problems and persevere in solving them by teaching math through problem solving.

Teach scholars to construct viable arguments and critique the reasoning of others through note-taking, board work, and students' discourse.

3. Background and Research on the Content

- Why we chose to focus on this topic - for example, what is difficult for our students, what we noticed about student learning
- What resources we studied, and what we learned about the content and about student thinking

According to the Common Core State Standards for Mathematics (CCSS-M), instructional time in Kindergarten should focus on two critical areas, one of which is "representing, relating, and operating on whole numbers, initially with sets of objects." The CCSS-M goes on to stress that more learning time in Kindergarten should be devoted to numbers than to other topics.

This research lesson and the broader unit that this lesson is part of, "Numbers Greater than 20" focuses on the CCSS-M Counting and Cardinality domain. By learning about the structure of numbers greater than 20, students begin to develop a foundational understanding of the base ten number system.

In Van de Walle's text, *Elementary and Middle School Mathematics: Teaching Developmentally,* Van de Walle devotes an entire chapter to the topic of developing whole number place value concepts. In it he describes the progression that children go through as they develop an understanding of the base ten system. In this chapter he uses a random collection of 53 small objects as an example. Initially, children understand 53 only as a collection of 53 ones. They count by ones up to 53 and that is their understanding of the number of objects in that group. The next developmental stage is one in which students count by groups and singles, "one, two, three, four, five bunches of ten and one, two, three singles." Although this method does not directly answer the question of "How many objects are there?" it is an important step in scholars' development of base ten understanding. This moves them one step closer to seeing the 53 random objects, organizing them into groups of ten and some remaining ones that do not add up to another group of ten, and then efficiently counting them by tens and then by ones: "Ten, twenty, thirty, forty, fifty, fifty-one, fifty-two, fifty-three." According to Van de Walle, teachers foremost objective should be to design activities that help students integrate the grouping by tens concept with what they already know about number from counting by ones.

This unit and research lesson are adapted from the research edition of Mathematics International for Kindergarten, published by Tokyo Shoseki. A close examination of the text reveals a curriculum that closely aligns itself to the Common Core State Standards for Mathematics' insistence that a majority of instructional time should be spent developing number sense. Previous units have engaged students in activities where they developed their understanding of number composition, "7 is 5 and 2", "10 is 8 and 2", etc. and understanding of numbers greater than 10, "10 and 6 make 16", "10 and 3 make 13". The exploration of these concepts has laid the foundation for scholars to be prepared for investigating numbers greater than 20.

4. Goals of the Unit

a. <u>Unit:</u> Scholars will be able to count, read, and write two-digit numerals (and 100). They will have an understanding of the structure and size relationships of these numbers.

b. <u>Lesson:</u> Scholars begin to see the benefit of making groups of ten when counting quantities over 20. They will be introduced to the base-ten structure of recording numerals to represent quantities and will, moving forward, be able to use and understand this structure when recording the results of counting.

5. Unit Plan

The lesson sequence of the unit, with the task and learning goal of each lesson. The asterisk (*) shows the research lesson

Lesson	Learning goal(s) and tasks
1-2	Learn how to count and name 2-digit numbers (through 29) by playing a game.
3-4	Learn how to count and name 2-digit numbers (through 29).
5*	Learn how to count and name 2-digit numbers (through 30) and be introduced to the structure of a number.
6	Learn numbers 40-90 as increments of 10s.

6. Relationship of the Unit to the Standards

- How the learning in the unit relates to the grade-level standards.
- How the learning in the unit relates to prior standards and future standards.

Prior learning standards that unit builds on	Learning standards for this unit	Later standards for which this unit is a foundation

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K.CC.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

K.CC.4 Understand the relationships between numbers and quantities; connect counting to cardinality.
K.CC.4a When counting objects, say the number names in the standard order, pairing each objects with one and only one number name and each number name with one and only one object.

K.CC.4b Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.

K.CC.4c Understand that each successive number name refers to a quantity that is one larger.

K.CC.5 Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration.

K.CC.6 Identify whether the

K.CC.1 Count to 100 by ones and by tens.

K.CC.2 Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

SL.K.1 Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.

SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood.

SL.K.6 Speak audibly and express thoughts, feelings, and ideas clearly

1.NBT.A.1 Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

1.NBT.B.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

1.NBT.B.2.a 10 can be thought of as a bundle of ten ones — called a "ten."

1.NBT.B.2.b The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.

1.NBT.B.2.c The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

number of objects in one group is greater than, less than, or equal to the number of objects in another group. K.CC.7 Compare two numbers between 1 and 10 presented as written numerals. K.NBT.1 Compose and decompose numbers from 11 to 19 into ten ones and some further ones.		

7. Goals of the Research Lesson

At the beginning of Unit 10, "Numbers Greater than 20," scholars are introduced to a new game called Pick-Up Sticks, as pictured above. Scholars played 'rock, paper, scissors,' and the winner of each round collected a specified amount of sticks, depending upon outcomes. Scholars began looking at ways to organize/group they sticks so that they could easily see how many there were.

In the research lesson, scholars realize that it is easier to see the number of sticks when they find all the groups of ten.

8. Research Lesson Plan

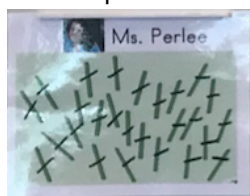| Learning task and activities, anticipated student responses, key questions or comparisons that will build insights	Teacher support	Assessment (Points to Notice)
Introduction T: **What game do you think Ms. Bentley and I were playing?** S: *Pick Up Sticks.* T: **You're right! Who do you think won the game? How can we be sure?** S: *We can count!*	Teacher shows poster of Ms. Perlee & Ms. Bentley with sticks.	

