

grapher™ 11

**Take Your Data to New
Heights**

Full User's Guide
Golden Software, Inc.

Grapher™ Registration Information

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For future reference, write your serial number on the line below.

Grapher™

User's Guide

2D & 3D Graphing Software for
Scientists, Engineers & Business Professionals



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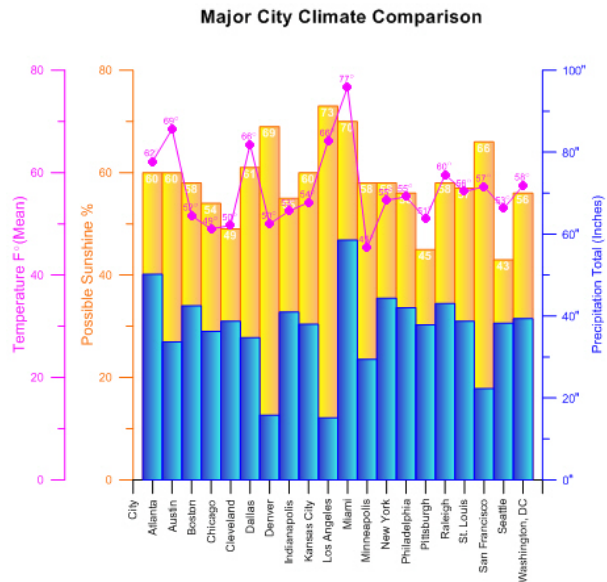
Chapter 1

Introducing Grapher

Introduction to Grapher

Welcome to **Grapher™**, the easy-to-use technical graphing package for scientists, engineers, business professionals, or anyone who needs to generate publication quality graphs quickly and easily. **Grapher** is an efficient and powerful graphing program for all of your most complex graphing needs. Create exciting graphs and plots for presentations, papers, marketing, analysis, sales, and more. Capture the interest of your audience with 3D graphs.

With **Grapher**, creating a graph is as easy as choosing the graph type, selecting the data file, and clicking the *Open* button. **Grapher** automatically selects reasonable default settings for each new graph, though all of the graph settings can be modified. For example, you can change tick mark spacing, tick labels, axis labels, axis length, grid lines, line colors, symbol styles, and more. You can add legends, images, fit curves, and drawing objects to the graph. To apply the same custom settings to several graphs, you can create a **Grapher** template containing the preferred styles. Advanced automation is incorporated using Golden Software's **Scripter™** program or any Active X automation program. Once the graph is complete, you can export it in a variety of formats for use in presentations and publications.



Grapher is extremely flexible. For example, you can combine multiple plot types, display graph titles, customize axis settings, and more.

The **Scripter** program, included with **Grapher**, is useful in creating, editing, and running script files that automate **Grapher** procedures. By writing and running script files, simple mundane tasks or complex system integration tasks can be performed

precisely and repetitively without direct interaction. **Grapher** also supports ActiveX Automation using any compatible client, such as Visual BASIC. These two automation capabilities allow **Grapher** to be used as a data visualization and map generation post-processor for any scientific modeling system.

The script recorder records all commands as you make them in **Grapher**. When the script is run, **Grapher** performs the steps for you. This is ideal for users that need to perform repetitive tasks but are unfamiliar with automation, for advanced users who do not want to manually enter all of the syntax, or for average users having difficulty with syntax.

New Features

This is an overview of some of **Grapher 11's** new features.

User Friendly

- New **Welcome** dialog allows **Grapher** to be opened with only the windows you want.
- Updated *Group* properties:
 - Right-click on multiple selected objects to add the selected objects to a Group.
 - Right-click on a *Group* object to enter or exit the group.
 - Right-click on a *Group* object to ungroup the sub-objects into separate objects.
- Right-click on an object or a group of objects and choose *Zoom Selected* to zoom to the selected objects.
- Right-click on an object or a group of objects and choose *Free Rotate* to rotate the objects with the mouse.
- Updated **Property Manager** with many new features, including:
 - Automatic updating with property changes.
 - Ability to select contents of a cell in the **Property Manager** with CTRL+A.
 - Better location of  and  options to easily see where sub-object properties are.
 - Use the keyboard UP and DOWN buttons to automatically increase/decrease the value and update the graph.
 - Set the color gradient directly in the **Property Manager**.
 - Use a slider  for opacity settings.

- Updated the **Options** dialog for easier access to default program settings.
- Updated the **Defaults** dialog for easier setting of default options for all plot, graph, and axis types.
- Updated the **Graph Wizard** dialog for easier setting of plot options.
- Added a method to close all open documents and choose not to save any with a single click.
- Last export and save formats always used the next time the **Export** or **Save As** dialog is opened.
- Zoom to the cursor location using the mouse.
- Added X to close tabs to the tab directly.

Graph Features

- New plot type - ternary class plots display ternary diagrams with different symbols for each class.
- New plot type - doughnut plots display similar to a pie chart, but with options for multiple rings of data.
- New plot type - 3D doughnut plots display similar to a 3D pie chart, but with options for multiple rings of data.
- New plot type - polar vector plots display vectors on angle and radius graphs.
- Added new class scatter method based on text. Now, all class plot types can use text columns for class designations.
- Increased the maximum number of classes for any class plot type to 300 classes.
- Added lighting options to 3D bubble plots.
- Added lighting options to 3D pie charts.
- Set the size of pie charts and 3D pie charts in page units.
- Set the X and Y center position for pie charts and 3D pie charts.
- Set histograms and 3D histograms to display as a normal histogram or as a cumulative histogram.
- Box-whisker plots column step is now set from the first displayed column, instead of the first column with data.
- Keep the plot columns when changing the plot's worksheet for all plot types.
- Display average values for plots without displaying error bars.
- Display different positive and negative error bar values on the same plot.
- Fill between more plot types, including line/scatter plots, step plots, function plots, fit plots, or summation plots on 2D graphs.

- Export fit curve data with selected limits and spacing to a data file.

Axis Features

- Link axes to automatically control scale, limits, location, and tick mark spacing.
- Set the default axis position with the **File | Defaults** command.
- Axis tick labels set to display between major tick marks display the last label after the last tick mark.
- Set the axis tick label starting and ending values separately from the axis tick mark starting and ending values.
- Keep the axis tick label *Data column* and *Label column* when changing the label *Worksheet*.
- Automatically switch an axis to use numeric or date/time tick labels when the data columns change.

Drawing and Digitizing Features

- Set the digitizing symbol to any symbol set, shape, size, and color.

Data Features

- The default save as format from the worksheet is .DAT.
- Last save formats always used the next time the **Save As** dialog is opened.
- Updated the date/time formats in the **Cells | Format | Format Cells** dialog.
- Added a new `\n` math text directive to create new lines.
- Use any date/time values from BCE to CE.
- Format date/time values in any language.
- Treat empty cells as blank, as the number zero, or as an empty text string when transforming data.
- Treat text strings as blank, as text, as the number zero, or convert to a number (if possible) when transforming data.
- Treat numbers as blank, as text, as the number, or as an empty text string when transforming data.
- Calculate statistics on all data values in the range or on a subset of data in the range.
- Use AutoCAD DXF files as data files.
- Import data from SP1 and SEG file formats.

Import and Export Improvements

- Export SVG file formats.
- Import AutoCAD DXF files as data files and create plots directly from the DXF.
- Import SP1 and SEG file formats.
- Export SP1 and SEG file formats.
- Exported GIF files are always exported at 72 DPI, to match the GIF file format definition.
- Export transparency to TIF files.
- Export transparency to GSI files
- Export transparency to vector PDF files.
- Export vector PDF files with compressed pages, making much smaller files.
- Export vector PDF files with embedded fonts. Embedding fonts makes PDF files larger, but retains the exact text appearance in the exported file.
- Export raster PDF files with a page size.
- Import PDF files with higher resolution.
- Set the blanking flag when exporting a BLN file.
- Update the CSV file format so that semi-colon separated variables with comma as the decimal delimiter can be imported.

Automation

- Added a *Transform3* command to transform worksheet data with various options for empty cells, text cells, and numeric cells.
- Added *Background*, *Line*, and *Side* properties to the *AutoAxisTitle* object.
- Added *LineOpacity* and *FillOpacity* to the *3DBubblePlot* object.
- Added a *ColorCol* option for the *BoxPlot* object to set the color column for the boxes.

System Requirements

The minimum system requirements for **Grapher** are:

- Windows XP SP 2 or higher, Vista, 7, 8 or higher
- 512MB RAM minimum for simple data sets, 1GB RAM recommended
- At least 500MB free hard disk space
- 1024x768x16-bit color minimum monitor resolution

Installing Grapher

Installing **Grapher 11** requires logging onto the computer with an account that has Administrator rights. Golden Software does not recommend installing **Grapher 11** over any previous version of **Grapher**. **Grapher 11** can coexist with older versions (i.e. **Grapher 10**) as long as they are installed in different directories, which is the default. For detailed installation directions, see the Readme.rtf file.

To install **Grapher** from a CD:

1. Insert the **Grapher** CD into the CD-ROM drive. The installation program automatically begins on most computers. If the installation does not begin automatically, double-click the Autorun.exe file located on the **Grapher** CD.
2. Click *Install **Grapher*** from the **Grapher Auto Setup** dialog to begin the installation.

To install **Grapher** from a download:

1. Download **Grapher** according to the directions you received.
2. Double-click on the downloaded file to begin the installation process.

Updating Grapher

Updates contain corrections to the program. It is recommended that you keep automatic updates turned on, so that you are always using the most recent version of the program.

Click the **File | Online | Check for Update** command to check for the most recent version of **Grapher**. If there is an update available (i.e. **Grapher 11.0** to **Grapher 11.1**), you can follow the directions to download and install the free update. An update contains minor changes to the program. Updates are available at no cost and there are not typically new features added in updates. A list of changes is located at www.goldensoftware.com/Grapher-Version-Info.

Before using this command, make sure your computer is connected to the Internet. Follow the directions in the dialog to complete the update if an update is available. If you have difficulties with the **File | Online | Check for Update** command, please contact technical support.

Automatic Update

The automatic update preference can be adjusted at any time using the **File | Options** command. Automatic updates allow the program to periodically check for an available update. Enabling automatic updates will allow your copy of **Grapher** to always automatically stay up-to-date.

Upgrading Grapher

To obtain an upgrade (i.e. **Grapher** version 10 to **Grapher** version 11), contact Golden Software.

Uninstalling Grapher

To uninstall **Grapher**, follow the directions below for the operating system you are using.

Windows XP: To uninstall **Grapher**, go to the *Windows Control Panel* and double-click *Add/Remove Programs*. Select **Grapher 11** from the list of installed applications. Click the *Remove* button to uninstall **Grapher 11**.

Windows Vista: To uninstall **Grapher** when using the *Regular Control Panel Home*, click the *Uninstall a program* link. Select **Grapher 11** from the list of installed applications. Click the *Uninstall* button to uninstall **Grapher 11**.

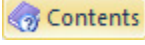
To uninstall **Grapher** when using the *Classic View Control Panel*, double-click *Programs and Features*. Select **Grapher 11** from the list of installed applications. Click the *Uninstall* button to uninstall **Grapher 11**.

Windows 7: To uninstall **Grapher**, go to the *Windows Control Panel* and click the *Uninstall a program* link. Select **Grapher 11** from the list of installed applications. Click the *Uninstall* button to uninstall **Grapher 11**.

Windows 8: From the *Start* screen, right-click the **Grapher 11** tile and click the *Uninstall* button at the bottom of the screen. Alternatively, right-click anywhere on the

Start screen and click *All apps* at the bottom of the screen. Right-click the **Grapher 11** tile and click *Uninstall* at the bottom of the screen.

A Note About the Documentation

The **Grapher** documentation includes the online help and the quick start guide. Use the **Home | Help | Contents** command  , or click the  in the upper right corner of the **Grapher** window to access the detailed online help. Information about each command and feature in **Grapher** is included in the online help. In the event the information cannot be located in the online help, other sources of **Grapher** help include our support forum, frequently asked questions, knowledge base, and contacting our technical support engineers.

