MATHEMAGIC

- QUICKER THAN THE CALCULATOR -

Educational Goals

- Determine numerical equivalences using relations between the commutativity and the associativity of multiplication.
- Familiarize oneself with a mental calculation process related to multiplication
- Represent a situation with an algebraic expression

Key Features of the Targeted Competencies

- To decode the elements of the situational problem
- To elaborate a mathematical solution
- To validate the solution
- To define the elements of the mathematical situation
- To form conjectures
- To make demonstrations or proofs

Concepts Used

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

Materials

- Magic trick video
- Paper
- Pencils
- Calculator

Targeted Academic Level
Grades 7-8

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).

You will find in the Explanation Sheet for the trick *Quicker Than The Calculator* the steps to follow if you want to do the magic trick yourself in front of your students instead of playing 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).

It is possible that the students figure out the trick quickly. However, what is most interesting is to find the mathematical explanation.

To guide their thought process, ask the following questions to the students:

- 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 the trick to the other students in the class. 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 4-digit number.