



COCA-COLA EXPERIMENT

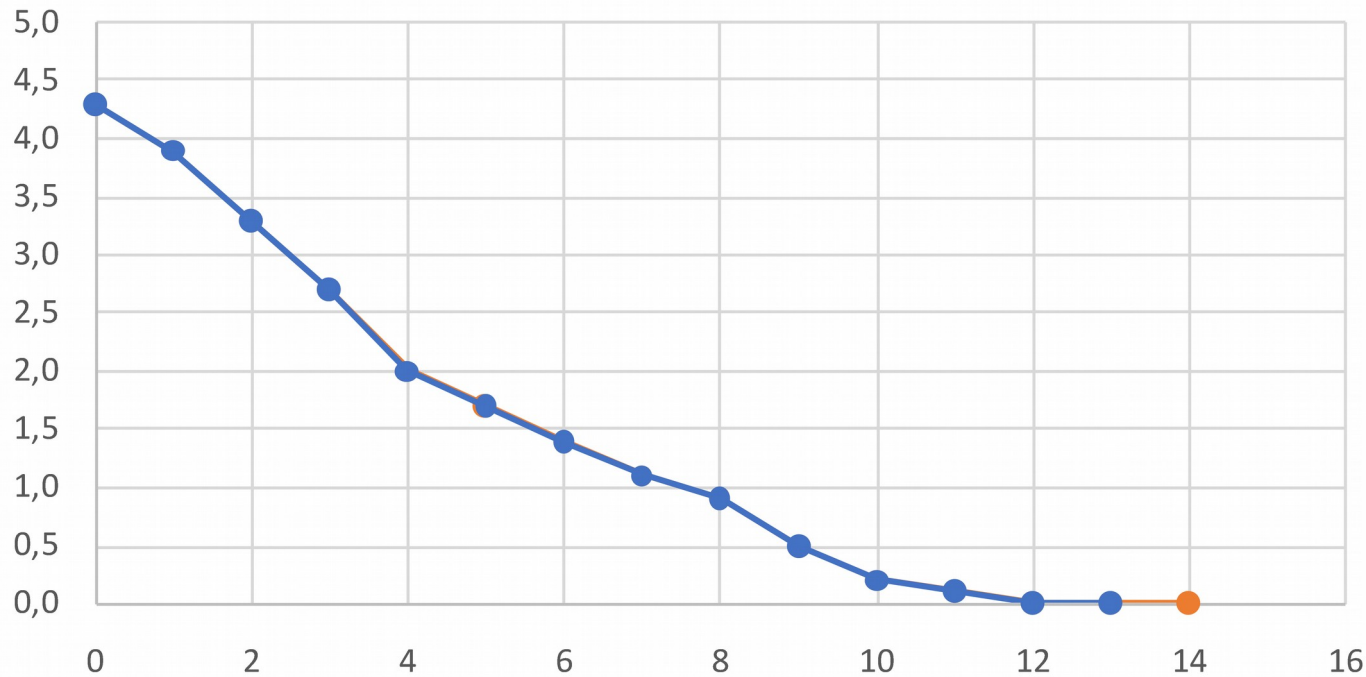
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COCA-COLA EXPERIMENT: MEASURE OF THE CONCENTRATION OF CO₂ PRESENT IN A BOTTLE

It is about the experience that measures the amount of gas present in a bottle of Coca-Cola by weight differential.