Various font styles are used throughout the **Grapher** documentation. **Bold** text indicates command names, dialog names, and page names. *Italic* text indicates items properties in the **Property Manager** or items within a dialog such as group names, options, and field names. For example, the **Save As** dialog contains a *Save as type* list. Bold and italic text occasionally may be used for emphasis.

In addition, commands appear as **Home | Clipboard | Copy**. This means, "click or scroll to the **Home** tab at the top of the document, then click the **Copy** command in the **Clipboard** group." The first word is always the ribbon tab name, followed by the group name(s), and the last word is always the specific command.

Grapher Printed Documentation

All of the available **Grapher** user documentation is included in the online help and the quick start guide. Check the **Grapher** support forum, FAQs, knowledge base, and technical support for additional information.

If you prefer printed documentation, the online help file can be printed in part or in full. See *Printing the Online Help* topic for more information. A full PDF user's guide that contains all of the information in this online help file can be purchased online.

Three-Minute Tour

We have included several sample files with **Grapher** so that you can quickly see some of **Grapher's** capabilities.

Sample Grapher Files

Sample files are a great way to quickly display completed graphs made in **Grapher** by Golden Software. Browse the sample files to get ideas and view different graphing possibilities that **Grapher** has to offer. Samples can be customized and turned into templates for future use. The sample file examples include only some of **Grapher's** many plot types and features. The **Object Manager** is a good source of information as to what is included in each file. Click the following sample file name to see an image and brief description of each sample file.

To view the sample files:

1. Open **Grapher**.
2. Click the **File | Open** command.
3. In the **Open** dialog, browse to the **Grapher** Samples folder. By default, the Samples folder is located in C:\Program Files\Golden Software\Grapher 11\Samples. If your version of **Grapher** was installed elsewhere, look in that installation folder.
4. Select a .GRF or .GPJ file located and click the *Open* button. The sample file is now displayed. Repeat as necessary to see the files of interest.
5. Click on various parts of the graph, axes, and plots in the **Object Manager**. View the object properties in the **Property Manager**.

Using Grapher

To create graphs in **Grapher**, you will need data. Once data exists, you can use the commands on the **Graphs** tab to create the graph. The **Graph Wizard** can be used to create a new graph in **Grapher**.

To progress from a data file to a finished graph:

1. Create a data file. This file can be created in **Grapher's** worksheet window or outside of **Grapher** (using as ASCII text editor or Excel, for example).
2. Click the **Graphs** tab to select a graph type directly. For instance, click the **Graphs | Create | Basic | Line Plot** command.
3. In the **Open Worksheet** dialog, select the data file (i.e. Tutorial.dat), and click *Open*. The graph is created from the selected data file, using default graph properties.

4. Adjust the graph properties using the **Property Manager**.

Using Scripter

Tasks can be automated in **Grapher** using Golden Software's **Scripter** program or any ActiveX Automation-compatible client, such as Visual BASIC. A script is a text file containing a series of instructions for execution when the script is run. **Scripter** can be used to perform almost any task in **Grapher**. You can do practically anything with a script that you can do manually with the mouse or your keyboard. Scripts are useful for automating repetitive tasks and consolidating a sequence of steps. **Scripter** is installed in the same location as **Grapher**. Refer to the ***Grapher Automation*** help book for more information about **Scripter**. We have included several example scripts so that you can quickly see some of **Scripter's** capabilities.

Example Script Files

A variety of free script files are available. You can run the script as is or you can customize the script.

To run a sample script in **Grapher's Script Manager**:

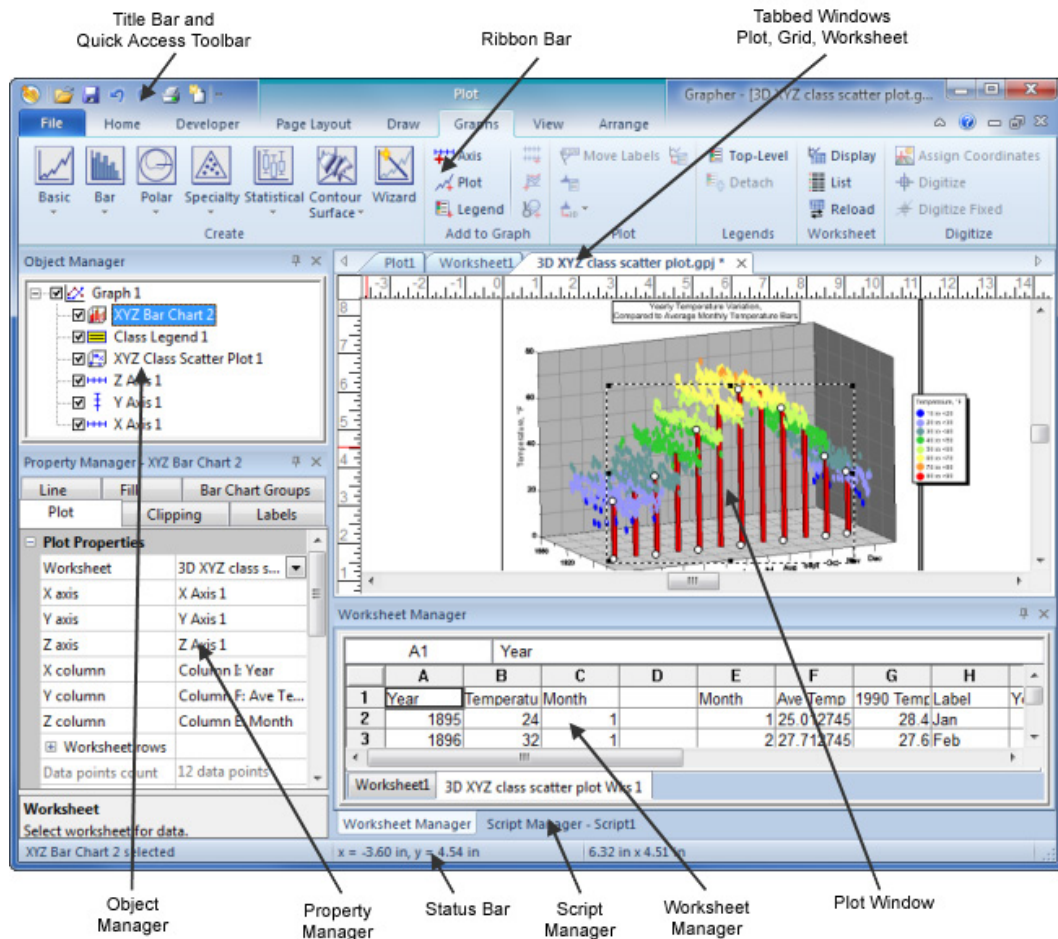
1. Open **Grapher**.
2. Check the **View | Display | Script Manager** command. A check mark will indicate the manager is turned on.
3. In the **Script Manager**, click the  button. In the **Open** dialog, select a sample .BAS file (i.e. *axis properties.bas*), and click *Open*. The script is displayed.
4. Click the  button, and the script is executed.

To run a sample script in **Scripter**:

1. Open **Scripter** by navigating to the installation folder, C:\Program Files\Golden Software\Grapher 11\Scripter. Double-click on the Scripter.exe application file.
2. Click the **File | Open** command and select a sample script .BAS file from the C:\Program Files\Golden Software\Grapher 11\Samples\Scripts folder.
3. Click the **Script | Run** command and the script is executed.

Grapher User Interface

Grapher contains four document window types: the plot window, worksheet window, Excel worksheet window, and grid window. Graphs and maps are displayed and edited in the plot window. The worksheet window displays, edits, transforms, and saves data in a tabular format. The Excel worksheet window allows a native Excel window to be opened in **Grapher**. The grid window allows viewing of various grid files. The **Grapher** user interface consists of the quick access toolbar, ribbon tabs and commands, tabbed windows, managers, and status bar.



The **Grapher** user interface includes several toolbars and managers.

The following table summarizes the function of each component of the **Grapher** layout.

Component Name	Component Function
Title Bar	The title bar lists the program icon, the quick access toolbar, and the saved Grapher file name, if any. An asterisk (*) after the file name indicates the file has been modified.
Ribbon	The ribbon contains the tabs and commands used to run Grapher . The commands are unique to the plot document, worksheet document, grid document, and Script Manager document.
Tabbed Windows	Multiple plot windows, worksheet windows, Excel worksheet windows and grid windows can be displayed as tabs. Click on the tab to display that window.
Plot Window	The plot window contains the graphs and other graphics. The plot window may also display worksheet data.
Status Bar	The status bar shows information about the activity in Grapher . The status bar is divided into three sections that contain information about the selected command, object, or position.
Managers	Grapher contains several managers including an Object Manager , Property Manager , Worksheet Manager , and Script Manager . Changes made in any manager are automatically reflected in the plot window, and vice versa. Managers can be dragged and placed at any location on the screen. Managers can be docked or floating.
Object Manager	The Object Manager contains a hierarchical list of objects in a Grapher plot window; these objects can be selected, arranged, and renamed in the Object Manager . The Object Manager is initially docked on the left side above the Property Manager .
Property Manager	The Property Manager allows you to edit the properties of a selected object. Multiple objects can be edited at the same time by selecting all of the objects and changing the shared properties.
Script Manager	The Script Manager controls scripts that are recorded and run within Grapher . Right-click in the Script Manager to see relevant menu commands for opening, saving, and running scripts.
Worksheet Manager	The Worksheet Manager contains a view of all data loaded into Grapher . Edits made in the Worksheet Manager are automatically reflected in the graph. Right-click in the Worksheet Manager to save, edit, transform, sort, or obtain statistics on cells.

Opening Windows

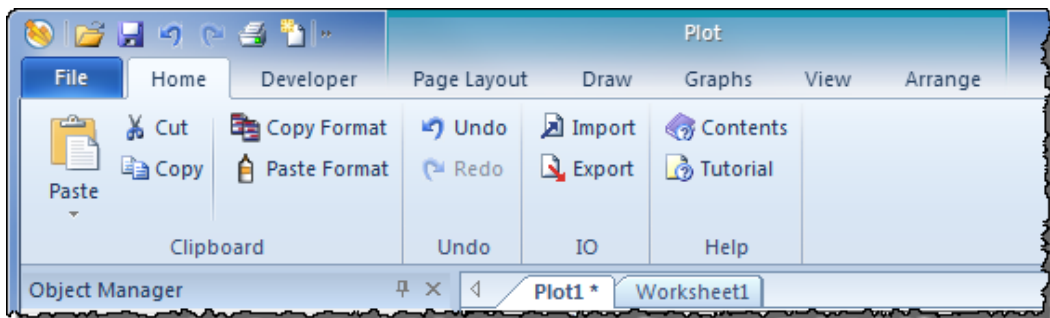
Selecting the **File | Open** command opens any of the three window types, depending on the type of file selected. The **File | Open** Excel command opens an Excel file in a native Excel window inside **Grapher**, if possible. The **File | New | Plot** command creates a new plot window. The **File | New | Plot from Template** command opens a new plot window, based on an existing template file. The **File | New | Worksheet** command creates a new worksheet window. The **File | New | Template** command creates a new plot window to use as a template file. The **File | New | Excel Window** opens a native Excel window inside **Grapher**, if possible.

Ribbon Tabs and Commands

All window types in **Grapher** include ribbons that contain icons for all **Grapher** commands. The ribbons are initially displayed in full size, but can be minimized by right-clicking on the ribbon and selecting *Minimize the Ribbon*. The ribbon is then displayed in a method similar to menus in older versions of **Grapher**.

The *Ribbon* is the strip of buttons and icons located above the plot, worksheet, and grid windows. The Ribbon replaces the menus and toolbars found in earlier versions of **Grapher**. The ribbon is designed to help you quickly find the commands that you need to complete a task.

