PRACTICE TASK: Capture the Caterpillar

Approximately 2 Days

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

MCC2.NBT.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

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 a good understanding of place value with groupable base ten models and well as pre-grouped base ten model concepts before proceeding with this activity. According to Van de Walle, "It is easy to attach words to both materials and groups without realizing what the materials or symbols represent." A student who places three counters in the tens section should understand that this represents 3 groups of ten or 30, not just 3. (Chapter 5 – *Teaching Student Centered Mathematics, Grades K - 3* by Van de Walle)

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

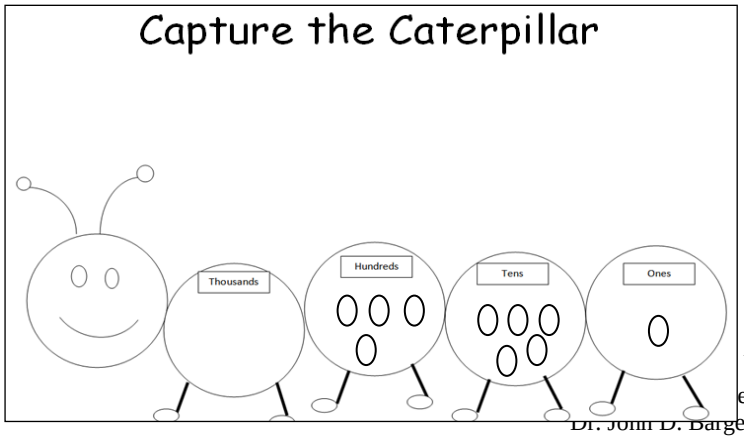
- Small counters such as beans
- Digit cards #'s 0 – 9 (1 set per group)
- Pair of dice for each group
- "Capture the Caterpillar" game mat (1 per student)
- "Capture the Caterpillar" recording sheet (1 per student)
- Optional: Dry erase board and markers to display target number for each team

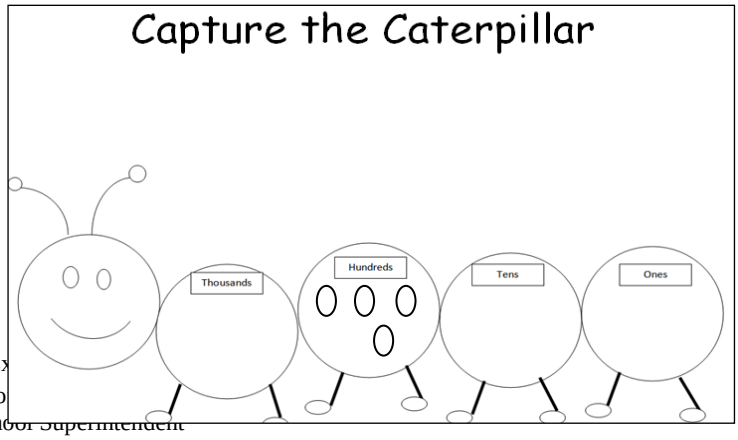
GROUPING

Small groups (2-3 students)

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Part 1
Divide class into small groups of 2 -3 students. Students will take turns being the group leader. The group leader will pick 3 digit cards and arrange them to make a number. This number should be written on each child's recording sheet. Students will then roll a set of dice to determine how many counters the group will receive. These counters will be arranged on the "Capture the Caterpillar" place value game mat to create a number as close to the target number as possible. Ex. **Target number = 453**
If the student rolls a 4 and a 6, they will get 10 counters. These counters may be divided into any of the place value sections on the "Capture the Caterpillar" game mat. In the picture below, the students arranged the 10 counters to create 451.
Once the students create their number, they will write it on the recording sheet and circle the appropriate symbol. The students will then write the number they created in expanded notation. The student in the group that gets closest to the Target number wins.
In the example below, the group rolled a 1 and a 3. After collecting 4 counters, the students placed all of the counters in the hundreds section to create the number 400.





FORMATIVE ASSESSMENT QUESTIONS

- How close is your number to the target number?
- Is your number smaller or larger than the target number?
- How would you write your number in word form?
- Can you represent this number in expanded form?
- What is the difference between place and value?

DIFFERENTIATION

Extension

- Vary the task by having students roll 3 dice to collect additional counters.
- Have students each roll a set of dice and create their own number. The numbers can be compared. Who is closest to the target number?
- Make true equations. Write one number in every space. Draw a picture if it helps.

1. 1 hundred + 4 tens = _____
   4 tens + 1 hundred = _____
2. 14 tens = 10 tens + _____ tens
   14 tens = _____ hundred + 4 tens
   14 tens = _____
3. 7 ones + 5 hundreds = _____
4. 8 hundreds = _____
5. 106 = 1 hundred + _____tens + _____ones
   106 = _____tens + _____ones
   106 = _____ones
6. 90 + 300 + 4 = _____

Students determine the number of hundreds, tens and ones that are necessary to write equations when some digits are provided. Student must, in some cases, decompose hundreds to tens and tens to ones. The order of the summands does not always correspond to the place value, making these problems less routine than they might seem at first glance.

See the solution for detailed information about the parts of this task.

Solution: Annotated solutions

1. 140, 140.
   The first problem asks for the same number (140) in different ways. This emphasizes that order doesn't matter in addition – yet order is everything when using place-value notation.

2. 14 tens = 10 tens+4 tens
   14 tens = 1 hundred+4 tens
   14 tens = 140.
   In this problem, the base-ten units in 140 are bundled in different ways. In the first line, "tens" are thought of as units: 14 things = 10 things + 4 things.
3. 507.
   By scrambling the usual order, the third problem requires students to link the values of the parts with the order of the digits in the positional system. Also, to encode the quantity, the student will have to think: "no tens," emphasizing the role of 0.
   7 ones + 5 hundreds = 507
4. 800.
   In the fourth problem, the zeros come with a silent "no tens and no ones":
   8 hundreds = 800
5. 106 = 1 hundred + 0 tens + 6 ones
   106 = 10 tens + 6 ones
   106 = 106 ones
   In this problem, the base-ten units in 106 are bundled in different ways. This is helpful when learning how to subtract in a problem like 106 – 34 by thinking about 106 as 100 tens and 6 ones.
6. 394.
   The sixth problem is meant to illustrate the notion that if the order is always given "correctly," then all we do is teach students rote strategies without thinking about the size of the units or how to encode them in positional notation.
   90 + 300 + 4 = 394

Intervention

- Reduce target number to a two digit number.

Capture the Caterpillar Recording Sheet

Round #	**Target Number**	Compare the Numbers (Circle One)	**My Number**	Our Number in Expanded Notation (Ex. 400 + 20 + 6)
1		< = >		
2		< = >		
3		< = >		
4		< = >		
5		< = >		

Which number from above was closest to the target number? _____

How do you know? _____

_____

_____

Capture the Caterpillar