- **Graphic 1:**

Mass of CO₂ present in the bottle

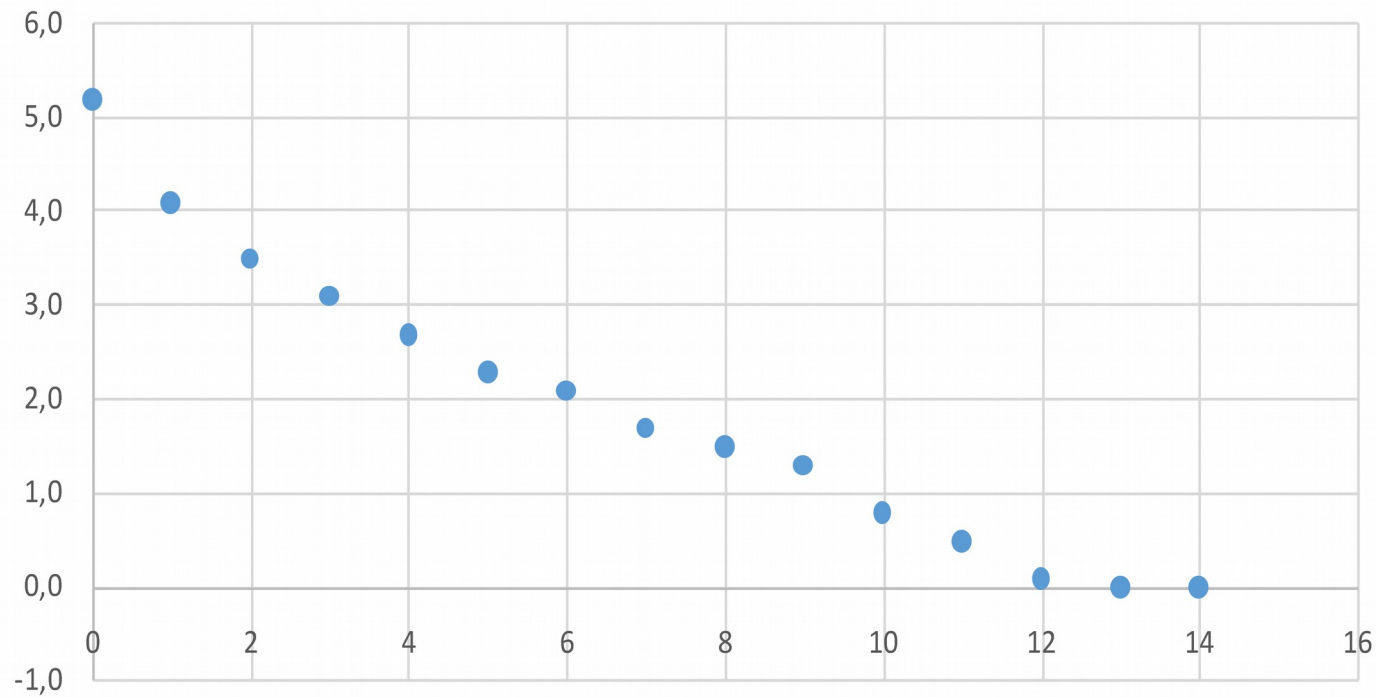


n	Mass of CO ₂
0	4.3
1	3.9
2	3.3
3	2.7
4	2.0
5	1.7
6	1.4
7	1.1
8	0.9
9	0.5
10	0.2
11	0.1
12	0.0
13	0.0
14	0.0

COCA-COLA EXPERIMENT: MEASURE OF THE CONCENTRATION OF CO₂ PRESENT IN A BOTTLE

- **Graphic 2:**

Mass of CO₂ present in the bottle



n	Mass of CO ₂
0	5.2
1	4.1
2	3.5
3	3.1
4	2.7
5	2.3
6	2.1
7	1.7
8	1.5
9	1.3
10	0.8
11	0.5
12	0.1
13	0.0
14	0.0

WORK PROPOSAL

- First step: create a table and a list of dots.
 - Graphic 1:

The screenshot displays the Gráfica_EC.ggb software interface. The main window is divided into three panes: Vista Algebraica, Vista Gráfica, and Hoja de Cálculo.

Vista Algebraica: Shows a list of points under the heading "Punto". The list includes points A through O, with their coordinates. A red box highlights the first few points: A = (0, 4.3), B = (1, 3.9), C = (2, 3.3), D = (3, 2.7), E = (4, 2), F = (5, 1.7), G = (6, 1.4), H = (7, 1.1), I = (8, 0.9), J = (9, 0.5), K = (10, 0.2), L = (11, 0.1), M = (12, 0), N = (13, 0), and O = (14, 0).

Vista Gráfica: Shows a coordinate plane with the points plotted. The x-axis ranges from 0 to 16, and the y-axis ranges from -2 to 8. The points are labeled A through O. A red box highlights the first two points, A and B.

Hoja de Cálculo: Shows a table with two columns, A and B, and rows 0 through 14. The data in the table is as follows:

	A	B
0	0	4.3
1	1	3.9
2	2	3.3
3	3	2.7
4	4	2
5	5	1.7
6	6	1.4
7	7	1.1
8	8	0.9
9	9	0.5
10	10	0.2
11	11	0.1
12	12	0
13	13	0
14	14	0

A red box highlights the entire table. A tooltip "Texto texto1" is visible over the cell containing 0.9.

