CONSTRUCTION TASK: What's My Number?

Approximately 3Days (Adapted from Content Standards: Kindergarten Through Grade Eight, Illustrative Mathematics)

STANDARDS FOR MATHEMATICAL CONTENT:

MCC2.NBT.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:

a. 100 can be thought of as a bundle of ten tens — called a "hundred."
b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

MCC2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s.

MCC2.NBT.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

STANDARDS FOR MATHEMATICAL PRACTICE:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

*****Mathematical Practices 1 and 6 should be evident in EVERY lesson. *****

BACKGROUND KNOWLEDGE

Students should have familiarity with base-ten models. This activity will encourage students to represent numbers in a variety of ways. "What is another way you can show 42 besides 4 bundles and 2 units? Let's see how many ways you can find." Students will begin to understand equivalent representations through groupable models and words. These models should reinforce the students base ten understanding. Many groupable models are shown on page 127 of Van de Walle's *Teaching Student-Centered Mathematics: Grades K-3*.

Not all students have seen base-ten blocks outside of the instruction that you have provided. This task should only be used with students who know what they are or have some on hand to use themselves. Because this task asks students to explain how they know the list is complete, it

aligns with Standard for Mathematical Practice 3: Construct viable arguments and critique the reasoning of others. A systematic approach to listing the solutions is not required to meet the standard, but it is a thorough way for students to organize and explain how they found all the possible ways to make 124 using base-ten blocks.

(Suggestion: See Teaching Student-Centered Mathematics by Van de Walle for additional base-ten riddle examples and learning games. Pages 132-134.)

- *Activity 5.4 – "Odd Groupings"*
- *Activity 5.5 – "Three Other Ways"*
- *Activity 5.6 – "Base Ten Riddles"*

This task acts as a bridge between understanding place value and using strategies based on place value for addition and subtraction. Within the classroom context, this activity can be differentiated using numbers that are either simpler or more difficult to manipulate across tens and hundreds.

ESSENTIAL QUESTIONS

- Why should we understand place value?
- What are the different ways we can show or make (represent) a number?
- What is the difference between place and value?
- If we have two or more numbers, how do we know which is greater?

MATERIALS

- 0-99 chart (optional)
- Math Journals to record/explain concepts (optional)
- Base 10 manipulatives, as needed
- Optional printable cards located in intervention section.

GROUPING

Small Group

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Part I

Pick a student to choose any two-digit number. Call on students to ask yes or no questions about the "secret number". Model asking questions using place value terms or comparison terms. As students are given clues to the "secret number", they could eliminate numbers on their 0-99 chart.

This activity helps students build flexibility using language and equivalent representations of numbers. Base ten manipulatives should be available if students desire to use them to visualize the numbers. Students could also draw pictures to help them make up their questions to find the mystery number. Children may begin with very simple, straightforward questions about the number, but eventually they will start to try to make up more difficult clues by combining the amount of ones, tens, or hundreds.

Part II
Create their own game set with clues. Each child could create 5 or more cards and then place these cards in a center or for a math mini lesson.

Examples of clues:

- I have a 4 in my tens place and a 2 in my ones place. Who am I?
- I have 1 more ten than the number 14 and 3 ones. Who am I?
- I am 35. I have 25 ones. How many tens do I have?
- I am 1 ten, 5 hundreds, and 29 ones. Who am I?

Commentary: A systematic approach to listing the solutions is not required to meet the standard, but it is a thorough way for students to explain how they found all the possible ways to make 124 using base-ten blocks.

Solution: systematic exchanges

The list of all ways using 1 hundred is:
1 hundred, 2 tens, 4 ones.
1 hundred, 1 ten, 14 ones
1 hundred, 0 tens, 24 ones.

The list of all ways not using any hundreds is:
12 tens, 4 ones.
11 tens, 14 ones
10 tens, 24 ones
9 tens, 34 ones
8 tens, 44 ones
7 tens, 54 ones
6 tens, 64 ones
5 tens, 74 ones
4 tens, 84 ones
3 tens, 94 ones
2 tens, 104 ones
1 ten, 114 ones
0 tens, 124 ones.

To know the list is complete as we make it, we can start with the standard way, namely 1 hundred, 2 tens, and 4 ones, and exchange tens for ones, one at a time, to get the first list. Then we exchange the hundred for 10 tens, to get a total of 12 tens along with 4 ones. Once again, we can exchange tens for 10 ones step by step in order to get the second list.

Part III
Implement game cards and clues that involve skip counting. Begin with two digit numbers so that the students can use a 0-99 chart to assist. Encourage students to write down a number and ask their partners to locate a number that is 5 more, 10 less, 100 more, etc. than the stated number. Discuss with the students strategies that they find helpful in skip counting, especially when they are skip counting by multiples of 10 or 100.

Examples:

1. What number is 1 more than 99?
2. What number is 1 less than 600?
3. What is 5 less than 50?
4. What is 5 more than 100?
5. What number is 10 more than 90?
6. What number is 10 less than 300?
7. What number is 100 more than 570?
8. What number is 100 less than 149?

FORMATIVE ASSESSSMENT QUESTIONS

- What helps you to eliminate those numbers?
- What number is 1 more than 99?
- What number is 1 less than 600?
- What is 5 less than 50?
- What is 5 more than 100?
- What number is 10 more than 90?
- What number is 10 less than 300?
- What number is 100 more than 570?
- What number is 100 less than 149?
- How can you organize your groupings?

DIFFERENTIATION

Extension

- "Three Other Ways", Activity 5.5 in Teaching Student-Centered Mathematics, Grades K-3. Working in groups or pairs. First they show "four hundred sixty-three" on their desks with strips and squares in the standard representation. Next they find and record at least three other ways of showing this number.

Intervention

- Students who are still having difficulty with understanding the magnitude of numbers and their place value can be given Popsicle sticks to bundle into groups of ten. As they are bundled, the student places the Popsicle sticks in cups or on a mat, labeled ones, tens, and hundreds. This is more hands-on for the student who has a difficult time accepting the base 10 stick as a group of ten because it is already together. Have the student stop on occasion and count out what they have on their mat. Add single Popsicle sticks to the mat and ask what number that would make. Have students count the Popsicle sticks in bundles then take a bundle apart and have the student count it again. This extra practice will help them recognize that the number doesn't change even though the bundle of ten has been taken apart. Finally, the student could trade each bundle of ten or one hundred for the matching base 10 blocks or snap cubes.

- Using pennies, dimes and dollars may also help students to grasp the idea of regrouping ("changing") ones, tens and hundreds, but still keeping the same total amount.

- Online pre-made card sets:

"Who Has? "- More or less - http://www.mathwire.com/whohas/whmoreorless.pdf
"Who Has? with tens and ones - http://www.mathwire.com/whohas/whbaseten.pdf
"Who Has?" with hundreds - http://www.mathwire.com/whohas/whohaspv.pdf