**Counting Objects by Groups**

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

**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.

**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 objects by 2s, 5s, and 10s.
* I can make a representation of a two-digit number.
* I can make connections between written numerals and representations of that number.

**Math Language:**

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

count, group, ones, tens

**Materials:**

* Unifix cubes or connecting cubes for the demonstration activity, chart paper,

collections of objects for the students to count. Collections include 30-60 objects. Collections could include books, cubes, color tiles, pencils, pennies, paper clips, paper, etc.

* hundred board, number cards, counters for game pieces for follow-up activities.

**Advance Preparation**:

* Gather materials.

**Launch:**

Counting by Groups (10-15 minutes)

Make a pile of Unifix cubes (between 25-32 cubes). Ask individual students to count the cubes.

Observe students as they count to see if they count one at a time or to see if they put them into groups before counting them. Some students should group them by twos, fives, and tens.

After counting the cubes one way and leaving the cubes in piles, ask, “How might we record our counting.” Write down their suggestions so that students can see them.

For example, if the cubes are in groups of 2 and there are 28 cubes the recording could be 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28.

Ask students, “Which number represents our total number of cubes?”

After the first student has counted, ask, “Is there another way to count the cubes?

After the cubes have been counted, record the quantity. Emphasize that although we are counting the cubes in different ways, such as individually, in groups of 2, 5 or 10, we still get the same number of cubes.

**Explore:**

Counting Collections (10-15 minutes)

Explain to the students that they are going to count collections of items and record their strategy for counting. Our goal is to count them by twos or fives **and** also by tens. Ask 1-2 students to restate the task to make sure that they understand. The teacher puts the students in pairs and gives them materials to count. As the students are working in pairs, observe students, looking for students who are struggling with counting by groups and those who after the first count already know how many groups they will have in the second count.

For example, if a pair counts 42 by tens and finds out there are 4 tens and 2 two ones, a student may say, “That’s going to be 20 twos and another group of two—21 twos.

There is an optional recording sheet at the end of this lesson. Before the students start working, have an idea of what you will be looking for. List those behaviors at the top of the chart. Check what is observed. For example, if a student groups 38 objects into 7 groups of 5 and 3 leftovers and quickly knows that will be 3 tens and 8 ones make a note of this.

As you observe students notice, which recording strategies that you will have students share later during the class discussion. Look for strategies that show tally marks, numbers (10 + 10 + 10 + 2) or other ways for recording the quantities.

If a pair counts their objects and records much quicker than another group have them count a third way or add more objects to their collection. If you add more objects, can students count on from their existing number to determine the amount or do they need to start over?

As students are working, questions you can ask include:

* How many groups of ten (two, or five) did you make?
* After you made groups, did you have any leftovers?
* How did you count your leftovers?
* If I gave you 10 (100) more, how many would you have?

**Discuss:**

Discussion of Counting Collections (8-10 minutes)

After most pairs have counted their collections twice and recorded, bring the class together and have them share their counting strategies.

Have 2-3 pairs of students share their strategies. If you have a document camera students can show their work. If a document camera is not available you may want to have the pair redraw their work on chart paper during the explore time. Another way to quickly share their work is for the teacher to draw their strategy on the board or chart paper, and then have the students talk about it.

As students are sharing their strategies ask:

* Why did you choose this strategy?
* What does this (pointing to the representation) mean?

After 2-3 students have shared keep these representations up so the class can see them. Possible questions:

* How are these strategies (representations) alike?
* How are these strategies (representations) different?
* Who can restate what (name) said? or Who can explain (name’s) strategy?

You can extend the discussion by having students use a specific strategy to count objects. For example, here is an example of a representation for 41:

Have a student get out 41 cubes. Put them in tens and ones. Have the class draw a representation of 41. Students can draw their representation on individual white boards or notebook paper. If the students have math journals, record the representation in the journals.

**Additional Activities (if needed)**

**More Collections of Objects**

Give students another 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).

Possible questions: What do the drawings represent? What do the pictures represent?

**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. They 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 up on the hundred board with a game piece. The goal is to cover up 5 (or fewer) consecutive numbers- vertical, horizontal, or diagonal.

**Evaluation of Student Understanding**

Informal Evaluation:

Observe the students during various activities to see how they are counting 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 consider giving students between 20 and 40 counters to see how they count them.

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

**Intervention:** Students may place one object out and count by twos (five or tens). Check to see if this student can use one to one correspondence to count to 100. Do they know the sequence of numbers to 100? Can they fluently tell you what number comes before and after numbers 0-100? If a student does understand one to one correspondence but is having difficulty grouping objects and then counting by 2s, 5s or 10s, have this student use a smaller number of objects—try numbers in the teens and twenties only. Have this student only focus on one-way of counting (2s, 5s or 10s).

Use the anecdotal notes checklist to record information about individual students.

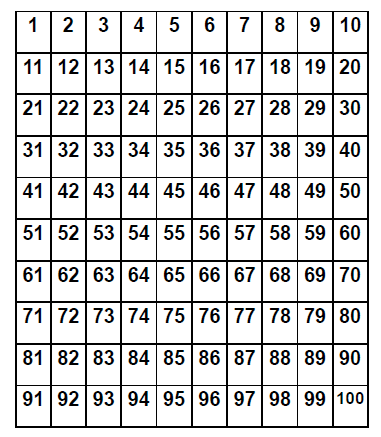
**Extension:** Some students will understand the number of tens and ones contained in a number without building the representation. These students can build numbers in the hundreds and relate the representation to the numeral.

**Possible Misconceptions/Suggestions:**

|  |  |
| --- | --- |
| **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 only be able to count 1 at a time. | Encourage students to count and make groups of 5 or 10 objects and then count at the end by 5 or 10. |

Possible Sheet for Anecdotal Notes Grouping Objects by 2s, 5s or 10s

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Student Names** | **Counts objects by ones. Does not understand grouping.** | **Groups objects by (2s, 5s 10s) but when counting the total counts by ones** | **Groups objects by (2s, 5s, 10s) & easily determines the total** | **Groups objects by 2s, 5s or 10s; uses that information to determine how many groups will be in a different arrangement** |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

**Hundreds Board**