

Glenmore State High School Maths and Science Department

MULTO

Name: _____ Due Date: _____

KAPS: _____ /5 _____ MAPS: _____ Communication: _____ Overall: _____

MULTO is a game like BINGO. A MULTO Board has 4 rows and 4 columns, or 16 numbers altogether. The numbers range from 0 to 81.

You choose which numbers to put onto your board. You also choose where to put them. Some numbers are better than others, and some cells on the board are better than others.

The object of this assignment is to design the best possible MULTO Board.

Rules

- Write 16 different numbers between 0 and 81 inclusive on your MULTO board. An example is shown alongside.
- The teacher has 100 cards. Each card contains a multiplication fact, from 0×0 to 9×9 .
- The teacher will draw a card at random. Multiply the two numbers together. If the answer is on your MULTO board, circle it.
- Repeat Step 3 until there is a winner. To win MULTO, you must circle 4 numbers in a row, column or diagonal, OR the 4 corner numbers.
The teacher will check that the board is a winner.
- The game will continue until there are at least 6 MULTO winners.

MULTO			
31	9	17	12
50	81	6	47
0	16	22	32
8	35	70	13

What To Do

- Your class will play a number of games of MULTO, to get a feel for the game.
- Think about how to re-design your MULTO board so you have the best chance of winning. Some things you may wish to think about:**
 - Which numbers are the best to choose? Which are the worst numbers to choose?
 - Are some cells better than others? If so, which cells? Why? Where on the board should you put the best numbers?
- Design the MULTO Board that you think has the best chance of winning.
- Write a report on why you chose those numbers and why you put the numbers where you did. **You must explain and justify your choices.** You will have to use your knowledge of factors, multiples and chance in your explanation.

Your report may include diagrams and tables.

The Competition

Who has designed the best MULTO board? There is only one way to find out – with a head-to-head-to-head competition.

You will play against two others over and over until it is clear whose board is best. It may be that playing 100 games is sufficient to determine the best board, but if the competition is close, you may have to play 10,000 games or more!

You can play 10,000 games by hand, if you wish, but can also use the special MULTO software program.

The winning board designer will win a prize!

Marking Criteria

KAPS	The MULTO board has been constructed according to the rules. [5 marks].
MAPS	A The choice of numbers and placement of numbers on the MULTO board has clearly been based on the underlying mathematics (factors, multiples and chance). The report is comprehensive and clearly gives the reasoning behind the board's design. Tables and diagrams are used as needed.
	C The student has made some justification for the selection and placement of numbers on the board, based on the underlying mathematics.
Comm	A The report is word-processed or neatly hand-written on lined A4 paper. It has an appropriate title page. There are almost no spelling or grammatical errors. Correct sentence structure has been used.
	C The report is word-processed or hand-written on lined A4 paper. There are some spelling and/or grammatical errors. Generally correct sentence structure has been used.

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Possible Solution

	0	1	2	3	4	5	6	7	8	9	Tot
0	19	1	2	2	3	2	4	2	4	3	42
1	2	0	4	0	2	2	3	0	4	0	17
2	2	2	0	0	4	1	0	2	2	0	13
3	2	0	2	0	0	2	3	0	0	0	9
4	2	0	2	0	0	2	0	0	2	1	9
5	0	0	0	0	2	0	2	0	0	0	4
6	0	0	0	2	1	0	0	0	0	0	3
7	0	0	2	0	0	0	0	0	0	0	2
8	0	1									1

The most frequent numbers are: 0 (19), 6 (4), 8 (4), 12 (4), 18 (4), 24 (4), 4 (3), 9 (3), 16 (3), 36 (3). There are many numbers with 2 factors. There are 4 ways that a corner number may be involved in a win, 3 ways a centre number may be involved in a win and 2 ways for an edge number to be involved in a win.

A good (but probably not optimal) solution is

0	4	9	6
54	18	48	45
63	16	24	56
8	36	72	12