Chapter 10
Working with Graphs and Charts

Most people understand information better when presented as a graph or chart than when they look at the raw data. Calc has the ability to graph data in a variety of ways and offers a wizard-type interface to guide you.

For some reason, spreadsheet programs tend to use the term "chart" for what most people call a "graph," a pictorial representation of data. This chapter uses the two terms interchangeably.

How do I create a graph?

There are a couple of ways to start the process of adding a graph to a spreadsheet. You can choose Insert | Chart from the menu. When you do so, the AutoFormat Chart dialog (**Figure 1**) appears. You can click the Insert Object button on the Main toolbar. (If it's not currently set for adding a chart, you need to long click and choose Insert Chart from the toolbar that appears.) In that case, the mouse pointer changes (as shown in **Figure 2**) and you need to click the location in the spreadsheet where the graph should go. After that, the AutoFormat Chart dialog opens.
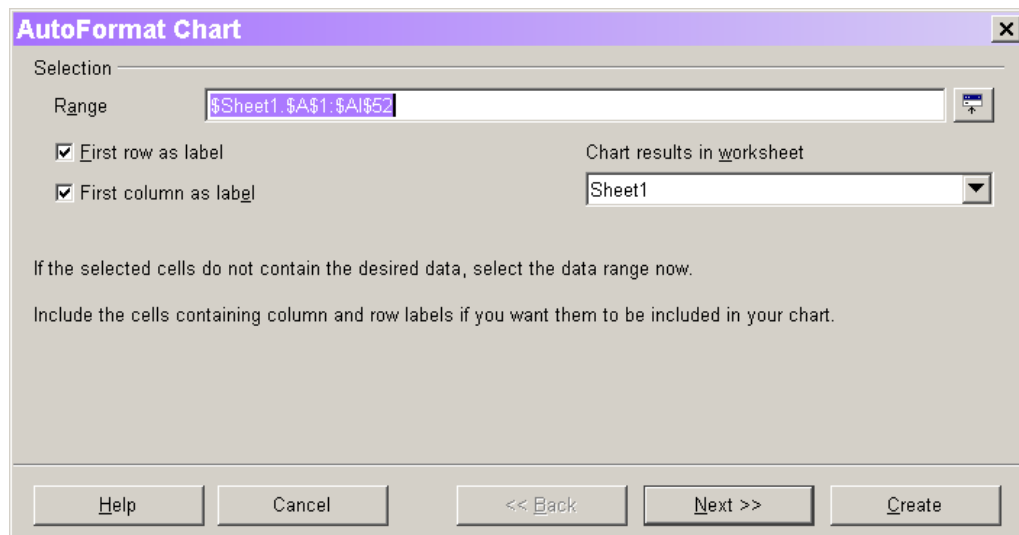

Figure 1. The AutoFormat Chart dialog guides you through the initial creation of a graph.

Figure 2. When you use the Insert Chart item from the Main toolbar, the mouse pointer changes to indicate you need to click the position for the graph.

If data is highlighted when you begin graphing, Calc assumes that's the data to graph (the *data range*). If no cells are selected when you begin graphing, Calc makes an intelligent guess as to what constitutes the data to be graphed. You can override Calc's assumption in either case by typing a range into the dialog, or by pointing to the right range. (As in other dialogs, use the Shrink button to get the dialog out of the way.) By default, each selected column constitutes a data series in the graph.

The two check boxes in Figure 1 indicate whether the first row and first column of the data being graphed contain labels for use in the graph and the legend. Again, Calc makes a pretty good guess based on what it finds.

The drop-down list lets you specify the destination for the graph. You can put it on any existing sheet of the workbook, or create a new sheet. The graph is placed at the cursor position on the specified sheet. A graph is a free-floating object, so you can move it on the worksheet once it's created.

Once the settings for data, labels, and destination are correct, click Next to go to the next page (**Figure 3**), where you specify the type of graph to create. See "What kinds of graphs can I create?" later in this chapter for specifics. On this page and all subsequent pages of this dialog, you can indicate whether the data you want to graph is in columns or rows.
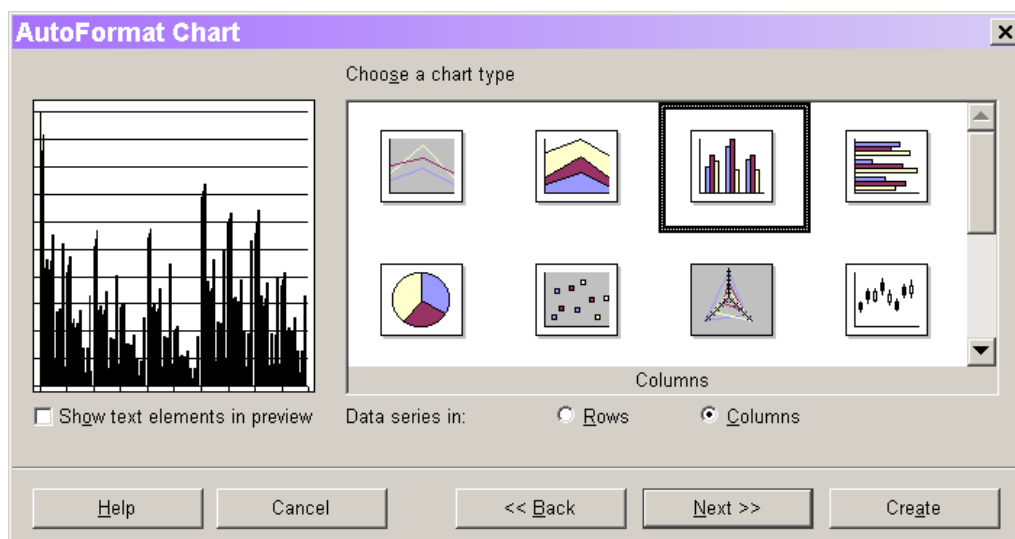

Figure 3. The second page of the AutoFormat Chart dialog lets you choose the type of graph to create.

The diagram on the left shows a preview of the graph. As you change the type of graph, the diagram changes. Select the check box to include legends and labels in the preview. Note that when you do so, the preview won't necessarily show all data items. For performance reasons, the number of data items shown is limited.

When you're happy with your choices on this page, click Next to move to the third page (**Figure 4**) where you choose from among variants for the chosen graph type. Depending on the type of graph chosen, you may also be able to indicate whether to include grid lines for the X, Y, and/or Z axis.
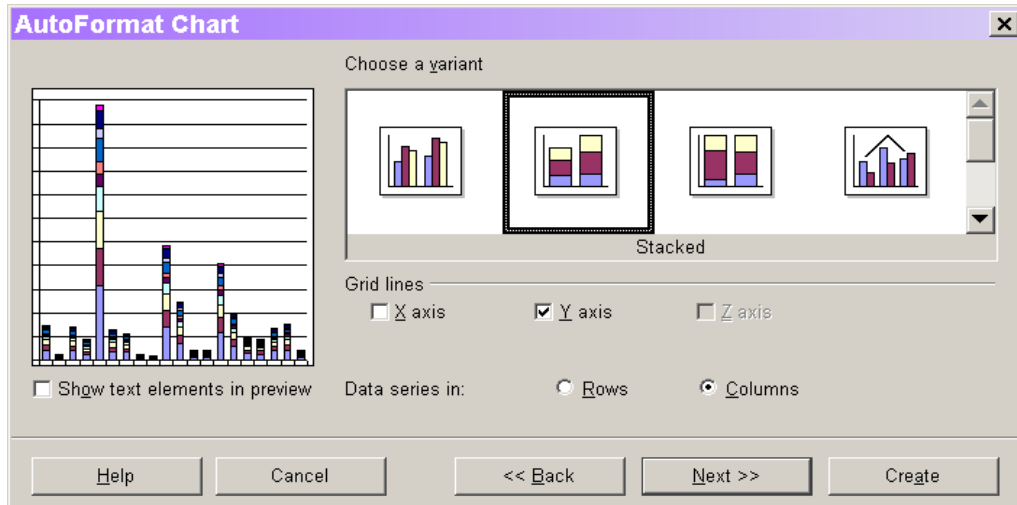
Figure 4. *Once you select a graph type, you can specify details for the type of graph.*

Again, click Next when you have the choices you want on this page.

