Counting Rope 20

Strand: Number and Number Sense

Topic: Place Value, Composing and Decomposing Numbers

Primary SOL: 2.1 The student will
>   b) identify the number that is 10 more, 10 less, 100 more, and 100 less
>   than a given number up to 999

Related SOL: 2.1a, c; 2.2 a, b, c; 2.5 a, b; 2.6 a, b, c

Materials:
- Counting Rope 20 Construction (attached)
- Place-value Mat Worksheet (attached)
- Extension Activity (2.2c) Odd and Even activity sheet (attached)
- Elastic cord
- Two different colors of beads
- Counting ropes of 100
- Hundreds chart (for differentiation)

Vocabulary

*digit, more or less, value*

Student/Teacher Actions: What should students be doing? What should teachers be doing?

The primary goal of the activity is having students practice any numbers up to 999 and identify the number that is 10 more, 10 less, 100 more, and 100 less than a given number.

1. Tell students that they are going to be playing a game using counting ropes and they are going to be given clues along the way to create numbers. They will be working as a class first, then in teams, and then finally independently. In order to be able to play this game they are going to be creating counting ropes. Each counting rope will have 20 beads and one piece of elastic cord 30 inches long. (It is important for students to make their own counting ropes. Besides counting, following directions, ownership of materials, and buy-in to the mathematics game are just a few great reasons to have children make their own rope.)

   (Note: Directions to creating the counting rope are below. Have students create their ropes before beginning the activity. This is best done by having students count their own beads and measure their own cord. Set up trays with materials for easy distribution and then tables of four students can send one student to retrieve materials.)

   Show students how to hold the counting ropes and move the beads. This is a new tool for their mathematics toolboxes.
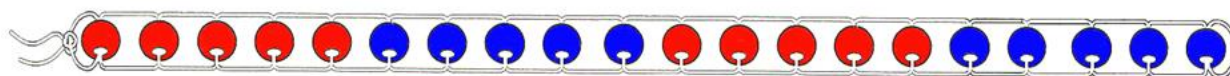
(There are larger loops on the ends than the picture above represents.)

2. Begin by asking students to show you a way to make 10. This allows students to learn to manipulate the beads and to familiarize themselves with the manipulative. Students make five red and five blue, four red and six blue, and make the 11 different combinations of 10. Now ask the children to make 10 more than 10. They will show you 10 and 10. Now what is 10 less than 10? Each student will be showing representations of the number. Formatively check all students to ensure student understanding. Give feedback to students during the process to correct any misconceptions. Ask the following questions:
    - "Using the counting rope, show me 8?"
    - "What is 10 more than 8?"
    - "Show me 5. What is 10 more than 5?"
    - "Show me 15. What is 10 less than 15? What is 10 more than 15?"

    When you ask, what is 10 more than 15, students will not be able to make that number due to having only 20 beads. Ask them to pair with another student and discuss how they could make 10 more than 15. Students will need to show you 15 on one counting rope and 10 on their partner's counting rope.

    Give a few more numbers that are less than 40 for students to practice. (This activity will go quickly due to students having some understanding of this concept with lower numbers from kindergarten and first grade.) It is important to formatively assess all students during this whole-group activity.

    Teacher should be representing these numbers on a place-value mat. After a few numbers are practiced, give the students their own place-value mat and have them record their findings.

3. After practicing several numbers of 10 more or 10 less, put students in groups of six. Tell students to begin with the number 8 and ask, *"What is 100 more than 8?"* Students should show you 100 (five students) and 8 (on one student's counting rope in different combinations of 8; 5 and 3; 4 and 4, etc.).

    (Students should be recording the numbers on their place-value mat.)

4. Now ask students to work in their groups and to think of the smallest number they can make by adding 10 without using zero. (Students should determine that 11 is the smallest number.) Now make the largest number that the team can make by adding 100. Students should be communicating and using discourse to answer the teacher's questions.

5. Now have the class form a line, and ask students to bring their counting ropes. Have students place their ropes on the floor in front of them. Hand out nine 100-beaded counting ropes to nine students. Have the rest of the class pick up their counting ropes. Have students sit in a row. Have the students with the 100 ropes stand up. Call out the number 500 and ask, *"What is 100 more than 500?"* Have that group of students come up with the answer. Write these numbers on the board on the place-value mat.

6. Make 826. Ask, *"What is 10 more than 826?"* Ask the students who are not moving to complete the place-value chart.

7. Switch roles and allow the students to come up with numbers. Have other students represent the value and then add or subtract 10 or 100 to the chosen number.