The software interface also includes a menu bar (Archivo, Edita, Vista, Opciones, Herramientas, Ventana, Ayuda) and a toolbar with various drawing tools. The Windows taskbar at the bottom shows the Start button and several open applications, including "Gráfica_EC.ggb".

WORK PROPOSAL

- First step: create a table and a list of dots.
 - Graphic 2:

The screenshot displays the Gráfica_EC2.ggb software interface. It features a menu bar (Archivo, Edita, Vista, Opciones, Herramientas, Ventana, Ayuda) and a toolbar with various drawing tools. The main workspace is divided into three panels: Vista Algebraica, Vista Gráfica, and Hoja de Cálculo.

Vista Algebraica: A list of points is shown, with the first point highlighted in red:

- Punto
- A = (0, 5.2)
- B = (1, 4.1)
- C = (2, 3.5)
- D = (3, 3.1)
- E = (4, 2.7)
- F = (5, 2.3)
- G = (6, 2.1)
- H = (7, 1.7)
- I = (8, 1.5)
- J = (9, 1.3)
- K = (10, 0.8)
- L = (11, 0.5)
- M = (12, 0.1)
- N = (13, 0)
- O = (14, 0)
- Texto

Vista Gráfica: A coordinate plane showing the plotted points A through O. The x-axis ranges from 0 to 16, and the y-axis ranges from 0 to 8. The points form a downward-sloping curve.

Hoja de Cálculo: A table with two columns, A and B, and 15 rows. The data is as follows:

	A	B
1	0	5.2
2	1	4.1
3	2	3.5
4	3	3.1
5	4	2.7
6	5	2.3
7	6	2.1
8	7	1.7
9	8	1.5
10	9	1.3
11	10	0.8
12	11	0.5
13	12	0.1
14	13	0,0
15	14	0,0

The software interface also includes a status bar at the bottom with the Windows taskbar visible, showing the Start button and several open applications.

WORK PROPOSAL

- Second step: analyse the pieces of information.

- Graphic 1:

The screenshot displays the Gráfica_EC.ggb software interface. The main window shows a scatter plot titled "Análisis de datos - Gráfica_EC.ggb". The plot displays a set of data points (A through O) that follow a downward trend, suggesting an exponential decay. The x-axis is labeled "X: A1:A15" and the y-axis is labeled "Y: B1:B15".

A tooltip for "Análisis Multivariable" is visible, stating: "Análisis de dos o más conjuntos de datos de las columnas seleccionadas".

The data points are listed in the left sidebar:

- lista1 = {(0, 4.3), (1, 3.9), (2, 3.3), (3, 2.7), (4, 2), (5, 1.7), (6, 1.4), (7, 1.1), (8, 0.9), (9, 0.5), (10, 0.2), (11, 0.1), (12, 0), (13, 0), (14, 0)}

The data table on the right shows the following values:

A	B	C
0	4.3	
1	3.9	
2	3.3	
3	2.7	
4	2	
5	1.7	
6	1.4	
7	1.1	
8	0.9	
9	0.5	
10	0.2	
11	0.1	
12	0	
13	0	
14	0	

The software interface also shows a menu for "Análisis de datos" with options for "Diagrama de dispersión" and "Exponencial". The "Exponencial" option is highlighted, and the equation $y = ? e^{?x}$ is displayed. The "Valor exacto (simbólico)" field shows $x =$ and $y =$.

WORK PROPOSAL

- Second step: analyse the pieces of information.
 - Graphic 2:

The screenshot displays a graphing software window titled "Gráfica_EC2.ggb". The main window shows a scatter plot of data points. The x-axis is labeled "X: A1:A15" and the y-axis is labeled "Y: B1:B15". The data points are as follows:

X	Y
0	5.2
1	4.1
2	3.5
3	3.1
4	2.7
5	2.3
6	2.1
7	1.7
8	1.5
9	1.3
10	0.8
11	0.5
12	0.1
13	0
14	0

The software interface includes a menu bar (Archivo, Edita, Vista, Opciones, Herr), a toolbar with various icons, and a list of points on the left. A red box highlights the "Exponencial" dropdown menu and the equation $y = ? e^{2x}$. Below the dropdown, there is a field for "Valor exacto (simbólico): x = [] y = []".