The final page of the dialog (**Figure 5**) lets you specify various titles and indicate whether the graph has a legend, an area that maps colors to the information they represent. You get one last chance to switch between columns and rows for your data, as well.
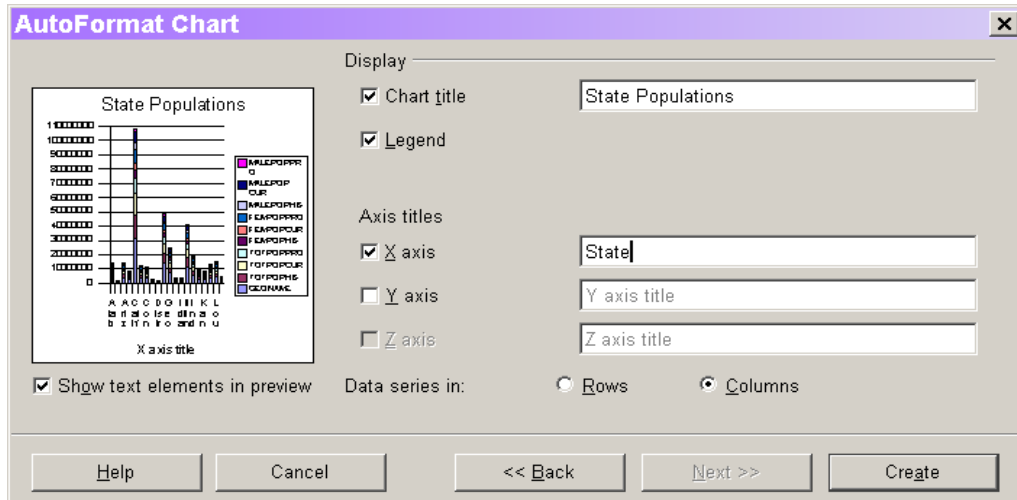

Figure 5. *The fourth page of the dialog deals principally with the textual components of the graph, titles and legends.*

When all the settings are as you want them, click Create to generate the graph. **Figure 6** shows some of the data being graphed, while **Figure 7** shows the graph created in the previous figures. As you can see, this graph needs some work before it's really usable. (Actually, the choice of stacked bars for this particular data makes the graph fairly meaningless.)

	A	B	C	D	E	F	G	H	I
1	GEONAME	GEONAME	TOTPOPHI	TOTPOPCU	TOTPOPPR	FEMPOPHI	FEMPOPCU	FEMPOPPR	MALEPOPH
2	Alabama	4040587	4221932	4455517	2104727	2194735	2313044	1935860	2027197
3	Alaska	550043	610350	679683	260230	289206	323009	289813	321144
4	Arizona	3665228	4000398	4452859	1854696	2020893	2246862	1810532	1979505
5	Arkansas	2350725	2441646	2566937	1217920	1262166	1324423	1132805	1179480
6	California	29760022	31546602	33575312	14863538	15749642	16767433	14896483	15796959
7	Colorado	3294394	3630585	4079905	1663315	1829591	2053524	1631079	1800994
8	Connecticut	3287116	3275195	3261723	1694467	1685708	1677174	1592649	1589487
9	Delaware	666168	707864	757702	343224	364186	389614	322944	343678
10	District Of O	606900	571592	530751	324005	304640	282896	282895	266952
11	Florida	12937926	13849741	14933526	6676516	7134287	7682227	6261410	6715454
12	Georgia	6478216	7020384	7713623	3334160	3606091	3957412	3144056	3414293
13	Hawaii	1108229	1186692	1278719	544330	585344	633386	563899	601348
14	Idaho	1006749	1120679	1270278	505853	562163	636315	500896	558516
15	Illinois	11430602	11760900	12177648	5879080	6037679	6242901	5551522	5723221
16	Indiana	5544159	5752928	6017915	2856315	2957899	3089520	2687844	2795029
17	Iowa	2776755	2823048	2880078	1432397	1453192	1480271	1344358	1369856
18	Kansas	2477574	2543745	2625638	1263216	1294143	1333637	1214358	1249602
19	Kentucky	3685296	3814122	3981255	1900357	1963079	2045975	1784939	1851043
20	Louisiana	4219973	4313195	4419968	2188796	2232628	2285361	2031177	2080567
21	Maine	1227928	1241451	1256627	630181	635781	642393	597747	605670
22	Maryland	4781468	5008060	5278406	2463018	2575802	2712835	2318450	2432258
23	Massachuse	6016425	6012972	6041000	3128254	3120601	3130873	2888171	2892371
24	Michigan	9295297	9521288	9784220	4783173	4889877	5017593	4512124	4631411

Figure 6. *When this data is graphed in a stacked bar chart (which isn't really meaningful in this case), the state names in column A become labels on the X axis and the titles in Row 1 are used in the legend.*
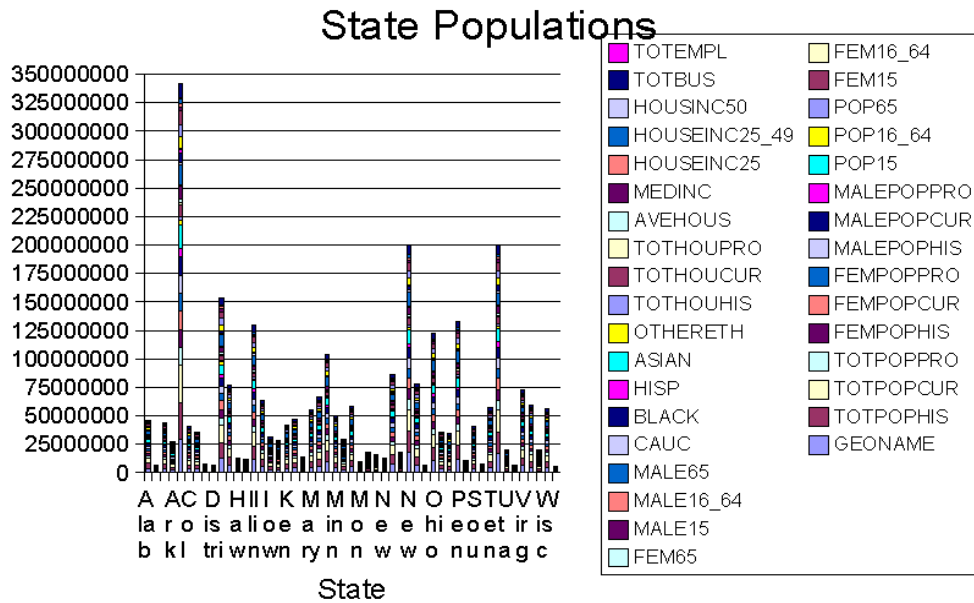

Figure 6. *The first attempt at a graph may need some tweaking.*

Fortunately, you're not stuck with the graph as you originally build it. You have considerable flexibility in modifying a graph to get just what you want. See "How do I change a graph?" later in this chapter for details.

