# MATHEMAGIC

## - LUCKY 13 -

## Educational Goals

- Develop logic
- Adopt a magic trick
- Develop the ability to find a constant element in a mathematical situation

## Key Features of the Targeted Competencies

- To decode the elements that lend themselves to a mathematical treatment
- To represent the situational problem with a mathematical model
- To elaborate a mathematical solution
- To validate the solution
- To form and apply a network of concepts and mathematical processes

## Concepts Used

- Arithmetic (additions, subtractions, divisions)
- Complementarity

## Materials

- Video of the trick
- Decks of cards
- Sheets of paper
- Pencils

**Targeted Academic Levels**
Grades 7 to 11

**Mathematical Field Concerned**

**Suggested Teaching Formula**

**Time Required**
Approximately 35 minutes

# SUGGESTED PROCESS

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

Notes: this trick follows the trick *Find the Card*. It is based on the same principles, but it is more complex. You can use *Lucky 13* as a continuation (complementarity) or you can also approach it as the first trick (understanding *Find the card* is not mandatory).

Play the video of the magic trick once (www.amazingmaths.ulaval.ca).

**Step 2: Recreate the magic trick** (15 minutes)

Recreate the trick with the whole class more slowly so the students see the process and the actions of the magician. One student will be the spectator and the others can formulate hypotheses to try to understand the trick.

They have to recreate the manipulations done in the video. To do that, present the video again so the students notice and note the magician's manipulations to recreate them. This allows them to use their judgment to separate the important information from the unnecessary elements of the trick.

**Step 3: Finding the solution** (15 minutes)

Place the students in teams of two and ask them to try to find the solution and the process of the trick. Guide the students' thought process by asking them the following questions:

- How many cards does the spectator have in his hands when he makes his 4 piles?
- How many cards would there be in a pile if the spectator had ended with an ace?
- Does placing one of the 4 piles back into the deck influence the trick?
- Why does the spectator add the numbers that are on the last card of his piles?
- Why does the magician count the cards?
- Should we take the kings into account?

Draw the students' attention on the last card of each pile. Bring them to see which card indicates the number of cards missing to complete the suit (queen to ace). Get the students to realize that, if the magician had separated his 48 cards into 4 equal piles, they would each count 12 cards.

**Step 4: Reveal the solution** (5 minutes)

Refer to the Explanation Sheet for the trick *Lucky 13*. The whole class together, repeat the trick in the front while explaining it at the same time. Draw their attention towards the key elements. During the manipulations, ask the students to say what they understood of the trick.