The Magic of the Moving Zero: Skip Counting & Place Value Patterns

Lesson Overview

Subject: Mathematics (Number Sense & Operations)

Grade Level: 3rd Grade (Age 9)

Duration: 30 Minutes

Focus: Understanding place value through choral counting, skip counting patterns, and the role of zero as a placeholder in multiplication.

Materials Needed

- Large Chart Paper or Whiteboard
- Markers (at least two different colors)
- Individual Number Lines (0-100)
- Base-Ten Blocks (Tens rods and ones cubes)
- "Pattern Detective" Exit Tickets

Learning Objectives

By the end of this lesson, students will be able to:

- Identify and describe horizontal and vertical patterns in a choral counting sequence.
- Explain the role of zero as a placeholder when counting by tens.
- Connect skip counting sequences to multiplication notation (e.g., 3 groups of 10 = 30).

Success Criteria

- I can find a pattern in a column of numbers.
- I can explain why the digit in the tens place changes when I count by tens.
- I can write a multiplication sentence that matches a skip counting pattern.

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1. Introduction: Count Around the Circle (5 Minutes)

The Hook: "Today, we are number detectives. We are going to see if we can predict the future using only our brains and the power of patterns!"

The Routine: We will 'Count Around the Circle' by 10s.

- **I Do:** "I'll start at 0. The person to my right will say the next number if we count by 10s."

- **We Do:** Begin the count (0, 10, 20, 30…). Stop at 50.
- **Think-Pair-Share:** "If we have 12 people in our circle, what number will the last person say? Don't count yet! Look at the pattern of the tens digit."
- **Objective Connection:** Point out that as we count, the "ones" place stayed the same (zero), but the "tens" place grew.

2. Body: Choral Counting & Pattern Recording (12 Minutes)

The Routine: Choral Counting (Inspired by Jessica Shumway's *Number Sense Routines*).

Step-by-Step Guidance:

- **Recording the Count:** On a large chart, record the students counting aloud by 10s, but arrange them in rows of 5:

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  10,  20,  30,  40,  50
  60,  70,  80,  90,  100
  110, 120, 130, 140, 150
  ```

- **Pattern Spotting (Horizontal):** "Look across the first row. What do you notice?" (*Expected answer: The tens digit goes up by 1 each time.*)
- **Pattern Spotting (Vertical):** "Look down the columns. What stayed the same? What changed?" (*Expected answer: The ones place is always 0. In the columns, the tens digit jumps by 5.*)
- **Modeling Place Value:** Use Base-Ten blocks to show 30 vs. 130. "Why is that zero still at the end? What happens if we take it away?" (*Discussion: Without the zero, 30 becomes 3. The zero 'holds the door open' for the tens place.*)

3. Application: Connecting to Multiplication (8 Minutes)

The Activity: Transition from skip counting to multiplication notation.

- **I Do:** "When we counted to 30 by tens, we said three numbers. That's 3 groups of 10. In math talk, we write that as 3 x 10 = 30."
- **We Do:** "Look at the number 70 on our chart. How many 'counts' did it take to get there? Let's write the multiplication sentence together." (7 x 10 = 70).
- **You Do (Partner Work):** On individual number lines, students must jump by 10s to reach 100. For every jump, they write the corresponding multiplication fact (1x10, 2x10, etc.) below the number line.
- **Challenge Question:** "If multiplication is just fast adding or skip counting, why does 10 x 4 have a zero at the end? Does the 4 just get a zero, or did it move to a new 'house' (place value)?"

4. Conclusion: Recap & Assessment (5 Minutes)

Recap: "Today we saw that numbers aren't random. They follow tracks like a train!"

- **Review:** What is the job of the zero in the number 120? (Success criteria check: Placeholder).
- **Summative Assessment (Exit Ticket):** Students receive a slip of paper with the number 80. They must:
  1. Draw 80 using Base-Ten shorthand (8 lines for tens).

2. Write the multiplication sentence (8 x 10 = 80).
3. Explain in one sentence why there is a 0 in the ones place.

Differentiation & Adaptations

- **Scaffolding (Struggling Learners):** Provide a hundreds chart where they can physically color in the jumps of 10. Use physical Base-Ten blocks for every step of the choral count.
- **Extension (Advanced Learners):** Ask students to predict the patterns if we counted by 20s. How would the vertical column pattern change? Can they write a multiplication sentence for 12 x 10?
- **Home/Classroom Adaptation:** This can be done with coins (dimes) to make it kinesthetic and relate to real-world money.