What kinds of graphs can I make?

Although Calc offers fewer types of graphs than Microsoft Excel, there's still quite a variety. The list contains both two-dimensional and three-dimensional options. Almost every type of chart has several variants. **Table 1** lists the chart types and their variants.

Table 1. *Calc's graphing engine includes a wide variety of graph types.*

Graph type	Description	Variants
Lines	Uses a different-colored line or curve for each data series.	Normal, Stacked, Percent, Symbols, Stacked with symbols, Percent with symbols, Cubic Spline. Cubic Spline with symbols, B-Spline, B-Spline with symbols
Areas	Uses an independent line for each data series, filling the area under the line with color.	Normal, Stacked, Percent
Columns	Creates a vertical bar chart using a different-colored set of bars for each data series.	Normal, Stacked, Percent, Lines and columns, Lines and stacked columns
Bars	Creates a horizontal bar chart using a different-colored set of bars for each data series.	Normal, Stacked, Percent
Pies	Creates a pie chart. Most variants can only use one data series.	Normal, Rings, Offset (two variations)
XY chart	Plots one data series against another.	Symbols only, Lines with symbols, Lines only, Cubic Spline, Cubic Spline with symbols, B-Spline, B-Spline with symbols
Net	Circular graph with a separate Y axis for each item on the X axis. Points within a data series are connected to form a polygon.	Normal, Stacked, Percent, Symbols, Stacked with symbols, Percent with symbols
Stock chart	Shows change from one data series to the next for each X value.	Four variations using different graphical representations of the change.
3D Lines	Shows each data series as a different-colored 3D surface.	Deep
3D Areas	Shows each data series as a different-colored solid	Stacked, Percent, Deep
3D Bars	Creates a 3D horizontal bar chart with different-colored bars for each data series.	Normal, Stacked, Percent, Deep, Tubes, Tubes stacked, Tubes percent, Tubes deep, Horizontal pyramids, Horizontal pyramids stacked, Horizontal pyramids percent, Horizontal pyramids deep, Horizontal cones, Horizontal cones stacked, Horizontal cones percent, Horizontal cones deep
3D columns	Creates a 3D vertical bar chart with different-colored bars for each data series.	Normal, Stacked, Percent, Deep, Tubes, Tubes stacked, Tubes percent, Tubes deep, Horizontal pyramids, Horizontal pyramids stacked, Horizontal pyramids percent, Horizontal pyramids deep, Horizontal cones, Horizontal cones stacked, Horizontal cones percent, Horizontal cones deep

The best way to get a handle on what the various types of graphs do is to take a simple data set with a couple of data series and run through the options.

How do I change a graph?

Once you create a graph, you can change almost anything about it from its position on the spreadsheet to its type to the data it's based on. In many cases, the hardest part is getting access to what you want to change.

When you click a graph, the entire graph is selected as an object. Green sizing handles appear at the four corners and in the middle of each side. The shortcut menu for the selected graph contains items related to the size and position of the graph. With one exception (discussed later in this chapter), none of the shortcut menu items reflect the content of the graph. The Drawing Object toolbar replaces the Spreadsheet Object toolbar. The remainder of this chapter refers to this single click action as "selecting the graph."

Double-click a graph to get "inside" so you can work with the content. When you double-click, a gray border appears (as in **Figure 7**) to indicate you're editing the graph. The shortcut menu includes a variety of items for changing the content of the graph, such as the labels on the axes and the legend. The Main toolbar changes to include a variety of options for editing the graph. The rest of this chapter refers to this double-click action as "editing the graph."
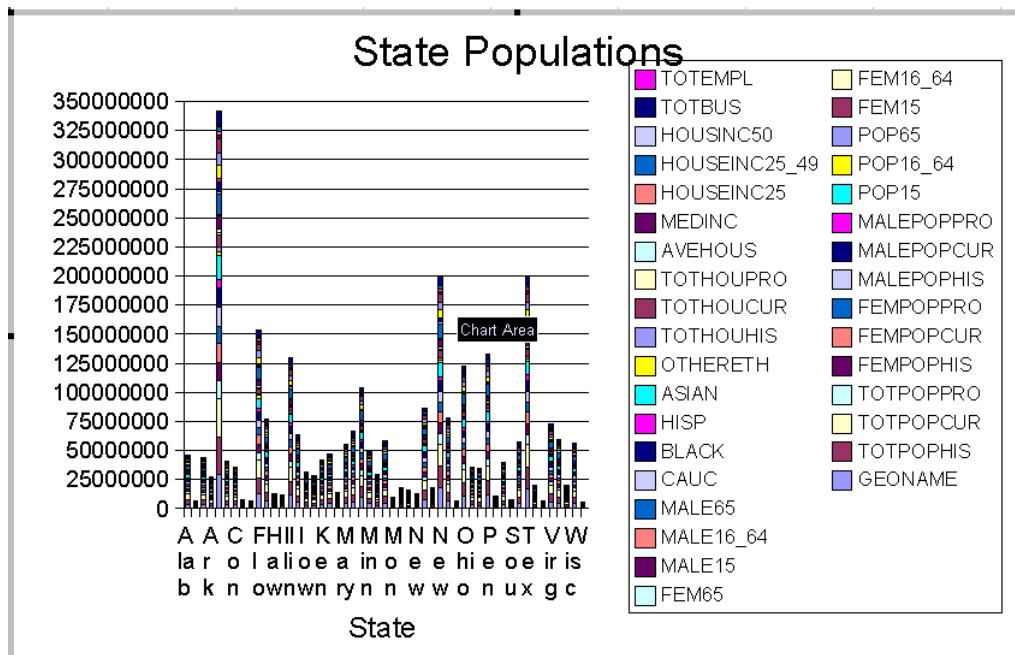

***Figure 7**. When you double-click a graph, a gray border appears and you can edit the components of the graph.*

Once the gray border displays, you can click various components of the graph, such as the legend, the axes, or the actual graphed data (the "chart wall") to select that component. The shortcut menu includes items for modifying that component. This action is called "selecting the <component>" in the following discussion, where "<component>" refers to a particular component of the graph.

You can also double-click textual components (such as titles) once you're editing the graph. This enables direct editing of the contents rather than the appearance of the component. The following discussion refers to this action as "editing the <component>."

Once you select or edit a component of the graph, you can't return directly to editing the graph as a whole. When you click elsewhere within the graph, the graph as a whole is selected (although the gray border persists indicating editing mode). You need to click outside the graph area and double-click the graph again to return to editing the graph.

To stop editing a graph or its components, click outside the graph area in the spreadsheet.

The following sections describe the various techniques for changing the components of a graph.

