Meaningful Rote Counting

Strand: Number and Number Sense

Topic: Counting by ones and tens and backward from 10.

Primary SOL: K.3 The student will:

a) count forward orally by ones from 0 to 100;

b) count backward orally by ones when given any number between 1 and 10;

d) count forward by tens to determine the total number of objects to 100

Related SOL: K.1, K.3c

Materials

- Beaded number frame (see attached directions for making)
- Beaded number line (see VDOE instructional video "Using a Beaded Number Line," [http://www.doe.virginia.gov/instruction/mathematics/resources/videos/index.shtml] for directions for making)
- 10 frames
- Number paths (attached)
- Hundreds chart with a ¾-inch grid (attached)
- Counters (or small items, such as beans, that can be used as counters)
- ¾-inch connecting cubes (10 per student)

Vocabulary

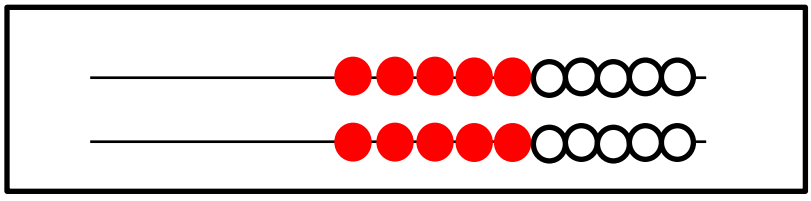
after, before, count, less, more, ones, patterns, skip counting, tens

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

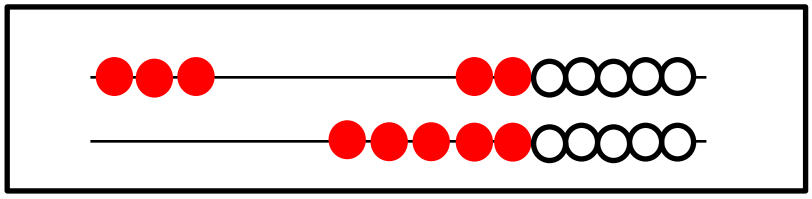
Note: This lesson is a collection of activities that help children meaningfully develop the rote counting sequence. The activities can be repeated throughout the year. You will not complete all of the activities in this lesson on any given day. Begin the year working with counting by ones to 10 and gradually work up to counting to 100 according to the readiness levels of your students. When most students are fluent with the forward counting sequence to 10, you can begin working on what comes before and after each number and also begin working on counting backward from 10. As you move closer to counting to 100, you can also begin working on counting by tens, as this will help to strengthen students counting skills as they move across decades.

Counting Forward by Ones

1. Using a beaded number frame: Display a beaded number frame to the class.



2. Say: *This is a beaded number frame. We will use this to help us count from zero to 10. Every time we say a number, watch as I move a bead across the frame.* Demonstrate by counting from 0–3, moving a bead on the top row from right to left each time a numeral is spoken.



Once you get to 3, say: *Stop! What number did we just say? How many beads have I moved? If I move one more bead, what's the next number we will say? What number comes after 3?* Move all of the beads back and have students count with you from 0–5. Again, stop the counting to ask questions regarding where we stopped and what number comes after that number. Move the beads back again and allow a student volunteer to move the beads as the class counts in unison. Eventually, the teacher or a student leader will manipulate the frame, while students point to the numerals on a number path. Students can also use individual beaded number frames to practice counting from 1–20 while moving beads.

3. Using Beaded Number Lines: See the instructional video linked above for directions for making beaded number lines. Beaded number lines can be used to extend the counting sequence to 100. They are used similarly to the beaded number frame. Students say each number as they touch and move one bead. Periodically stop, ask students to tell you the number of beads that has been counted and what number comes after ___. Ask: *How do you know that ___ comes after ___?*
4. Using 10 Frames: Show a blank 10 frame and ask: *How many counters are on the ten frame?* Add one counter to the 10 frame and ask: *Now how many?* Continue adding counters and asking how many until you get to 10. Periodically stop and ask: *If I add one more counter, how many will I have? How do you know?* Say: *So the number that comes after (4) is (5) because one more than (4) is (5).* Use a double 10 frame to extend this to 20. Students can use individual 10 frames to show what the teacher is doing or to practice independently.
5. Using Number Paths and Hundreds Charts: Students can use number paths (for numbers through 20) or hundreds charts (for numbers through 100) to count by ones to the final number. (At the beginning of the year, count to 10, gradually increasing to 100.) Tell students: *You will be using this number path/hundreds chart to count with me to 20/100. Our number path starts with 1.* We know that we say zero to show that we have no beads. We will say zero and then each *time we say a number, I want you to cover that number with a counter.* Demonstrate by counting from 0–20, placing the first counter when you say "one" and a new counter on the next numeral that is spoken. Talk with the students about the patterns they notice as they move to the right by counts of 1. Ask: *Can you use what you know about the numbers 0–9 to help you with the numbers after 10? Do you think you'll see these numbers again as we count higher?* Once you've moved on to the hundreds chart, encourage students to use the vocabulary of "one more than" paired with

