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Subject: Mathematics

Title of activity: Playing brilé

Level: 1st and 2nd year of ESO (Ages: 12-14)

Justification: Maths usually requires a certain level of abstraction. They are frequently complicated for adults who have their minds developed so for kids in their early teens, sometimes they become unreachable. This is the reason why we try to acquire and discover the mathematical concepts with objects they can touch. The handwork must be a previous step to the abstract reasoning.

We also try to provide experiences to remember and, of course, to have fun.

Objectives:

- Understand the algebraic language. See in an example that's a way to describe and analyze everyday life.
- Techniques to solve equations. Associate something physical as taking off a shirt at the game with changing the sign when we change the side.

Description of the activity:

Our goal will be to find and study the huge amount of equations which occur in a "brilé" match. For that reason we will split students in two groups with different amount of components. I would be lovely to be in proportion eight and sixteen or six and eighteen. The team with fewer components will be named "X-men" and the larger one will be "The Humans". Besides reminding the traditional rules of the game we inform that each player situated in the "Dead area" or "cemetery" must wear a training t-shirt that he or she must take off when returning to the middle area with the rest of his/her mates. We also inform that in this game there is mystery that being a mystery we can't reveal just yet. With no further information we will go to the pitch and while students play the match the teacher takes a register of the movements.

The following day we will obtain the equation inside some of the multiple situations of the match. This is the idea:

Left side (X-men). First, we must consider humans on the left side: the dead players in the cemetery. As they are not in the usual side with all their buddies, we must underline using the minus sign (it's wrong they are not with their mates and friends).

We, also, must consider the X-men standing on the left side. As they are in the right place we will use the positive sign but as they are superheroes we must express this skill with an X after the number of X-men on the left. An example in this left side of the pitch could be $-3+4x$ meaning that in the left side of the pitch there are three humans and 4 X-men

Right side: The reasoning is identical to the one followed on the left side.

As in any sport pitch one side of the field is parted from the other by the central circle in our mathematical universe what divides both parts is an equal sign.

We analyze different situations: at the beginning, after 10 movements, after 20 movements,...

We'll do the first one all together screening it on the whiteboard. We'll ask them to do the second on their own and we will make sure it is correct. They must do the rest by themselves

The way to solve the first equation will be as follows. We put on the left end of the classroom all the X-men but the who started at the cemetery that will be at right end of the classroom wearing his training shirt. We ask this last student to join the other X-men taking off his sport shirt on the way. We will express mathematically this situation. In the the example we use before it would be $4x+1x$ because there were four X-men at the left who were joined by the isolated one. As he changed the side he change the sign (the equivalent of taking off the sport t-shirt).

We will do exactly the same with the humans.

The next will be to count (add up) the X-men on the left and The Humans on the right to finish by answering the great mystery: How many Humans is each X-men worth?

Document students work: In the next page

EQUATIONS WITH "BRILÉ"

	Humans on the left	X- men on the left	=	Humans on the right	X- men on the right	Equation
Beginning						
Mov. 1-10						
Mov. 11-20						
Mov. 21-30						
Mov. 31-40						
Mov. 41-55						

Are all the equations equal?

Are all the equations similar (semejantes; same game, same amount of players)?

Solving the equations:

Equation 1:

- 1) Copy the equation →
- 2) Move the humans on the left side to the right side and the same with the x- men.
Remember to "take off the shirt" (quitar el peto) →
- 3) Add/ subtract all the X-men and add/ subtract all the humans →
- 4) How many humans an X-men is worth?

Note: In the final step what is multiplying the "x" goes to the other side dividing

Equation 2:

- 1) Copy the equation →
- 2) Move the humans on the left side to the right side and the same with the x- men.
Remember to "take off the shirt" (quitar el peto) →
- 3) Add/ subtract all the X-men and add/ subtract all the humans →
- 4) How many humans an X-men is worth?

