



# MATHEMAGIC

## - THE HAT TRICK -



### Educational Goals

- ❖ Recognize the operations to be done in a situation (addition and subtraction)
- ❖ Develop mental calculation processes for situational problem
- ❖ Develop logic
- ❖ Adopt a magic trick
- ❖ Highlight the playful potential of mathematics
- ❖ Develop the ability to find a constant element in a mathematical situation

### Key Features of the Targeted Competencies

- ❖ To decode the elements of the situational problem
- ❖ To modelize the situational problem
- ❖ To apply different strategies in order to elaborate the solution
- ❖ To validate the solution
- ❖ To define the elements of the mathematical situation
- ❖ To mobilize and apply concepts and processes appropriate to the given situation

### Concepts Used

- ❖ Arithmetic (addition, subtraction)
- ❖ Sense of arithmetic operations: mixed composition of transformations
- ❖ Mental calculation

### Materials

- ❖ Video of the trick
- ❖ 1 deck of cards per team
- ❖ Paper
- ❖ Pencils

**Targeted Academic Level**  
Grades 5-6

**Mathematical Field Concerned**



**Suggested Teaching Formula**



**Time Required**  
Approximately 35 minutes



# SUGGESTED PROCESS



## Step 1: Introduction (5 minutes)

Play the video of the magic trick a first time ([www.amazingmaths.ulaval.ca](http://www.amazingmaths.ulaval.ca)).

You can also do “The Hat Trick” in front of your students rather than present the video. Refer to the Explanation Sheet to follow the steps necessary to do it.

## Step 2: Recreate the magic trick (10 minutes)

Present the video a second time or do the magic trick again. This time, direct the students’ attention towards the manipulations done by the magician. This will help them to sort out the important information from the superfluous elements of the trick.

Place the students in teams of 4: one plays the role of the magician and the others play the spectators. The other students in the team can help the magician remember the manipulations to be done.

If the students are not able to recreate the trick from the video, you can help them by referring to the trick’s sequence in the Explanation Sheet.

This trick contains several subtle manipulations that can change the trick’s outcome if they are not done in the right order. The students must be very attentive during the trick’s presentation in order to accurately recreate the manipulations.

The manipulation most likely to be problematic is step **6** in the Explanation Sheet. To be sure that he places the cards in the right order, the student has to put the **pile A**’s cards directly back on the deck.

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

Ask the students to try to find the solution, keeping the same teams as for the previous step.

To help the students in their progression, you can advise them to place the 3 cards chosen by the spectator face up. This way, it will be easier to follow them through the manipulations.

## Step 4: Reveal the solution (10 minutes)

Refer to the Explanation Sheet for the trick “The Hat Trick”.

### To go further...

If the students understood the trick well, you can ask them to find a different number of cards. You can ask them to find only 2 or to find more, let’s say 5.

The question they should then ask themselves is: how many cards should I give to the spectator in the beginning?

The magician must always give 8 cards to the spectator and add the number of cards he wants to find in the deck, because he wants the cards to be in positions 9 and more in the deck (refer to the **Explanation Sheet**).