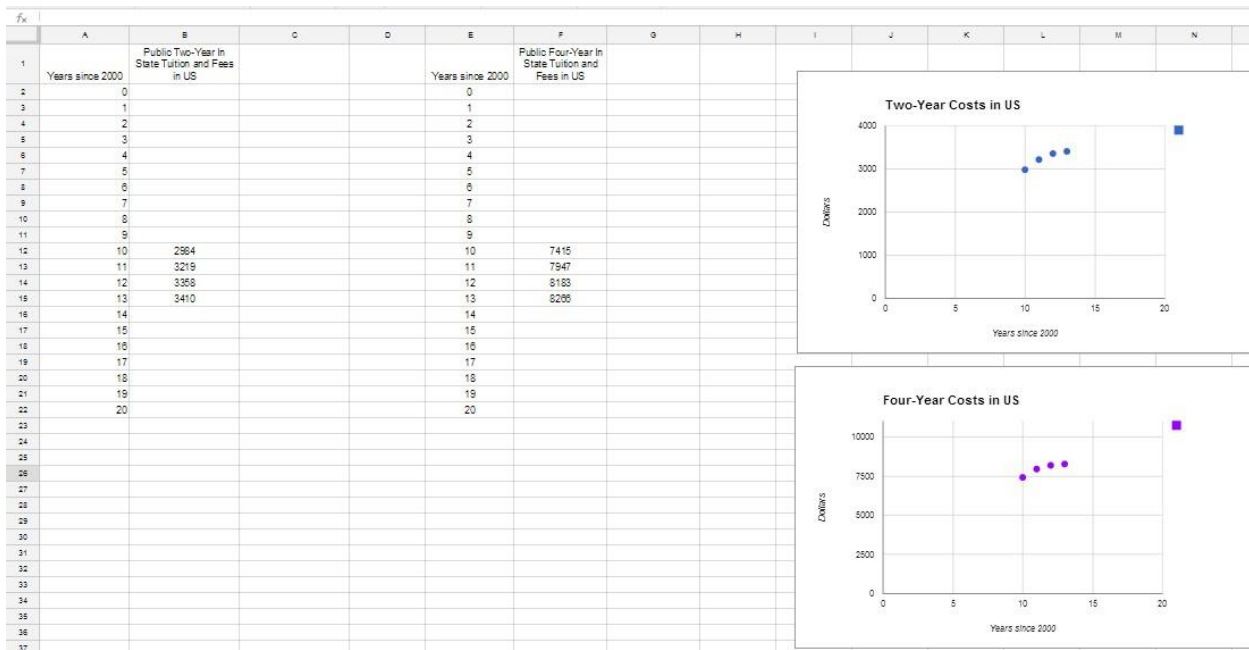


## Tech Assignment: Make a Scatter Plot of College Costs

Before you start this technology assignment, you must locate the data you have been assigned in the project. In the first three technology assignments, you'll use the data assigned to you (instead of the data in the technology assignment handouts) to get started on the project. The handouts use the data for the entire US. You'll use the data for two-year colleges in the state you are assigned and either the public or private four-year college data in the state you were assigned. If you have not been assigned a state, contact your instructor as soon as possible. Make sure you check the project webpage before you do this.

In this technology assignment, you will create a worksheet in Google Sheets that looks like the one below.

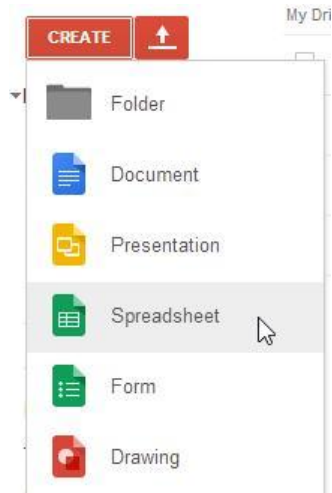


The goal is to create two scatter plots that depict the trend in tuition and fees at two-year colleges and at either public or private four-year colleges. The worksheet you will create should use the data from the state you have been assigned, not the data for the entire US.