How do I move a graph?
To move a graph within the worksheet, select it and drag it to the new location. You can also move a graph by selecting it, cutting it, and then pasting it at the new location. Finally, you can move a graph by selecting it and choosing Position and Size from the shortcut menu or Format | Position and Size from the menu. On the Position tab, specify the X and Y coordinates where the upper left corner of the graph is placed.

How do I change the size of a graph?
To resize a graph, select it and put the mouse over one of the green sizing handles. Click and drag to the new size. Alternatively, the Position tab of the Position and Size dialog (Format | Position and Size from the menu or Position and Size from the shortcut menu), lets you specify the exact size you want.

How do I change the type of graph?
Double-click to edit the graph. Next, choose Format | Chart Type from the menu, Chart Type from the shortcut menu, or Edit Chart Type from the Main toolbar. The Chart Type dialog (**Figure 8**) opens, showing the current type. Choose the chart type and variant you want and click OK.
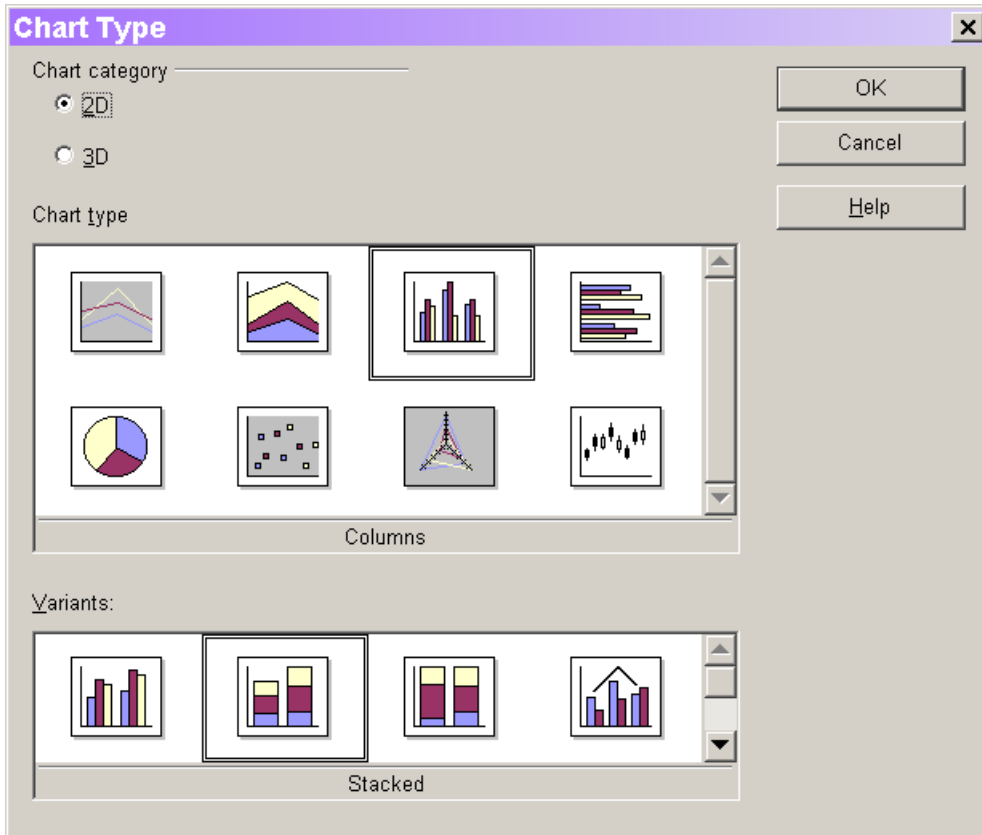
Figure 8. *Use the Chart Type dialog to choose a different type of graph or variant of the type you originally chose.*

How do I change the data in a graph?

The data for the graph is the one content item changed by selecting the graph rather than editing the graph. The shortcut menu when you select the graph includes Modify Data Range. When you choose it, the Modify chart data range window appears. It's the first page of the AutoFormat Chart dialog with the destination drop-down list disabled. You can type in or point to the desired range. When you press the Create button, the chart updates.

How do I change a graph's main title?

The main title appears centered at the top of the graph. To change the text of the title, edit the title by double-clicking first on the graph, and then on the title. The title takes on a special border (**Figure 9**) to show that it's editable. Edit the text to provide the new title.
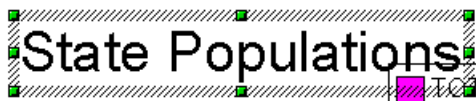
Figure 9. *When you double-click a title, the border indicates the text is editable.*

To modify the appearance of the main title, select the title and choose Object Properties from the shortcut menu or Format | Object Properties from the menu. The Title dialog (**Figure 10**) appears. You can add a border to the title, change the font, font size, font style, and much more.
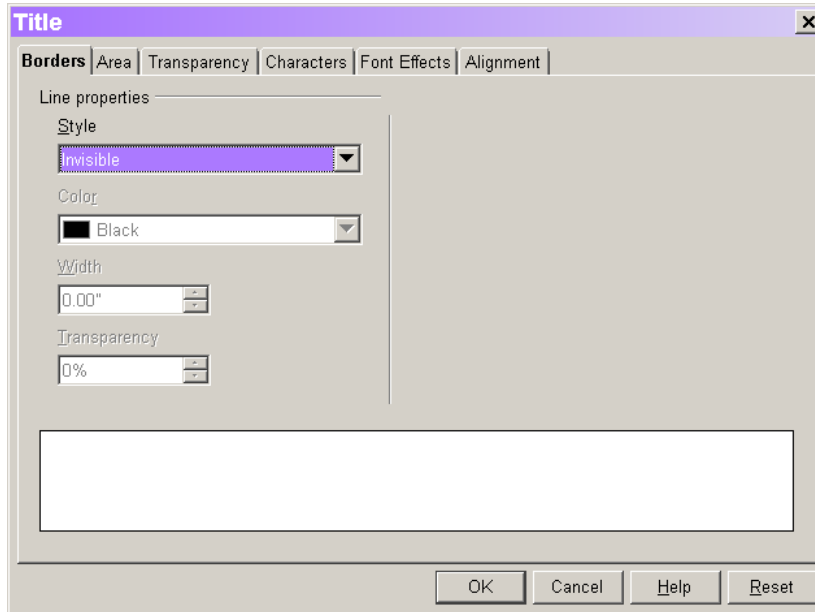

Figure 10. *The Title dialog lets you modify the appearance of the title, including changing the font and style, adding a background color, border, or rotating the title.*

When the title is selected, you can move it around within the graph by dragging it or with the keyboard arrows. For example, you might move the title to the left side of the graph and switch to vertical text.

How do I change the axis titles?

Changing the title that appears for the X, Y, or Z axis is the same as editing the main title. To modify the title text, double-click the graph, double-click the title to edit, and edit the text. To modify the appearance, select the title and open the title dialog from the menu or shortcut menu.

Is there an easier way to change the text for multiple titles?

