

The Counting Game

Here is a counting game to try with a partner.

- The object of the game is to be the first one to say “20”.
- The first person must start at “1”.
- Each person may say one, two, or three numbers per turn, and the numbers must be in counting order. Each person must start with the number after the last one that the other person said.
- For example, the first person can say “1”, or “1, 2”, or “1, 2, 3.”
- If the first person says “1, 2”, then the second person could say “3” or “3, 4”, or “3, 4, 5”.
- Whoever says “20” wins the game.
- Play this game at least ten times and try to discover a winning strategy.
- You can alter this game by picking a goal number other than 20. You can also change how many numbers each person can say per turn. How would these modifications change the strategy?
- A hint about the strategy is that there are winning numbers that will guarantee you a win if you say them and don’t mess up later.
- The winning numbers for the original game are 4, 8, 12, and 16 (all the numbers with remainder 0 when you divide by 4). It is usually easiest to discover that 16 is a winning number first and then work backwards to find the rest.
- If the goal number changes to 22, but you are still allowed to say three or fewer numbers per turn, then the winning numbers would be those with remainder 2 when you divide by 4.
- If the number of numbers allowed per turn changes to four or fewer numbers, then the winning numbers would be those with a certain remainder when dividing by 5.