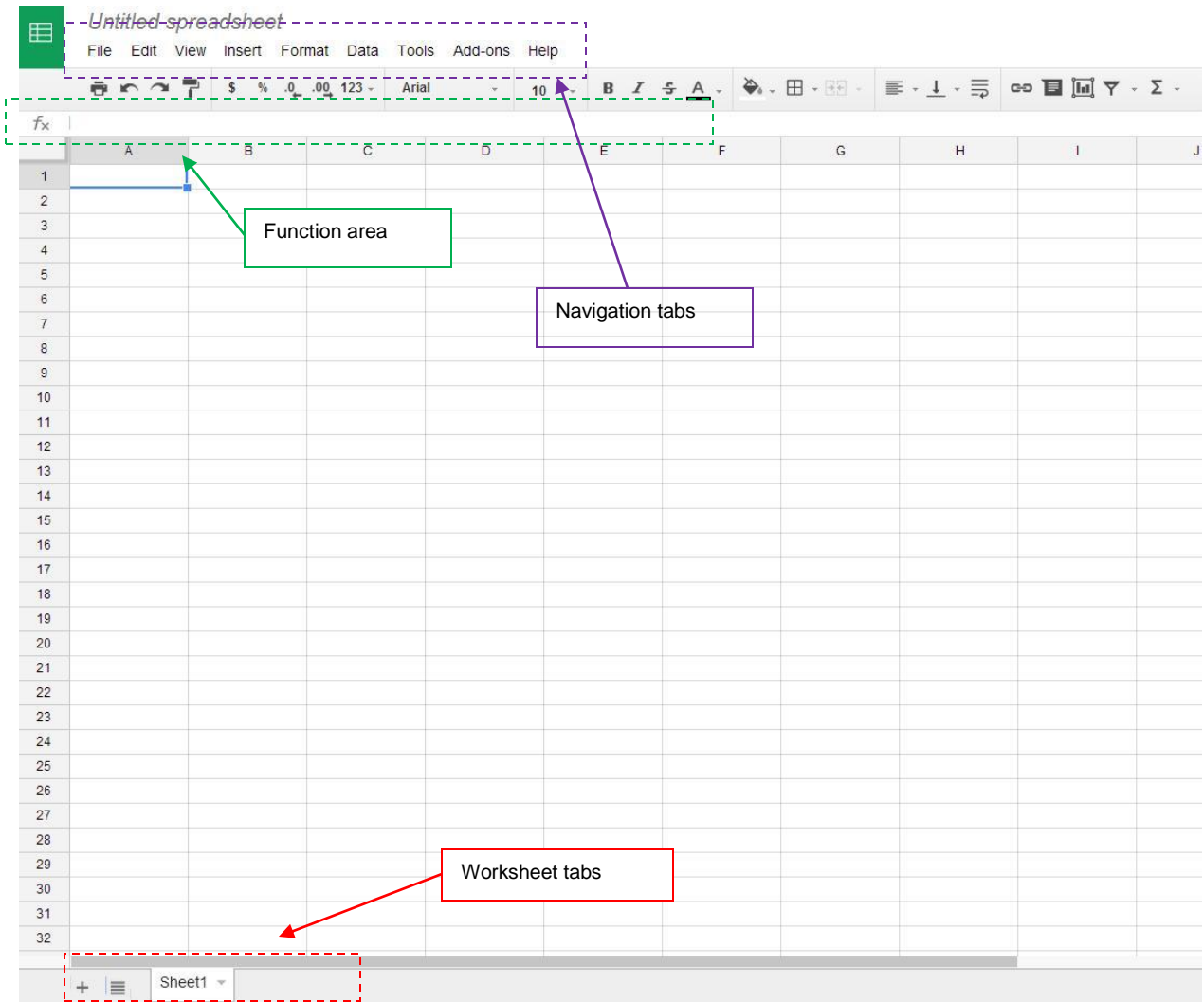
Below you will find instructions for creating a worksheet like this one for the state you were assigned. Follow the instructions carefully. It is critical that you complete this assignment successfully since it will be the starting point for the next technology assignment. Without completing the first three technology assignments, you will not be able to complete the solution for the project.