If you need to change the text of more than one title, double-clicking each and editing can get tedious. Instead, you can choose edit the graph and choose Insert | Title from the menu to open the Titles dialog (**Figure 11**). For each title you want to include, select the appropriate check box and type the text you want.
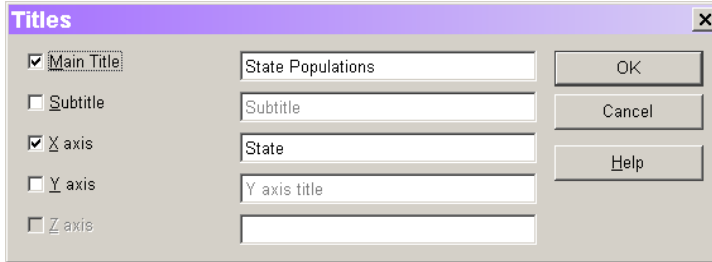
Figure 11. The titles dialog lets you change the text of all titles in one shot.

How do I turn off all titles?

The Titles dialog (shown in Figure 11) offers one way to turn off all titles—just clear each check box. However, you can also turn off titles using the Main toolbar. When you edit the graph, the toolbar includes a Titles On/Off button and an Axes Title On/Off button. Be aware that turning on titles using the toolbar is equivalent to selecting all of the relevant check boxes in the Titles dialog. For example, in the graph in Figure 7, if you click the Titles On/Off button twice, when the main title reappears, so does a subtitle with the text "subtitle."

How do I change the legend?

The legend of a graph tells what the various colors and/or symbols stand for. The text of the legend is automatically generated (based on the row or column labels and the type of graph) and can't be changed. (Neither can the symbols used for each data range.) However, the appearance and position of the legend can.

To change the appearance of the legend, select the legend and choose Object Properties from the shortcut menu or Format | Object Properties from the menu. The Legend dialog appears; it's similar to the Title dialog shown in Figure 10. However, the last tab of the Legend dialog (**Figure 12**) specifies the position of the legend in the graph. By default, Calc places legends to the right of the graphed data.
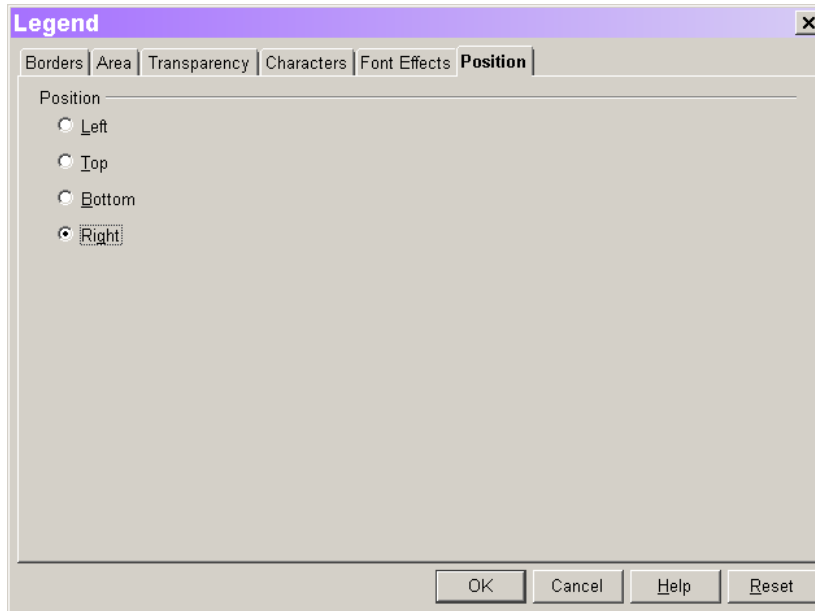
Figure 12. *The Position tab of the Legend dialog lets you specify the location of the legend within the graph area.*

You can also specify the position of the legend, as well as whether or not it should appear, by choosing Insert | Legend from the menu when editing the graph. A cut-down version of the Legend dialog (**Figure 13**) appears. The Display check box determines whether the legend is shown. The Position option buttons determine its position.
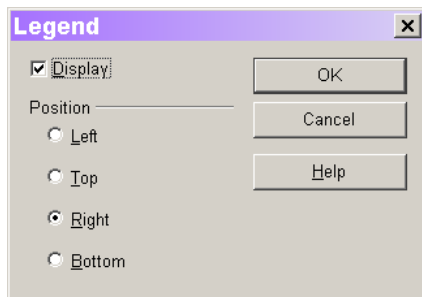

Figure 13. *This version of the Legend dialog appears when you choose Insert | Legend from the menu.*

When the legend is selected, you position it by dragging or with the keyboard. Also, when you edit the graph, the Main toolbar includes a Legend On/Off button. Note that turning the legend off does not resize or reposition the chart itself. The area previously occupied by the legend is left empty.

How do I change the axes?

You can control a number of features of the X, Y, and Z axes, including whether or not they are displayed, the style and color of the line, whether descriptive labels are shown, and the scale used for the axis. As with the other graph features, there are different ways to control the various aspects of the axes.

While editing the graph, the Format menu and the shortcut menu contain an Axis item with a submenu listing the various axes and a special All Axes item. Choose any of these items to open the Axis dialog (**Figure 14**), where you control the appearance of the axes themselves, and the labels along the axes. The title for this dialog varies according to the menu choice used to access it. (You can also open this dialog for a particular axis by positioning the mouse over the axis and double-clicking. Use the tooltip to determine when the mouse is positioned correctly.)
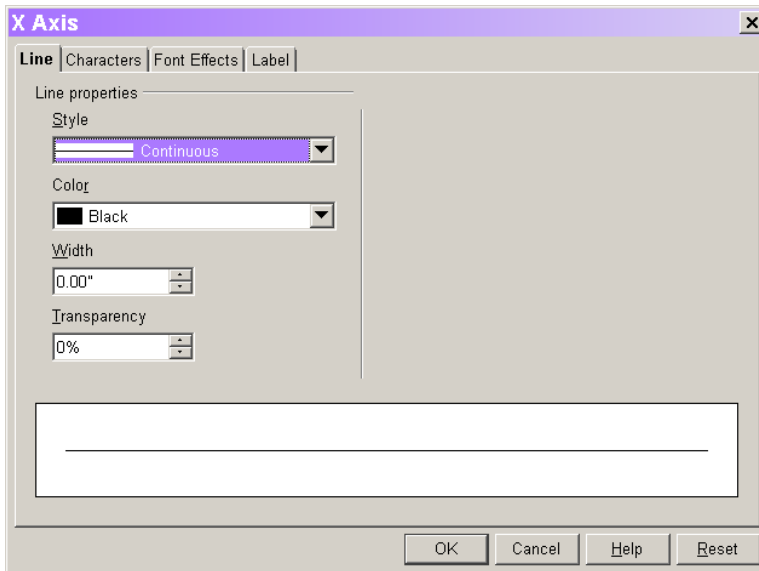
Figure 14. The Axis dialog controls both the appearance of the axis line, and the appearance of the labels on that axis.

Change Style to Invisible on the Line tab to prevent a line from being drawn for the axis.