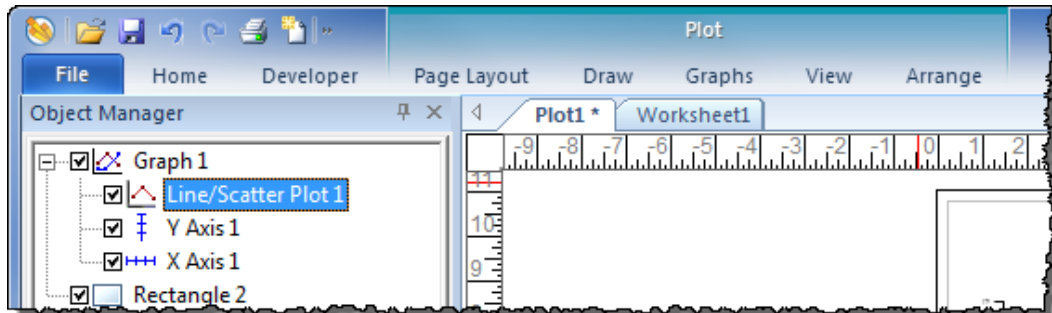
Above the ribbon are a number of tabs, such as **Home**, **Developer**, and **Graphs**. Clicking or scrolling to a tab displays the options located in this section of the ribbon. The tabs have commands that are organized into a group. For instance, all the script related commands are on the **Developer** tab.



The Ribbon is displayed with the **Home** tab selected.

Minimizing the Ribbon

The ribbon can be minimized to take up less space on the screen. To minimize the ribbon, right-click on the ribbon and select *Minimize the Ribbon* or click the  button in the top right portion of the **Grapher** window. When displayed in a minimized mode, only the tabs at the top of the screen are visible. To see the commands on each tab, click the tab name. After selecting a command, the ribbon automatically minimizes again.



The Ribbon displayed with the Minimize the Ribbon option selected. Clicking any tab name displays the ribbon.

Customizing the Ribbon

The ribbon is customizable in **Grapher**. To customize the commands in the ribbon, right-click on the ribbon and select *Customize the Ribbon*.

In the **Customize Ribbon** dialog, you can add new tabs, add groups, hide existing tabs or custom groups, and add commands to any custom group. You can also rearrange the tabs into an order that fits your needs better.

To customize the commands in the **Customize Ribbon** dialog, right-click on the ribbon and select *Customize the Ribbon*. In the **Customize Ribbon** dialog, use the following options.

Tab options:

1. To add a custom tab, set the *Customize the Ribbon* section to *All Tabs*. Click in the list on the right side of the dialog where the custom tab should be located and click the *New Tab* button.
2. To delete custom tab, right-click on the tab name in the list on the right side of the dialog and select *Delete*.

3. To rename a default or custom tab, click on the tab name in the list on the right side of the dialog. Click the *Rename* button. Type the new name and press OK to make the change.
4. To hide a default or custom tab, uncheck the box next to the tab name on the right side of the dialog. Only checked tabs will be displayed.
5. To change the order of default or custom tabs, click on the tab name that should be moved in the list on the right side of the dialog. Click the up and down arrow buttons on the far right side of the dialog to move the selected tab up or down. Default tabs must remain in their major group.

Group options:

1. To add a custom group to a default or custom tab, click on the  next to the tab name. Click in the list of group names where the new group should be located and click the *New Group* button.
2. To delete a default or custom group on any tab, right-click on the group name in the list on the right side of the dialog and select *Delete*.
3. To rename a default or custom group on any tab, click on the group name in the list on the right side of the dialog. Click the *Rename* button. Type the new name and click OK to make the change.
4. To change the order of default or custom groups on any tab, click on the group name that should be moved in the list on the right side of the dialog. Click the up and down arrow buttons on the far right side of the dialog to move the selected group up or down in the list.
5. To replace a default group with a custom group, right-click on the default group name and select *Delete*. Click the *New Group* button. Add the desired commands to the new group that you want displayed. Rename the new group, if desired.

Command options:

Commands can only be added to or deleted from custom groups. Commands can only be rearranged or renamed in custom groups. If commands in default groups are desired to be edited, the default group should be deleted and a new custom group should be created with the same commands.

1. To add a command to a custom group, set the *choose commands from* list to *All Tabs* so that all commands are listed on the left side of the dialog. Select the desired command that should be added. On the right side of the dialog, click the  next to the custom group name. Click on the desired position in the list of commands. If no commands exist in the group yet, click on the group name. Click the *Add>>* button and the command is added to the custom group.

2. To delete a command from a custom group, right-click on the command name in the list on the right side of the dialog and select *Delete*. Only commands from custom groups can be deleted.
3. To rename a command in a custom group, click on the command name in the list on the right side of the dialog. Click the *Rename* button. Type the new name and click OK to make the change. Only commands in custom groups can be renamed.
4. To change the order of commands in a custom group, click on the command name that should be moved in the list on the right side of the dialog. Click the up and down arrow buttons on the far right side of the dialog to move the selected command up or down in the list.

Resetting the Ribbon

To reset all customizations on the ribbon, click the *Reset* button at the bottom of the **Customize Ribbon** dialog.

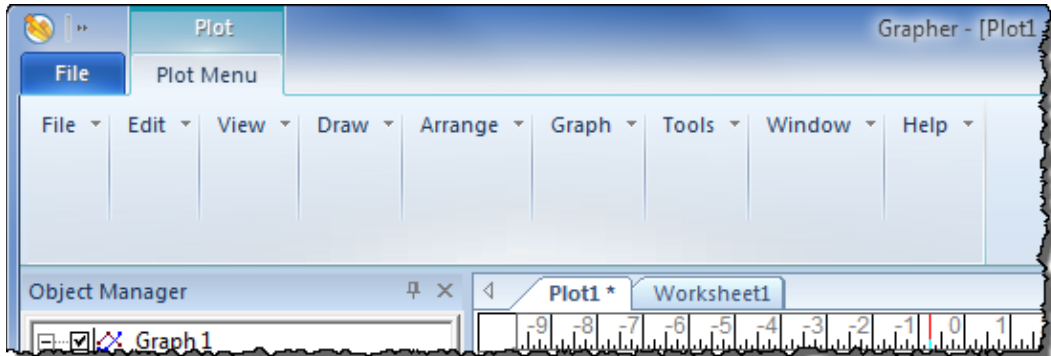
Displaying Classic Menu Appearance

To display the ribbons in a format that is similar to the older menu interface,

1. Click the **File | Options** command.
2. On the left side of the dialog, select *Display*.
3. On the right side of the dialog, check the box next to *Display ribbon menus*.
4. Click *OK*.
5. A new **Plot Menu** tab is displayed in the plot window. This tab displays old style menu drop-down lists. A similar **Worksheet Menu** tab is displayed in the worksheet window and **Grid Menu** tab is displayed in the grid window.

To turn off the display of other tabs,

1. Click the **File | Customize Ribbon** command.
2. On the right side of the dialog, select *All Tabs* in the *Customize the Ribbon* list.
3. Uncheck the boxes next to all tab names except for **Worksheet Menu**, **Plot Menu**, and **Grid Menu**.
4. Click *OK* and only the class style tab is displayed.



*The classic style menus are displayed on the **Plot Menu** tab.*

To access the commands with the keyboard, click the ALT+M and then the appropriate keyboard keys.

Quick Access Toolbar

The Quick Access Toolbar is at the top of the **Grapher** window. This toolbar has frequently used commands and can be customized by the user. The commands in the Quick Access Toolbar are the same regardless of the type of window displayed in **Grapher**.



*The **Quick Access Toolbar** is displayed at the top of the **Grapher** window.*

Customizing the Quick Access Toolbar

The Quick Access Toolbar is a customizable toolbar. One method that can be used to add commands to the Quick Access Toolbar is to right-click on the command in the ribbon and choose *Add to Quick Access Toolbar*. The command is automatically added to the end of the toolbar.

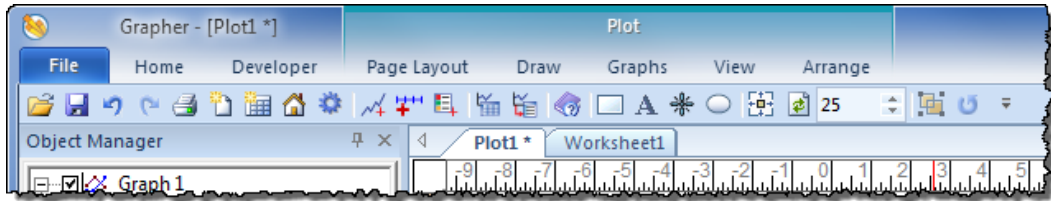
To customize the commands in the **Quick Access Toolbar** dialog, right-click on the ribbon and select *Customize Quick Access Toolbar*. In the **Quick Access Toolbar** dialog,

1. To add a command, select the command from the list on the left that you want to add. Click the *Add>>* button and the command is added to the list on the right.
2. To add a separator between commands, set the *Choose commands from* to *Main* on the left side of the dialog. Select *<Separator>* and click *Add>>*. Move the separator to the desired position.
3. To delete a command, select the command from the list on the right. Click the *<<Remove* button and the command is removed from the list on the right.
4. To rearrange commands or move separators, click on the command or separator name from the list on the right that you want to move. Click the up and down arrow buttons on the far right to move the command up or down the list. Commands are shown in the exact order that they are displayed in the Quick Access Toolbar.
5. To reset the Quick Access Toolbar to the default display, click the *Reset* button below the list on the right side of the dialog.
6. Click OK and all changes are made.

Note: to add individual plot types as buttons to the Quick Access Toolbar, set the *Choose commands from* to **Plot | Plot Menu**. Then on the left side of the dialog, select the appropriate plot type, such as 3D Bar Chart. Click *Add>>* and the plot type is added with an icon to the right side. Click *OK* and the plot type is displayed in the Quick Access Toolbar.

Displaying the Quick Access Toolbar Below the Ribbon

To display the Quick Access Toolbar below the ribbon, right-click on the ribbon and select *Show Quick Access Toolbar Below the Ribbon*. This setting is useful if you have added many commands to the Quick Access Toolbar. More commands display, by default, when the Quick Access Toolbar is below the ribbon. When combined with the minimized ribbon appearance, this can give single click access to all your most used commands and maximize the viewing area for the plot.



Customize the Quick Access Toolbar to display all the commands you frequently use. Then, display the Quick Access Toolbar below the ribbon bar. When the ribbon bar is minimized, it appears that all of your commands are in a single toolbar, ready to create exactly what you want with a single click.

Keyboard Commands

Keyboard commands can be used to increase efficiency and precision in the **Grapher** environment.

Plot Window

You can use the keyboard to move the pointer within the plot window, to select and move objects, and perform commands.

- The ARROW keys move the pointer within the plot window.
- Pressing the SPACEBAR is equivalent to clicking the left mouse button.
- "Double-clicking" the SPACEBAR by pressing the spacebar twice is the same as double-clicking the mouse.
- Holding down the SPACEBAR and using the ARROW keys allows you to drag or resize selected objects.
- Press CTRL+TAB to change the active tab in a dialog.

Tab Commands Access

The keyboard can be used to access the menu commands.

- Press the ALT key and press any letter or number that appears in a box to indicate the desired ribbon tab.
- When the appropriate tab is displayed, you can access a command by pressing the letter or number that appears in a box to indicate the desired command.
- Press ALT and the ARROW keys on the keyboard to switch between ribbon tabs.

Dialog Access

You can also use the keyboard to move around in a dialog.

- The TAB key moves between the options in the dialog. As you use the TAB key to move through the dialog, the options are highlighted as they become active.
- The SPACEBAR is used to simulate mouse clicks, allowing you to toggle check boxes or press buttons that provide you with access to other dialogs or close the current dialog.
- You can also use the underlined hotkeys by holding down the ALT key and typing the letter. This moves you immediately to the desired option. Note that not all of the dialogs have ALT key access.

