



Materials:

- Video of the trick
- 15 tokens with 2 distinctly different faces (pieces of cardboard with an X on one side can work)

MATH MAGIC

-RED OR YELLOW-

How to perform the trick

1. The magician lays a handful of tokens on the table. The two sides of the tokens are distinctly different. As an example we'll say one side is yellow and the other red.
2. The magician explains to the spectator what is going to happen. The magician will turn around so he can't see the table. The spectator can then flip any number of tokens, as many times as the spectator wants. However, every time that the spectator flips a token, the spectator must say out loud "flip." *Before turning around, the magician counts the number of tokens that are of a certain colour. The magician notes whether this number is even or odd. For example, the magician will count the number of red tokens.*
3. The magician turns around, and the spectator follows the instructions given in step 2. *Every time that the spectator says "flip," the magician switches the word he's thinking of from even to odd or vice versa.*
4. Once the spectator is done flipping tokens, the magician asks the spectator to take one of the tokens and hide it under their hand.
5. The magician turns around and announces the colour of the token under the spectator's hand. *The way the magician knows the colour of the token is by counting the number of red tokens on the table. If the parity (odd/even) matches the word in the magician's head, then the spectator has a token of the opposite colour. If the parity doesn't match, then the spectator has a red token.*



MATHEMATICAL EXPLANATION



Why the trick works

Before turning around, the magician counts the number of tokens that are of a certain colour. Red tokens will be used for this example. The magician notes whether the number of red tokens is odd or even. Every time a token is flipped, the parity of the red tokens is changed, so all the magician has to do is keep track of the parity of the red tokens. This is because for every flip the amount of red tokens will either increase by 1 or decrease by 1. When the magician turns back around, the magician knows whether the amount of red tokens should be even or odd. The magician counts the red tokens. If the parity on the table doesn't match the parity in the magician's head, then the spectator has the missing red token under their hand. If the parity does match, then the spectator has the opposite colour token.