1. Within Google Drive, open an existing worksheet by clicking on it or create a new worksheet. A new worksheet may be created by selecting the Create button on the left side of the page.

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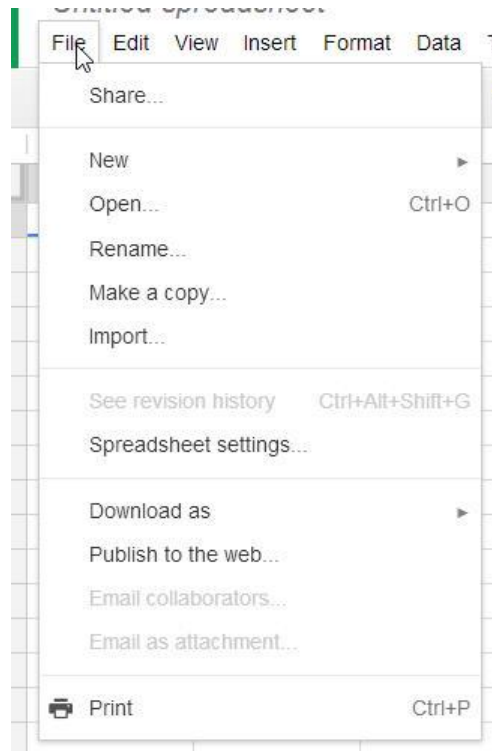


2. The file will open showing a view like the one below.

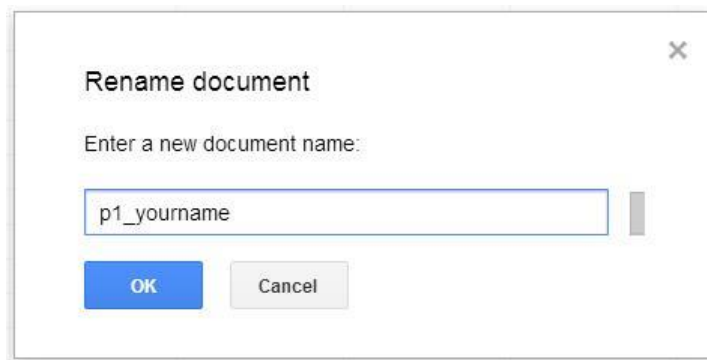


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Several areas in this window are important. Along the top of the page are several navigation menus. By selecting these menus, you'll expose different menus.



In the screenshot above, the File menu has been selected and it several options for modifying the file. If this is a new worksheet, you'll want to give it a name. For Project 1, you might want to call it something like p1\_yourname. Select Rename. A box will appear that allows you to type in the name.



Make sure you replace yourname with an appropriate identifier. Then select OK to save this file to your Google Drive.

Later on we'll explore other menus at the top of the Sheets window.

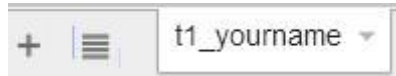
3. Along the bottom of the screen are the worksheet tabs. By default, one worksheet is shown in new files. These worksheets are useful when you are working on various aspects of a project. Each aspect

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can utilize a different worksheet making it easy to organize your work. Double click on the tab label Sheet1. The label will be highlighted as shown below.



Now you can type in the name of the worksheet. For instance, for Technology Assignment 1, you might type t1\_yourname.



You can easily identify this as the worksheet for Tech Assignment 1 by the t1. Adding an identifier after this helps you to distinguish this from other Tech 1 assignments should you be doing collaborative work with other students.

4. In this assignment we will create scatter plots of the cost data for two-year and four-year colleges. Make sure you have located the data assigned to you before proceeding any further. Eventually you add a mathematical model to that data. Think of the mathematical model as a formula that follows the trend in your data. For this reason, we'll start by putting a label for the numbers in column A representing Years since 2000. Click in cell A1 and type Years since 2000 in the function bar.

	A	B
1	Years since 2000	
2		

Press Enter on your keyboard.