Customize the Keyboard

Keyboard shortcuts can be changed by right-clicking on the ribbon and selecting *Customize the Ribbon*. In the **Customize Ribbon** dialog, click the *Customize* button next to *Keyboard shortcuts*. On the left side of the dialog, select the tab name in the *Categories* list. This is the name of the tab where the command is located in the ribbon. On the right side of the dialog, click on the command name in the *Commands* list. Click in the *Press new shortcut key* box and press and hold the keys that should be used for the command. For instance, you might press and hold the CTRL, ALT, SHIFT, or any character key on the keyboard. The key names will be listed in the *Press new shortcut key* box.

If no other command uses the key combination, the *Assigned to* section lists [Unassigned]. When the keys are unassigned, click the *Assign* button at the bottom of the dialog to assign the key combination to the selected command.

If the key combination is currently assigned to another command, the command will be listed in the *Assigned to* section. If a key combination is currently assigned to another command, select the currently assigned command name. Click on the *Current Keys* combination that you want to reassign and click the *Remove* button at the bottom of the dialog. Click back on the original command. Click in the *Press new shortcut key* box and press the keys on the keyboard. Click the *Assign* button to assign the key combination to the new command.

Click *Close* to make the new commands effective. Click *Reset All* to reset all customizations to the defaults.

Sharing Customizations Between Computers

All of the **Grapher** Quick Access Toolbar, ribbon, and keyboard commands are stored in the registry. The registry key can be copied and pasted onto other computers to easily share customizations. Be very careful when editing the registry! A small mistake can cause the program or computer to become unresponsive.

1. Make any customizations to the ribbon, quick access toolbar, and any keyboard commands you desire.
2. When all customizations have been made, close **Grapher**.
3. Open the registry. In Windows Vista and 7, you can do this by clicking the Windows Start button and typing *regedit* into the *Start Search* box.
4. Go to the *HKEY_CURRENT_USER\Software\Golden Software\Grapher\11\BCGSettings\BCGRibbonBar-59398* key.
5. Click the **File | Export** command.
6. Type a name, such as *My Customizations*, and make sure that the *Selected range* is set to the *Selected branch*.
7. Click *Save*.
8. Locate the .REG file on your computer and copy it to a CD, USB drive, or network share location.
9. On another computer, close **Grapher**.
10. Paste the .REG file in a place where it is easily found on the new computer.
11. Double-click on the .REG file.
12. Click *Yes* if you are prompted if you want to change the computer.
13. Open **Grapher**. The customizations have been applied to the new machine.

Maximize the Plot Window Display Space

Several options exist to maximize the plot window display space. See some common options below.

Turn Manager Display Off

One of the easiest ways of maximizing the plot window display space is to turn on only the managers that you use. To turn off other managers, click the **View** tab in the ribbon. In the **Display** section, uncheck the boxes for the managers that you do not regularly use. For instance, if you do not use the **Script Manager** or **Worksheet Manager**, unchecking these options will provide much additional space.

To temporarily turn the display of all of the managers off, click the **View | Display | Hide All** command. To turn the display of all of the managers back on, click the **View**

| **Display** | **Show All** command. Alternatively, check only those managers that you want to see.

Minimize the Ribbon

The ribbon can be minimized so that the tab names appear more like menus instead of tabs. To minimize the ribbon, right-click on the ribbon and select *Minimize the Ribbon*. When displayed in a minimized mode, only the tabs at the top of the screen are visible. To see the commands on each tab, click the tab name. After selecting a command, the ribbon automatically minimizes again.

Create a Custom Quick Access Toolbar

No option exists to switch the user interface back to the old style **File, Edit, View**, etc. menu, toolbar, and command appearance. But, you can customize the Quick Access Toolbar and display it below the ribbon to make it appear similar to an older style toolbar.

To customize the commands in the **Quick Access Toolbar** dialog, right-click on the ribbon and select *Customize Quick Access Toolbar*. In the **Quick Access Toolbar** dialog,

1. To add a command, select the command from the list on the left that you want to add. Click the *Add>>* button and the command is added to the list on the right.
2. To add a separator between commands, set the *Choose commands from* to *Main* on the left side of the dialog. Select *<Separator>* and click *Add>>*. Move the separator to the desired position.
3. To delete a command, select the command from the list on the right. Click the *<<Remove* button and the command is removed from the list on the right.
4. To rearrange commands or move separators, click on the command or separator name from the list on the right that you want to move. Click the up and down arrow buttons on the far right to move the command up or down the list. Commands are shown in the exact order that they are displayed in the Quick Access Toolbar.
5. To reset the Quick Access Toolbar to the default display, click the *Reset* button below the list on the right side of the dialog.
6. Click OK and all changes are made.

To display the Quick Access Toolbar below the ribbon, right-click on the ribbon and select *Show Quick Access Toolbar Below the Ribbon*. You now have a custom set of buttons displayed directly above the plot window.

Tab View

The plot, worksheet, and grid windows are displayed as tabbed documents. When more than one window is open, tabs appear at the top of the document, allowing you to click on a tab to switch to a different window. The tabs may be dragged to reorder them. When a document contains unsaved changes, an asterisk (*) appears next to its tabbed name. The asterisk is removed once the changes have been saved. Click the X on the tab to close that tab. If unsaved changes are in the document, a prompt to save the document appears.

Changing the Window Layout

The managers display in a docked view by default; however, they can also be displayed as floating windows. The ribbon displays in full size by default; however, it can be displayed in a minimized view. The Quick Access Toolbar displays above the full size ribbon, but it can be displayed below the ribbon, as well. The visibility, size, and position of each manager may also be changed.

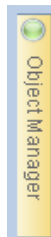
Manager Visibility

Use the **View | Display** commands to toggle the display of the **Object Manager**, **Property Manager**, **Script Manager**, **Worksheet Manager**, and Status Bar.

Alternatively, you can click the  button in the title bar of the **Object Manager**, **Property Manager**, **Script Manager**, or **Worksheet Manager** to close the manager window. If the **Property Manager** is currently closed, it can be opened by pressing the ALT+ENTER keys or double-clicking on an object.

Auto-Hiding Managers

Click the  button to auto-hide a docked manager. The manager slides to the side or bottom of the **Grapher** main window and a tab appears with the window name.



*The **Object Manager** appears as a tab on the side of the window.*

Position the mouse pointer over the tab to view the manager. Move your mouse away from the manager and the manager "hides" again. You can also click inside the manager to anchor it at its current position. Click in another manager to release the anchor and hide the manager. Click the  button to disable the auto hide feature.

Size

Drag the sides of a floating plot window, worksheet window, manager, toolbar, or menu bar to change its size. If a window or manager is docked, its upper and lower bounds are indicated by a  or  cursor. Move the cursor to change the size.

Position

To change the position of a docked manager, click the title bar and drag it to a new location. A thick light gray rectangle indicates that the manager is floating.

Docking Managers

To dock the manager, click the title bar and drag the manager to a side of the **Grapher** window until the thick gray line indicates that the manager will attach to the side. Alternatively, double-click the manager's title bar to toggle between floating and docked modes.

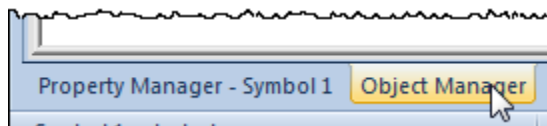
Tabbed Managers

To create tabbed managers:

1. Drag one manager on top of another window.
2. Hover over the title bar of the non-moving manager. The outline shows where the tabbed manager will display.
3. Release the mouse button.

To return to individual managers from the tabbed view:

1. Click on the manager's name on the tab.
2. Drag the tab to a new position.



Click on the manager's tab and drag the cursor to a new position to separate the managers.

Restoring the Managers to Their Original Locations

If the managers have moved or become invisible, or if they are in undesired locations, you can use the **View | Display | Reset Windows** command to move them back to their original locations. You must restart **Grapher** for the changes to take effect.

Plot Document

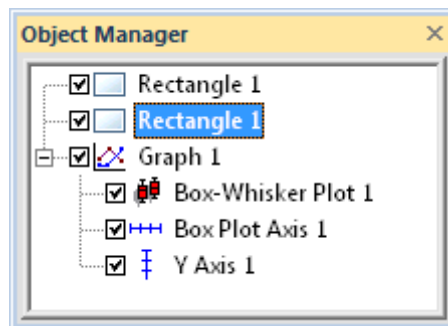
Plot windows contain the commands for creating and modifying graphs. When you first start **Grapher** you are presented with an empty plot window. Multiple plot windows can be open at one time. Tabs can be used to easily move between plot windows.

Object Manager

When **Grapher** opens, the **Object Manager** is visible in the plot window by default. It contains a hierarchical list of the objects in the **Grapher** plot window. The **Object Manager** is initially docked at the left side of the window, giving the window a split appearance; however, it can be dragged and placed anywhere on the screen. The **Object Manager** can also be hidden as a tab, or displayed as a floating dialog.

The **Object Manager** contains a hierarchical list of the objects in a **Grapher** plot window. The objects can be selected, arranged, and renamed in the **Object Manager** or through the plot window menu commands. Changes made in the **Object Manager** are reflected in the plot window, and vice versa.

Check the **View | Display | Object Manager** command to show or uncheck the command to hide the **Object Manager**. A check mark indicates the manager is visible. No check mark indicates the manager is hidden.



*The **Object Manager** contains a list of all objects in a plot window. The **Object Manager** can be used to select objects, arrange objects, and control object visibility.*

Object Visibility

Each item in the list consists of an icon indicating the object type, a text label for the object, and a check box. A checked box indicates that the object is visible; an empty box indicates that the object is not visible. Click the check box to the left of an object icon to change its visibility status. Invisible objects do not appear in the plot window and do not appear on printed output.

Object Manager Tree

If an object contains sub-objects, a  or  displays to the left of the object name. Click the  or  icon to expand or collapse the list. For example, a graph object contains a plot, e.g., line/scatter, plus at least two axes. To expand the tree, click on the  icon, select the item and press the plus key (+) on the numeric keypad, or press the right arrow key on your keyboard. To collapse a branch of the tree, click on the  icon, select the item and press the minus key (-) on the numeric keypad, or press the left arrow key.

Selecting Objects

Click on the object name to select an object. The selection handles in the plot window change to indicate the selected item and the status bar displays the name of the selected object.

To select multiple objects, hold down the CTRL key and click on each object. To select multiple contiguous objects at the same level in the tree, click on the first object's name, hold down the SHIFT key, and then click on the last object's name.

Opening Object Properties

Click on the object name to display its properties in the **Property Manager**.

Editing Object IDs

Select the object and then click again on the selected item (two slow clicks) to edit the text ID associated with an object. You must allow enough time between the two clicks so it is not interpreted as a double-click. Enter the new name into the box.

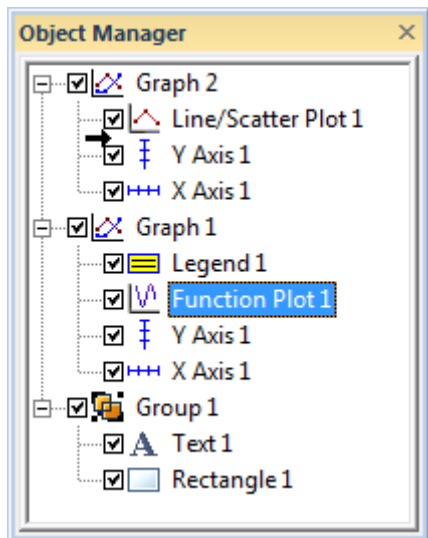
Alternatively, you can right-click on an object name and choose **Rename Object** or click the **Arrange | Selection | Rename** command.

Arranging Objects

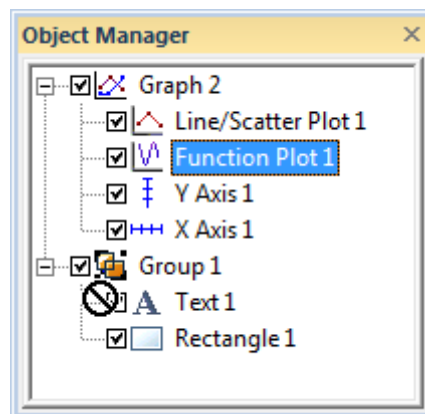
To change the display order of the objects with the mouse, select an object and drag it to a new position in the list above or below an object at the same level in the tree. The pointer changes to a black right arrow if the object can be moved to the pointer

location or a black circle with a diagonal line if the object cannot be moved to the indicated location. For example, a line/scatter plot can be moved anywhere within its graph object or into another graph object, but not into a group object.

