THE EFFECTIVENESS OF DAMATH IN ENHANCING THE LEARNING PROCESS OF FOUR FUNDAMENTAL OPERATIONS ON WHOLE NUMBERS

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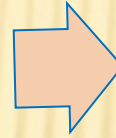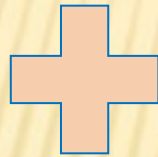Our Lady of Fatima University, Philippines

Presented
in Pullman Hotel
Kuching, Sarawak Malaysia

October 22, 2013

WHAT IS DAMATH?

Dama

+

Mathematics

→

DAMATH

INTERNET SEARCH

https://www.google.com.ph/search?q=damath+game&oq=damath&aqs=chrome.3.69i57j0l3.4002j0j1&sourceid=chrome&ie=UTF-8

about damath.mht

Damath is a board game that comes *from* the Philippines, and is used as a *teaching tool* for high school mathematics.

Why teaching tool for high school mathematics only?

How about elementary school mathematics ?

HISTORY OF DAMATH

Province of Sorsogon, Bicol Region, Philippines

- encountered problems in teaching math using traditional teaching methods
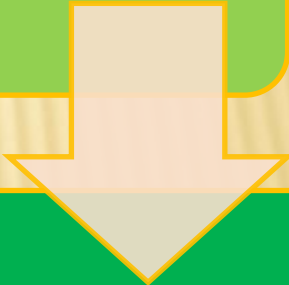
public school teacher

student

- investigatory project
- Dama de Numero"

- overhauled the game
- introduced it to his class,
- enjoyed playing.

Jesus L. Huenda,

DAMATH GREW IN POPULARITY!!!!!!!

1st Damath tournament was held in Sorsogon, Phil. , 1980

Huenda received a gold medallion from the late President Ferdinand Marcos for his contributions in the field of teaching mathematics, 1981

DAMATH reached its peak popularity in the 1990s

It made the rounds of several mathematics education conventions all over the world .

10th Conference of the Mathematical Association of Western Australia

UNESCO-ICT4E conference, Thailand

SEAMEO RECSAM/SEAMEC conference , Malaysia

APEC Learning Community Builders (ALCoB) conference,

Korea

- Memorandum enacted by the Department of Education encouraging public and private schools to integrate DAMATH in the teaching of Mathematics

Public and Private Schools conducted their own version of DAMATH Competitions both in elementary and secondary levels