Note: In the final step what is multiplying the "x" goes to the other side dividing

Equation 3:

- 1) Copy the equation →
- 2) Move the humans on the left side to the right side and the same with the x- men.
Remember to "take off the shirt" (quitar el peto) →
- 3) Add/ subtract all the X-men and add/ subtract all the humans →
- 4) How many humans an X-men is worth?

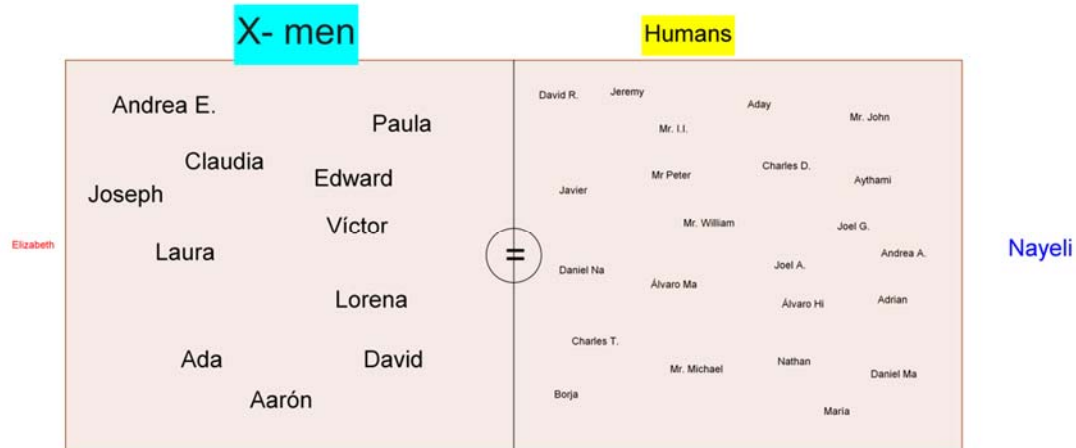
Do equations four, five and six at the back of the page

Document we use as support

BEGINNING

X-men: Laura, Víctor, Paula, Claudia, Nayeli, Ada, Lorena, Andrea E., Joseph, Aarón, David and Edward

Humans: Elizabeth, Charles T., Charles D., Mr William, Javier, Andrea A, Daniel N, Daniel M, Joel G., David R., Joel A., Borja, Mr. I.I., Jeremy, Nathan, Aythami, Aday, María, Peter, Adrian, Álvaro, Mr. John, Mr. Michael



Left side:

- How many humans are there on the left side?
- Is the left side the right place for the humans?
- If it is the right place for the human write plus and the number of humans on the left side. If it isn't write minus and the number of humans on the left side
- How many X-men are there on the left side?
- Is the left side the right place for the X-men?
- If it is the right place for the X-men write plus and the number of X-men on the left side followed by an "x". If it isn't, write minus and the number of X- men on the left side followed by an "x".

Right side:

- How many humans are there on the right side?
- Is the right side the right place for the humans?
- If it is the right place for the human write plus and the number of humans on the right side. If it isn't write minus and the number of humans on the right side
- How many X-men are there on the right side?
- Is the right side the right place for the X-men?
- If it is the right place for the X-men write plus and the number of X-men on the right side followed by an "x". If it isn't, write minus and the number of X- men on the right side followed by an "x".