Objects can also be arranged using the **Arrange | Order | Move** command's **Move to Front**, **Move to Back**, **Move Forward**, and **Move Backward** options.



*The cursor changes to a black horizontal arrow if an object can be moved to a new location in the **Object Manager**.*



*The cursor changes to a circle with a diagonal line if an object cannot be moved to a new location in the **Object Manager**.*

Deleting Objects

To delete an object, select the object and press the DELETE key. Some objects cannot be deleted. For example, you cannot delete an axis used by a plot in a graph.

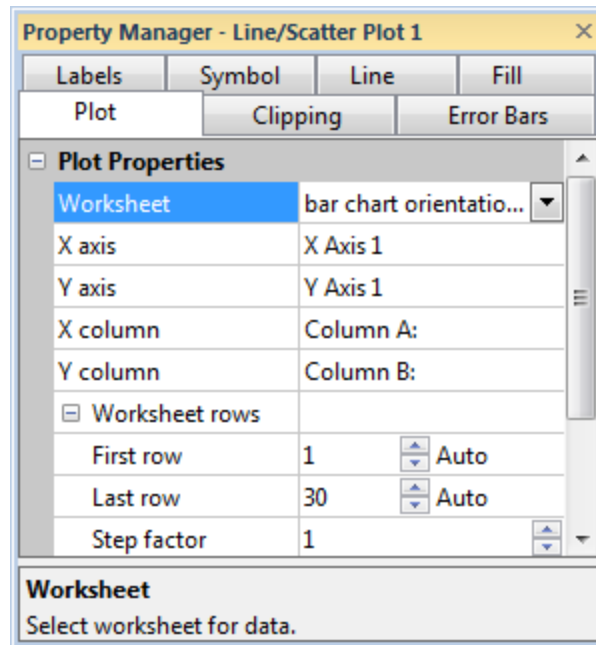
Property Manager

The **Property Manager** allows you to edit the properties of an object, such as a line or axis. The **Property Manager** contains a list of all properties for a selected object. The **Property Manager** can be left open so that the properties of selected objects are always visible.

When the **Property Manager** is hidden or closed, double-clicking on an object in the **Object Manager** opens the **Property Manager** with the properties for the selected

object displayed. To turn on the **Property Manager**, check the **View | Display | Property Manager** command.

For information on a specific feature or property that is shown in the **Property Manager**, refer to the help page for that feature. For instance, if you are interested in determining how to set the *Symbol column* for a line/scatter plot or how to change the *Foreground color* for a bar chart, refer to the specific pages for **Symbol Properties** or **Fill Properties**.

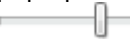


The **Property Manager** displays the properties associated with the selected object.

Expand and Collapse Features

Features with multiple options appear with a plus  or minus  to the left of the name. To expand a group, click on the  icon. To collapse the group, click on the  icon. For example, the expanded *Worksheet rows* feature contains three options, *First row*, *Last row*, and *Step factor*.

Changing Properties

The **Property Manager** displays the properties for selected objects. To change a property, click on the property's value and select a new property from the pop up box, scroll to a new number using the  buttons, select a new value using the , select a new value from the list or palette, or type a property type. For example, a polyline has *Style*, *Color*, *Opacity*, *Width*, and an *End Styles* sub-section with *Start*, *End*, and *Scale* properties. Changing the *Color* requires clicking on the current color and selecting a new color from the color palette. Changing the *Opacity* requires highlighting the existing % value and typing a new value or clicking on the slider bar and dragging it left or right to a new value. Changing the *Width* requires typing a new number or scrolling to a new number. Changing the *End* requires clicking on the existing style and clicking on a new style in the list.

You can modify more than one object at a time. For example, if you click on *X Axis* in the **Object Manager** and then hold the CTRL key and click on *Y Axis*, you can change the properties of each axis simultaneously in the **Property Manager**.

Occasionally, some properties are dependent on your other selections. For example, there is a *Scale* option in fill properties. This option is disabled (grayed out) unless you have selected a bitmap fill type as the *Pattern*.

Applying Property Manager Changes

Object properties automatically update after you select an item from a palette, press ENTER, or click somewhere else in the **Property Manager**. When using the  or , changes are displayed on the graph immediately.

Keyboard Commands

When working with the **Property Manager**, the up and down arrow keys move up and down in the **Property Manager** list. The TAB key activates the highlighted property. The right arrow key expands collapsed sections, e.g., *Plot Properties*, and the left arrow collapses the section.

CTRL+A can be used to select all of the contents of a highlighted option, such as the function plot's $Y = F(X) =$ equation. CTRL+C can be used to copy the selected option text. CTRL+V can be used to paste the clipboard contents into the active option.

Property Defaults

Use the **File | Options** command to change the default rulers and grid settings, digitize format, line, fill, symbol, and font properties. Use the **File | Defaults** command to set the default values for base objects, graphs, line type plots, bar type plots, 3D XYY plots, 3D XYZ plots, maps, other plots, axes, legend, wind chart legends, and class plot legends.

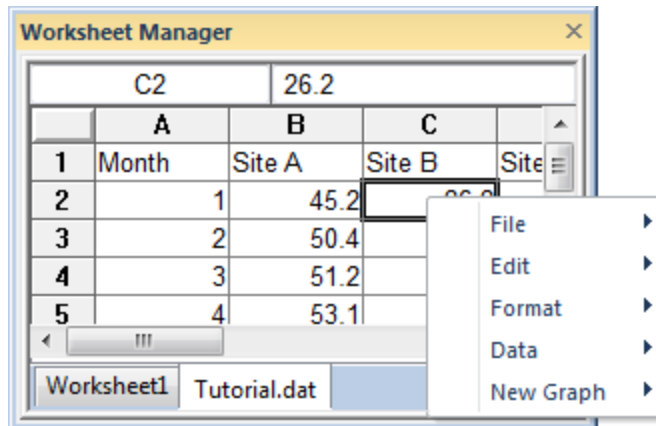
Property Manager Information Area

If the *Display **Property Manager** info area* is checked on the **File | Options | Display** page, a short help statement for each selected command in the **Property Manager**.

Worksheet Manager

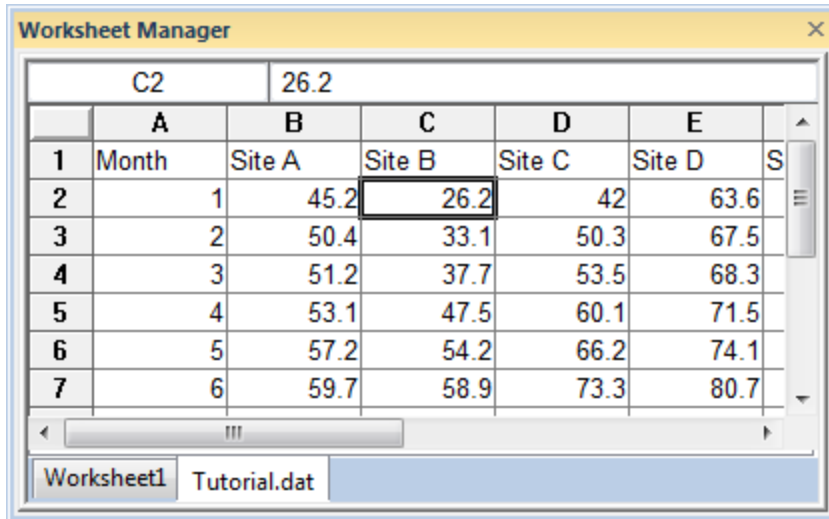
The **Worksheet Manager** contains a view of all data loaded into **Grapher**. Multiple data files are displayed in a tabbed format. By default, the **Worksheet Manager** appears at the bottom of the **Grapher** window below the plot window.

Right-click inside the **Worksheet Manager** to open the worksheet menu commands. Use the **New Graph** command to create a graph in the current plot window. Use the **Data** menu commands to transform, sort, or generate statistics for the worksheet data.



Right-click in the **Worksheet Manager** to access all worksheet menu commands.

Check the **View | Display | Worksheet Manager** command to show or uncheck the box to hide the **Worksheet Manager**. A check mark indicates the manager is visible. No check mark indicates the manager is hidden.



	A	B	C	D	E	
1	Month	Site A	Site B	Site C	Site D	S
2	1	45.2	26.2	42	63.6	
3	2	50.4	33.1	50.3	67.5	
4	3	51.2	37.7	53.5	68.3	
5	4	53.1	47.5	60.1	71.5	
6	5	57.2	54.2	66.2	74.1	
7	6	59.7	58.9	73.3	80.7	

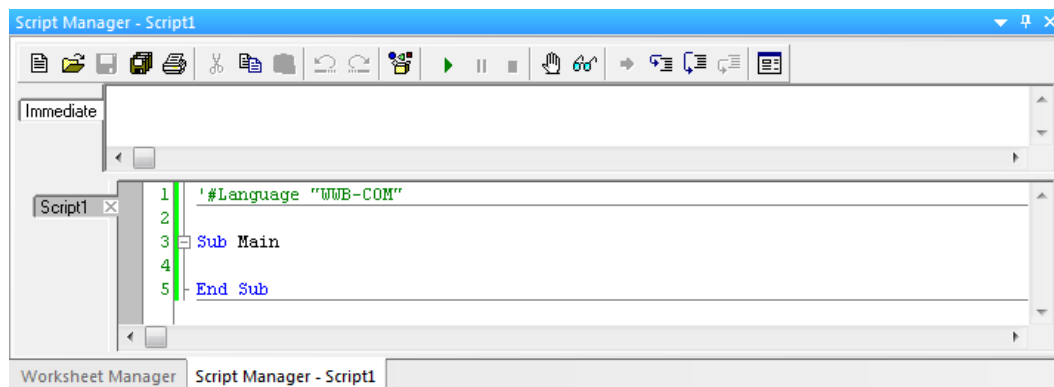
Worksheet1 Tutorial.dat

You can see all data used in all open plot windows in the **Worksheet Manager**.

Script Manager

The **Script Manager** allows you to work with automation within **Grapher** rather than opening Golden Software's automation program, **Scripter**, separately. All of **Scripter's** toolbars, menus, etc. are available within the **Script Manager**. You need to right-click in the **Script Manager** to access **Scripter's** menu commands.

Check the **View | Display | Script Manager** command to show or hide the **Script Manager**. A check mark indicates the manager is visible. No check mark indicates the manager is hidden. Typically, the **Script Manager** is located at the bottom of the **Grapher** window, tabbed with the **Worksheet Manager**.



The **Script Manager** is used to view, record, edit, and run scripts.

File Types

Several file types are used in **Grapher**.

Grapher Files

There are three types of **Grapher** files: **Grapher** .GRF, .GPJ, and .GRT files.

Grapher .GRF Files

Grapher .GRF files contain all of the information necessary to reproduce the graph, except for the data. When you save a **Grapher** file, all the scaling, formatting, and parameters for the graph are preserved in the file. **Grapher** .GRF files save a link to the data and do not store the data internally in the file. For example, if a .GRF file needs to be sent to a colleague, you would need to send the data file(s) used to create the graph, in addition to the .GRF file. This format is preferred for graphs where the data changes and needs to link to the external source data file.

Grapher .GPJ Project Files

Grapher .GPJ files store all of the information necessary to reproduce the graph, including embedding the data. All scaling, formatting, and parameters for the graph are preserved in the file. If a .GPJ file needs to be sent to a colleague, you would only need to send the .GPJ file. This format is preferred when you want to have the data and the graph contained in a single file and the data does not change often.

