MATHEMAGIC

- QUICKER THAN THE CALCULATOR -

Educational Goals

- Determine numerical equivalences using relations between commutativity and the associativity of multiplication
- Develop strategies to master numerical facts and link them to the properties of multiplication
- Become familiar with the ‘’multiplication’’ function of the calculator.

Key Features of the Targeted Competencies

- To decode the elements of the situational problem
- To apply different strategies to work out a solution
- To validate the solution
- To define the elements of the mathematical situation
- To mobilize mathematical concepts and processes appropriate to the given situation
- Justify actions using mathematical processes

Concepts Used

- Arithmetic operations (multiplication)
- Commutativity and associativity of multiplication

Materials

- Magic trick video
- Paper
- Pencils
- Calculators

Targeted Academic Level
Grades 5-6

Mathematical Field Concerned

Suggested Teaching Method

Time Required
Approximately 25 minutes

SUGGESTED PROCESS

Step 1: Introduction (5 minutes)

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

In the "Quicker Than The Calculator" Explanation Sheet, you will find the steps to follow if you want to perform this magic trick yourself in front of your students rather than play the video presentation.

Step 2: Find the solution (15 minutes)

Place the students in teams of 2 to 4 and ask them to find an explanation for the result of the magician's multiplication (if necessary, present the video again or repeat the trick with a different number).

To help them, ask students questions to push their reasoning:

- If we put the number chosen by the spectator at the end of the operation rather than at the beginning, would we get the same result? And if we put it in the middle? And if we changed the order of all the numbers?
- If we did this multiplication in two steps, so by multiplying the number of the spectator by 7 first, and multiplying 11 by 13, then multiplying the results of the two previous operations with each other, would we get the same result?
- If we multiplied the first three numbers with each other (the spectator's number, 7 and 11), then we multiplied the result by 13, would we get the same result?
- If we did this multiplication without the number chosen by the spectator, what would the result be?
- What is the link between this result and the one obtained by also multiplying the number chosen by the spectator?
- Etc.

Step 3: Reveal the solution (5 minutes)

Refer to the ''Quicker Than The Calculator'' Explanation Sheet and explain the trick to the students. A student who has understood the trick can also explain the logic of it to the other students. Complete the student's explanations if needed.

Want to go further?

→ Ask the students to create a new magic trick of the same kind by finding a number different from 1 001 that would have similar characteristics (101, 111, 1 000 001).

→ Ask the students to predict the result of the same multiplication using a 2 or a 4-digit number.