<u>CONSTRUCTING TASK</u>: Building Towers of 10

Approximately 1-2 days

STANDARDS FOR MATHEMATICAL CONTENT

MCC1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
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).

MCC1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

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.

BACKGROUND KNOWLEDGE

Students should have experience working with numbers up to 100 in previous tasks. Students should be able to build numbers with an understanding of place value. This task is focused on students counting collections of objects and using their understanding of place value to record larger amounts. The discussion about what happens when a student reaches ten groups of ten should happen during the modeling of this game. Students should be aware of how this number different, what happens to the digits and understand when a new place value position is needed. ***This is not intended to introduce the strategy of regrouping.***

ESSENTIAL QUESTIONS

- How does using 10 as a benchmark help us compose numbers?
- How do we represent a collection of objects using tens and ones?
- How can making equal groups of ten objects help us count larger quantities?

- How can making equal groups of ten objects deepen my understanding of the base ten number system?

MATERIALS

- Unifix cubes (100 per partner set)
- 2 ten sided dice or 0-9 spinner for each pair of students
- Place Value Mat

GROUPING

Partners

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I

The teacher will model the "Building Towers of 10" game with the class. The modeling of this game is important to lead to the discussion about what happens when a student reaches ten groups of ten. The students should understand that when there are ten groups of 10 a new place is created for this bundle. Model this idea and ask students about the why this number is different. The understanding of the 3 digits should be modeled for students to gain a deep understanding of what is happening. Students should discuss how this number different, what happens to the digits and understand when a new place value position is needed. ***This is not intended to introduce the strategy of regrouping.***

Students work with a partner and play the "Building Towers of 10" game. Students take turns tossing both number cubes and creating a number sentence with the two numbers. Students will find the sum and add this number of cubes to the place value mat. Once the ones column is full the student will connect the cubes and move them to the tens column. Players will work together on one mat until they have created ten towers of 10. Allow students to play without any recording and focus on building the representation.

Part II

Students work with a new partner and play the "Building Towers of 10" game again. This time, the students will record their equations and keep up with the total sum on a 99 chart. Students will take turns tossing both number cubes and creating a number sentence with the two numbers. For instance, if the first two numbers rolled are 7 and 2, the student will record 7 plus 2 equals 9 on the recording sheet. Then, the player who rolled the number cubes collects that many objects and adds them to the place value mat. Students will use one place value mat to manipulate the number. After each toss, the player must tell the number sentence created, and the total number of objects counting by 10s and 1s. Recording the equation allows additional practice with writing addition equations correctly. Students will then use a cube or counter to count the total number of objects on a 0-99 chart. If the current number is 16 and a player rolls a 2 and 4, then the player will record the equation and then add 6 + 16 on the place value mat and the 99 chart. This will allow them to check the representation with the total number on the 99 chart after each turn. Both players are adding the cubes to one mat and the 99

chart to form a running total. Together partners determine their new total until they have reached 100. Discuss what happens to this number. Is there another chart that could be created for numbers larger than 99? Partners continue rolling and collecting objects until they create a collection of 100 cubes – ten towers of 10. The teacher should walk around and monitor students while playing this game. Ask the students questions throughout the game to ensure understanding.

A follow up class discussion is very important to build deeper understanding. Ask questions throughout the game and revisit the same questions during the class discussion. How many equations did it take you and your partner to get to 99? How does the cube representation help us find the number on the 99 chart? Discuss how the tens place digit determines the decade where the number can be located.

FORMATIVE ASSESSMENT QUESTIONS

- How did you add the two numbers on the dice?
- How do you write an addition equation correctly?
- Read the total number of blocks on your place value mat.
- How can you locate the number on the 99 chart?
- What happens when there are ten single cubes in the ones column?
- What happens when there are ten groups of 10 in the tens column?
- Can you represent the number ____ with a collection of objects using tens and ones?