The background shows a spreadsheet window titled "Hoja de Cálculo" with the following data:

	A	B
1	0	5.2
2	1	4.1
3	2	3.5
4	3	3.1
5	4	2.7
6	5	2.3
7	6	2.1
8	7	1.7
9	8	1.5
10	9	1.3
11	10	0.8
12	11	0.5
13	12	0.1
14	13	0
15	14	0

The Windows taskbar at the bottom shows the Start button and several open applications: Traducción list..., Experiencia_C..., Experimento..., 2 Microsoft O..., Gráfica_EC2.ggb, paso11 - Paint, and system icons including the clock showing 21:42.

WORK PROPOSAL

- Third step: create two sliders and a function.

- Graphic 1:

The screenshot displays the Geogebra software interface. The main window is titled "Gráfica_EC.ggb". The menu bar includes "Archivo", "Edita", "Vista", "Opciones", "Herramientas", "Ventana", and "Ayuda". The toolbar contains various geometric and algebraic tools. The "Vista Gráfica" (Graph View) is active, showing a coordinate plane with an orange exponential curve $f(x) = 1 \cdot e^{1x}$. The curve passes through points A through O, which are listed in the left sidebar. The sliders for parameters a and b are set to 1. A table of values is shown in the center-right, and a spreadsheet view is visible on the right. The taskbar at the bottom shows the Windows Start button and several open applications: "Experiencia_C...", "LibreOffice", "Microsoft ...", "paso2 - Paint", "Gráfica_EC.ggb", and "Gráfica_EC2.ggb". The system clock shows "ES" and "22:44".

Función

- $f(x) = 1 \cdot e^{1x}$

Número

- $a = 1$
- $b = 1$

Puntos:

- A = (0, 4.3)
- B = (1, 3.9)
- C = (2, 3.3)
- D = (3, 2.7)
- E = (4, 2)
- F = (5, 1.7)
- G = (6, 1.4)
- H = (7, 1.1)
- I = (8, 0.9)
- J = (9, 0.5)
- K = (10, 0.2)
- L = (11, 0.1)
- M = (12, 0)
- N = (13, 0)
- O = (14, 0)

x	y
0	4.3
1	3.9
2	3.3
3	2.7
4	2
5	1.7
6	1.4
7	1.1
8	0.9
9	0.5
10	0.2
11	0.1
12	0
13	0
14	0

Hoja de Cálculo

	A	B	C
1	0	4.3	
2	1	3.9	
3	2	3.3	
4	3	2.7	
5	4	2	
6	5	1.7	
7	6	1.4	
8	7	1.1	
9	8	0.9	
10	9	0.5	
11	10	0.2	
12	11	0.1	
13	12	0	
14	13	0	
15	14	0	
16			

Entrada

WORK PROPOSAL

- Third step: create two sliders and a function.
 - Graphic 2:

The screenshot shows a software interface for graphing a function. The main window is titled "Gráfica_EC2.ggb". The interface includes a menu bar (Archivo, Edita, Vista, Opciones, Herramientas, Ventana, Ayuda) and a toolbar with various drawing tools. The "Vista Algebraica" panel shows the function $f(x) = 1e^{1x}$ and its parameters: $a = 1$ and $b = 1$. The "Vista Gráfica" panel displays a graph of the function $f(x) = 1e^{1x}$ with a red box highlighting the function and the sliders for a and b . The graph shows a set of points labeled A through O, with a small table of values next to it:

0	5.2
1	4.1
2	3.5
3	3.1
4	2.7
5	2.3
6	2.1
7	1.7
8	1.5
9	1.3
10	0.8
11	0.5
12	0.1
13	0,0
14	0,0

The "Hoja de Cálculo" panel shows a spreadsheet with columns A and B, containing the same data as the table above. The "Entrada" field at the bottom left is highlighted with a red box.

WORK PROPOSAL

- Fourth step and result: modify the sliders and fit the function.