THE GAME
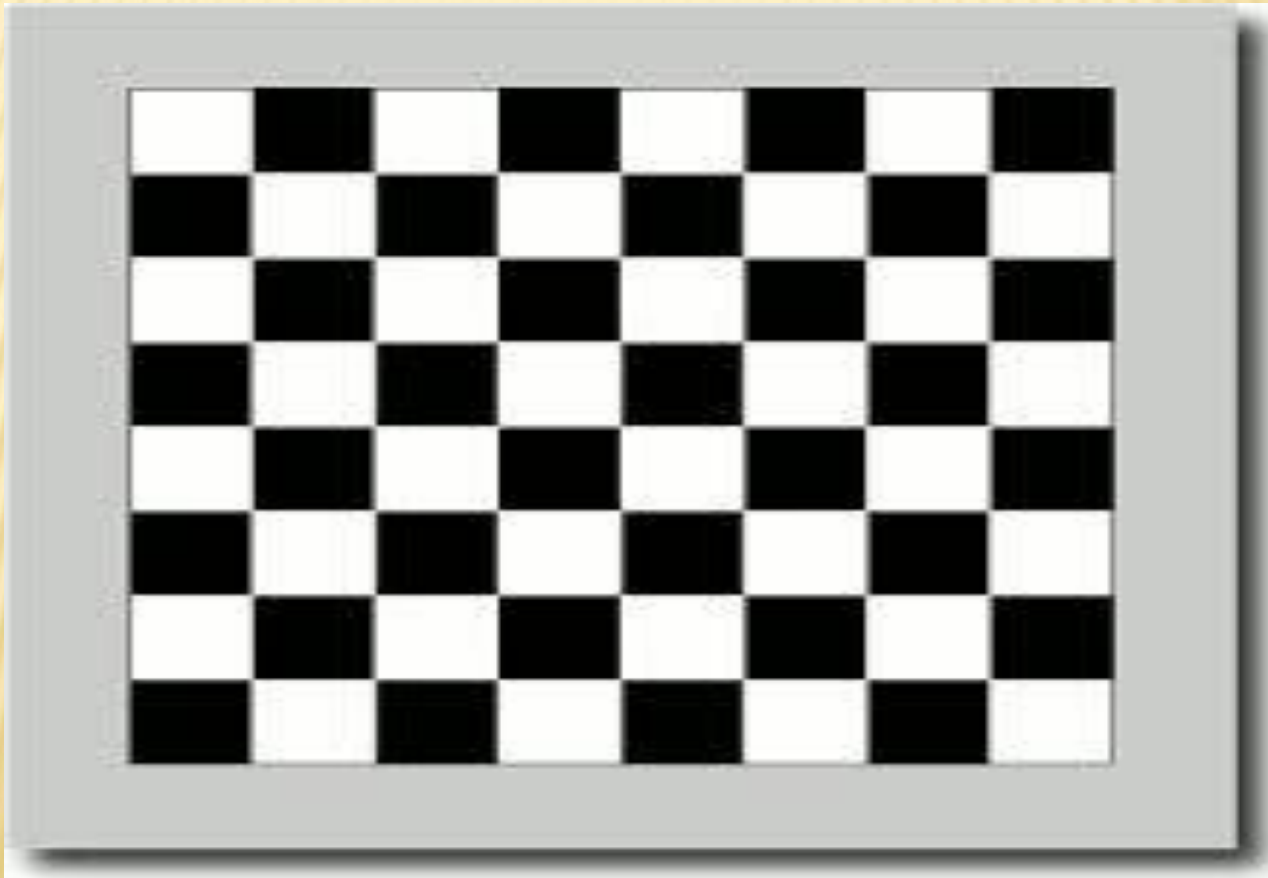
THE GAME OF CHESS

THE GAME OF DAMA

× Dama uses the checkers board or chess board

TO UNDERSTAND DAMATH MEANINGFULLY, WE HAVE TO UNDERSTAND FIRST HOW TO PLAY DAMA.

DAMA

- Countries around the world have their own versions of the game called "checkers", a name which gets its roots from North America.

In the Philippines and in Armenia, the game is called *dama*.

PLAYING DAMA

- The game is played by two people, each with 12 pieces of *pitsas or chips* made from <u>bamboo</u>, stones, or bottle caps.

- Player position the 12 pieces of "chips" on the end points of the diagram.

- They move from point to point, and like <u>chess</u>, the game ends once the opponents *chips* are captured.

- In some parts of the Philippines, the game is played using a chess board and its pieces.
- The pawns, knights, and rooks are usually used at the start, while the kings, queens, and bishop are used when a player reached the "*dama*".
- The "dama stage" is reached when a player gets his piece to the last row of the board.

- The chips can only move diagonally along the intersection of lines or squares in chessboards

- Chips cannot eat or capture backwards.

- Chips that have reached the "dama stage" can move from row to row diagonally.

ILLUSTRATE
HOW TO PLAY DAMA

DAMATH BOARD

- The Damath board, similar to a chess board, consists of 8 x 8 squares alternating in black and white.

- On the white squares are the four basic Mathematical operations–addition, subtraction, multiplication and division

.

DAMATH GAME

ORIGINAL RULES IN PLAYING DAMATH-

- As the name implies, the game is essentially the same as dama but with an added math twist: in order to win in Damath

- a player must score the most points which are earned by "eating" the opponent's pieces.

- the player must solve the mathematical operation on the square in which the opponents piece is currently standing.

- The answer to that mathematical operation is the amount of points that the player will receive when s/he does "eat" the opponent's piece.

- players have to do mathematical computation whenever they capture an opponent's chip. The game will go on until all pieces belonging to a player have been eaten and the scores computed.

EXAMPLE

- if the piece marked "1" eats the piece marked "3," with "3" standing on a multiplication square, the player must first solve the operation (1 x 3 = 3) and will get three points.

- Because of the need to solve operations, players must list down all moves during the game so the moves can be reviewed, especially by the judges in a tournament setting.
- The two players alternately take turns in moving a chip (pass is not allowed)
- Each player is allotted one minute per 'move' including the computing of the 'move' and the corresponding score in the score sheet.