Posing the Task T: Your task is to count Ms. Perlee's sticks. Think about how you will organize your sticks to make it easier for you to see how many sticks I had. If you finish early, you can show my number of sticks with counting blocks.	Pass out picture of Ms. Perlee's sticks to scholars. Scholars write date & glue picture in math notebook. Only Ms. Perlee's picture remains displayed on the board.	Are scholars clear on the task? Do they need individual reminders? Are scholars engaged in solving the problem? Are scholars showing their own thinking in their notebooks or are they looking to see what their friends are doing and copying the thinking of others? Are scholars using tick marks to accurately count or are they just going through the motion of using tick marks and <u>then</u> going back to recount by ones?
Anticipated Student Responses Strategy 1 (S1): Organizes by ones without tick marks OR counts by ones with tick marks. Strategy 2 (S2): Organizes with a group of ten and circles it; counts the rest by ones Strategy 3 (S3): Organizes by finding all groups of ten, encircling each; counts remaining single sticks by ones	**T: Why did you organize your sticks this way?** **T: Can you explain to me how you have made it easier to see how many sticks Ms. Perlee has?** **T: Can you count the sticks?**	

Comparing and Discussing, including Teacher Key Questions		Are scholars actively listening to their peers throughout the discussion? Are scholars able to explain each others' ideas?

Scholars move to the carpet in front of the board.

T: Who thinks that they found a way to count Ms. Perlee's sticks quickly & easily?

Scholar presents S1: counting by ones.

T: Who had a different way of organizing their sticks that they think is quicker & easier?

T: (If total is not 26 and other scholars are vocal about it) hmmmm some of your friends think Ms. Perlee has a different number of sticks…keep watching as your other friends come up to share

Scholar presents S2: circling one group of ten & putting tick marks on the remaining sticks.

T: What did [scholar who shared S2/S3] do to make it easier to see the number of sticks?

T: Who can tell us what's the same and what's different about these two strategies (S1 and S2)?
S: They both got 26.
S: (Scholar who shared S2)'s strategy found a group of 10 so when we count, we don't have to start at 1, we can start at 10! It's faster!

T: Use your thumb to show if you agree (thumbs up) or disagree (thumbs down).

T: Who thinks that they organized their sticks in a way that would make it even easier to see how many sticks there are?

Scholars show their thinking with their thumbs.

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Scholar presents S3: circling two groups of ten & putting tick marks on the remaining sticks.
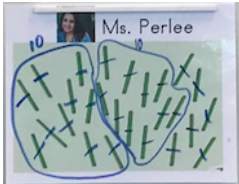
**T: Who can tell us what's the same and what's different about these two strategies (S2 and S3)?**
S: They both got 26 and circled at group of 10.
S: (Scholar who shared S3's strategy found all the groups of 10 so when we count, we can say 10, 20, 21, 22…)

T: Use your thumb to show if you agree (thumbs up) or disagree (thumbs down).

T: Who can show Ms. Perlee's sticks with counting blocks.

Scholar comes to board and displays 2 ten trays and 6 single blocks.

T: I want you to think about which of your friends' strategies made it the easiest to see how many sticks Ms. Perlee has. Your task is to use organize Ms. Bentley's sticks in a way that will make it easy for you to see how many sticks she has. If you are finished early, you may use your counting blocks to represent Ms. Bentley's sticks.
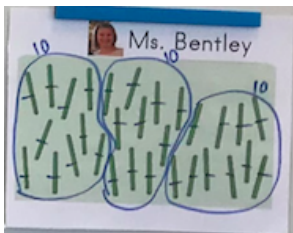
Scholar presents S3, finding all 3 groups of 10.

T: Who can come up and explain to us how this helps us see Ms. Bentley's number of

Teacher passes out picture with Ms. Bentley's sticks. Scholars go back to seats and organize their sticks so the number of sticks can be seen easily. Scholars will be given approximately 2 minutes to work independently. During this time, teachers will observe and check in with individual scholars to gain understandings of revised student thinking. Scholars are then asked to come back to the rug for a

Are students using a more sophisticated strategy as a result of the comparison and discussion?

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sticks easily? S: She found all the groups of 10! There are 3 groups of 10! We can count 10, 20, 30! *T: Would somebody like to come up and show us how to represent Ms. Bentley's sticks using counting blocks?* Teacher calls scholar who did so correctly at desk to come to board. **T: How many sticks did Ms. Perlee have?** S: 26! **T: How many sticks did Ms. Bentley have?** S: 30! **T: So who won Pick Up Sticks?** S: Ms. Bentley because 30 is more than 26. S: Ms. Bentley because she has 3 groups of 10 and Ms. Perlee has 2 groups of 10.	discussion. Scholar comes to board and displays 3 ten trays.	
Summing Up T: (Points to board work) **Finding all the groups of 10 helps us count quicker and easier.**		

9. Points to notice (Assessment)

Prompts to focus observation and data collection.

Refer to *Plan | Step 7: Focus the Data Collection*

Do the scholars use the arrived upon strategy (S3: finding all groups of ten) as a means of organizing Ms. Bentley's sticks?

What evidence is there that the 'comparing & discussing' portion of the lesson deepens scholars' understanding?

10. Board Plan

11. End of Cycle Reflection

What Did We Learn? (to be filled out after the post-lesson discussion)