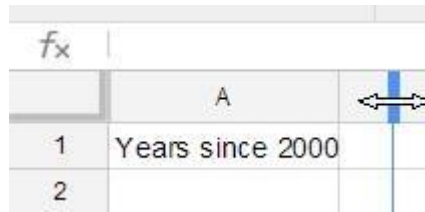
	A	B
1	Years since 2000	
2		

Notice that the text exceeds the width of the cell slightly on the right side. We can adjust this width by moving the cursor to the border between column A and B.

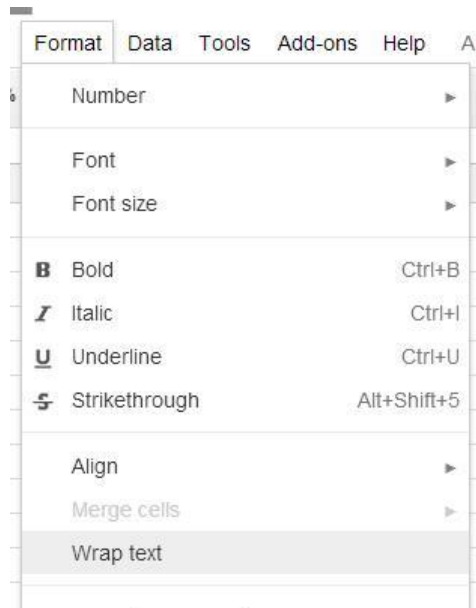
	A	B
1	Years since 2000	
2		

## Tech Assignment: Make a Scatter Plot of College Costs

Once the cursor changes to double arrows, you can hold down the left mouse button and drag the column to the right to make it wider.



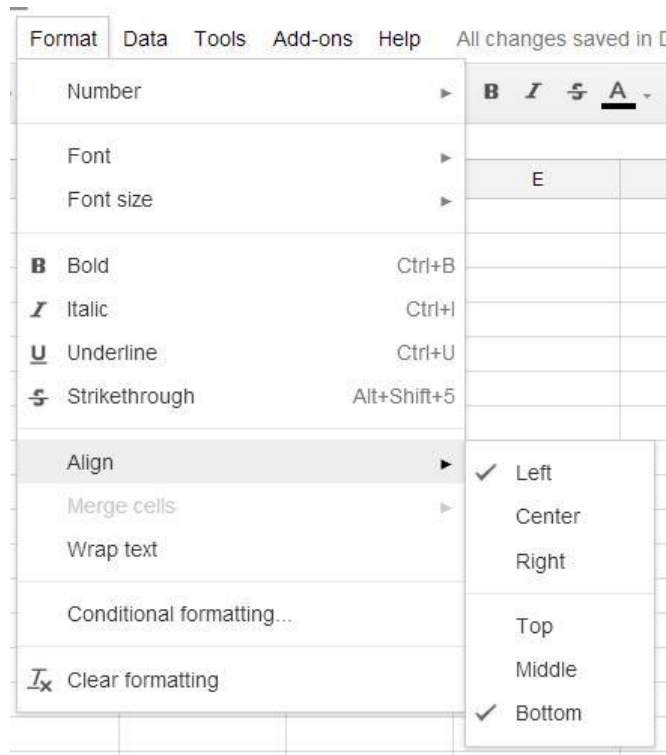
Another way of making text fit in a cell is to wrap it. That is done by selecting the cell and then clicking Format and then Wrap Text.



This will fit the text in the cell by making it higher and wrapping the text in the existing width.

Under Format is the Align feature.

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This can help you to change how the contents of a cell are aligned.

- Next we want to enter some values for the variable in column A. Place the cursor in cell A2 and press the left mouse button to select the cell. Type a 0 in the cell to correspond to the year 2000 (remember the variable is years since 2000). Now press Enter to put the value in the cell.

	A
1	Years since 2000
2	0
3	
4	

Now cell A3 is selected. Type a 1 followed by Enter on the keyboard.

	A
1	Years since 2000
2	0
3	1
4	

Now we have two values in column A.