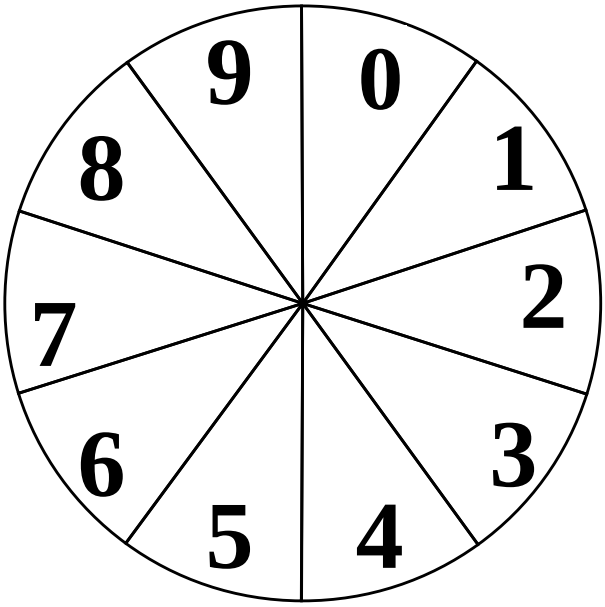
DIFFERENTIATION

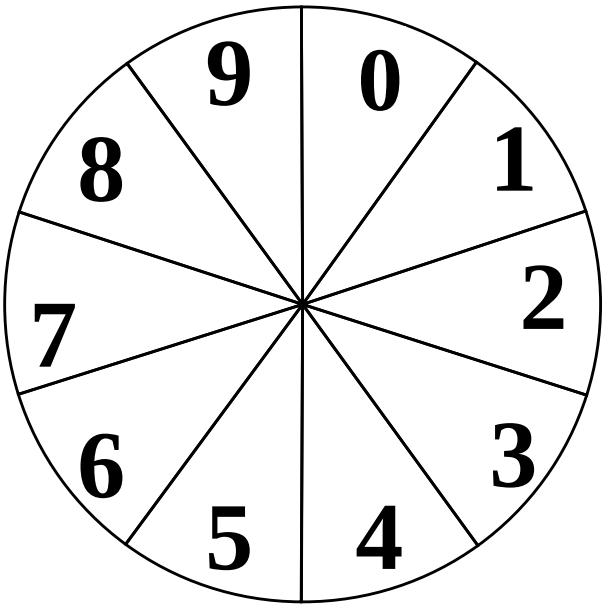
Extension

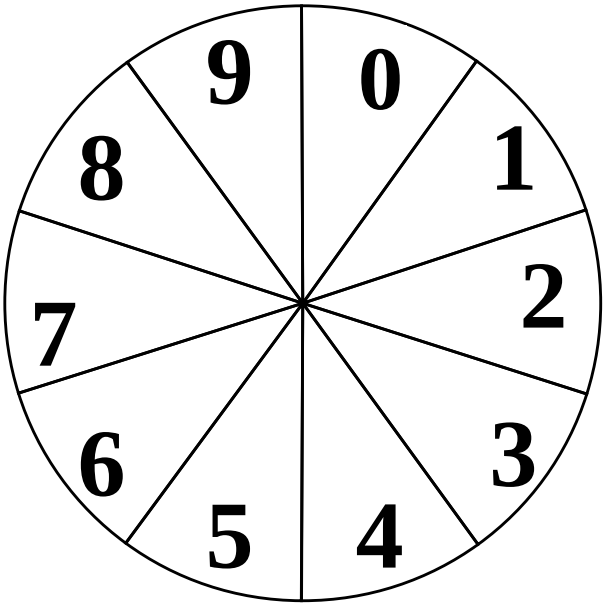
- Have students play backwards from 99 to 0. Students begin with nine groups of 10 cubes and nine ones. Students will break apart or decompose the groups to remove the sum of the dice they rolled.

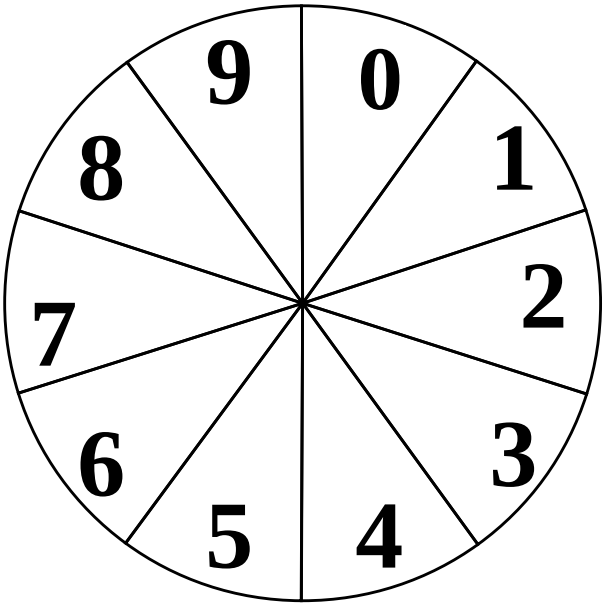
Intervention

- Have students build collections to 50 and use 2 (1-6) number cubes.



