AMAZINGMATHS

MATHEMAGIC

- THE TIME MASTER -

Materials:

- Magic trick video
- 9 tokens per team
- Paper
- Pencils
- Representation of a clock

How to do the Magic Trick

1. At the magician's request, the spectator chooses a number between 2 and 12 inclusively.

2. The spectator places his finger on the 12 of the paper clock[1] and spells out the number that he chose by moving forward by one number with each letter. For example, if the spectator chooses 3, he will spell out t-h-r-e-e which consists of 5 letters. He will then end up on the 5.

3. Similarly, the magician asks to mentally spell the number on which the spectator landed on at the end of the spelling, moving forward by one number with each letter. Then, he asks the master of time[2] to put down a token or a card on the 3, the 5, the 7, and the 11, in order to eliminate these squares.

4. Again, the magician asks to mentally spell the new number on which the spectator has put his finger and to move forward by one number with each letter, but skipping the numbers that the master of time has covered. The magician then asks to cover the 6, the 12, the 8, the 9, and the 10.

5. One last time, the magician asks to spell the final number by skipping the numbers that have already been covered and announces[3] with certainty that the final number is 4.

[1] You may use cards, pieces of paper, a real clock, etc.

[2] The spectator can be the master of time if we do not want to or cannot include a third person in the trick.

[3] The magician can also make a prediction before or at the beginning of the trick.

MATHEMATICAL EXPLANATION

Why this trick works.

When spelling the first number, there are 4 possibilities of squares chosen by the spectator. By asking to spell a different number again, there are only 3 possibilities of possible squares for the spectator. Continuing like this, we would probably find a number on which we are certain to arrive, but we would like it not to be too long. Removing the squares reduces the number of possible squares to 2 and then to only one square, which ends the trick. Indeed, regardless of the number chosen by the spectator at the start, he will end on the 4.

Detailed Explanations

Many people have the impression that by choosing any number, you always come up with different results. This is false. The person rather chooses the number of letters corresponding to the number that she selects.

Number	1	2	3	4	5	6	7	8	9	10	11	12
Letters	3	3	5	4	4	3	5	5	4	3	6	6

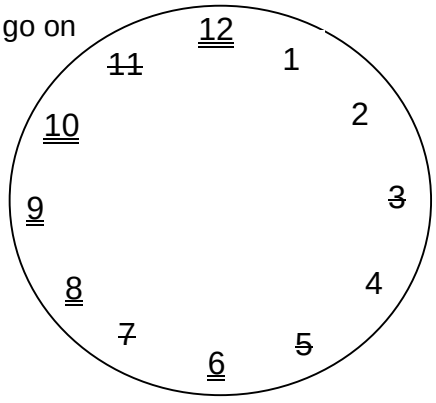
Therefore, the person can find herself on the numbers 3, 4, 5, or 6. From there, by asking to spell out the number on which we have arrived on, we have the following structure:

Starting number	3	4	5	6
Ending Number	8	10	9	9

There are now 3 possibilities. To lessen these possibilities, we remove the following numbers: 3, 5, 7 and 11. We can proceed this way, since we are certain that the person could not land there. These numbers are crossed off with a line on the following clock.

Now, here are the remaining possibilities considering that we cannot go on the crossed-out squares:

Starting Number	8	9	10
Ending Number	1	2	2



We remove the numbers 6, 8, 9, 10 and 12. These are the numbers that are underlined on the clock. Thus, numbers 1 and 2 lead to the same place: number 4.

NOTE: We can exchange the 4 with any number of the second list of numbers to remove. For example, we can keep the 6 instead of the 4 and it will become the final number. This allows us to redo the trick a few more times.