- We could continue typing in numbers individually, but there is a shortcut that can allow us to fill the other values into column A. We want to type 0, 1, 2, 3, ... , 20 into the rows in column A. Using the fill feature in Sheets, we can produce this simple pattern quickly.

Click in cell A2 to select that cell. While holding the left mouse button down, drag the cursor to cell A3.

	A
1	Years since 2000
2	0
3	1
4	

Notice that both cells are now shaded indicating that they have been selected.

- Move the cursor to the small box in the lower right hand corner of the selection.

	A
1	Years since 2000
2	0
3	1
4	

The cursor will change to a large black +. Hold the left mouse button down and drag the + to cell A22. Release the mouse button.

Notice that the cells from A2 to A22 are filled with 0, 1, 2, ..., 20. You have just completed a Fill! The numbers in the first two cells establish the pattern for the fill. For instance, putting 0 and 2 into A2 and A3 and carrying out the fill would put 0, 2, 4, ..., 40 in the column. You can fill more cells or fewer cells depending on how far you drag the +.

With these numbers in place, we have x values for the data you need to enter as well as x values for the mathematical model you will create in later assignments.

- Examine your data. We need to match up the school years like 2010-2011 with a value in column A. If we use the beginning of the school year as establishing the data, 2010-2011 matches up with 10 in cell A12. Then we can put the corresponding cost in the column next to it (in cell B12). Type each of the two-year cost in the appropriate cells in column B.

This gives us a sheet like the one shown below.

	A
1	Years since 2000
2	0
3	1
4	2
5	3
6	4
7	5
8	6
9	7
10	8
11	9
12	10
13	11
14	12
15	13
16	14
17	15
18	16
19	17
20	18
21	19
22	20

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9. Your data values will be different since you should be using the data values assigned to you in the project.

Notice that column B has a heading in cell B1. Type your own heading in. Remember that you are doing a particular state and not the entire US so your heading should reflect the actual state.

You can also use the Format menu to Wrap Text or Align the entries. Just remember to select the cell first by clicking in it and then accessing the Format menu along the top of the sheet.

10. With the data entered, we can now move to making and formatting a scatter plot of the data. Start by clicking in cell A12 where the 10 appears. While holding the left mouse button down, drag the cursor to cell B13. This will highlight the values we want to graph.

12	10	2984
13	11	3219
14	12	3358
15	13	3410
16	14	

	A	B
1	Years since 2000	Public Two-Year In State Tuition and Fees in US
2	0	
3	1	
4	2	
5	3	
6	4	
7	5	
8	6	
9	7	
10	8	
11	9	
12	10	2984
13	11	3219
14	12	3358
15	13	3410
16	14	
17	15	
18	16	
19	17	
20	18	
21	19	
22	20	
23		