"what number comes after?" You might say: *Put your bean on the number 25. What number comes after 25? And one more is...? Now put your bean on the number 65. What number comes after 65? And one more is...? Now put your bean on the number 75. What number comes after 75? And one more is...? What did you notice?*

Counting Backward by Ones

6. Beaded Number Frames: Use the beaded number frame and push all 10 beads on the top row to the left. Ask: *How many beads do we have? How do you know?* Move one bead to the right and ask: *Now how many beads? How do you know?* Be aware that some children will just know that one less than 10 is nine, but many will see this as an unrelated problem and either count all of the beads or use some other strategy to figure out that there are nine. Having students share how they know it is nine aids in developing the relationship of one less. Say: *We started with 10. We moved one away and now there are nine. One less than 10 is nine. The number before 10 is nine.* Move another bean to the right. *Now how many beads? How do you know?* Say: *One less than nine is eight. The number before nine is eight.* Continue until you get to zero. This activity can and should be done by starting with any number between one and 10.
7. Using Ten Frames: Show a 10 frame with 10 counters in the frame. Ask: *How many counters?* Then remove one counter and ask: *Now how many counters?* Periodically stop and say: *We see seven counters. What number will we have if I take one away? How do you know? What number comes before seven? What is one less than seven? This activity can be done by starting with any number from 1–10 and asking students to count backward as they remove counters.*
8. Using Number Paths: Use a number path that only shows 1–10. Direct students to cover each numeral with a small counter. Say: *We are going to count backward from 10 to one, using our number path. As you can see, our numbers are covered. Each time we remove a counter, we will say the number we see. We will go from right to left. See what you notice about the numbers and the amount of counters.* As you count backward and remove counters, students should realize that the numerals, as well as the number of counters, are getting smaller instead of bigger. As students begin to master this skill, remove the counters. Tell students: *I'm going to call out a number. I want you to cover it with a counter and continue counting backward from that number, covering each numeral with a counter. Our entire number path won't be covered this time, unless we start counting at 10.* Eventually, remove the number path and counters, and students should be able to count backward from any number between one and 10.

Counting By Tens

9. Using Connecting Cubes: Gather students in a circle on the carpet and show the hundreds chart. Ask: *How many squares make up one row of the hundreds chart?* (10) *Is that the case for every line?* Count to make sure students suggest this. Next, provide several tubs of connecting cubes and have each student make a stick of 10 connecting cubes. (It is important that each student create the stick themselves so that they know that it is made up of 10 cubes.) Ask each student to compare his or her stick to another student's to be sure that both sticks contain 10 cubes. Collect any extra cubes. Ask one student to bring their stick to the center of the circle. Have the student lay his or her cubes across the first

row of the hundreds chart. Ask: *How many squares are covered on the hundreds chart? Why do you think this stick covered 10 squares?* Help students see that all of the numerals up through 10 are covered. Have a second student lay his or her stick across the second row. Ask: *Now how many squares are covered? Why do you think that?* Help students see that all of the numerals through 20 are covered. Repeat with a third row, fourth row, etc. until the whole hundreds chart is covered. Say: *Sometimes we can count a lot of objects without saying each number; that's called skip counting. We can count these cubes by skip counting by tens. Lift each stick starting from the top as you count 10, 20, 30, 40, etc.* Repeat the skip counting sequence several times then let each child claim his stick. Then say: *I wonder how far we will count if we use five sticks. Invite five different students to use their sticks to cover the hundreds chart and count by tens.* Ask: *Why did we count by tens? Why did we get to 50?* Repeat with different numbers of sticks, until all children have had a chance to use their stick as part of the activity.