Left side

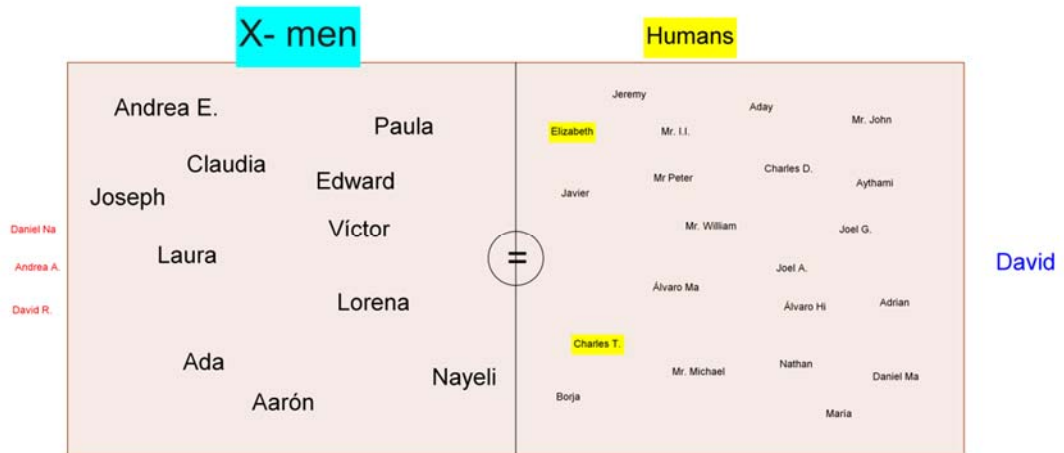
EQUATION

Right side

=

Ten movements later:

- 1) Charles T is hit (goes to the left side)
- 2) Elizabeth goes back to the humans' side
- 3) Charles T. hits David (D goes right)
- 4) Nayeli goes back to the X-men' side
- 5) C. T. goes back to the humans' side
- 6) Elizabeth goes left
- 7) Andrea A is hit (A.A. goes left)
- 8) Elizabeth goes back to the humans' side
- 9) Daniel N is hit (D.N. goes left)
- 10) David R is hit (D.R. goes left)



Left side

EQUATION after 10 movements

Right side

=

How many humans did we have in both sides at the beginning?

How many humans did we have in both sides after 10 movements?

How many X-men did we have in both sides at the beginning?

How many X-men did we have in both sides after 10 movements?

What has changed: the number of members in the teams or their location in the game?

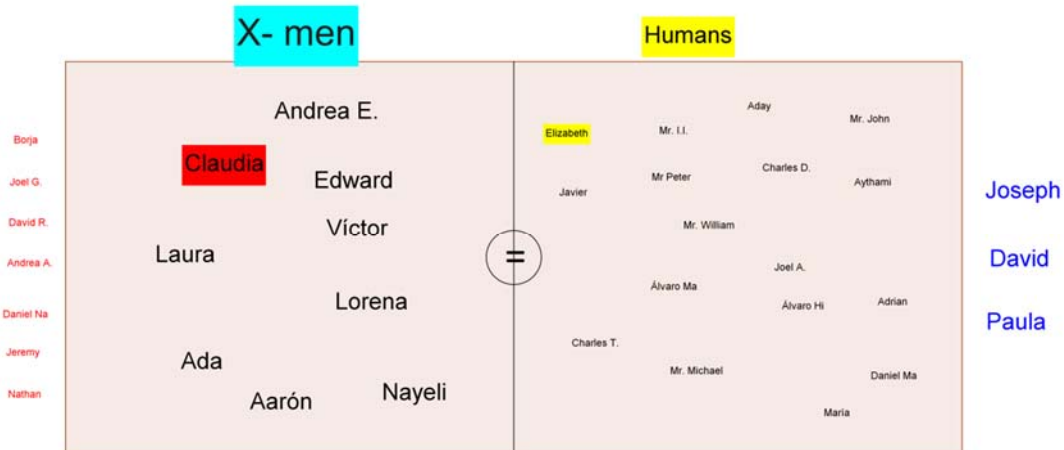
Would you say is still the same match?

Movements 11 to 20:

- 11) Joel G. is hit (J.G. goes left)
- 12) Joseph is hit (Joseph goes right)
- 13) Claudia is hit (Claudia goes right)
- 14) Claudia hits Borja (B goes to the left side)
- 15) C. goes back to the X-men's side
- 16) Claudia is hit (Claudia goes right)
- 17) Claudia hits Jeremi (J goes to the left side)
- 18) C. goes back to the X-men's side

19) Paula is hit (goes to the right side)

20) Nathan is hit (Nathan goes left)



=

Left side

EQUATION after 20 movements

Right side

=

How many humans did we have in both sides at the beginning?

