**Counting by 10s**

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| In this lesson students participate in activities focused on counting objects by tens. |

**NC Mathematics Standard(s):**

**Number and Operations in Base Ten**

**Understand place value.**

**NC.2.NBT.2** Count within 1,000; skip-count by 5s, 10s, and 100s.

**Use place value understanding and properties of operations.**

**NC.2.NBT.8** Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.

**NC.2.NBT.1** Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones.

* Unitize by making a hundred from a collection of ten tens.
* Demonstrate that the numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds, with 0 tens and 0 ones.
* Compose and decompose numbers using various groupings of hundreds, tens, and ones.

**Additional/Supporting Standards:**

**NC.2.NBT.3** Read and write numbers, within 1,000, using base-ten numerals, number names, and expanded form.

**Standards for Mathematical Practice:**

2. Reason abstractly and quantitatively.

3. Construct viable arguments and critique the reasoning of others.

4. Model with mathematics.

7. Look for and make use of structure.

**Student Outcomes:**

* I can count forward and backward by 10s for any number between 10-99.
* I can count forward and backward by 10s for any number between 100-999.

**Math Language:**

**What words or phrases do I expect students to talk about during this lesson?**

 count, group, ones, tens, hundreds

**Materials:**

* base ten blocks, ten sticks, hundred boards, counters, numeral cards (1-9, 4 of each), pocket chart of 100 board (optional), 100 board (optional), markers for 100 board
* dot sticks

**Advance Preparation**:

* Gather materials
* Cut apart dot sticks.

**Launch:**

Dot Sticks (10-15 minutes)

Display dot sticks (attached) or place value blocks and some ones.

Ask students, “How many are there?” “How do you know?”

Example: The teacher places 4 sticks of ten and 3 ones and ask students, “How many dots (cubes) do you see?” Then ask, “How did you figure it out?”

Students might say, “I saw 4 sticks of ten and knew that was 40 and then added three more; 41, 42, 43.” or “I saw 2 tens and knew that was 20. Then I saw 2 more tens and knew that was 20 more. 20 + 20 is 40. 40 plus the 3 ones is 43.”

Have a student write the numeral 43 on the board.

The teacher should do 2-3 of these examples, paying attention to whether students understand how to count the tens and ones and correctly determine the total quantity

**Explore:**

Adding Ten More Dots (8-10 minutes)

Add another block of ten to the 43 (or whatever number you ended with) and ask, “How many dots are there now?”

Have students respond with a total and how they knew it.

Responses might be, “I counted 5 tens and 3 ones and knew it was 53.” Or “I started at 43 and counted on ten more 44, 45, 46…52, 53.”

The goal of this activity is for students to mentally add on ten without having to count all or count on by ones. You can support this skill by asking questions such as:

“How many tens did we have at the beginning?” (4) “How many ones did we have at the beginning?” (3) “What did we add?” (a ten)

“How many tens do we have now?” (5) “How many ones do we have now?” (3) “What is our total number?” (53)

“How is 53 different from 43?” (there are 5 tens instead of 4 tens)

Follow up by asking students, “How much would we have if we add another ten?” Continue this by adding tens and list the numbers on the board vertically: 43, 53, 63, 73, 83

Ask, “What do you notice about the numbers?” Comments might be:

The numbers always end in 3—ask why? The tens go 4, 5, 6, 7, 8—ask why?

We want them to understand that when we add ten, the tens place will change but the digit in the ones place stays the same.

Follow this by repeating it with another number. As you are adding tens, use the word “compose.”

Example:

“How many do we have now?” (57)

“How many tens and ones do we have?” (5 tens and 7 ones). “So 57 is *composed* of 5 tens and 5 ones.”

As you add blocks of ten, have one child write the numbers on the board or chart paper and have another child mark the numbers on a large 100 board pocket chart. You could also have students at their seats cover the numbers on their 100 boards.

When the teacher finishes adding the blocks of ten, have students check to see whether the numbers covered are also recorded on the board.

Explore (Part 2)

Plus-Minus-Stay the Same

Demonstrate the game for students (directions are attached). As students play the game as a class, ask, “How does this game relate to the counting we have been doing with the tens and ones strips.” “How does counting with these strips help you play the game?”

As the class or groups play the game observe the students to see if they:

* mentally add or subtract ten
* count on their fingers or use objects to determine 10 more or less.

If students are struggling, help them through questioning by asking, “If you have 32 dots and I give you a ten strip, how many dots would you have?” If a student responds with 42 within 3-5 seconds, then help the child see the connection to this game.

If a child cannot respond ask them, ”If you have 32 dots and I give you 1 more how many dots would you have?” If a child cannot respond quickly to this question he/she needs more practice with counting one more/less.

**Discuss:**

Discussion of Plus-Minus-Stay the Same (8-10 minutes)

After the class has played *Plus-Minus Stay the Same* bring the class back together to discuss the game. The discussion should focus on mentally adding or subtracting ten in the context of the game.

Show a hundred board that has two numbers already marked in a row such as 32, 42. Tell them that someone drew a 6 card and a 2 card. Ask them, “Should we use the number 26 or 62?”

Students should identify that 62 is the correct number to use, because there is a 2 in the ones place. If students subtract 10 from 62 that would be 52, which means they would have 3 numbers marked in a row: 32, 42, 52.

Ask students, “Why did we want to make the number 62 instead of 26?”

