

Mathemagic

- The Missing Link -

Educational Goals

Understanding the properties of whole numbers in relation to parity

Key Components of the Targeted Competencies

- To decode the elements of the situational problem
- To model 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

Concepts Used

- Parity
- Association of a number with a set of objects (dominos)

Materials

- ✤ Magic Trick video
- 1 set of dominos
- Appendix 1



Targeted Academic Level Kindergarten to Grade 2

Mathematical Field Concerned



Suggested Teaching Method



Time Required Approximately 30 minutes







Suggested Process



Step 1: Introduction (5 minutes)

If you are comfortable performing the trick yourself, refer to *The Missing Link*'s explanation sheet for the magic trick's steps and instructions.

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

Step 2: Find solutions (20 minutes)

Ask your students about the possible ways dominos could be placed if we would want to use all of them. If students raise the possibility of placing all the dominos in a line, explain to them that the only way dominos can be placed next to one another is if both dominos have matching values. At this point, students should be able to find that the shape of a **loop** would allow such a placement (if the students have yet to find the solution of placing the dominos in a loop, continue asking them questions for them to think about different shapes and linking possibilities).

After this discussion, place the students in pairs and distribute appendix 1 to each team. Appendix 1 contains the 21-dominos needed to complete the trick. The students will first have to cut the domino pieces and take note of the ones they have. Then, they will have to make a loop to link all the dominos together.

Once the loop is done, question your students about the way the dominos are set up. Here are some hints and questions you can ask them to guide their thinking:

- How many times is each value represented? (As an example, take the domino with a value of 4 and ask students to count how many times this number is represented in the domino set.)
 - Answer: Each value is represented six times (i.e. The value of 4 is represented on six different dominos).
- Observe what happens when we remove a domino from the loop (again, use the domino with the value of 4). Now that one of them is removed, how many times is the value of 4 represented in the domino loop?
 - Answer: The value of 4 is now represented five times.
- Ask students to take the remaining dominos that have a value of 4 and to create pairs. Is it possible?
 - Answer: No, because there is an uneven amount of dominos with the value of 4 left. So, there is always one domino left over.

Bring your students' attention to the fact that, at the beginning, there was an **even** number of dominos with the same value (i.e. The value of 4 was represented six times). Now, since one of the dominos with the value of 4 was taken out of the circle, there is an **uneven** number of dominos with this value (i.e. The value of 4 is now represented five times).

To help them understand the trick more clearly, play the video again and bring their attention to the extremities of the domino chain created by the magician's assistant.

- What do both extremities indicate?
- By looking at the extremities, how can we find the values that are present on the missing domino?





Return to a whole group discussion, and have groups share their thinking, what they tried, and what were their results. If any students have successfully solved the trick, allow them to recreate the trick for the class while explaining their solution.

Step 4: Recreate the Magic Trick (5 minutes)

If the students were initially unsuccessful in solving the trick, allow them time to recreate it now that they have seen the solution.

To go further

Ask the students about the components of a whole domino set and how double dominos would impact the magic trick. In this trick, the double dominos were removed. However, what would it change if we would keep double-value dominos? What impact would that have on the magician's prediction?

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Appendix 1: Domino Set to Cut Out











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