Grapher .GRT Template Files

Grapher .GRT files are used to create a template with set graphing preferences. A saved template file does not contain a reference to a specific data file. This means that

once the template graph is created, you can use the template with any data set. You can use the template to set options such as the number of decimal places on axis tick mark labels, label angles, axis labels, graph titles, line plot colors, fill colors, symbol size, or any other graphing option. If a .GRT file is sent to a colleague, they can use their own data set with the file to create a graph based on the specifications in the template file. This format is preferred when the layout of the graph needs to remain consistent with a variety of similarly formatted data files.

Data Files

In most cases, there is a prompt for a data file when you create a graph in **Grapher**. Data files can be imported from a variety of sources, such as ASCII text files, Excel files, or database files. Data can be entered directly into **Grapher's** worksheet if the files do not already exist.

The data to be represented on a plot needs to be in column and row format. Each row is assigned to a single point on most plots. The columns contain the different variables to be represented on the plot. Some of the most commonly used data types are described in the following sections.

Data files contain the information used to create a graph. Each record in a data file occupies a single row and is comprised of at least two values (X, Y) for most plot types and at least three values for XYZ plots, contour maps, and surface maps (X, Y, Z). At least three values are also required for class plots, floating bar, hi-low-close, bubble, ternary, vector. The X, Y, and Z values are each placed in separate columns. X and Y coordinates define the position of the point on the graph.

The order of the data in the file is the order the data are plotted. Descriptive headers in row 1 of each column are helpful but not required. When text appears in row 1 of a column, this text appears in list boxes as column titles. If a number resides in row 1, it is not incorporated into the list boxes, and instead, the column heading (such as column B) is displayed.

Rows with non-numeric entries (empty cells or text) are excluded when graphing. These records are not considered during the graphing operation.

Creating Data

Data files can be created in the **Grapher** worksheet, an ASCII editor, or any program that can produce files in one of the file formats listed in the **Open** dialog.

ASCII Data

ASCII files are generic format files that can be read or produced by most applications. There are three common ASCII data formats: .DAT, .CSV, and .TXT. These files can also be imported into most applications, including word processors, spreadsheets, and ASCII editors. The files differ in the types of delimiters, or column separators, between the data. ASCII files do not contain any worksheet formatting information such as row height, column width, or cell formatting. This format does not have a limitation on the number of rows or columns.

ASCII data files can contain up to one billion columns. Since you can specify the columns to be graphed, your data can occupy any columns. This allows you to have columns containing additional information particular to each point. The data file can contain several columns, so you can produce several graphs using the same data file.

Excel Files

Microsoft Excel .XLS, .XLSX, and .XLSM files contain data and retain some cell formatting in **Grapher**. Some information, such as formulas, is ignored. Excel files can preserve all formatting information available in the Golden Software worksheet. An Excel 2003 .XLS worksheet has a 65,536-row limit and a 256-column limit; therefore, this format cannot be used to store very large data sets. An Excel 2007 .XLSX worksheet has a 1,048,576 row limit and a 16,384 column limit.

Use Caution when Saving Excel Files!

A file can be saved in an Excel .XLS or .XLSX format from **Grapher**, but only one worksheet can be saved. **Grapher** does not allow for saving multiple worksheets in a single Excel document. If a multi-worksheet Excel file is open and saved from the **Grapher**, be aware that only a single worksheet is saved in the document. If the existing file is overwritten, all the other worksheets are destroyed. In this case, a warning message is issued.

Retaining Excel Information

To save all the formatting, formulas, and worksheets in an .XLS or .XLSX file, you can use Excel directly in **Grapher**. Use the File | Open Excel command to utilize all of Excel's features and create graphs in **Grapher**. Excel disables the save command, so you can only use the Save As command and save to a new .XLS or .XSLX file.

Database Files

In **Grapher**, graphs can be created from Access .ACCDB and .MDB files and dBase .DBF files directly without first converting to a new worksheet. A graph is created

directly from the database file and will reference the database. Changes made in the database table will automatically update the graph.

Other database formats can be imported into **Grapher's** worksheet. Click the **File | Open** command. In the **Open** dialog, click the *Database* button. Step through the dialogs to import the file and the database is converted into a worksheet format. These files cannot be saved in their native format, but you can save the files in any of the available worksheet formats by clicking the **File | Save As** command.

Microsoft Access .MDB is a binary database file format used by pre-2007 versions of Microsoft Access. The .ACCDB format is used in Access 2007 and 2010. **Grapher** can import data from tables and queries in both Access .MDB and .ACCDB formats.

64-Bit Access Driver

In order to import Microsoft Access Database (*.mdb, *.accdb) files, you must have the Microsoft Access Database driver installed on your machine. It's shipped as part of the Microsoft Office suite and comes in 32-bit and 64-bit versions. Installing the 32-bit Microsoft Office suite will install the 32-bit Access Database driver. Installing the 64-bit Microsoft Office suite will install the 64-bit Access Database driver. Unfortunately, Microsoft doesn't allow BOTH to be installed simultaneously on a 64-bit Windows platform. If you need to import data from Microsoft Access Database files into Golden Software products, you must install the 32-bit version of our product if you have a 32-bit Access Database driver. You must install the 64-bit version of our product if you have a 64-bit Access Database driver. If you don't need to import Access Database data with our product, you may install either version on a 64-bit Windows platform.

Grid Files

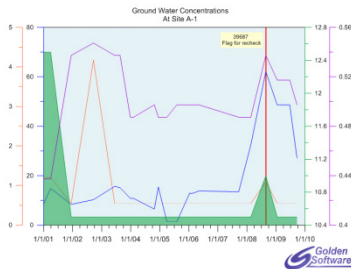
Grid files are used to produce contour and surface grid-based maps in **Grapher**. Grid files contain a regularly spaced rectangular array of Z values organized in columns and rows. Grid files can be imported from a wide variety of sources. For example, the contour grid map.GPJ sample file uses a Surfer .GRD file to create a contour XY grid map.

Plot Types

Several different 2D and 3D plot types can be created with **Grapher**. The **Graphs** menu includes **Basic**, **Bar**, **Polar**, **Specialty**, **Statistical**, and **Contour Surface**. Detailed information about each plot type and an example graphic is located in the online help in the *Introduction* book on the *Plot Types* page.

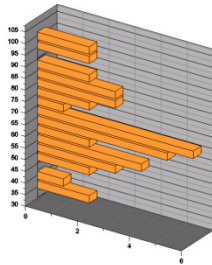
You can combine multiple plots in a single graph. A graph can contain as many axes and plots as needed to display your data.

Basic Plots



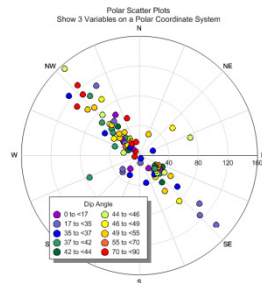
Basic plots include 2D line plots, scatter plots, line/scatter plots, step plots, function plots, bubble plots, and class plots. In most cases, two variables are displayed on two axes. The **Basic** plots also include ribbon plots, wall plots, ribbon step plots, and function plots with a 3D aspect. In these cases, two variables are displayed with a 3D view. **Basic** plots also include XYZ line/scatter plot, bubble plots, and class plots. These are true 3D plots, using at least three variables and three axes.

Bar Plots



Bar plots include 2D and 3D horizontal and vertical bar charts and floating bar charts. In 2D cases, two variables are displayed on two axes. In 3D, either two variables are displayed with a 3D aspect or three variables are displayed on three axes. 2D bar charts can also be created directly from category data.

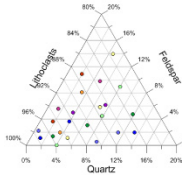
Polar Plots



Polar plots include polar line plots, scatter plots, line/scatter plots, class plots, vector plots, function plots, bar charts, rose charts, wind charts, and radar charts. Data are positioned on a circular plot at an angle and a specified distance away from the center location.

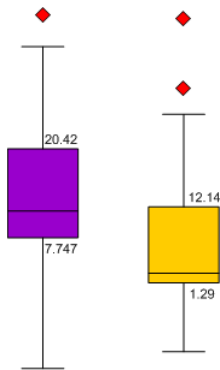
Specialty Plots

Specialty plots include high-low-close plots; candlestick plots; ternary line plots, scatter plots, line/scatter plots, and class plots; 2D and 3D vector plots; and stiff plots.



High-low-close and candlestick plots display at least three variables on two axes. All ternary plots display three variables on three axes, arranged in a triangle display. Vector plots display four or six variables on two or three axes. Vectors can be displayed between two points (XYXY and XYZ-XYZ plot types) or from a starting point to another point (XYAM and XYZ-dx, dy, dz plot types).

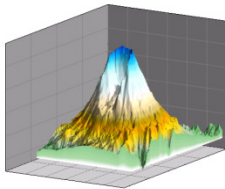
Statistical Plots



Statistical plots include 2D and 3D vertical and horizontal histograms, box-whisker plots, notched box-whisker plots, 2D and 3D pie charts, Q-Q plots, normal Q-Q plots, and 2D and 3D doughnut plots.

Histograms read raw data and count the number of instances in each bin, creating a frequency of each data count. Pie charts display data as percentages of a whole. Doughnut plots are similar to pie charts, but can be stacked and have a hole in the center. Box-whisker plots and notched box-whisker plots display median, quartile, and outliers for a data set. Q-Q plots and normal Q-Q plots display a data set compared to another data set or to the normal distribution.

Contour Surface Plots



Contour maps include contour data maps, grid maps, and function maps. Contour maps are 2D representations of three variables. The contour line defines the equal Z values across the map. Contour maps can be displayed with an XY or XZ orientation. Surface Maps include surface data maps, grid maps, and function maps. Surface maps are 3D color representations of three variables.

Creating Graphs

You can create graphs in several ways in **Grapher**. These various methods allow you to create graphs in a manner most comfortable for you. Graphs can be created:

- from the **Graphs** tab,
- with the **Graph Wizard**,
- from the worksheet,
- and from templates.

Additional plots, axes, legends, titles, summation plots, duplicate axes, and magnifiers can be added to the graph after it is created. All properties of the plot can be edited after the graph is created.

Creating Graphs in the Plot Window

The most common method of creating graphs is to use the plot window **Graphs** tab.

To create a graph in the plot window:

1. In the plot window, click or scroll to the **Graphs** tab.
2. In the **Create** group, click the **Basic**, **Bar**, **Polar**, **Specialty**, **Statistical**, or **Contour Surface** button.
3. Click on the plot type you would like to create.
4. Select a data file in the **Open Worksheet** dialog and click *Open*. If you are creating a contour grid map or surface grid map, you are prompted for a .GRD file. If you are creating any type of function plot, you are not prompted for a data or grid file.

The graph is created with the default properties. You can change the properties of a selected plot or axis through the **Property Manager**.

Creating Graphs with the Graph Wizard

The **Graph Wizard** leads you through the necessary steps to create a new graph or add a plot to an existing graph. This is often the simplest way to make the graph if you are not familiar with **Grapher** or if you want to change some portion of the graph before it is created. You can set some of the plot features through the wizard, although for the most part default plot parameters are used to create the graph.

To create a graph with the **Graph Wizard**:



1. Click the **Graphs | Create | Wizard** command
2. In the **Graph Wizard** dialog, select the plot category from the *Plot Categories* list, and select a plot type from the *Plot Types* section. A description of the selected plot type is listed in the *Description* section.
3. If you want to create a new graph, select *New graph* next to *Add plot to*. If you want to add a curve to an existing graph, select the graph name next to *Add plot to*.
4. Click the *Next* button.
5. In the **Open Worksheet** dialog, choose a new data file to open, or click on an open data file in the *Open worksheets* list. Click the *Open* button.
6. In the **Graph Wizard** dialog, check the box next to *Display preview*, to see what the worksheet data looks like with the current plot type.
7. Set the plot, line, and fill properties. You can review or edit the plot properties and see the *Plot Preview* update as the options are changed if the *Display preview* box is checked.
8. If these plot settings are not acceptable, click the *Back* button to make changes.
9. Once the plot settings are acceptable, click the *Finish* button to create the graph.

