Mathemagic

-The Balloon -

Educational Goals

- ❖ Develop logic
- ❖ Adopt a magic trick
- ❖ Highlight the playful potential of mathematics
- ❖ Bring to the students' attention the opposite effect of a subtraction and an addition
- ❖ Determine numerical equivalences using relations between the operations

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 (subtraction, addition)
- ❖ Natural number factorization
- ❖ Equivalent expressions
- ❖ Counting

Materials

- ❖ Video of the trick
- ❖ 26 tokens per team or the balloon's image in Appendix 1
- ❖ Sheets of paper and pencils

Targeted Academic Level
Grades 2 to 4

Mathematical Field Concerned

Suggested Teaching Formula

Time Required
Approximately 35 minutes

Step 1: Introduction (5 minutes)

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

You will find in the Explanation Sheet for the puzzle "The Balloon" the steps to follow if you want to do this magic trick yourself with your students rather than play the video.

Step 2: Recreate the magic trick (10 minutes)

Place the students in pairs: one plays the role of the magician and the other plays the spectator. They have to recreate the manipulations done in the video. An image of the balloon is available in the Appendix to replace the tokens or to lay them out more easily.

To do so, present the video a few more times so the students notice and note the manipulations of the magician and the spectator. If they are not able to recreate the trick from the video only, you can help them by referring to the magic trick's sequence available in the trick's Explanation Sheet. *Careful, the "Preparation" section of the explanation reveals the magician's trick* (but does not explain why it works)!

After a few attempts, the students should understand that no matter what the chosen number is, the final token is always the same. If they do not come to this conclusion, you may encourage them to use different numbers.

Step 3: Finding the solution (15 minutes)

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

To help them, replay the video and guide their thought process. To do so, you may suggest to them to wind the rope round the balloon to see the corresponding tokens. They should notice that the rope ends one token before the final square. What is left to understand is that there is a difference of one token, because we do not count the token on which we are at the beginning, during the second countdown.

Step 4: Reveal the solution (5 minutes)

Refer to the Explanation Sheet for the trick "The Balloon".

Appendix 1