10. Using Beaded Number Lines: Provide each child with a beaded number line. Ask students to move the first set of colored beads to the left and mark it off with a clothespin. Ask: *How many beads do we have? How do you know?* (Be aware that some students will want to count by ones. Allow them to do this to enable them to make sense of what is happening.) Ask students to remove the clothespin and move the second set of beads to the right and mark it off with the clothespin. Then ask: *Now how many beads?* (Again, if students want to count by ones, allow it.) *How do you know?* (Sharing ideas will help some students make connections to counting by tens.) Then say: *OK. The first set was 10, then we added the second set and we have 20. I wonder how many we will have when we move the third set.* Share ideas and then let students move the third set of beads. If students share that they are counting by tens, ask: *Why can we count by tens?* Continue moving a set and determining how many until you get to 100. A hundreds chart can be displayed and each count by 10 can be colored or marked in some way as you find each new amount. Practice moving and counting the groups of beads by tens several times to reinforce the rote counting sequence. (This may be easier if you do not use the clothespin.)

Assessment

- **Questions**
    - When counting by ones to 100, how do you know whether a number has been left out?
    - When you get to 59, how do you decide what comes next?
    - When looking at a row in the hundreds chart, what patterns do you see in this row?
    - What happens when you count backward from 10?
    - What happens when you count by tens?
    - How is counting by ones different from counting by tens?

- **Journal/writing prompts**
    - When Kelly was counting by tens, she made a mistake. She said, "10, 20, 40, 50." What was Kelly's mistake?
    - What number comes after 11?
    - Write the numbers you would say as you were counting backward from 10.
- **Other Assessments**
    - Assess students by listening to them as they complete the tasks during the lesson. Make note of students who need extra time. They may require reviewing in a small-group/individual setting with the teacher.
    - Individually assess students by listening to them complete the following tasks: Count forward by ones starting at zero. Count forward by tens starting at zero. Count backward from 10. Count backward from 7. Count backward from 4.

Extensions and Connections (for all students)

- Sing along with recordings that feature counting by ones and tens. Follow up with questions that deepen understanding.
- Have the class stand in a circle. Designate one student to begin counting off in sequence backward from 10 to zero. Give the starting student a necklace to signify that she/he is to start the counting. Also, have this student predict who will be number zero. The student who says the last number in the sequence (zero) sits down. The starting student then takes the necklace and places it on the student to his/her right. This new starting student must now predict who will be number zero when counting backward from 10 to 0. The process continues, skipping those who are sitting down, until only one student is left standing.
- Practice counting by tens around the circle. Have everyone stand. The first person says "zero," and each person says the next number. The person who says 100 sits. The next person starts again at zero. Play continues until everyone is sitting or until students lose interest in the game.
- Practice counting forward by ones around the circle. Have everyone stand. The first person says "zero" and each person says the next number. The person who says a count-by-ten number sits. Play continues until you get to 100 and you can see who is still standing.
- The 100th day of school provides many opportunities to reinforce counting by tens. Student projects might include posters containing 100 objects grouped in tens. Books relating to the 100th day of school can be shared.

Strategies for Differentiation

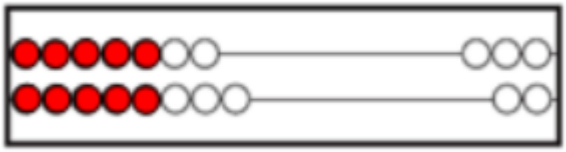
- Use manipulatives for counting experiences that include a variety of textures (e.g., foam shapes, plastic straws, ceramic tiles, plastic and metal bottle caps).
- Students who are having difficulty with moving to the next decade when counting by ones (i.e., 59 to 60) may benefit from working with the count-by-tens sequence.

- Emphasize the tens part of the number by saying it softer or louder so that students may be able to better hear the patterns in the counting sequence.
- While this standard does not require students to identify or write numerals, it may help visual learners to see the numerals as they say the numerals to notice the following patterns: the tens digit (or front part) of the number stays the same, and the ones digit (or back part) of the number changes.
- The numbers between 10 and 20 are often difficult for students because they do not follow a consistent pattern. Some students will need more practice with these numbers to learn the rote counting sequence.

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

Directions for Making a Beaded Number Frame

The directions below are for making one student-sized beaded number frame. You will need to make one frame for each of your students. You will also need one larger frame for the teacher. It is suggested that you use sturdy cardboard and larger beads for the teacher frame.