The graph is created with the properties specified. You can change the properties of a selected plot or axis through the **Property Manager**.

Creating Graphs from the Worksheet

If you are working with the data in the worksheet, you can create a graph without switching to the plot window. Simply select the columns you wish to plot and choose the graph type you wish to create.

To create a graph from the worksheet:

1. Open the worksheet using one of the following methods:
2. Click the **File | Open** command, select a data file in the **Open** dialog, and click the *Open* button.
3. Click the **File | New | Worksheet** command to open a new worksheet. In the worksheet, select **File | Open**, choose a data file in the **Open** dialog, and click the *Open* button.
4. Click the  button in the Quick Access Toolbar to open a new worksheet.

5. Select a plot in the plot window and click the **Graphs | Worksheet | Display** command.
6. In the plot window, check the **View | Display | Worksheet Manager** command to view data files already loaded into the program.
7. Highlight the columns to use in the plot.
8. Click the **Graphs** menu. If you are using the **Worksheet Manager**, right-click in the worksheet and select **New Graph** from the context menu.
9. In the **Create** group, click the **Basic, Bar, Polar, Specialty, Statistical**, or **Contour Surface** button. In the **Worksheet Manager**, click **2D XY Graphs, Polar Graphs, Specialty Graphs, 3D XYY Graphs, 3D XYZ Graphs, Contour Maps**, or **Surface Maps**.
10. Select the plot type you would like to create and the graph is created with the default plot properties.

You can change the properties of a selected plot or axis through the **Property Manager**.

Creating Graphs Using Templates

Template graphs are used to set graphing preferences in **Grapher**. When a template file is saved it does not contain any reference to a data file. This means that once the template graph is created, you can use the template to create a new graph with any compatible data set.

To Create a Template

In a plot window, design the graph exactly the way you want the final graph to appear. Create any plot type, set the axes properties, add titles, format legends, import company logos, set background properties, add text, etc.

Click the **File | Save As** command.

In the **Save As** dialog, specify a *Save in* location, a *File name*, and choose *Plot Template (*.grt)* for the *Save as type*. Click the *Save* button to save the completed template file.

To Create a Plot From a Template

To create a new plot from a template:

1. Click the **File | New | Plot from Template** command.
2. In the **Open** dialog, select a .GRT template file, and click *Open*.
3. Select the data file to use with the template. Check the *Use this worksheet for remaining items* if all the plots in a template use the same worksheet.

4. Check the *Set columns* if you want to change the column specifications for individual plots in the graph.
5. Click the *Open* button and the new plot is created.

You can change the properties of a selected plot or axis through the **Property Manager**. Refer to template graphs for information on creating or saving an edited template.

Serial Number

Your **Grapher**™ serial number is located on the CD cover or in the email received with the download directions. You may also access your serial number at any time by clicking **File | About Grapher** in the **Grapher** window.

Register Your Serial Number

Please remember to register your software by filling out the registration form online. Registering your serial number entitles you to free technical support, announcements, and **Grapher** upgrade pricing. Our database is confidential. Please take a minute to register your copy of **Grapher** with us.

Technical Support

Golden Software's technical support is free to registered users of our products. Our technical support staff is trained to help you find answers to your questions quickly and accurately. We are happy to answer any of your questions about any of our products, both before and after your purchase. We also welcome suggestions for improvements to our software and encourage you to contact us with any ideas you may have for adding new features and capabilities to our programs. To allow us to support all customers equitably, an individual user's daily support time may be limited.

Technical support is available Monday through Friday 8:00 AM to 5:00 PM Mountain Time, excluding major United States holidays. We will respond to email and fax technical questions within one business day. When contacting us with your question, please have the following information available:

- Your **Grapher** serial number, found in the **File | About Grapher** dialog, on the CD cover, or in the email received with the download directions
- Your **Grapher** version number, found in **File | About Grapher**
- The operating system you are using (Windows XP, Vista, 7, or higher)
- The steps you took prior to experiencing your problem

- The exact wording of the first error message (if any) that appeared

If you cannot find the answer to your question in the online help, the frequently asked questions, the knowledge base, or in the support forums, please do not hesitate to contact us:

Email: GrapherSupport@GoldenSoftware.com

Web: www.GoldenSoftware.com

Phone: 303-279-1021

Fax: 303-279-0909

Mail: Golden Software, Inc., 809 14th Street, Golden, Colorado, 80401-1866, USA

Chapter 2

Tutorial

Tutorial Introduction

Welcome to the **Grapher** tutorial. This tutorial is designed to introduce you to some of **Grapher's** basic features and should take less than an hour to complete. After you have completed the tutorial, you will have the skills needed to begin creating your own graphs with your own data. The lessons should be completed in order; however, they do not need to be completed in one session.

Tutorial Overview

The following is an overview of lessons included in the tutorial.

- [Starting Grapher](#) shows you how to begin a new **Grapher** session and open a new plot window.
- [Lesson 1 - Viewing and Creating Data](#) - opens and edits an existing data file and creates a new data file.
- [Lesson 2 - Creating a Graph](#) - shows you one way to create a graph.
- [Lesson 3 - Modifying Plot Properties](#) - shows you how to open and edit the plot properties.
- [Lesson 4 - Editing Axes](#) - shows you how to add an axis title, how to change the tick mark spacing, and how to change the tick label source.
- [Lesson 5 - Adding Additional Plots to the Graph](#) - shows you how to add a second plot to an existing graph.
- [Lesson 6 - Editing Graph Properties](#) - shows you how to edit properties of the graph, such as adding a graph title.
- [Lesson 7 - Adding and Editing a Legend](#) - shows you how to create and edit a legend.
- [Lesson 8 - Working with the Script Recorder](#) - shows you how to use the **Script Recorder** with the techniques in the previous lessons and adds a few new items. This is an optional advanced lesson. Because other features are covered in this advanced lesson, it is highly encouraged that you complete *Lesson 8*, even if you do not wish to use the script recorder.
- [Advanced Tutorial Lessons - Saving Graphs](#) shows you how to save a graph.

- [Advanced Tutorial Lessons - Using the Magnifier](#) shows you how to add a magnifier to your graph.
- [Advanced Tutorial Lessons - Using the Inset Zoom](#) shows you how to draw an inset zoom on your plot page.
- [Advanced Tutorial Lessons - Combining Plots from Different Graphs](#) demonstrates how to add an existing plot to a second existing graph.
- [Advanced Tutorial Lessons - Using Axis Linking](#) shows you how to add an additional axis that is linked to an existing axis on the graph.

A Note About the Documentation

Various font styles are used throughout the **Grapher** quick start guide and online help. **Bold** text indicates command names, dialog names, and page names. *Italic* text indicates items within a dialog such as group box names, options, and field names. For example, the **Save As** dialog contains a *Save as type* list. Bold and italic text occasionally may be used for emphasis.

In addition, commands appear as **Home | Clipboard | Copy**. This means, "click or scroll to the **Home** tab at the top of the document, then click the **Copy** command in the **Clipboard** group." The first word is always the ribbon tab name, followed by the group name(s), and the last word is always the specific command.

Using the Tutorial with the Demo Version

If you are using the demo version of **Grapher**, you will not be able to complete some of the steps due to disabled save, export, and print features. The demo version is a fully functional read-only version of the program. When this is a factor it is noted in the text and you are directed to proceed to the next step that can be accomplished with the demo.

Starting Grapher

To begin a **Grapher** session:

1. Navigate to the installation folder, C:\Program Files\Golden Software\Grapher 11 by default.
2. Double-click on the Grapher.EXE application file.
3. Select the type of document to create in the **Welcome** dialog. For the tutorial, select *New Plot*.
4. A new empty plot window opens in **Grapher**. This is the work area for producing graphs.

If this is the first time that you have opened **Grapher**, you will be prompted for your serial number before step 3. Your serial number is located on the CD cover or in the email received with the download directions, depending on how you purchased **Grapher**. Once input, you may access your serial number at any time by clicking **File | About Grapher** in the **Grapher** window.

If you have already been working with **Grapher**, open a new plot window before starting the tutorial. To open a new plot window, click the **File | New | Plot**

command, click the  button on the quick access toolbar, or press CTRL+N on the keyboard.

Lesson 1 - Viewing and Creating Data

A data file is a file that contains columns of data values. At minimum, two columns are required to create most 2D graphs in **Grapher**. Data files can contain header information, labels, point identifiers, filter information, and multiple columns of data. As such, it is often a good idea to examine the data file contents before creating your graph.

Opening an Existing Data File

If you would like to view or edit data, you can open the data file in **Grapher**. There are several ways to view a data file. If a graph has already been created, the most common method to view the data is to use the **Worksheet Manager**. If a graph is not yet created, you can open the data in the worksheet window.

1. Click the **File | Open** command, click the  button on the quick access toolbar, or press CTRL+O on the keyboard. The **Open** dialog displays.
2. If you are not in the Samples folder, browse to it. The Samples directory is located at C:\Program Files\Golden Software\Grapher 11\Samples, by default. In the list of files, click *Tutorial.dat*.
3. Click the *Open* button to display the data in the worksheet window.

Notice that there are several columns of data. Column A contains Month number data. Columns B through I contain site information. Column J contains an abbreviation of month names. Row 1 contains header text, which is helpful for identifying which column contains which data. When a header row exists, the information in the header row is used in the **Property Manager** when selecting worksheet columns.

The screenshot shows the Grapher software interface with a worksheet window titled 'Tutorial.dat'. The worksheet contains data for 10 sites (A through J) across 10 months (Jan through Sep). The data is organized into columns: A1 (Month), B1 (Site A), C1 (Site B), D1 (Site C), E1 (Site D), F1 (Site E), G1 (Site F), H1 (Site G), I1 (Site H), J1 (Site I), and K1 (Month Name). The data values are as follows:

Month	Site A	Site B	Site C	Site D	Site E	Site F	Site G	Site H	Site I	Month Name
1	45.2	26.2	42	63.6	27.7	36.1	27.1	33.7	33.7	Jan
2	50.4	33.1	50.3	67.5	32.9	41.2	35.7	34.6	34.6	Feb
3	51.2	37.7	53.5	68.3	38	44.8	41.7	37.8	37.8	Mar
4	53.1	47.5	60.1	71.5	45.6	54.5	50.8	46.8	46.8	Apr
5	57.2	54.2	66.2	74.1	58	60.5	55.5	57.9	57.9	May
6	59.7	58.9	73.3	80.7	65.6	67.2	63.4	67	67	Jun
7	62.2	64.1	78.9	83	69.4	74.4	67.4	71.8	71.8	Jul
8	62.7	62.6	74.7	81.9	66.4	69.7	66.1	70.5	70.5	Aug
9	58.5	58.3	70.5	81.3	61.9	66.3	61.8	65.2	65.2	Sep

The data is displayed in a worksheet window. Note that each variable is a separate column. Row 1 contains a description of what the column contains.

Editing Data

To edit any value, click in the cell to select it. Type information and the existing value is overwritten. Data can be sorted, transformed, or transposed in this window. You can also calculate statistics for the worksheet data in this window. New columns or rows can also be added.

For instance, if we noticed that the value in cell B2 was incorrect, we could change it.

1. Click in cell B2.
2. Type the value 47.2.
3. Press ENTER on the keyboard.
4. After making changes to the worksheet, save the file by clicking the **File | Save** command. Accept the default save options and click OK.