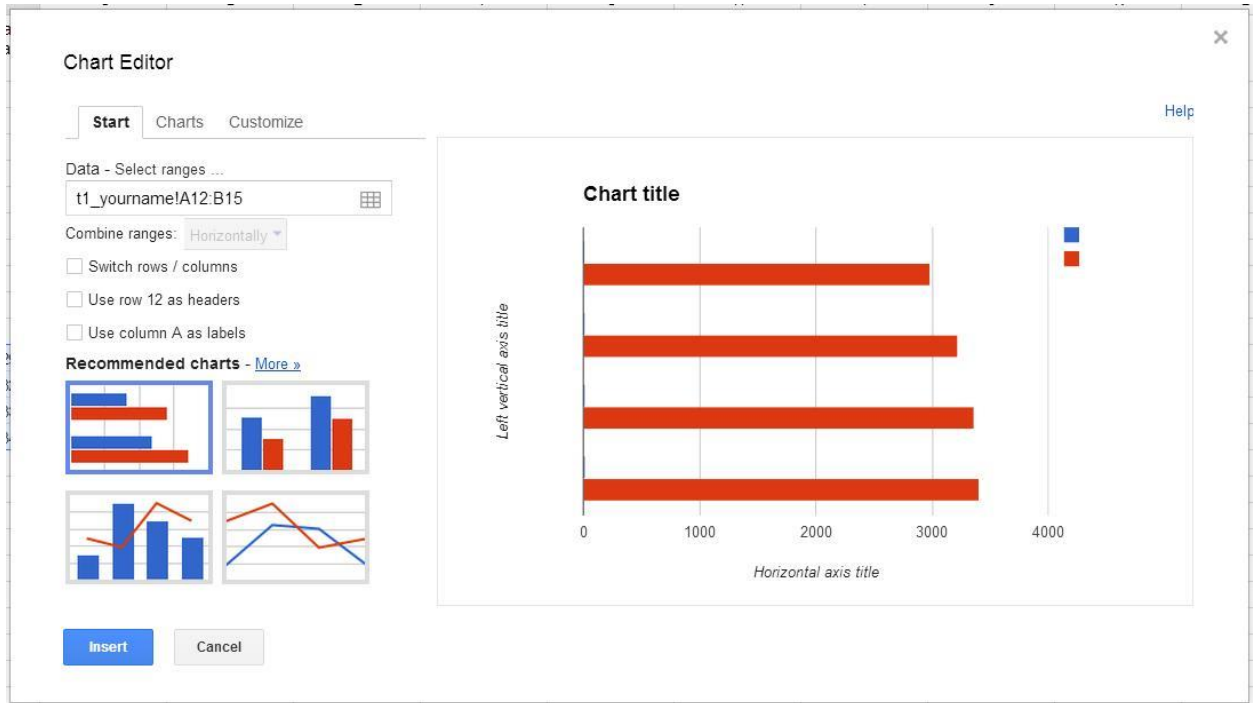
11. Locate the Insert menu along the top of the page. Select that menu and then Chart toward the bottom of the resulting selections.

12. This starts the Chart Editor that will help us to select the proper type of graph as well as label the graph with descriptive text on the axes.

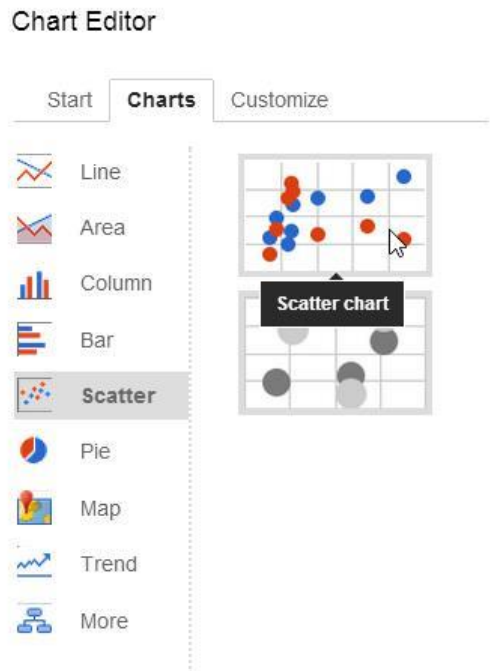




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The default and recommended charts do not include a scatter plot. To find this type of chart, select More next to the Recommended Charts label.



Select Scatter and then Scatter Chart to make a scatter plot.

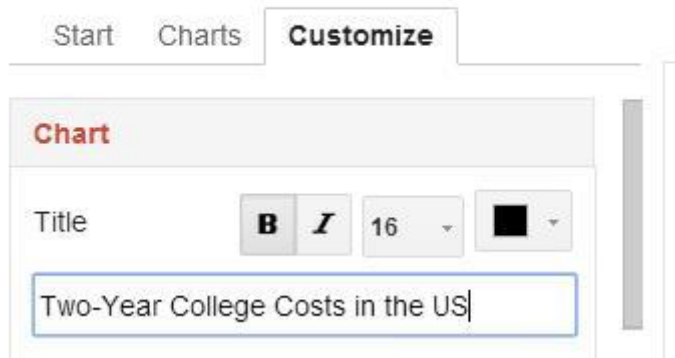
13. Now select Customize in the Chart Editor.

## Chart Editor



Change the text where it says “Chart Title” to something appropriate for your data.

## Chart Editor



You should see the sample on the right update to reflect your text.