GAMES FOR DAMATHS COMPETITIONS:

ELEMENTARY LEVEL

- **Levels Grades   -   Contents**
- Level 1 Grades I – II   - Counting Numbers
- Level 2 Grades III – IV - Whole Numbers
- Level 3 Grades V – VI   - Positive Fractions

HIGH SCHOOL

- Level 4   First Year   -   Integers
- Level 5 Second Year -   Signed Fractions
- Level 6 Third Year   -   Radical Damath
- Level 7 Fourth Year -   Polynomial Damath

OBJECTIVES

Integrate the Filipino checkerboard game of dama into the teaching of mathematical concepts and skills

→

Encourage the utilization of recycled materials in preparing damath board and chips (set for the classroom use only)

→

Analyze damath as possible subject of mathematics investigations.

↓

Promote awareness of girls in mathematics (as king is to the game of chess, so dama (for lady) is to damath

←

Promote mathematical consciousness among family members in particular and the community in general through mathematics club's community outreach damath competitions

←

Enhance wholesome interpersonal relations among players

DAMATH GAME

modified by Dr. Marilyn Morales-Obod

presented in iCoTLG 2013

Pullman Hotel

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DAMATH BASIC GAME - WHOLE NUMBERS

	7	6	5	4	3	2	1	0	
0	x	dama	-	dama	÷	dama	+	dama	0
1		÷		x		+		-	1
2	÷		+		-		x		2
3		x		-		+		÷	3
4	-		÷		x		+		4
5		+		-		÷		x	5
6	+		x		+		÷		6
7	dama	-	dama	÷	dama	x	dama	+	7
	7	6	5	4	3	2	1	0	

MODIFIED DAMATH GAME- DECIMALS

	7	.6	5	.4	3	.2	1	0	
0	X	dama	-	dama	÷	dama	+	dama	0
.1		÷		X		+		-	1
2	÷		+		-		X		.2
.3		X		-		+		÷	3
4	-		÷		X		+		.4
.5		+		-		÷		X	5
6	+		X		+		÷		.6
.7	dama	-	dama	÷	dama	X	dama	+	7
	.7	6	.5	4	.3	2	.1	0	

MODIFIED DAMATH GAME- INTEGERS

	7	- 6	5	- 4	3	- 2	1	0	
0	X	dama	-	dama	÷	dama	+	dama	0
-1		÷		X		+		-	1
2	÷		+		-		X		-2
-3		X		-		+		÷	3
4	-		÷		X		+		-4
-5		+		-		÷		X	5
6	+		X		+		÷		-6
-7	dama	-	dama	÷	dama	X	dama	+	7
	-7	6	-5	4	- 3	2	-1	0	

SIMPLIFIED RULES IN PLAYING DAMATH GAME

The game is played by two students, each with 12 pieces of *chips*

Player positions the 12 pieces of "chips" on the end points of the diagram

Toss a coin to determine which player will have the first 'move'.

The two players alternately take turns in moving a chip (pass is not allowed).

Moving a chip means sliding it diagonally in the forward direction only except when taking an opponent's chip or if a 'dama' chip takes an opponent's

chip.

In the Philippines, children start the game with **"bato - bato pick"**

A player who touches a chip ('touch move') is required to move unless it is not possible to do so

After each 'move', a player has to form the equation using the numbers and the operation involved

EXAMPLE

If the possible move of the chip landed on the space with + sign and it is the intersection of nos. 3 and 2

The equation formed is 3 +2 = 5

For this particular move, the score is 5

If landed on x sign, the equation would be 3 x 2 = 6, and the score is 6

The player has to record this equation in a score sheet (only one score sheet will be used by the two players).

SIMPLIFIED RULES IN PLAYING DAMATH GAME

In case the chip landed on ÷ sign and the numbers involved are not divisible,

+ or x may be used ; whichever will give the higher score

since the objective of the game is to get the higher score in order to win

SIMPLIFIED RULES IN PLAYING DAMATH GAME

If the possible move of the chip landed on the space with **÷ sign** and it is the **intersection of nos. 4 and 7**

For this particular move, the score is 28

the equation formed is **7÷4**

And since 7x 4 = 28 will give a higher answer, it may be used by the player
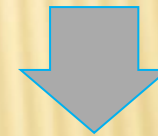
but 7 is not divisible by 4

The player may use either, 7+4 = 11 or 7x 4 = 28
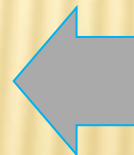
SIMPLIFIED RULES IN PLAYING DAMATH GAME

Each player is allotted one minute per 'move' including the recording of the 'move' and the corresponding score in the score sheet
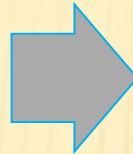
In taking an opponent's chip, the 'taker' chip jumps over the 'taken' chip and uses any of the four operation symbols of +, -, x, and -:- where the taker chip lands

