<u>CULMINATING TASK:</u> Find the 5th Tower

Approximately 1-2 days

STANDARDS FOR MATHEMATICAL CONTENT

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

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

MCC.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).

MCC.K.CC.4. Understand the relationship between numbers and quantities; connect counting to cardinality.

f. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
g. 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.
h. Understand that each successive number name refers to a quantity that is one larger.

MCC.K.G.1. Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above*, *below*, *beside*, *in front of*, *behind*, and *next to*.

MCC.K.MD.3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

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

Numbers are related to each other through a variety of number relationships. The number 7, for example, is 3 more than 4, two less than 9, composed of 3 and 4, as well as 2 and 5, is three away from 10, and can be quickly recognized in several patterned arrangements of dots. These ideas further extend to an understanding of 17, 77, and beyond. Number concepts are intimately tied to the world around us. Application of number relationships to the real world marks the beginning of making sense of the world in a mathematical manner (Van de Walle, 2010).

ESSENTIAL QUESTIONS

- Why is it important to know how to put things in number order?
- How does putting things in order keep things organized?
- Why do we need to be able to put things in order?
- Why do we need to be able to read ordinal numbers?
- What is the difference between "more" and "less"?

MATERIALS

- Recording Sheet
- 10 cubes (let students count out the 10 cubes)

GROUPING

Whole group and small group

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Students count 10 cubes. Students choose the colors.

Allow time for students to build towers of no more than 5 and practice placing them on the recording sheet. Allow students time to describe and share what their towers look like and the order in which their towers appear.

Teacher reads the directions as students build towers and place them in the correct location/order according to what the teacher says. The teacher will give the directions for (4) towers and students must determine what the 5th tower would look like based on what they see (patterns). As the teacher describes what each tower should look like, the students recreate the tower to match what the teacher is saying. Students should identify the pattern and be able to count the total number of cubes used to make all the 5 towers. Students must record the quantity for each tower in the box provided.

After students have counted the total amount of cubes, have students make one long tower. *(Some students may have done this to count all of their cubes, which is fine).* After all five towers for the first set have been connected to make one tower, have students **decompose** the tower one cube at a time counting backwards out loud. Discuss the vocabulary term **decompose** if not already addressed previously. As they count backwards, engage students in questions by asking what number is next, more/less than, etc… Once the tower has been broken down into individual cubes move on to the next set of towers and repeat.

First set of towers:

- The 1st tower has one cube.
- The 2nd tower has 2 cubes.
- The tower after the 2nd has the same amount of cubes as the 1st tower.
- The 4th tower has 2 cubes.
- What would the 5th tower look like?
- How many cubes make up all 5 towers?

Second set of towers:

- The 2nd tower has 2 cubes.
- The tower that comes after the 3rd tower has 1 cube.
- The tower in between the 2nd and 4th tower has 3 cubes.
- The first tower has 1 less cube than the 2nd tower.
- What would the 5th tower look like?
- How many cubes make up all 5 towers?

Third set of towers

- The fourth tower has 3 cubes.
- The second tower has 1 cube.
- The first tower has less than one cube. *(Zero-Allow for constructive struggle and conversation)*
- The third tower has 1 more cube than the 2nd tower.
- What would the 5th tower look like?
- How many cubes make up all 5 towers?

After students have made all the towers and counted all the blocks in the five towers, have them reconstruct their favorite set of towers. Have students decide and describe how they could sort their favorite set of towers. (Color, height, quantity, etc…) This will vary with student and chosen set. Student then sort towers in the way they described and draw a picture of how they sorted.

FORMATIVE ASSESSMENT QUESTIONS

- How do you know that you counted correctly?
- What did you do to find the 5^{th} tower?
- How did you decide what the 5^{th} tower would look like?
- Did you have a strategy for counting all your cubes? Describe your strategy.
- What does decompose mean?
- What are some ways that we can sort objects?

DIFFERENTIATION

Extension

- Increase the complexity by adding the terms "more" and "less" into the descriptors. Example:
    - The 2^{nd} tower has 1 less cube than 3 cubes.
    - The 1^{st} tower has one less cube than the 2^{nd} tower.
    - The tower after the 3^{rd} tower has 1 more cube than the 1^{st} tower.
    - The tower between the 2^{nd} and 4^{th} has one less than the towers it is between.
    - What would the 5^{th} tower look like?
- Allow student to make a pattern with towers and describe the pattern to their partner. The partner must predict what the 5^{th} tower looks like.

Intervention

- Be explicit in the description of each tower and describe each tower in order. For example:
    - The 1^{st} tower has 2 cubes.
    - The next tower has 1 cube.
    - The 3^{rd} tower has 2 cubes.
    - The 4^{th} tower has 1 cube.
    - What would the 5^{th} tower look like?

Find the Fifth

Build Tower Here	Build Tower Here	Build Tower Here	Build Tower Here	Build Tower Here

__________ __________ __________ __________ __________

How many blocks were used to make the 5 towers?
Write the total amount in the square

Build Tower Here	Build Tower Here	Build Tower Here	Build Tower Here	Build Tower Here

__________ __________ __________ __________ __________

How many blocks were used to make the 5 towers?
Write the total amount in the square

Build Tower Here	Build Tower Here	Build Tower Here	Build Tower Here	Build Tower Here
________	________	________	________	________

How many blocks were used to make the 5 towers?
Write the total amount in the square

What is a way you can sort your towers?

I can sort my towers by ______________________________

Show what you mean and draw a picture below: