Name: .....

Day: .....

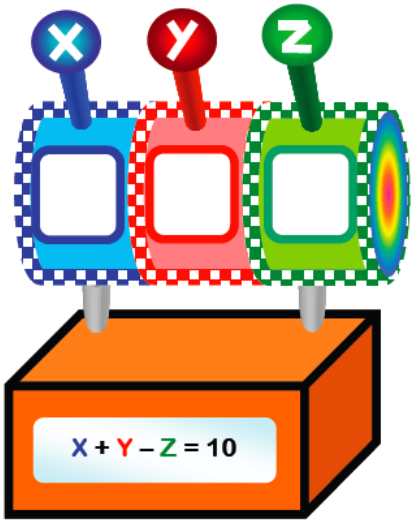
ImaginaryBCN

Monitoring notebook

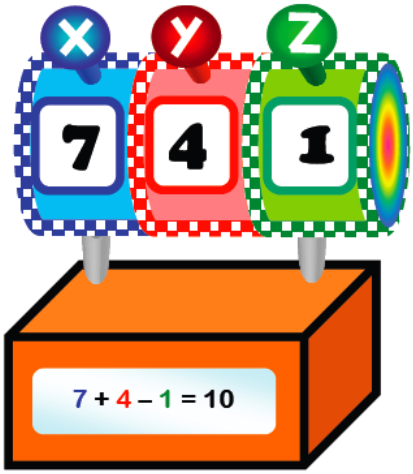
Activity: Initiation to the Algebra

◆ The set of variables and equations

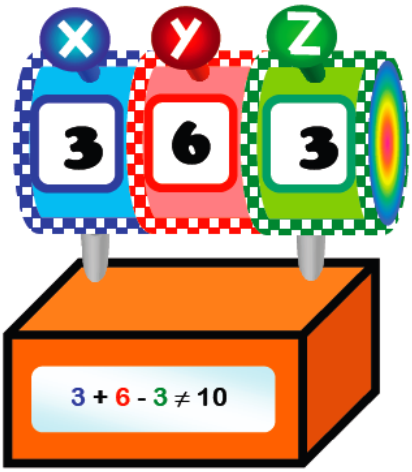
To play this game we will use the **Gaming Machine**: This is a machine with three small screens and three levers. The first screen bearing the letter **x**, the second under the letter **y** and the last bearing the letter **z**. These letters are called **variables**. When we activate the lever with the variable **x**, it is a real mystery to know which number will appear on the blue screen: the Gaming Machine can make the rolls become a 7, 6, 3 or any other number. The letters **x**, **y** and **z** are called variables because each time we activate the lever, the number displayed on the screen may be different. **The variables represent numbers that vary.**



Before playing



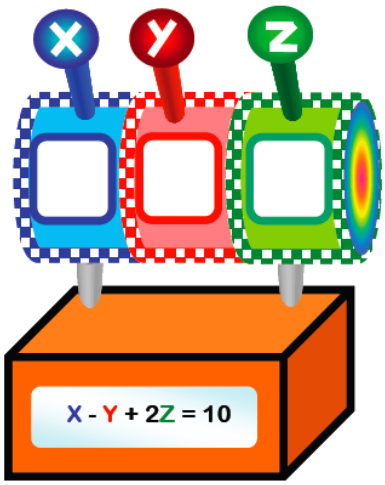
Winning game



Losing game

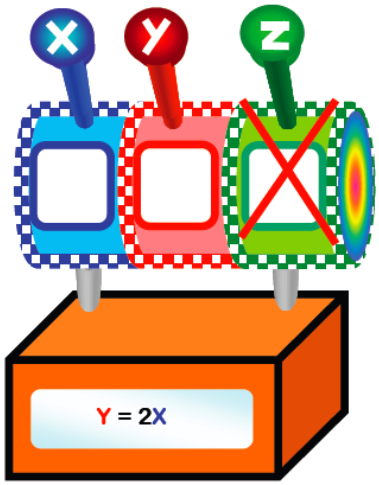
Additionally, when you look at the Gaming Machine's base you can see a large screen. Before each game, the screen shows an equality with the variables **x**, **y** and **z** already mentioned: it's the **equation**. The game consist in actioning the three levers and see if the three numbers on the screens of **x**, **y** and **z** cause that the equality is fulfilled or not: if it is true, we've won! The combination of winning numbers (**x**, **y**, **z**) is the solution of the equation.

Every time we start the Gaming Machine the equation changes. The same equation has showed to three different players who have obtained three different results: could you tell who won and who did not? Circle the correct answer.



0	10	0	Victory	Defeat
8	6	3	Victory	Defeat
8	6	4	Victory	Defeat

Thus, (**8**, **6**, _) is a solution of the equation **x** - **y** + 2**z** = 10. Have you noticed that once you know the values of the variables **x** and **y** of a solution, then the value of the variable **z** is determined? Now, the Gaming Machine has broken: neither the lever nor the screen of the variable **z**; work, only variables **x** and **y** are working. The same in the screen of the equation, it only shows **x** and **y**. So, we can only play with just two levers. Below we list some of the winners results for the same equation **y** = 2**x**: What do you think it's happening?



1	2	4	8
2	4	5	10
3	6	6	12

If you remember the multiplication table of 2, you're right! We've just found out that solutions of the equation **y**=2**x** form the number 2 table. The SURFER software works as a very powerful Gaming Machine: it generates all the values of the variables **x**, **y**, **z** which are solutions of the equation.

◆ Drawing with variables

Do you know how SURFER displays a surface from the solutions of the equation?