How many humans did we have in both sides after 10 movements?

How many humans did we have in both sides after 20 movements?

How many X-men did we have in both sides at the beginning?

How many X-men did we have in both sides after 10 movements?

How many X-men did we have in both sides after 20 movements?

What has changed: the number of members in the teams or their location in the game?

Would you say is still the same match?

Movements 21 to 30:

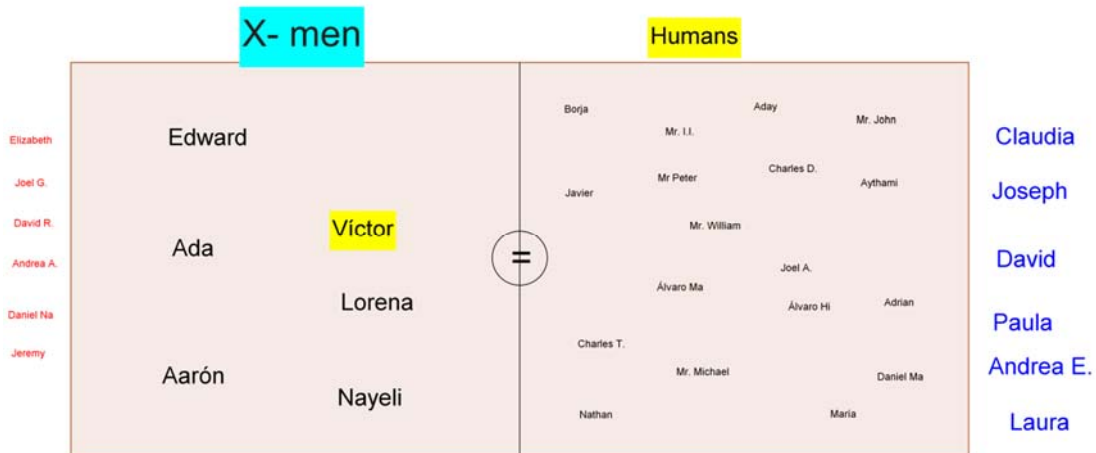
21) Nathan hits Claudia (C goes right) 22) Nathan goes back to the humans' side

23) Borja hits Andrea E (A.E. goes right) 24) Borja goes back to the humans' side

25) Mr. I.I. is hit (I.I. goes left) 26) Víctor is hit (V. goes to the right side)

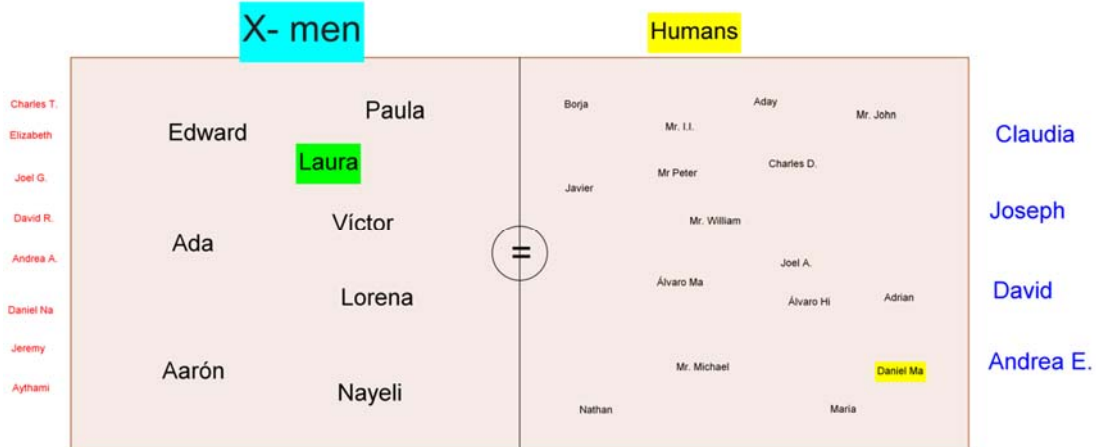
27) Víctor hits Elizabeth (E. goes left) 28) Víctor goes back to the X-men' side