A chip is declared 'dama' if it stops in any of the following squares of the opposing player: (1,0) (3,0) (5,0) (7,0)

Similarly, the opposing player's chip is declared 'dama' if it stops in any of the following squares: (0,7) (2,7) (4,7) (6,7)

SIMPLIFIED RULES IN PLAYING DAMATH GAME

'dama' chip

can slide diagonally forward or backward in any unoccupied square as long as no opponent's chip blocks its path

could take a chip or chips whereby its corresponding sum, difference, product or quotient is doubled

Similarly, if an ordinary chip takes an opponent's 'dama' chip, its score is also doubled

DAMA chips move from point to point
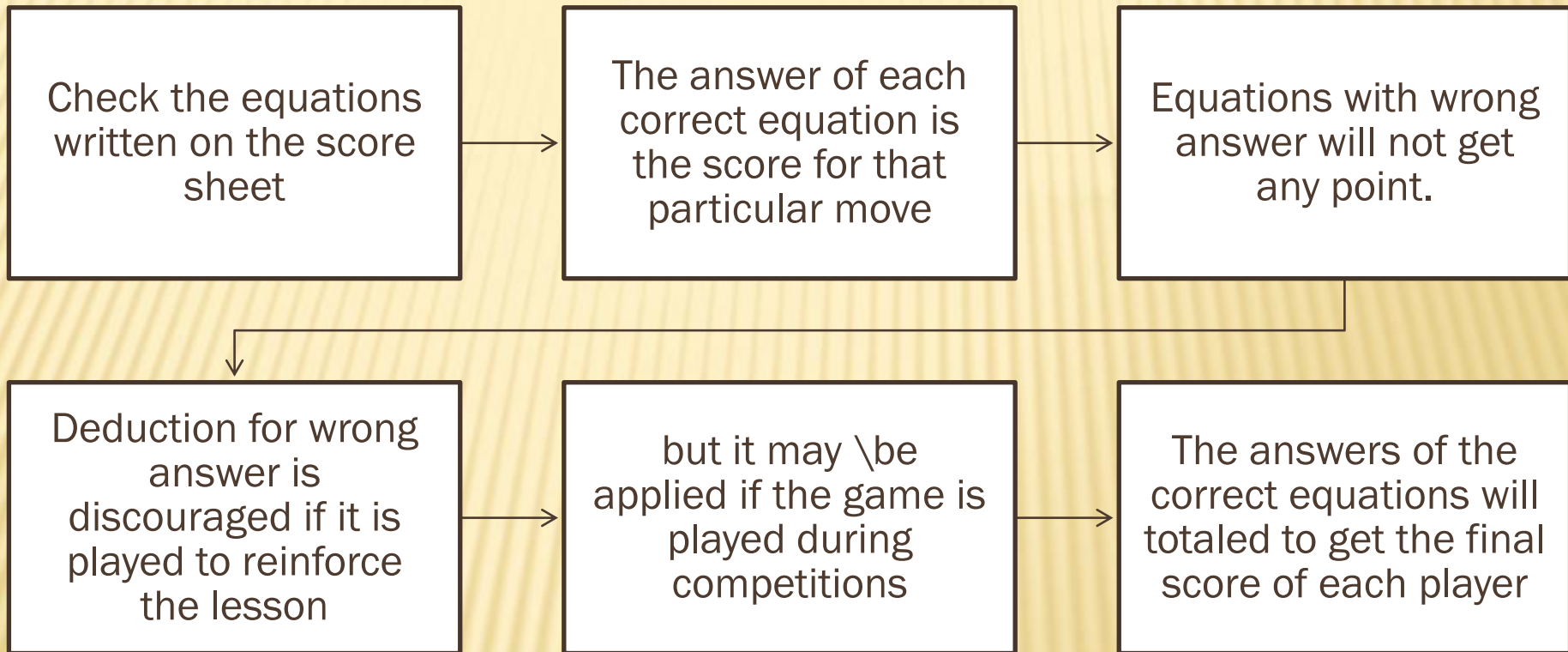
the game ends if:

an opponent's chip is 'cornered'

time limit set for the game period lapsed

moves are repetitive

a player has no more chip to move

HOW TO SCORE/WIN

Check the equations written on the score sheet	The answer of each correct equation is the score for that particular move	Equations with wrong answer will not get any point.
Deduction for wrong answer is discouraged if it is played to reinforce the lesson	but it may \be applied if the game is played during competitions	The answers of the correct equations will totaled to get the final score of each player