Students should talk about the idea that they can change the number in the tens place, but the number in the ones place must stay the same. So, if they were trying to get to 52, they need to put a 2 in the ones place.

Example 2: Show students a game board that has 36 and 38 marked. Pull the number cards 2 and 7. Ask them, “What 2 numbers could we make?” (27 or 72). Follow-up by asking, “Which number do we want to make and why?”

Students hopefully see that the number they need to win has a 7 in the ones place, so 27 is a better choice. By making the number 27 and adding 10, they will get 37, which will give them 3 in a row.

During the discussion, revisit the term composed and decomposed with phases such as “37 is

composed of 3 tens and 7 ones” or “we can decompose 37 into 3 tens and 7 ones.”

**Additional Activities (20-30 minutes)**

 **Place Value with Three Digit Numbers (teacher-led small group)**

If students have demonstrated success with two-digit numbers you can move them into mentally adding/subtracting 10 or 100 to/from a given number between 100 and 999.

After most students are fluent adding and subtracting by tens, display 9 tens and 2 ones (value of 92). Ask, “What is the total and how do you know?” “If we added 1 more ten how many would we have?” Do this a few more times with numbers ranging from 91 to 98.

Display a 100 block, 1 ten and 2 ones. Add 100 blocks and have the students determine the value of the blocks. Continue to add 100s until you get to 512. Ask students to tell you how they determined the value of the blocks. Record the value of the numbers so students can help to make sense of the pattern-

112

212

312

412

Help students discover that the hundreds place increases by one each time and the number of tens and ones stays constant. If needed, do this with a few more starting numbers between 111 and 119.

**Collections of Objects**

Give students a collection of objects. Have students make groups of 10, and record the quantity two different ways. Recordings could include tallies, rectangles and singles, bundles of ten, or an equation (10+10+10+1+1= 32).

While students are working, ask some of the following questions: What does this drawings/numbers represent? When they have their representation drawn and the number is written, point to one of the numbers (tens or ones) and ask, “Where is that number in this representation?” Point to part of the representation and ask, “Where is that in the number?”

**Building Two-Digit Numbers**

Give students number cards and base ten blocks. Students pick two number cards and make a two-digit number: a 5 and a 3 could be 35 or 53. Students then build those two-digit numbers with base ten blocks, record the number and a picture of the blocks. They continue to do this during the center. Students can build 3 digit numbers.

**Hundred Board Bingo**

Students use number cards and a hundred board. Students pick two number cards, make a two-digit number, and then cover the number on the hundred board with a game piece. The goal is to cover up 5 consecutive numbers- vertical, horizontal, or diagonal.

**Evaluation of Student Understanding**

Informal Evaluation:

Observe the students during various activities to see how they are counting and grouping objects. Ask them questions about how they are counting and how they know they are correct.

Formal Evaluation/Exit Ticket:

Activities during the lesson can be used as a formal evaluation. If you would like an exit ticket ask students to start at a given number (21 as an example) and count by tens. They can record the numbers, 21, 31, 41, 51, 61, 71, 81, 91, 101, 121, etc.

**Meeting the Needs of the Range of Learners**

**Intervention:** For those who are struggling, work with numbers less than 50. Also, while working have conversations. For example, ask, “If you have 32 dots and I give you a ten strip, how many dots would you have?” If a student quickly responds 42, then help the child see the connection to adding tens.

Those who can add one and subtract one from a given number but cannot fluently count by tens, may need to practice in a small group with the ten strips. He/she may also need to build two-digit numbers with the Unifix cubes “bundling” the sticks of ten.

If a child cannot respond quickly to “If you have 32 and I give you 1 more how many would you have?” he/she needs more practice with counting one more/less.

**Extension:** Students who can easily add or subtract by 10s can use this knowledge to add 20s, 30s and other multiples of ten to a given number.

**Possible Misconceptions/Suggestions:**

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| **Possible Misconceptions** | **Suggestions** |
| Students may reverse a number, e.g., stating that 32 is 2 tens and 3 ones. | Provide either place value blocks or ten frame cards to help students make sense of the idea that a ten is a group of ten ones.  |
| Students may struggle or incorrectly say numbers as they are counting by 10s or 100s.  | Focus on numbers less than 100 and provide students with access to a hundred board. |

Dot Sticks




## Plus-Minus Stay the Same

**Materials**

100 chart to share between 2 players
Deck of numeral cards 1-9, four of each numeral
Distinct markers for each player

**Players**: 2

**Directions**

1. Decide which player will go first. The first player chooses 2 numeral cards from the deck. Determine which card is the tens digit and which card is the ones digit. For example, if 2 and 4 are drawn, the player can use these cards as 24 or 42.
2. Player One must decide whether to keep the number the same and mark it, add 10 to this number, or subtract 10 from this number. After the decision is made, player 1 covers the number on his/her chart. For example, if the player decides to use 42 the player can cover 42, 32, or 52.
3. Player Two chooses two numeral cards from the deck, determines the number, and decides whether to add 10 to the number, subtract 10 from the number or stay with the number. Player 2 covers the number on the 100 chart.
4. Players continue to play.
5. The winner is the first player to cover 3 numbers in a row. Rows can be vertical, horizontal or diagonal. The game can be made more difficult by having students cover 4 or 5 numbers in a row.

**Hundreds Board**