29) Laura is hit (goes to the right side) 30) Laura hits Charles D (C.D. goes to the left side)



Movements 31 to 40:

- 31) Laura goes back to the X-men' side
- 32) Paula hits Charles T. (C.T. goes left)
- 33) Paula goes back to the X-men' side
- 34) Mr. I.I hits Laura (L goes right)
- 35) Laura hits Daniel Ma. (D.M goes left)
- 36) Laura goes back to the X-men' side
- 37) Daniel Ma. hits Laura (Laura goes right)
- 38) Daniel Ma goes back to the humans' side
- 39) Laura hits Aythami (A. goes left)
- 40) Laura goes back to the X-men' side

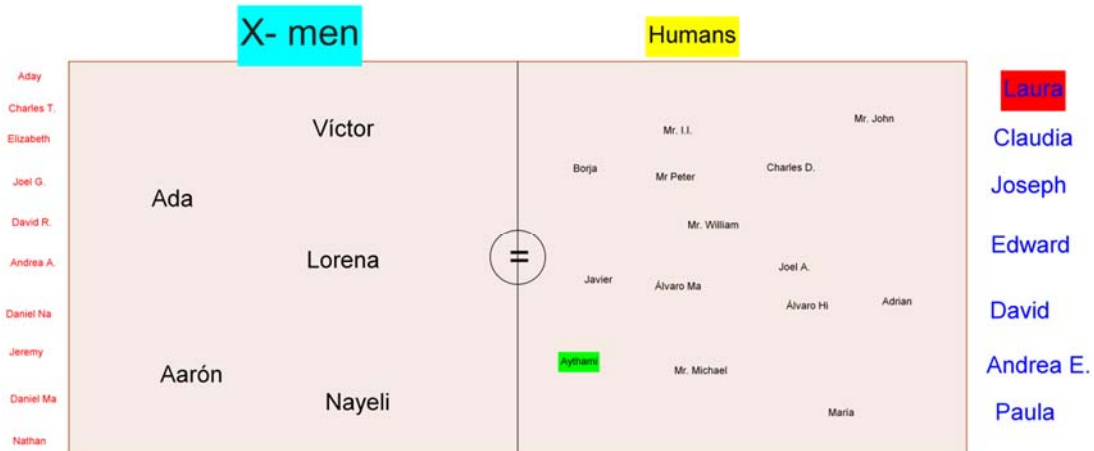


Movements 41- 53

- 41) Aythami hits Edward (E. goes right)
- 42) Aythami goes back to the humans' side
- 43) Dani Ma. is hit (goes to the left side)
- 44) Nathan is hit (Nathan goes left)
- 45) Nathan hits Laura (L. goes right)
- 46) Nathan goes back to the humans' side
- 47) Laura hits Aythami (A. goes left)
- 48) Laura goes back to the X-men' side
- 49) Nathan is hit (goes to the left side)
- 50) Aday is hit (goes to the left side)
- 51) Mr. William is hit (goes left)
- 52) Mr. William hits Laura (L goes right)

53) Mr William goes back to the humans' side 54) Aythami hits Paula (P goes right)

55) Aythami goes back to the humans' side



Summarizing the information

	Humans on the left	X- men on the left	Humans on the right	X- men on the right	Equation
Beginning					
Mov. 1-10					
Mov. 11-20					
Mov. 21-30					
Mov. 31-43					

Are all the equations equal?

Are all the equations similar (semejantes; same game, same amount of players)?

Solving the equations:

Equation 1:

- 5) Copy the equation →
- 6) Move the humans on the left side to the right side and the same with the x- men. Remember to "take off the shirt" (quitar el peto) →
- 7) Add/ subtract all the X-men and add/ subtract all the humans →
- 8) How many humans an X-men is worth?

Note: In the final step what is multiplying the "x" goes to the other side dividing?

