# MATHEMAGIC

## -FIND THE CARD-

## Educational Goals

- ❖ Develop logic
- ❖ Learn a magic trick
- ❖ Show the fun side of math
- ❖ Develop the ability to spot the constant element in a mathematical situation

## Key Features of the Targeted Competencies

- ❖ Break down the elements of a situation/problem
- ❖ Model the problem
- ❖ Apply different strategies to create a solution
- ❖ Validate the solution
- ❖ Pinpoint the important elements of a mathematical situation
- ❖ Apply the appropriate processes and concepts for the situation

## Concepts Used

- ❖ Arithmetic Operations (addition, subtraction)
- ❖ Properties of natural numbers (complement)

## Materials

- ❖ Video of the trick
- ❖ 1 deck of cards per group

**Recommended grade**
Grades 7 to 11

Sec | Cycle One | Cycle Two

**Field of Math**

**Suggested Teaching Method**

**Time Required**
About 35 minutes

**Step 1: Introduction** (5 minutes)

If you are comfortable performing the trick yourself, begin with Step 2.
Play the video of the magic trick (INSERT LINK HERE).

**Step 2: Find solutions** (10-15 minutes)

Show the video a couple more times, or perform the trick yourself so that the students can take note of the magician's movements and be able to recreate them. Let them use their judgement to decide what parts of the trick are important and what parts are unnecessary for the trick to work.

Place the students in pairs and have them try to solve the trick.

Note: The movement most likely to not be executed properly by the students that is essential to the trick is: "The magician places the 9 cards at the **bottom** of the deck."

Hints for students:

- Ask them to think about where the chosen card is located within the whole deck.

**Step 3: Share solutions** (15 minutes)

In the same groups, have the students try and figure out why the magic trick works. Guide your students to ensure that they understand the following three elements of the trick.

**Element 1:**

The selected card is placed at the 44$^{th}$ position in the deck. Therefore, the trick is simply a clever way to count to 44.

Questions to guide your students

- How many cards are in the deck?

- How many cards does the spectator take? Where does he place his selected card?

- What does the magician do with the 9 cards? What position in the deck is the spectator's card placed?

**Element 2:**

The sum of the amount of cards in each pile, and the value of the top card in the pile is always 11.

Questions to guide your students

- How many cards are there in a full count from 10 to 1? Why is a flipped pile counted as 1?

- What relationship is there between the amount of cards in a pile and the value of the top card of the pile?

**Element 3:**

To get to the 44th card, 4 piles are made that each creates a count of 11 and 11 x 4 = 44.

<u>Questions to guide your students</u>

- How many piles does the magician deal?

- Where is the spectator's card placed in the deck?

- If 4 equal piles were formed to reach the selected card, how many cards would be in each pile?

- Why is a flipped pile counted as 1?

**Step 4: Recreate the Magic Trick** (5 minutes)

If the students were initially unsuccessful in solving the trick, they may want time to recreate it now that they have seen the solution.

The students will realize that there is no sleight of hand when they are able to do the trick themselves.

## Short on time?

→ Show the video of the trick at the end of class. Let your students try and find the solution as homework. Show the solution at the beginning of the next class.

→ If you have 15 minutes, show the video and have one student try and do the trick at the front of the class. The other students can help, and if they're having trouble you can help them by using the Explanation document of the trick. Initiate and guide a discussion about the trick. After a couple minutes, explain the solution.