- Graphic 1:

The screenshot shows the GeoGebra interface with the following components:

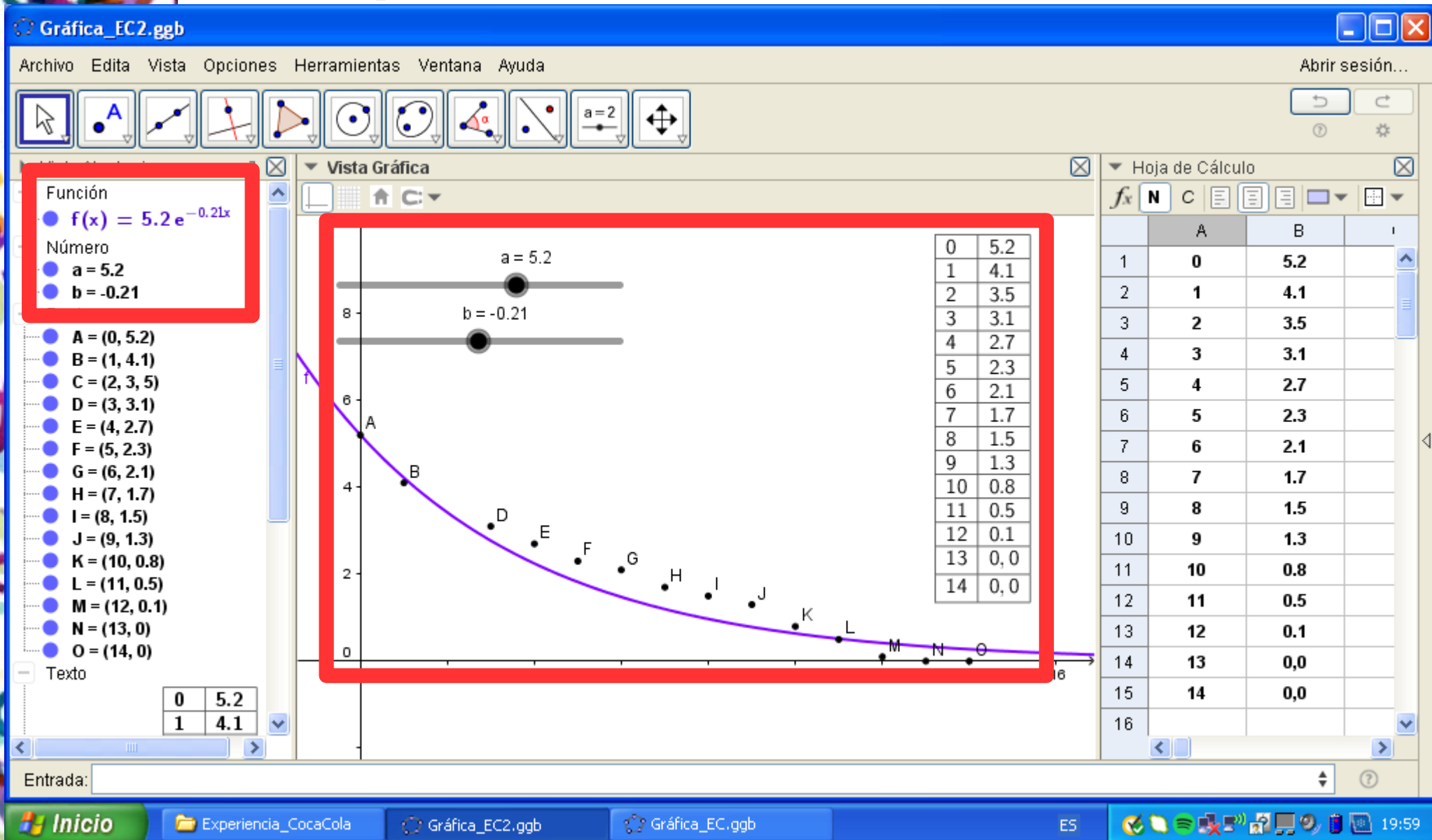
- Función:** $f(x) = 4.6e^{-0.23x}$
- Número:** $a = 4.6$, $b = -0.23$
- Puntos:** A = (0, 4.3), B = (1, 3.9), C = (2, 3.3), D = (3, 2.7), E = (4, 2), F = (5, 1.7), G = (6, 1.4), H = (7, 1.1), I = (8, 0.9), J = (9, 0.5), K = (10, 0.2), L = (11, 0.1), M = (12, 0), N = (13, 0), O = (14, 0)
- Hoja de Cálculo:**

	A	B	C
0	0	4.3	
1	1	3.9	
2	2	3.3	
3	3	2.7	
4	4	2	
5	5	1.7	
6	6	1.4	
7	7	1.1	
8	8	0.9	
9	9	0.5	
10	10	0.2	
11	11	0.1	
12	12	0	
13	13	0	
14	14	0	

WORK PROPOSAL

- Fourth step and result: modify the sliders and fit the function.

- Graphic 2:





THE END