Equation 2:

- 5) Copy the equation →
- 6) Move the humans on the left side to the right side and the same with the x- men.
Remember to “take off the shirt” (quitar el peto) →
- 7) Add/ subtract all the X-men and add/ subtract all the humans →
- 8) How many humans an X-men is worth?

Note: In the final step what is multiplying the “x” goes to the other side dividing?

Equation 3:

- 5) Copy the equation →
- 6) Move the humans on the left side to the right side and the same with the x- men.
Remember to “take off the shirt” (quitar el peto) →
- 7) Add/ subtract all the X-men and add/ subtract all the humans →
- 8) How many humans an X-men is worth?

Note: In the final step what is multiplying the “x” goes to the other side dividing?

Equation 4:

- 1) Copy the equation →
- 2) Move the humans on the left side to the right side and the same with the x- men.
Remember to “take off the shirt” (quitar el peto) →
- 3) Add/ subtract all the X-men and add/ subtract all the humans →
- 4) How many humans an X-men is worth?

Note: In the final step what is multiplying the “x” goes to the other side dividing?

Equation 5:

- 1) Copy the equation →
- 2) Move the humans on the left side to the right side and the same with the x- men.
Remember to “take off the shirt” (quitar el peto) →
- 3) Add/ subtract all the X-men and add/ subtract all the humans →
- 4) How many humans an X-men is worth?

Note: In the final step what is multiplying the “x” goes to the other side dividing?

Document we use to register : In the next page

	X-men (left)	Humans (right)
1		
2		
3		
4		
5		
6		
7		
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9		
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12		
13		
14		
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47		
48		

Document we use to register (filled): In the next page

	X-men (left)	Humans (right)
1		Paula Ravelo out (cemetary)
2	Noelia is out (cemetary)	
3		Alejandro V out
4		Paula Ravelo in
5	Pedro out	
6	Noelia in	
7	Yeday out	
8		Rachel out
9	Noelia out	
10		Raúl out
11	Yeday in	
12		Adrián out
13		Arinegua out
14	Nuhazet out	
15		Michel Angel out
16	Nuhazet in	
17		Albert out
18	Peter in	
19	Nuhazet out	
20		Maria Naranjo out
21	Peter out	
22		Albert in
23		Ariadna G. out
24	Peter in	
25		Tania out
26	Nuhazet in	
27		Maria the teacher out
28		Paula Ravelo out
29		Albert out

30	Alexander R out	
31		Albert in
32		Lucía out
33		Ariadna P out
34	Noelia in	
35		Lía out
36		Nauzet out
37		Paula Riviezzi out
38	Peter out	
39		Paula Riviezzi in
40		Sara out
41		Albert out
42		M ^a Ángeles out
43	Nuhazet out	
44		Rachel in
45		Paula Riviezzi out
46		Keilyn out
47		Rachel out
48		

Rules of brilé (adapted from Internet): In the next page

Official rules of Dodgeball.

Official rules of dodgeball.

Official rules of dodgeball.

Introduction

Competition, parties and sanctions.A. 1.

Dodgeball is a team sport, which is to eliminate players by hitting them with a track ball. When you are eliminated you can go back to "life" by hitting an opponent from the cemetery.

A. 1 II
The match starts with a jump ball players and the team gets the ball starts the play.A player is eliminated when the ball hits any part of your body except in the front of the head. If the ball hits a player and he or another player picks it up before hitting the ground the player is not eliminated

A. 2
A player who is on the track can pass the ball to his team players who are eliminated in the area to execute a shot.

A. 3
If a player is eliminated in the area, can not enter the court until it is saved. But if the ball is near him on the track, you can get the arm but not the body, to collect and thus have a shot.

A. 5
If the ball leaves the band for your team track, passing can be picked like a throw-in, but if the ball goes in the opposite track even if it had thrown out the opponent, only he can pick you up. If the ball goes through the area of the deleted, deleted can get it to execute a shot. Where there were none out in the area to eliminate the opposing team picks up the ball.

A. 6.
The game finishes when all the players of one of the teams are removed and the last one hit fails the final shot.