CONSTRUCTING TASK: Creating a Number Line

Approximately 2-3 days

STANDARDS FOR MATHEMATICAL CONTENT

MCC1.NBT.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.

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 representing numbers using pictures and objects. Students should also be able to count correctly in a sequence to 100. This may be the first experience with number lines up to 50 for several students.
When creating a number line with students, be sure to use 0 as a starting point on the number line. This will communicate to students that zero is a number, not merely a placeholder, and that it is even. Having zero on a number line will give it status as a number and, as other numbers, tells how many. *(About Teaching Mathematics: A K-8 Resource, by Marilyn Burns*)

ESSENTIAL QUESTIONS

- What does a number represent?
- What can a number line show us?
- How can (or why would) we use a number line?
- How can I use a number line to help me count? Or count on?

MATERIALS

- 51 sheets of paper
- Crayons or markers
- About 20 ft of ribbon, yarn or string
- Masking tape
- 51 clothespins (you could use tape if needed)
- Clothing cards with numbers (You could copy these on colored paper, rather than copy in color)
- Laundry basket or small basket or box

GROUPING

Large Group, Individual

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Part I

Tell students that we will make our very own class number line. Assign each student a number or allow each student to choose a number. If you assign students a number at the beginning of the year then you may let them use their assigned number. Have the student write the number in large print on a sheet of construction paper or white copy paper. Then, have the student represent the number as many ways as they can. Encourage students to think outside the box: symbols, words, coins, bills, tally marks, time, addition/subtraction problems, dots, pictures, etc. (Have the number words available for students on the math word wall). After students have created their number card, take a field trip to the hallway. The students will place the number cards in order.

After all the students have finished placing their numbers, ask, "*There is a very important number missing, who knows what it is? (zero) What do you think the zero number card would look like? (nothing on it but the numeral 0 and the word zero)"*

Once this discussion has taken place have a volunteer put the zero number card on the number line. Then have the class use the number line to help them count up to the number of students in the classroom. Allow students to check at this time to see that the numbers are in the appropriate order on the number line. If there are any incorrect number placements, have a discussion with the students about how they know these numbers are in the wrong place, what needs to be done to put them in the correct place, and how they will know the new placement is correct.

Discuss how the classroom number line can help during math. You may tape the pieces of paper together and leave at the back of the classroom. Students will enjoy walking the number line to count, solve word problems and much more. This may be several students' first experience with a number line. Allow the discussion to continue as long as the students are engaged.

While students are working on their number cards, ask questions such as:

- What number are you representing for the number line?
- How are you representing this number?

- How are you self-checking to see that your number matches your picture representation?
- Where did you look to find the spelling for your number word?
- Which numbers are on either side of your number?
- Now that you know your numbers neighbors, can you show us which one comes before your number and which one comes after your number? How did you figure that out? Are these numbers more or less than your number? How do you know?
- How can the class number line help you?

Part II

Share a scenario about lining up the clothes in number order. Create a clothes line in your classroom using string or ribbon. It works best if you tape the clothes line to a wall or the board (place 2 pieces of tape on the ends and then equally space 4 additional pieces in between.) Before the task, collect a laundry basket or small basket or box, and print and cut the various clothes below with numbers on each item. As students draw an item out of the basket, have them place the item where they think it should go on the clothes line using a clothespin. Students may have several turns to get all the numbers 0-50 on the clothes line.

As students place the items, ask questions like: *Why did you decide to place the 7 there? What information did you use to place the 2 in that position/place? Do any of the clothing items need to be moved? How do you know this?*

Draw students' attention to the class number line. Ask students what they already know about the number line.

- What number does our class number line begin with? (Make sure it is zero!)
- How far up does the class number line count to? Could we keep going? Why do you think we can or cannot keep going?
- Can there be numbers before or after what is displayed on the classroom number line? How about in between the numbers?
- What do you notice about the spacing between the numbers?
- How are the numbers sequenced on the number line?
- Can someone show us where 15 lives? Who are 15's neighbors?
- Who can tell us one of 32's neighbors? What number is not a neighbor of 32? Who is it a neighbor of? How did you figure that out?
- Are all numbers included on the number line? How do you know?

Part III – Line It Up

Play the game "Line It Up". The teacher will use the clothes cards with the numbers for this game. Hand out one number card to 8 different students. All the number cards must be there to create a sequential order but they do not have to start with 0. The students will line up facing the remaining students. When the teacher says "GO", the students must put themselves in order without talking.

The remaining students at their seats will give a thumbs up if they are in the correct order or a thumbs down if they need to try again. Once all students are giving a thumbs up the students may count the numbers to double check the order. Repeat with a different set of numbers and students. Example: The teacher passes out the following number cards: 16, 19, 15, 17, 18, 14, 20, 13. As the students get the card they go to the front of the room. The teacher says "GO", and the students look at each other's cards and put themselves in order without talking. The students have put themselves in this order 13, 14, 15, 16, 17, 18, 19, 20. The remaining students show thumbs up. The class reads the order out loud and they are correct.

FORMATIVE ASSESSMENT QUESTIONS

- How can you represent the number _____using numerals, pictures, and words?
- How can you place a group of numbers in the correct counting sequence?
- Which numbers are on either side of your number?
- Now that you know your number's neighbors can you show us which one comes before your number and which one comes after your number? How did you figure that out? Are these numbers more or less than your number? How do you know?
- Can there be numbers before or after what is displayed on the classroom number line? How about in between the numbers?
- What do you notice about the spacing between the numbers?
- How are the numbers sequenced on the number line?

DIFFERENTIATION

Extension

- Students can experiment with sequencing numbers from 0-100 or higher on a number line. Use index cards or the blank clothes cards to students to add larger numbers.

Intervention

- Some students may need to use manipulatives to help count out objects before drawing the corresponding number of objects on their paper.