It uses a three-dimensional coordinate system which can accurately locate each point in the space. Each solution of the equation becomes a surface point in the space. Let's work it on the grid:

We draw number 2 multiplication

Each multiplication we do can be drawn as a point in the grid below. For example, the point corresponding to the multiplication 2 x **3** = **6** is the point (**3**,**6**),

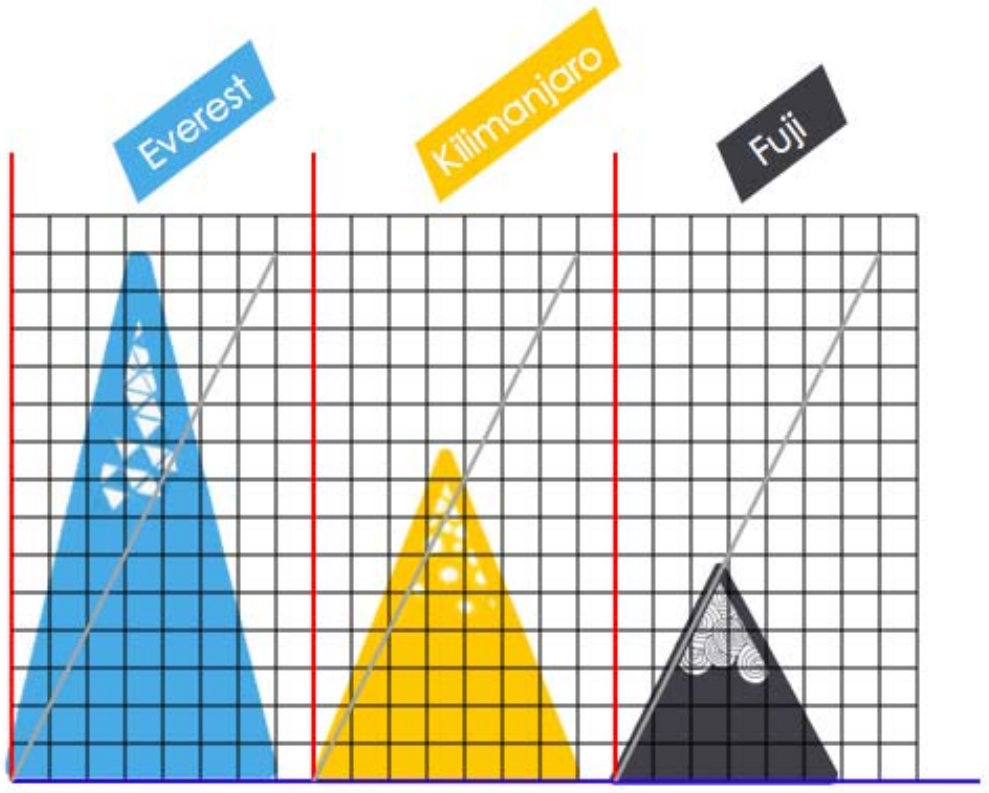
2 x **3** = **6** → (**3**,**6**)

This is the point of the box that has blue number 3 and red number 6. The same for the points (**1**,**2**), (**2**,**4**), (**3**,**6**), (**4**, _), (_ ,**10**), (**6**,**12**),...

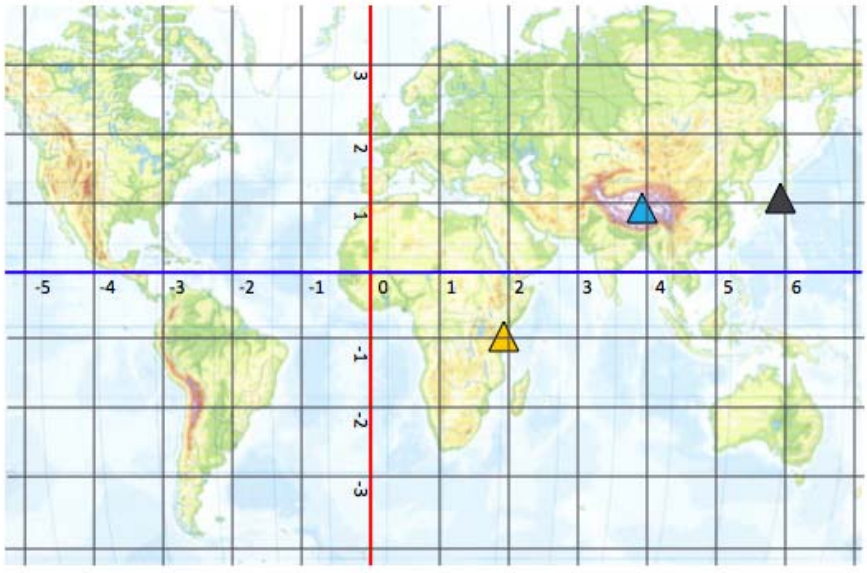
Write the missing numbers in the table of values. Draw them in the grid and join them. Which picture do you get?

x	y=2x
0	
1	
2	
3	
4	
5	

The equation is the director of the points: it decides how to move from blue numbers to red ones. In this case, the equation **y** = 2**x** decides to move from blue numbers to red ones by multiplying per 2. All points on the line drawn are solutions of the equation **y** = 2**x**. Use it to know which mountain height doubles its base.



Now look at the map and locate the mountains from their coordinates:



Everest (4, 1)

Kilimanjaro (,)

Fuji (,)

Remember:

Create your own surface and participate to the contest!

www.imaginary-exhibition.com/concurso

You can download (for free!) SURFER from the website:

www.imaginary-exhibition.com/surfer?lang=es