Assessment

- **Questions**
  - How is subtracting 100 from a number different from adding 100 to a number?
  - What is a digit?
  - What does value mean?
  - How is adding 100 to a number similar to adding 10 to a number?
  - How is subtracting 100 from a number similar to adding 100 to a number?

- **Journal/writing prompts (include a minimum of two)**
  - When I add 100 to any number ...
  - When I subtract 100 from any number …
  - When I add 10 to any number …
  - When I subtract 10 from any number …
  - Write a letter to your principal about adding and subtracting 10 from any number up to 999.
  - John has 434 pieces of candy for a parade. He has 100 more guests who will be attending the parade. How many pieces of candy will he need?
  - If Amy has 356 crayons and she only has room in her desk for 346, how many will she need to give to a friend? How do you know? Use the place-value chart to show your thinking.
  - Explain how to add and/or subtract 100 to any number up to 999.

- **Other Assessments (include informal assessment ideas)**
  - Observe throughout the room during the activity to ensure students are having discourse and participating in the activity. Give in-the-moment feedback during the lesson.
  - Exit ticket: Post three numbers on the board and have students come up with a word problem that represents 10 more, 10 less, 100 more, or 100 less in the context of the word problem.

Extensions and Connections (for all students)
- Teachers can conduct a number talk.
- Teachers can play the game "My Number Is …" and give clues about being 10 more, 10 less, 100 more, or 100 less.
- Teachers can discuss odd and even (see place-value chart for this extension activity).

Strategies for Differentiation
- Based on students' mathematical understanding of number sense, the teacher can differentiate the place-value mat, numbers that students are exposed to, and number of beads on the beaded rope.
- Use formative assessment throughout the lesson to give descriptive feedback on how to achieve the outcome of the standard and the lesson.

- The counting rope's use is encouraged for all students, especially kinesthetic and visual learners.
- The place-value mat is a visual that can be manipulated based on students' mathematical understanding. A focus only on tens and ones can be achieved by reducing the hundreds from the chart or adding the thousandths place for advanced students.
- Using a projector, interactive whiteboard, or modeling can address visual learners' learning style.
- Having students make and manipulate their own counting rope is best for auditory, visual, and kinesthetic learners.
- Students may use the hundreds chart to make connections to the linear model.
- Redirection and corrective feedback should be given to students who have difficulty with attention.
- Have premade bead sets for students who have difficulty with fine-motor skills.
- Provide one-on-one peer assistance for students who struggle with fine-motor skills.

Note: The following pages are intended for classroom use for students as a visual aid to learning.

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Counting Rope 20 Construction

Materials
- 20 pony beads in two colors (10 of each color)
- elastic cording

Directions

1. Cut a length of elastic cording 24" in length or longer for 20 beads.

2. Fold elastic cord in half.

   Insert one end of the cord into the bead hole. Insert the other end of the cord into the bead hole. The ends of string cross within the bead hole.
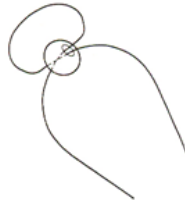
3. Continue threading beads until five of one color are threaded.
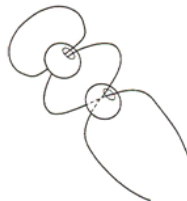
4. The same process will be done for the remaining beads of another color. Continue to alternate colors until all 20 beads are on the cord.
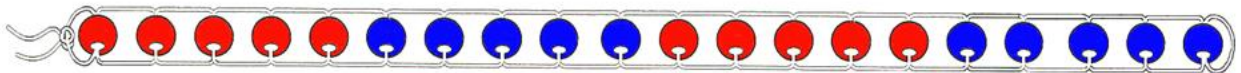
5. Tie the end of the elastic cord once all 20 beads are on the cord.

   When making the 100-beaded number line, use 54 inches of elastic cord. It is important to use only two colors and to alternate after five beads.

   Students' hands will go inside the end loops and then they can manipulate the beads.

Place-value Mat Worksheet

Show the value	Hundreds	Tens	Ones	What is 100 more?	What is 100 less?	What is 10 more?	What is 10 less?
ex. 243	2	4	3	343	143	253	233

Extension Activity (2.2c) Odd and Even

Show the value	Odd Or Even	Hundreds	Tens	Ones	What is 100 more?	What is 100 less?	What is 10 more?	What is 10 less?
Ex. 243	odd	2	4	3	343	143	253	233

Show the value	Hundreds	Tens	Ones	What is 10 less?
ex. 243	2	4	3	233

Show the value	Hundreds	Tens	Ones	What is 10 more?
ex. 243	2	4	3	253