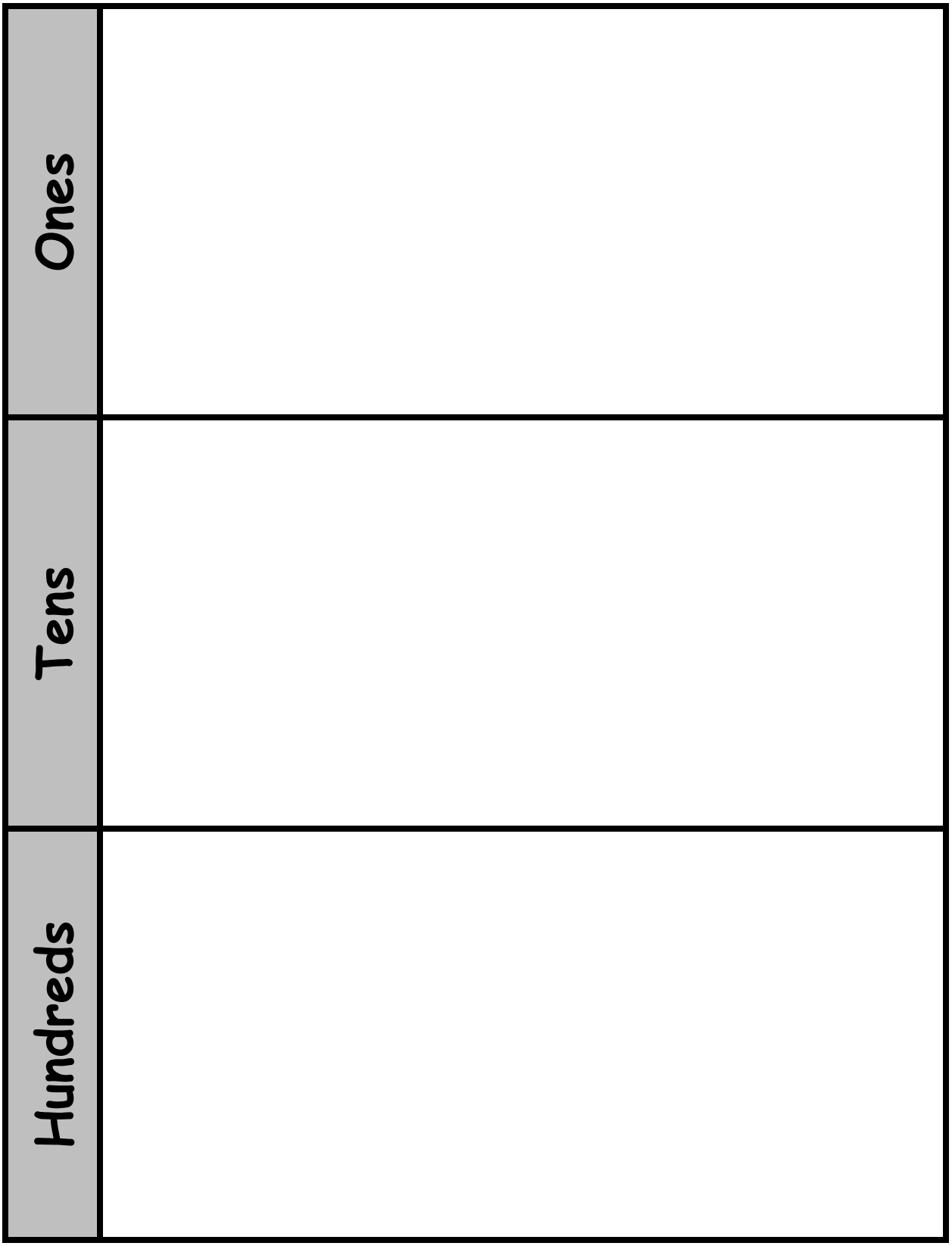






0-9 Spinners

Place Value Mat



Towers of 10 Equation Recording Sheet

1st number rolled	2nd number rolled	Addition equation