

Bagels

Overview: This is one of my family's favorites! It's a guessing game, but you can use logic and strategy in order to guess the numbers very quickly. I'll show you how to use the game to guess numbers even larger than three digits. Once you've mastered the strategies in this game, you'll never lose another game of *Mastermind* again.

Materials

- Two people with brains

Activity: I have a two-digit number in my mind. Can you figure out what it is?

YOU: 12

ME: Bagels! (This means the number and the position are wrong.)

YOU: 34

ME: Bagels!

YOU: 65

ME: Pico! (This means right number, wrong position.)

The trouble is, you don't know which number is the right one. So guess something that will tell you which number is right, like guessing 45.

YOU: 45

ME: Bagels!

Now you know that the 5 is not the right number, and you also know the position that the 6 is in – the ones place. You can guess a number like 26 to check.

YOU: 26

ME: Fermi! (This means that one number is the right one in the right position.)

YOU: 78

ME: Pico! (This means right number, wrong position.)

Since you already know that the ones place is taken by the 6, you also know the tens is the only one open. And since the response was "pico", you know it's the 8 since it wasn't in the right position.

YOU: 86!

ME: Double Fermi! (This means for a two-digit number game, you've won!)

What about more than two digits? Here's how you handle three and more digits:

YOU: 1111

ME: Fermi! (One of the 1's is in the right position.)

YOU: 1222

ME: Pico! (There is one right number in the wrong position, and there are no 2's in this number.)

YOU: 3133

ME: Double fermi! (So now the 1 and one of the 3's is in the right position, but we don't know which 3 yet.)

YOU: 4134

ME: Femi pico! (Now we know there are no 4's, and the 3 is in the wrong position)

YOU: 5153

ME: Fermi pico! (Now we know the right position of 3 is in the spot we haven't tried yet, and that there are no 5's)

YOU: 3166

ME: Triple fermi! (We're getting close! One of the 6's is in the correct position.)

YOU: 3167

ME: Double fermi pico! (The 6 is in the wrong position, and there is no 7 in this number.)

YOU: 3186

ME: Quadruple Fermi! (You got it!)

Exercises

Your exercise for this lesson is to play this game (start with two-digit numbers) until you can see a pattern to quickly guess any number. Have fun!

Answers to Exercises: Bagels

1. Wrong guess
2. One of the digits is right but in the wrong position
3. One of the digits is right and in the correct position
4. 76
5. 672
6. 75
7. 25
8. 36
9. 75
10. 1375