The tabs available in the Axis dialog vary depending on the axis. If the axis is numeric, it includes Scale and Numbers tabs. The Numbers tab controls the format used for the numeric labels and is based on the Numbers tab of the Format Cells dialog (discussed in Chapter 8, "Creating Simple Spreadsheets"). The Scale tab (**Figure 15**) lets you control the starting and ending values on the axis, the interval between points shown, and more. Generally, Calc does a pretty good job of setting these based on the data, but there are times when you need more control. You can also use this tab to change an axis to use a logarithmic scale for those situations where the data warrants it.
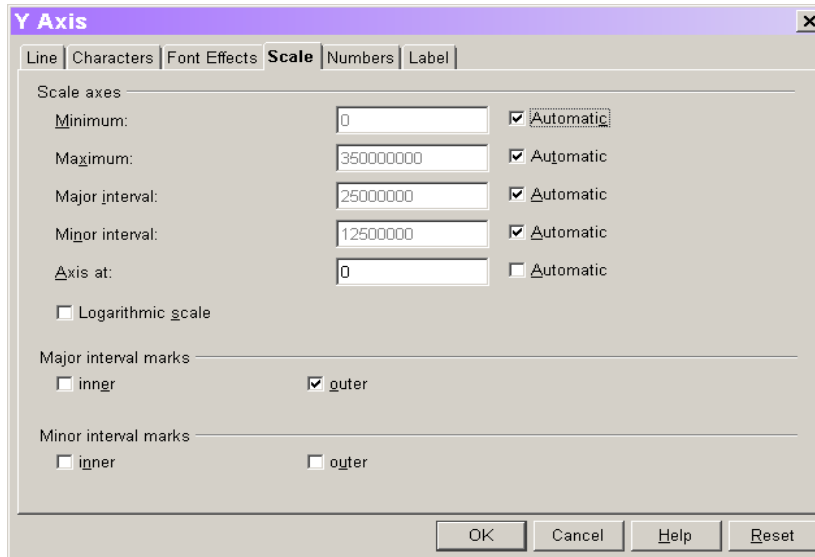
Figure 15. *The Scale tab of the Axis dialog controls the range of values and the size of intervals along the axis.*

The Characters, Font Effects, and Label tabs (**Figure 16**) of the Axis dialog affect the labels that appear next to or below the axis line. On the Label tab, you can turn labels off, or you can modify the way they appear, for example, staggering them to make them fit better. Another thing to try if axis labels don't fit is rotating them, also available on the Label tab.
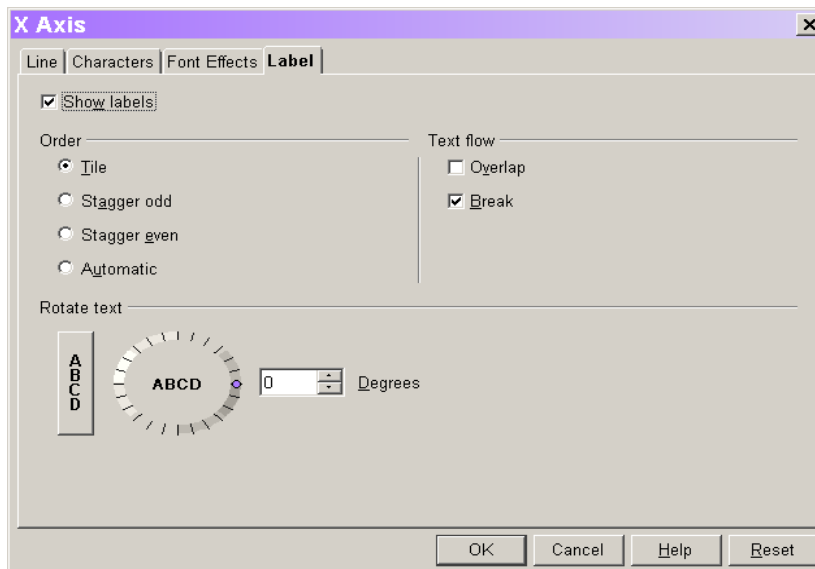

Figure 16. *Use the Label tab of the Axis dialog to turn axis labels on and off, to rotate them, or to reposition labels to fit better.*

Choose Insert | Axes from the menu to open the Axes dialog (**Figure 17**) that lets you determine which axes display at any time.
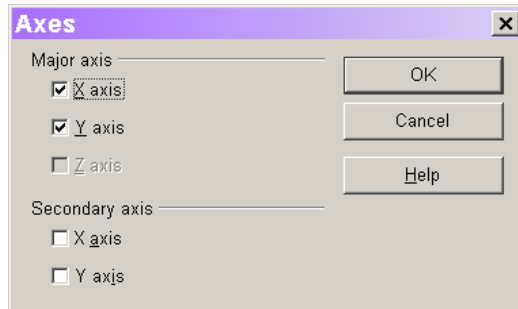

Figure 17. The Axes dialog lets you turn axes on and off.

The Show/Hide Axis Description(s) button available on the Main toolbar when editing the graph turns axis labels on and off. As with the other buttons in this section, this is all or nothing rather than affecting a single axis.

How do I control grid lines in my graph?

When you create a graph, Calc adds the grid lines it thinks make sense. For example, a column chart (vertical bar chart) has horizontal grid lines while a bar chart (horizontal bar chart) has vertical grid lines. You can control both whether grid lines show and what those grid lines look like.

When editing the graph, the Main toolbar contains toggle buttons for both horizontal and vertical grid lines. You can also choose Insert | Grids to open the Grids dialog (**Figure 18**) to choose which grid lines display.
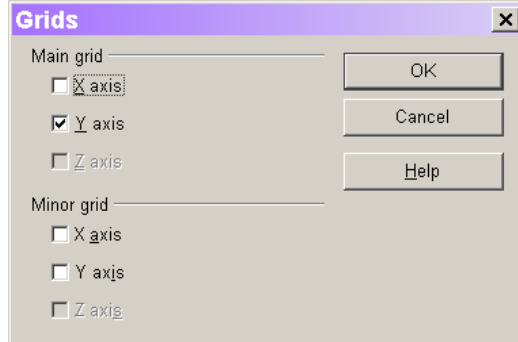

Figure 18. Use the Grids dialog to indicate what grid lines display.

Once the grid lines you want are displayed, you can control their color and style using the Grid dialog (**Figure 19**). To access it, use the Grid item on the shortcut menu or the Format menu. Choosing this item opens a submenu where you choose the grid lines you want to modify or choose All Axis Grids to modify all grid lines at once. You can also open this dialog by double-clicking in the chart when the tooltip indicates you're over grid lines.

Choosing All Axis Grids affects only those grid lines currently turned on. It doesn't turn on any grid lines.
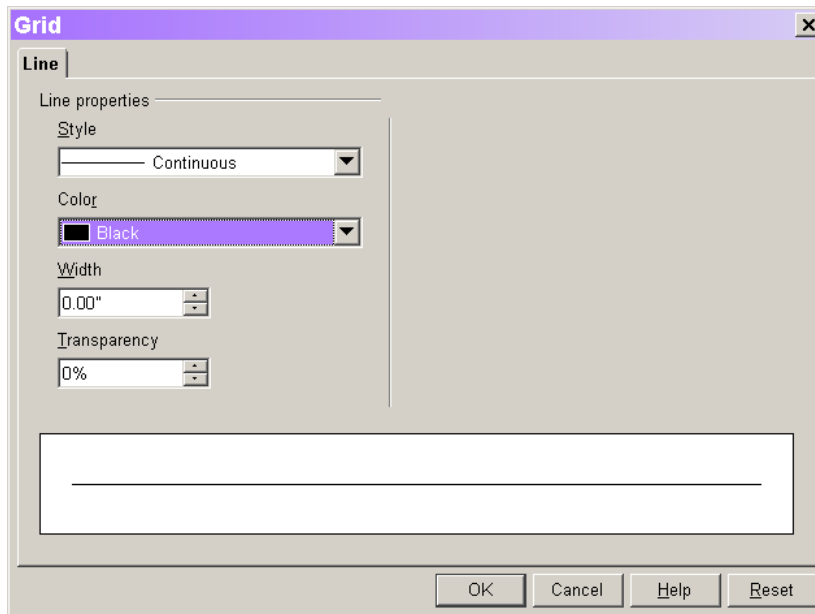

Figure 19. Use the Grid dialog to set the color and style of grid lines.

