



## Guess My Number A Lesson with Third, Fourth, and Fifth Graders

by Rusty Bresser and Caren Holtzman

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Guess My Number invites children to consider the structure of the number system while engaging in a logic game. Students try to guess a secret number from within a given range of possibilities. Guess My Number also presents an opportunity to reinforce mathematical symbols such as the “greater than” and “less than” signs. Through this activity, students learn the usefulness of number lines as tools for solving problems. Guess My Number appears in Rusty Bresser and Caren Holtzman’s *Minilessons for Math Practice, Grades 3–5* (Math Solutions Publications, 2006).

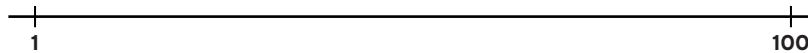
As Patty Stark’s fifth graders settled into their seats, I went to the board and drew a box with a question mark inside it.

“Good morning,” I greeted the class. “I’ve got a secret number for you to guess. Since it’s early in the morning I’m going to make it pretty easy for you. I’ll tell you the number is somewhere between one and one hundred.”

“Could it be one hundred?” Martina asked.

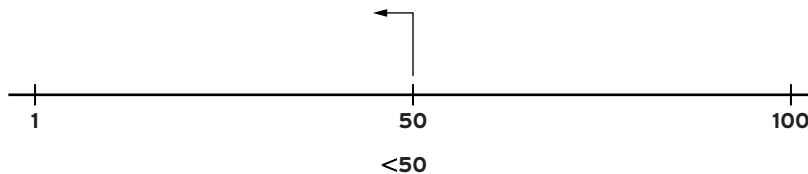
“Yes,” I responded. “It could be any number between one and one hundred, including one or one hundred. You can guess a number and I’ll tell you if my secret number is greater than or less than your guess.”

I drew a number line on the board to help the students keep track of their guesses.



“How about fifty?” Latoya asked.

“The secret number is less than fifty,” I told her as I wrote this information on the board. I also marked 50 on the number line with an arrow, indicating all the numbers fifty and above were too large.



Before I took any more guesses I decided to have a brief discussion about strategies for guessing. I had deliberately picked an easy number to start with so we could focus on the mechanics and thinking involved with the game.

"I'm a bit curious, Latoya," I said. "Is there a particular reason you chose fifty?"

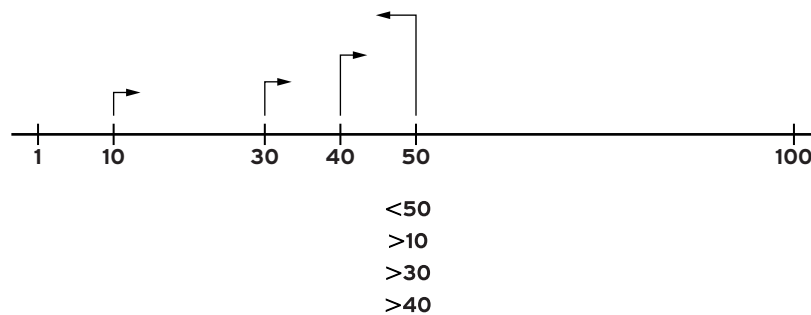
"Yeah," Latoya responded. "I knew your number was between one and one hundred, so I picked fifty because it's in the middle."

"So how does that guess help you?" I pushed.

"Because it splits the numbers. Since you said the secret number is less than fifty, I know it's in the bottom half of the numbers."

I summarized Latoya's strategy with accompanying references to the number line. "I think I get it," I told the class. "All the possible numbers are between one and one hundred. So if you guess a number right in the middle, you can figure out which half the secret number is in and then you can just throw away the other half and not have to worry about it."

I proceeded to take some more guesses. Within a minute the number line looked like this:



I then asked students to pair up and briefly discuss two things—what they thought they already knew about my secret number and what number they'd like to guess next. I wrote the two prompts on the board to help them stay focused. Also, I was giving them a preview of the discussion to come.

*What do you already know about my secret number?*

*What next guess would you like to make? Why?*

After a few minutes I called for the students' attention. "So can anyone tell something you know about my secret number?" I asked.

"It's more than forty," Hilario offered.

"It's between forty and fifty," David added.

"It's in the forties," Brenda posited.

“So you already know a lot about the secret number,” I validated. “With all this information, what number would you like to guess next? If you raise your hand to guess a number, you also have to be willing to explain why you think that number is a helpful guess.”

I called on Destinee. “Forty-five,” she volunteered.

“Why is forty-five helpful?” I asked.

“Because,” Destinee explained, “we know the secret number is in the forties, and forty-five is in the middle of the forties.”

“It’s just like Latoya’s idea,” Reynaldo chimed in. “You can get rid of half the numbers that are left.”

“Aha,” I responded, “so you’re using your logical thinking to help eliminate a bunch of possibilities with one guess. Well, I’ll tell you that the secret number is less than forty-five. Talk to a partner again about what you know about the number now and what guess you’d like to make next.”

I let the students talk to each other as I added the new information to the number line. Many students wanted to use the same strategy and pick the number that was halfway between 40 and 45. We took a brief detour to establish that 42.5 was the midpoint between 40 and 45, but I explained that this *Guess My Number* game involved whole numbers only, so they needed to choose either 42 or 43.

Christina guessed forty-two. I told her that the secret number was greater than forty-two and recorded this information on the board. Then Kenny guessed forty-nine. Some students expressed frustration with his guess since they already knew the number was less than forty-five. I stopped briefly to have a talk about maintaining a safe environment.

“This is a new game we’re playing today,” I told the class. “Part of learning and trying new things is making mistakes. It’s really important that everyone in the class feels safe enough to share his or her ideas and sometimes make mistakes. That’s how we learn. If you disagree with someone or you have a different idea, that’s fine. Just make sure you communicate that in a way that won’t hurt anyone’s feelings. Do you know what I’m talking about?” I asked the class as I looked at each student.

“Yes,” the students murmured.

I added Kenny’s guess to the board and moved on.

“How about forty-three?” Lisa suggested.

I wrote 43 on the board and circled it.

“Yes,” I congratulated. “My number is forty-three. I’m impressed with everyone’s thinking. It could have been any of one hundred different numbers, and it took you only eight guesses to get it. That shows you used a lot of good mathematical thinking.”

Before I left the class, I called on a pair of students to lead the class in another round of *Guess My Number*.

## **Extending the Activity**

*Guess My Number* works equally well with fractions, decimals, or percents. Giving the students some visual tools is essential. Using a number line helps students compare numbers and order the numbers.

A 1–100 chart is another tool that works nicely for *Guess My Number*. Tell students that the secret number is somewhere on the 1–100 chart. Cross numbers off the chart as they are eliminated. Familiarity with a 1–100 chart gives upper-elementary students a distinctive edge when it comes to mental computation and understanding our number system. When students have a visual model of the chart in their heads, they can easily jump around using tens. They also have a useful geometric model (the 10-by-10 square) to get a feel for how numbers are related to one another. Playing *Guess My Number* with a 1–100 chart gives students further exposure to the chart and pushes them to articulate some of the number relationships inherent in it.