Materials:

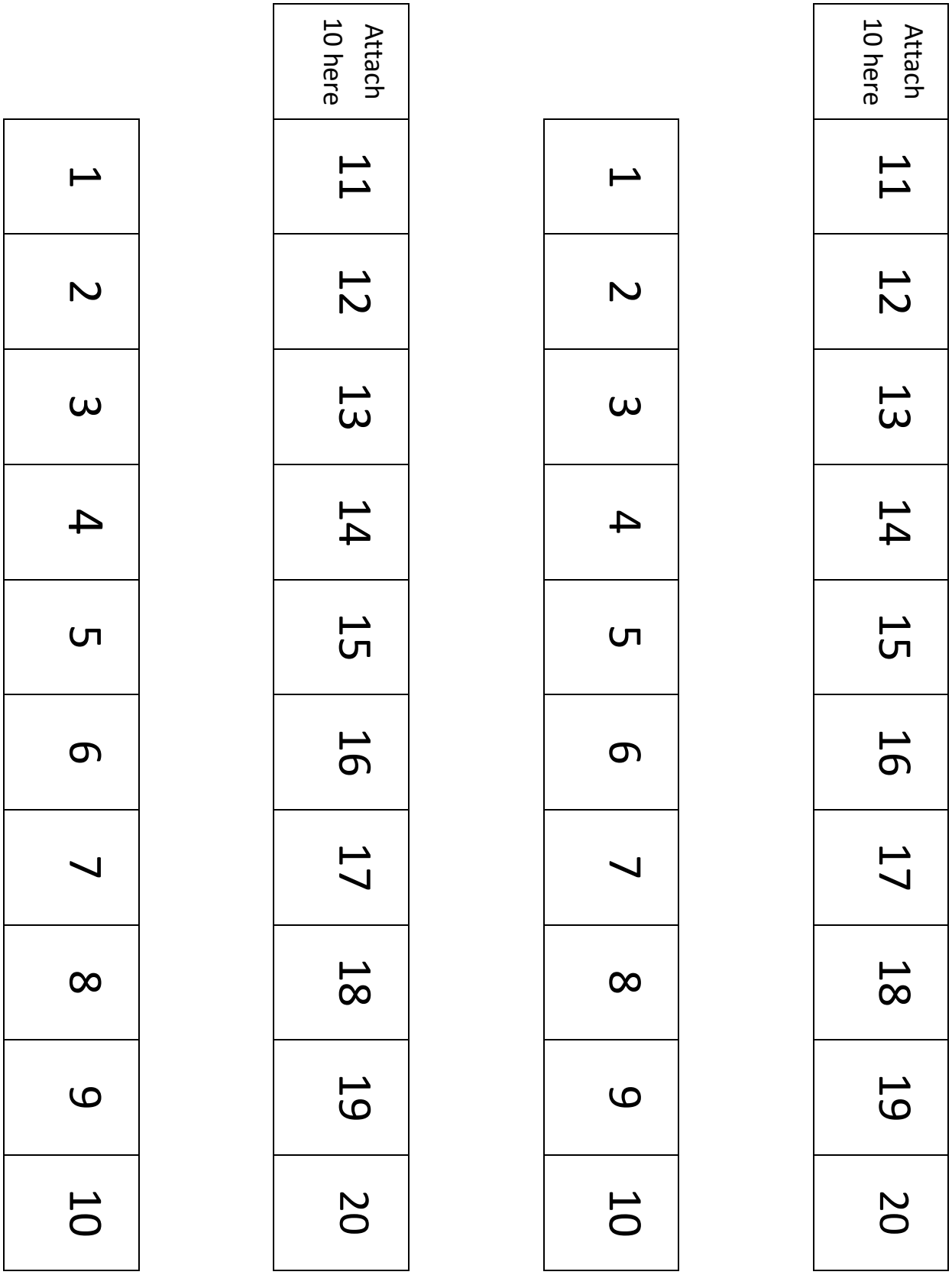
- Approximately 4” x 6” piece of cardstock or craft foam
- 20 pony beads (10 red, 10 white or two contrasting colors)
- Two pipe cleaners (any color) – at least 6” long
- Tape

1) Cut four half-inch slits in the cardboard (two on each of the shorter sides).

2) String five red and five white beads onto each of the two pipe cleaners.
3) Slip the ends of the pipe cleaners through the slits on the side of the cardboard so that the beads are on the front of the cardboard and the ends of the pipe cleaners are on the back. Tape the pipe cleaners in the back to cover sharp ends.

Beaded number frames can be used for counting and modeling numbers, modeling various part-whole relationships, developing benchmarks of five and 10, modeling 10 and some more, and developing addition and subtraction strategies.

Number Paths



Ten Frames

Hundreds Chart

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100