How do I give a graph a colored background?

There are actually three different backgrounds involved in a single graph. The term "chart area" refers to the whole graph, including the graphed data, the legend, the axis labels, and so forth. The term "chart wall" refers to the area behind the graphed data. For 3D graphs, the "chart floor" is the area at the bottom of the graph. You can set the background for any or all of these.

To modify the chart area, edit the graph and choose Format | Chart Wall from the menu or Chart Wall from the shortcut menu, or double-click the background. In all three cases, the Chart Area dialog opens. Use the Area tab (**Figure 20**) to set the background color.
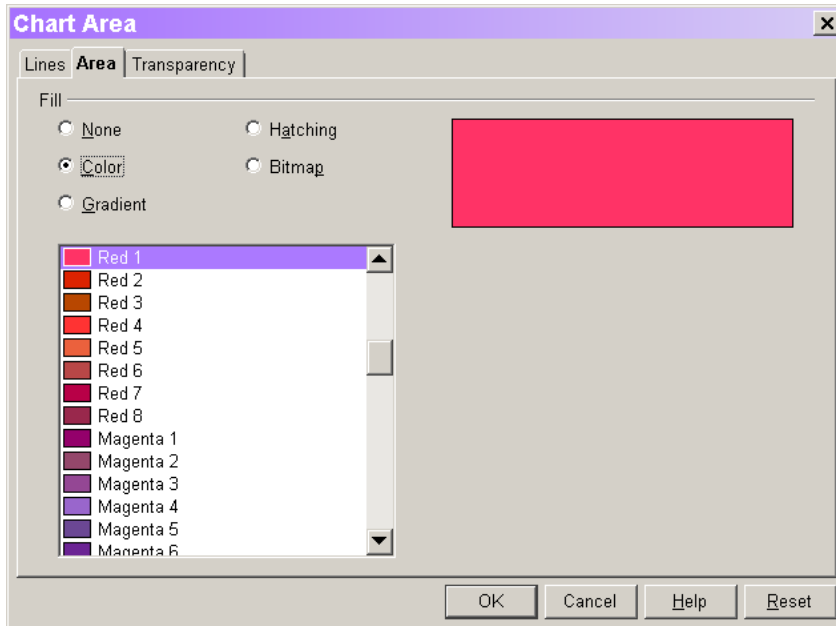
Figure 20. Use the Chart Area dialog to set the background color for the graph as a whole, including the legends, labels, titles, and so on.

To change the color of the Chart Wall, choose Format | Chart Wall from the menu or Chart Wall from the shortcut menu, or double-click in the graph when the tooltip says "Chart Wall." The Chart Wall dialog opens; it's identical to the Chart Area dialog, but the choices you make here affect only the area behind the graph.

Editing the Chart Floor is analogous to editing the Chart Wall. Choose Format | Chart Floor from the menu or Chart Floor from the shortcut menu, or double-click the Chart Floor to open the Chart Floor dialog, which looks the same as the Chart Area and Chart Wall dialogs. The Chart Floor item appears only when you work on a 3D graph.

How do I change the colors used to represent data?

To modify the appearance of a data series, select the data series by clicking it while editing the graph. The exact approach needed varies with the type of graph, but typically a single click when the tooltip indicates you're at a data point does the trick.

Once you select the data series, choose Format | Object Properties from the menu or Object Properties from the shortcut menu to open the Data Series dialog (**Figure 21**). Use the Area tab to control the color for the data series.
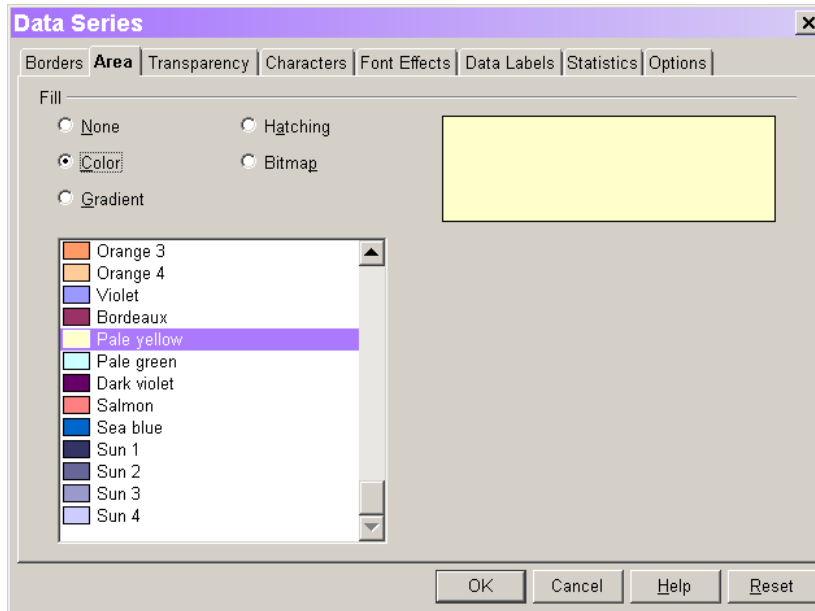
Figure 21*. The Area tab of the Data Series dialog controls the color for a particular data series.*

You can also control individual data points. To select a data point, click it while the data series containing it is selected. Next, choose Format | Object Properties or Object Properties from the shortcut menu to open the Data Point dialog, which is similar to the Data Series dialog. To change the color of the data point, use the Area tab.

How do I display the value for a data item?

In some graphs, it's useful to show the data not just as a point or bar, but to display the actual value that point or bar represents, using what's called a *data label*. Data labels are controlled at the data series and data point level. To turn on data labels for a data series or data point, select the series or point (as described in the preceding section) and use the Data Labels tab (**Figure 22**) of the corresponding dialog.
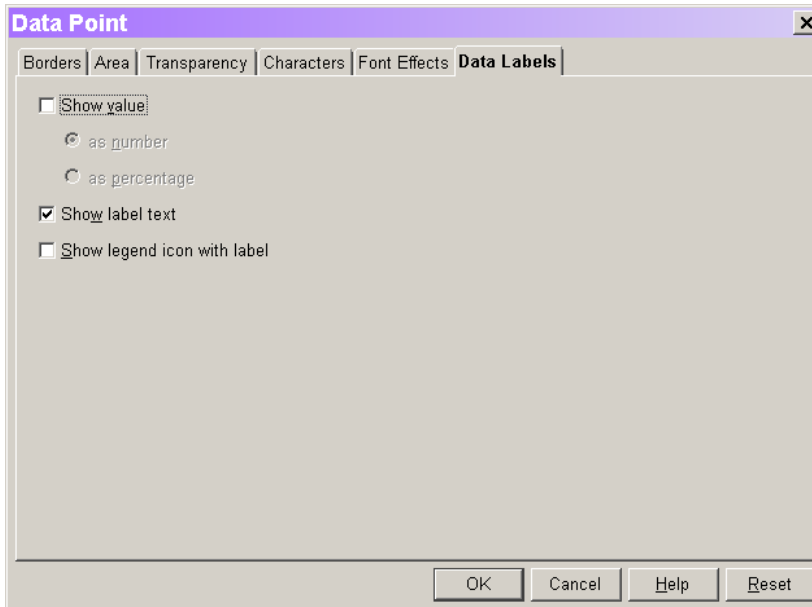
Figure 22. *Use the Data Labels tab of the Data Series or Data Point dialog to determine whether the data value displays along with the graphical representation.*

You can show the actual data value or the label for the value. For example, in a bar chart, you're likely to show the data value, but in an XY graph, you're more likely to use the data label, which doesn't appear anywhere else in the graph.

