MATHEMAGIC

-TO MAKE THE SUM-

Educational Goal

❖ Use addition's commutativity to quickly calculate the sum of a big series of numbers

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)

❖ Addition's commutativity

❖ Mental calculation process

Materials

❖ Video of the trick

❖ Sheet of paper

❖ Pencils

Targeted Academic Level
Grades 5-6

Mathematical Field Concerned

Suggested Teaching Formulas

Time Required
Approximately 30 minutes

Step 1: Introduction (5 minutes)

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

You will find in the Explanation Sheet for the puzzle "10 Make the Sum" 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 (20 minutes)

Play the video a second time, asking the students to note the different actions the magician and the spectator do.

Place the students in pairs: one plays the role of the magician and the other plays the spectator. They have to recreate each step and the manipulations done in the video.

Stop the manipulations when the spectator is done writing his series of numbers and come back with the whole class.

Each pair will have a different series, so it is interesting to share the students' possibilities:

- At this point, what difference do you notice between your 10 numbers? What kind of information does the leap between them give? (The difference is always the same between each number of the series.)

Name the next step of the trick: the magician asks the spectator to tell him the first and the last number he wrote down.

- Why does he ask this question?
- What are the first and the last number of the series useful for to find the total sum?

Ask the students to find numbers of the series that have the same sum than the first and the last number.

Give them the clue that pairs of numbers that have the same sum as the first and the last number can be formed.

Let the students look for pairs. Then, question them about them:

- What characteristic allowed you to form pairs? (Two numbers that have the same sum as the first and the last number.)
- How many pairs can we form in total in your series of 10 numbers? (5 pairs.)

From these pieces of information, ask the magicians of each pair to reveal their final answer, which is the total sum of the series' numbers.

- Knowing there are 5 pairs that have the same sum, how would you proceed to find the total sum of all the series' numbers? (Multiply the sum of each pair by the number of pairs, which is 5.)

It is pertinent to question the students about their strategies to calculate the product of a number by 5. For example, it is possible to make them notice that we can quickly calculate the product of the sum by 5 (divide the sum by two and multiply the result by 10).

To conclude, play the video again and ask the question to the whole class to know which answer the magician should give according to the numbers that were written down by the spectator.

Step 3: Reveal the solution (5 minutes)

Refer to the solution video for the trick "10 Make the Sum".

To go further...

It would be interesting to question your students on the reason why the other pairs have the same sum as the first and the last number.
To push the thought further, ask to think about the leaps that are used to form the series.
Since the leaps determine the space in between the numbers, the difference between two consecutive numbers is always the same. The way the pairs are formed, we add to the first number what we take from the last one. This allows us to get the same sum for each pair.