The player with the higher score wins the game
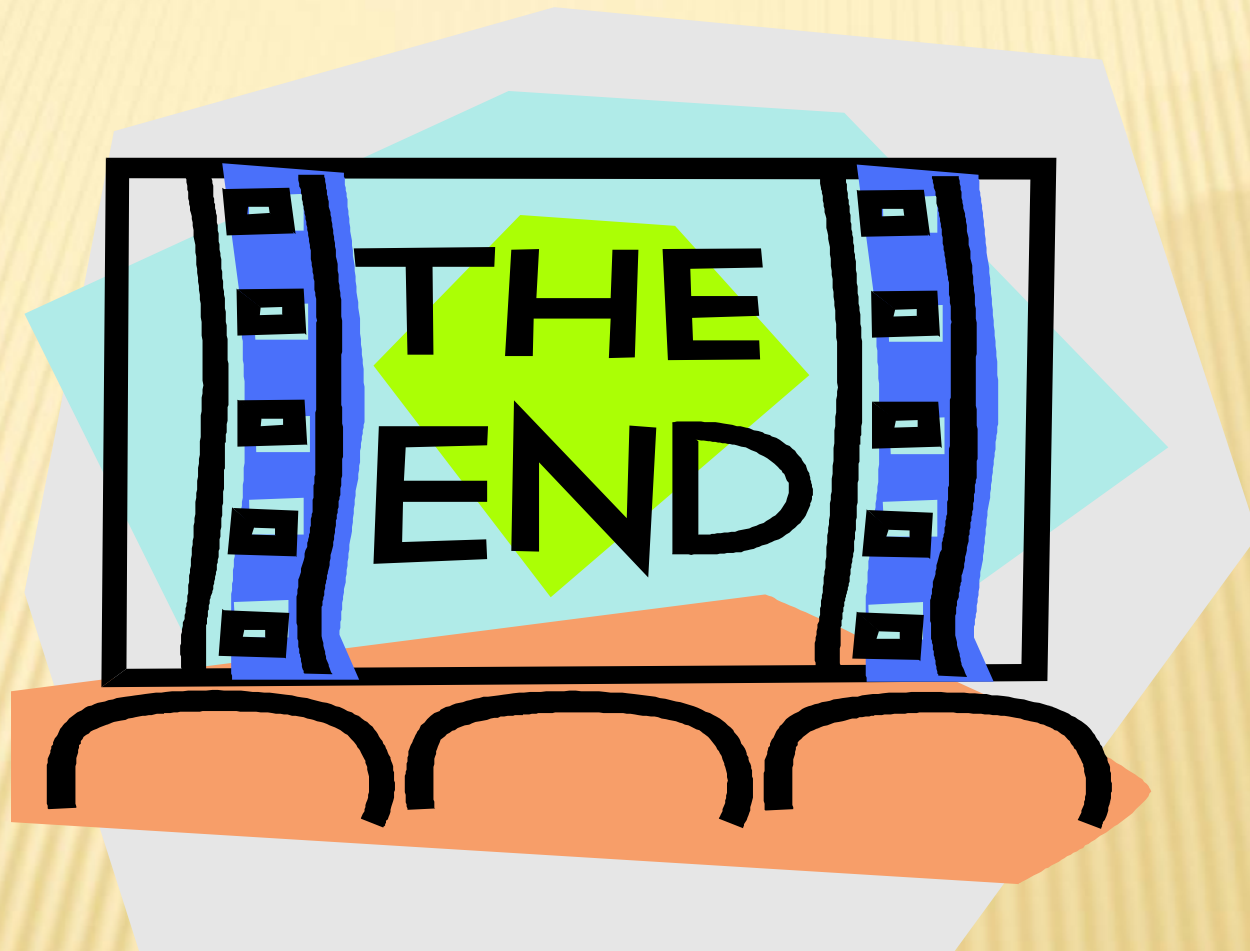
Possible Modifications

The numbers put around the damath board may be changed according to the subject matter and the number literacy of the players

The +, - , x , and ÷ signs may be put in any order provided NO operation sign is repeated in a row or column

The chip could be in any form (e.g stone, shell, bottle caps or crown, card board cut into pieces, cover of clear books cut into pieces, and the like) depending upon the availability of materials in the locality

The rules of the game may be enhanced depending upon the creativity of the teacher

THE END

LET'S PLAY DAMATH