The Characters and Font Effects tabs of the Data Series and Data Point dialogs affect whatever data labels you turn on.

Can I look at 3D graphs from another angle?

When you use the 3D graph types, you can rotate the graph so you can see it differently. To do this, double-click the graph and select the graphed data by clicking it. The mouse pointer changes to a horseshoe shape, and you click and drag to rotate the graph.

When you click, the outline of a cube appears showing you the object you're rotating. **Figure 23** shows a graph ready to be rotated. **Figure 24** shows the same graph after dragging down and to the right.
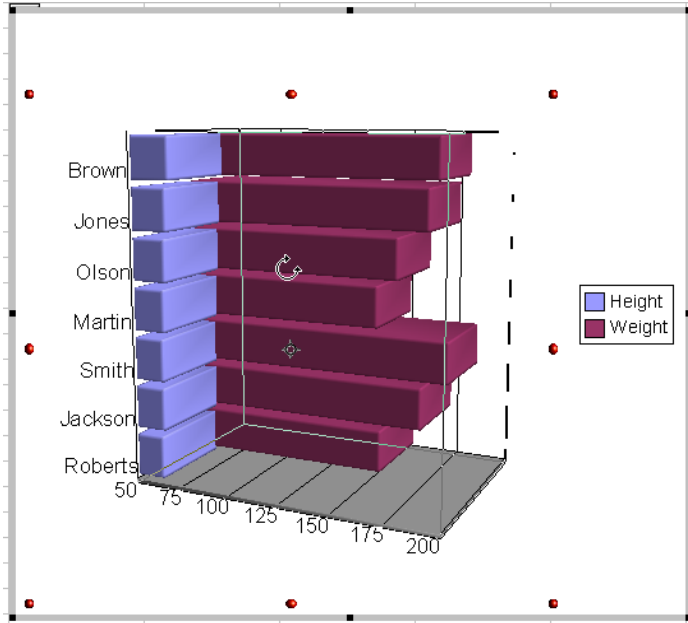
Figure 23. *You can rotate a 3D graph. The horseshoe cursor and the outline of a cube indicate the graph is ready to be rotated.*
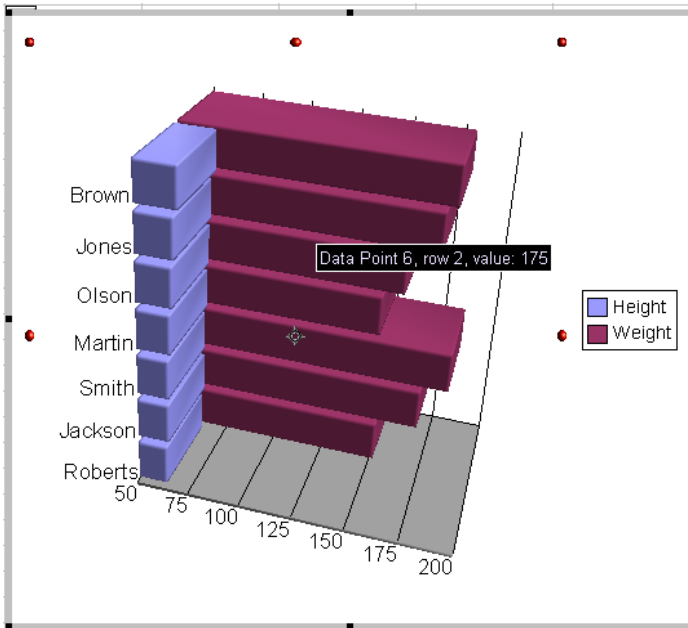

Figure 24. *After rotating down and to the right, you're seeing this graph from above.*

You can also control rotation by choosing Format | Position and Size from the menu or Position and Size from the shortcut menu when the graph data is selected. The Rotation tab (**Figure 25**) of the Position and Size dialog lets you specify the center of rotation and the angle. The default center of rotation appears in Figures 23 and 24 as a circle with compass points.
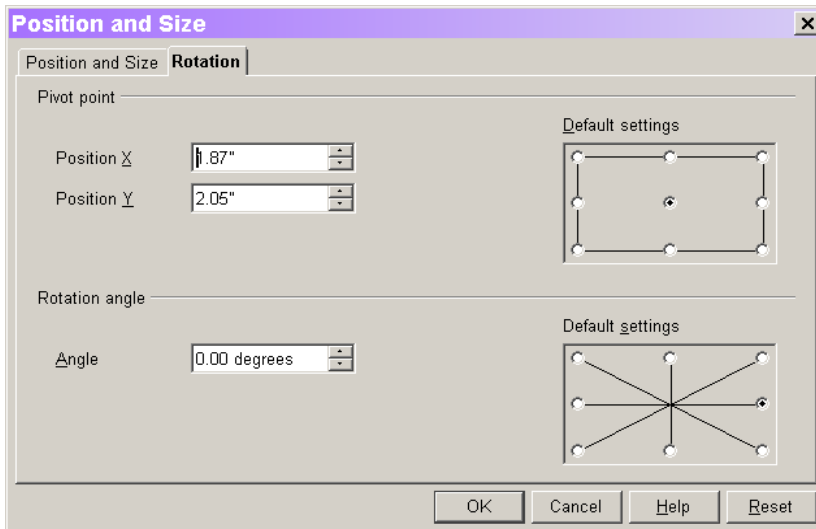

Figure 25. *The Rotation tab of the Position and Size dialog lets you specify the center of rotation and the amount of rotation.*

There's one more way to control rotation. Choose Format | 3D View from the menu to open the 3D View dialog. You can set rotation about each axis independently.
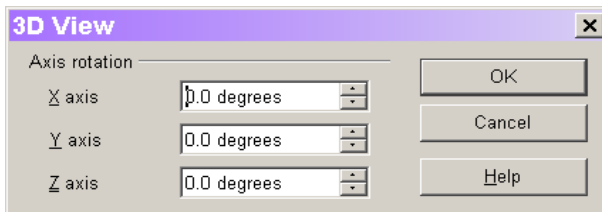

Figure 26. *The 3D View dialog lets you rotate a graph around any axis or all three.*

Summary

Calc gives you tremendous control over the appearance of graphs. This chapter explores many of the options, but the best way to understand them is to spend some time experimenting.

Updates and corrections to this chapter can be found on Hentzenwerke's web site, **www.hentzenwerke.com**. Click "Catalog" and navigate to the page for this book.