14. Within the Customize tab, scroll down until you see Axis.

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The screenshot shows the 'Axis' settings panel for a horizontal axis. The 'Axis' dropdown is set to 'Horizontal'. The 'Title' field is empty, with bold (B) and italic (I) buttons, a font size of 12, and a color selection box. Below the title is a text input field. The 'Min' and 'Max' fields are empty. There is a checkbox for 'Allow bounds to hide data' which is unchecked. At the bottom, the 'Axis labels' field is empty, with bold (B) and italic (I) buttons, a font size of 12, and a color selection box.

Here is where you can define the horizontal window on your graph as well as add a label to the horizontal axis. Enter the values shown below.

The screenshot shows the 'Axis' settings panel with values entered. The 'Axis' dropdown is 'Horizontal'. The 'Title' field has 'Years since 2000' entered. The 'Min' field has '0' and the 'Max' field has '20'. The 'Allow bounds to hide data' checkbox is checked.

This means the horizontal axis will extend from 0 to 20 on the scatter plot.

15. To label the vertical axis, we need to select it using the box to the right of Axis.

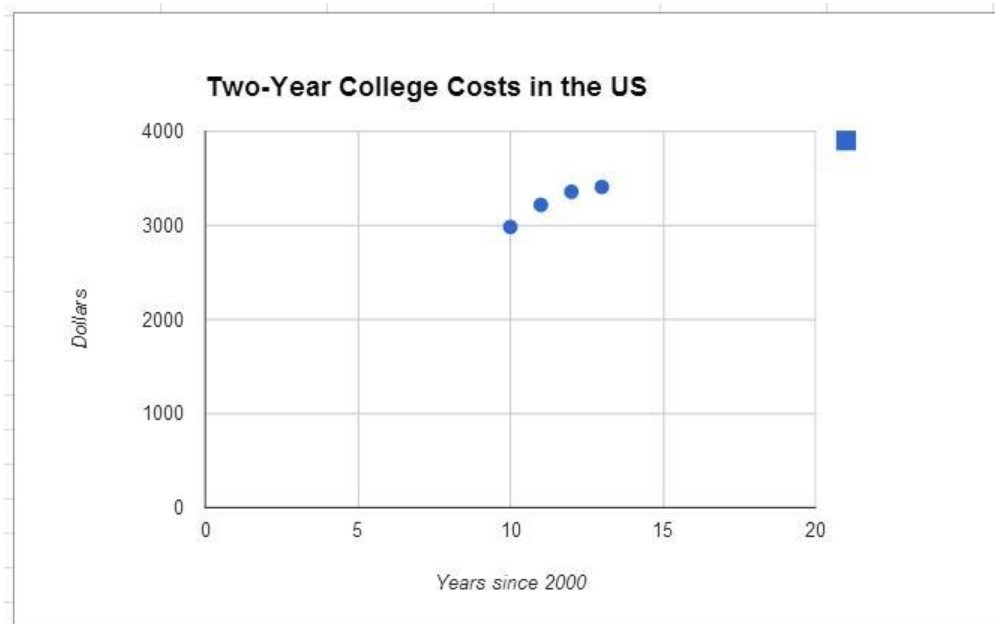
The screenshot shows the 'Axis' settings panel with a dropdown menu open. The 'Axis' dropdown is 'Horizontal'. The dropdown menu has two options: 'Horizontal' and 'Left vertical'. A mouse cursor is pointing at 'Left vertical'. The 'Title' field has 'Years since 2000' entered.

Enter the text below for an axes label. Use a min of 0 and a max determined by your largest cost.



There other options in the Customization tab that we will explore later.

16. Select Insert to put the graph in the worksheet.



Once the graph is in the worksheet, you may need to move it around to make your data visible. To do this, click on the graph. Now move the cursor to the top of the graph window. The cursor will change to a hand. If you now hold down the left mouse button, you can drag the graph to the right side of the worksheet.

17. Repeat steps 4 through 16 for the four-year college data. However, for the data put the Years since 2000 in column E and the four-year costs in column F. When you have created the second scatter plot, your worksheet should look like the one below.

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