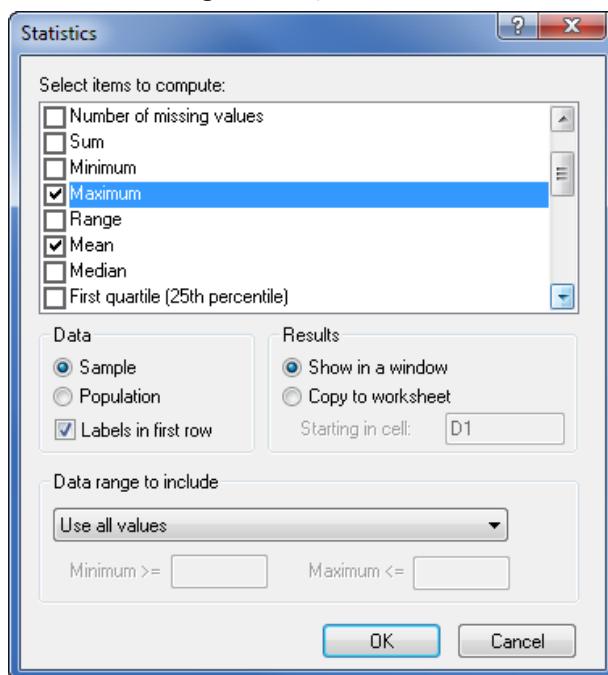
Note, data cannot be saved in the demo version.

Calculating Statistics on the Data

Sometimes, it is necessary to know some basic statistical information about the data. For instance, with this data, what is the high value for each site and how do the average values relate to one another? This information can be calculated in the worksheet.

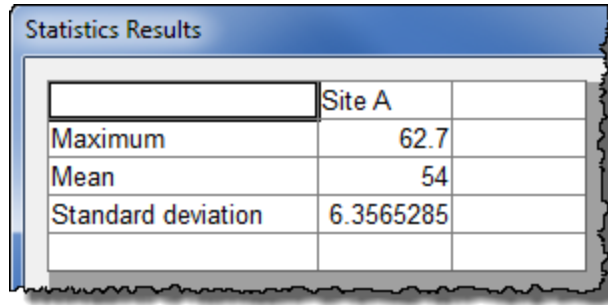
To display basic statistical information for one column:

1. Click on the header B to select all of Column B: Site A.
2. Click the **Cells | Data | Statistics** command.
3. In the dialog, check the items that should be displayed. For instance, if we are interested in the highest value, we would check *Maximum*. Since we are interested in the highest value and average values, Check *Maximum* and *Mean*.



Check the box next to Maximum and Mean to calculate the high and average values.

4. Click *OK* and the information is displayed in a small report window.



	Site A	
Maximum	62.7	
Mean	54	
Standard deviation	6.3565285	

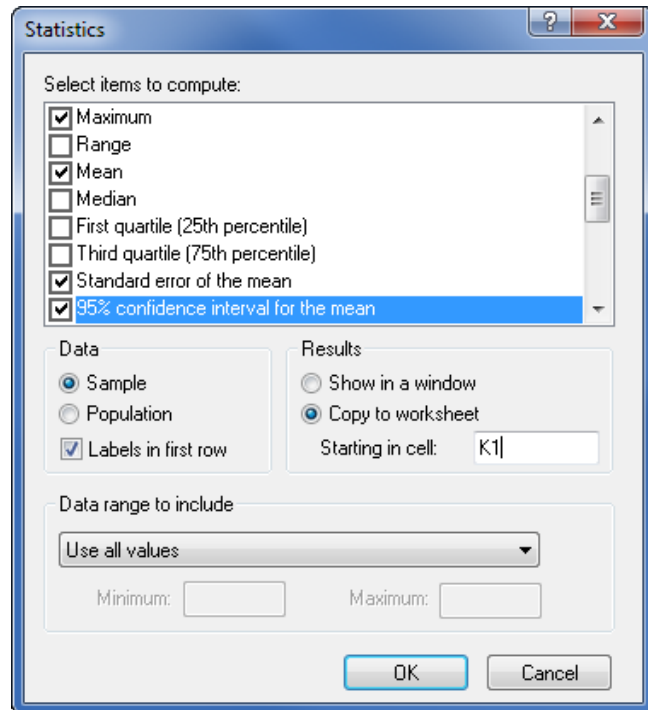
The statistics are displayed in a dialog.

5. We can note that the *Maximum* value is 62.7 for this site and the *Mean* is 54. Click *Close* to close the report window.

To compare multiple site average values and compare confidence in the values, we could click on each column separately or we could display all of the information at once.

To display all of the information at once:

1. Click on the header B and hold down the left mouse button. Drag the mouse across all columns until column I is highlighted. All Site columns are now selected.
2. Click the **Cells | Data | Statistics** command.
3. In the dialog, check the items that should be displayed. In this case, we are interested in the highest value, average values, and confidence in the average values. Check *Maximum*, *Mean*, *Standard error of the mean*, and *95% confidence interval for the mean*.
4. Select *Copy to worksheet*



Check all of the desired options and select Copy to worksheet to copy the results to the existing worksheet.

and set the *Starting in cell* to K1 to display the summary information in the same worksheet as the actual data instead of in a report window.

5. Click *OK* and the information is displayed in columns K through S.
6. Mean values can be compared visually. The standard error of the mean and 95% confidence value can also be compared. In addition, plots can be created directly from the summary statistics information, if desired.

K	L	M	N	O	P	Q	R	S
	Site A	Site B	Site C	Site D	Site E	Site F	Site G	Site H
Maximum	62.7	64.1	78.9	83	69.4	74.4	67.4	71.8
Mean	54	45.2	60.233333	74.016667	48.558333	54.191667	48.966667	51.566667
Standard e	1.8349717	4.3208094	3.6693310	1.9076335	4.4566168	3.8626702	4.2184360	4.2006192
95% confid	4.0387728	9.5101015	8.0761975	4.1987014	9.8090135	8.5017371	9.2847776	9.2455630
Standard d	6.3565285	14.967723	12.710935	6.6082364	15.438173	13.380682	14.613091	14.551372

Visually inspect the statistical results to compare various site data.

Creating a New Data File

The **Grapher** worksheet can also be used to create a new data file. Use these steps to open a new worksheet window and begin entering data. Refer to the Worksheet Window section on for information about the various portions of the worksheet window.

1. Click the **File | New | Worksheet** command, click the  button in the quick access toolbar, or press CTRL+W on the keyboard. A new empty worksheet window is displayed.
2. Data are entered into the active cell of the worksheet. The active cell is selected by clicking on the cell or by using the arrow keys to move between cells. When a cell is active, enter a value or text, and the information is displayed in both the active cell and the active cell edit box.
3. To preserve the typed data in the active cell, move to a new cell. Move to a new cell by clicking a new cell with the mouse, pressing one of the arrow keys, or pressing ENTER.

Refer to the [Chapter 3 – Data Files and the Worksheet](#) for additional information about the various portions of the worksheet window.

Saving the Data File

When you have completed entering all of the data, the data can be saved in a variety of formats.

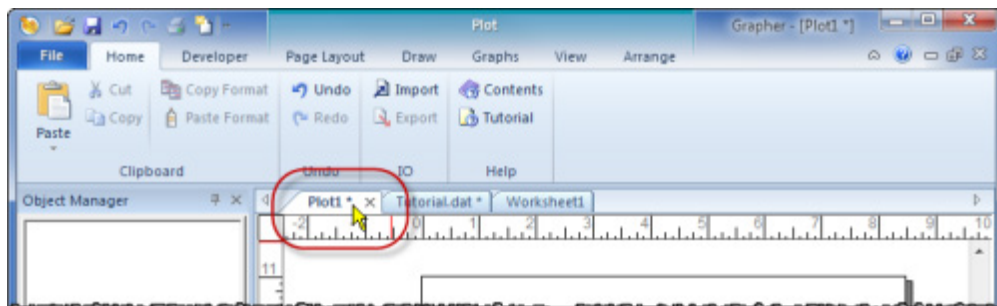
1. Click the **File | Save** command, click the  button on the Quick Access Toolbar, or press CTRL+S on the keyboard. The **Save As** dialog is displayed if you have not previously saved the data file.
2. In the *Save as type* list, choose the DAT Data (*.dat) option.
3. Type the name of the file in the *File name* box.
4. Click the Save button and the Data Export Options dialog opens.
5. Accept the defaults in the **Data Export Options** dialog by clicking *OK*.
6. The file is saved in the Data .DAT format with the file name you specified. The name of the data file appears in the title bar and on the worksheet tab.

Lesson 2 - Creating a Graph

You can create graphs in several ways in **Grapher**. Graphs can be created from the Graphs tab, with the **Graph Wizard**, from the worksheet, and from templates. All of these methods are discussed in the Creating Graphs topic. In the tutorial, we use the most common method, creating a graph through the **Graphs** tab **Create** group. We will create a line/scatter plot from an existing data set.

To create a line plot graph:

1. If the worksheet window is still open, click the *Plot1* tab. Alternatively, you can create a new plot window by clicking the **File | New | Plot** command.



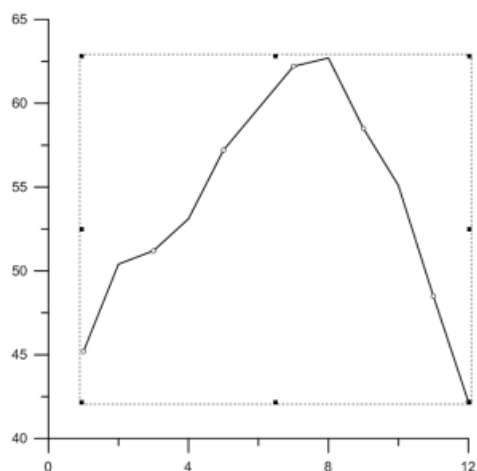
Click on the Plot1 tab to select the existing plot window.

2. Click the **Graphs | Create | Basic | Line Plot** command .

3. In the **Open Worksheet** dialog, select the *Tutorial.dat* samples file, from the Samples directory. You can select the file in the file list section or in the *Open worksheets* section at the bottom of the dialog.
4. Once the file is selected, click the *Open* button.

A line plot is created using the default properties. By default, **Grapher** uses the first two columns containing numeric or date/time data in the data file. With this data file, the X Axis is equal to column A and the Y Axis is equal to column B.

By default, the line plot is selected after the graph is created. The selected plot appears with a bounding box around the outside and selection handles on the line.



The line plot is created with the default settings and should look similar to this graph.

Lesson 3 - Modifying Plot Properties

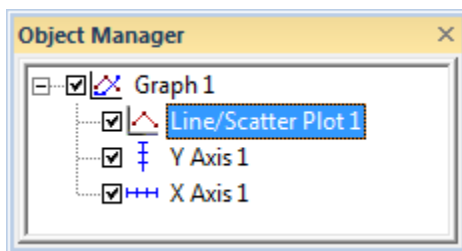
You can edit any of the plot properties after the graph has been created. You can edit the columns used to create the plot, the plot line color, the symbol display, label display, add fill to the plot, or just about anything you see on the plot. In this example, let's change the line plot created in the *Lesson 2 - Creating a Graph* section to a scatter plot and add labels. The graph from Lesson 2 - Creating a Graph should already exist in the plot window before you proceed with this lesson.

Selecting the Line/Scatter Plot - Tutorial

The **Object Manager** is the easiest way to select the exact object you want, so this method is used throughout the rest of the tutorial. Methods for selecting objects are discussed in the Selecting Objects topic. Once an object is selected, its properties are available for editing in the **Property Manager**.

To select the line/scatter plot:

1. Make sure the **Object Manager** is open. If you do not see the **Object Manager**, check the **View | Display | Object Manager** command. A check mark is displayed next to the visible managers. If the **Object Manager** box is not checked, click in the empty box next to **Object Manager** to display it.
2. In the **Object Manager**, left-click the *Line/Scatter Plot 1* object. This selects the line/scatter plot and opens the line/scatter plot properties in the **Property Manager**. When the line/scatter plot is selected, a selection box appears around the plot and selection symbols appear on the line.



Click on the object title, Line/Scatter Plot 1, to select the plot.

Changing the Line/Scatter Plot Properties - Tutorial

The **Property Manager** contains all of the properties for the selected object on multiple pages. A line/scatter plot contains **Plot**, **Clipping**, **Error Bars**, **Labels**, **Symbol**, **Line**, and **Fill** tabs. Click the tab name to open that property page.

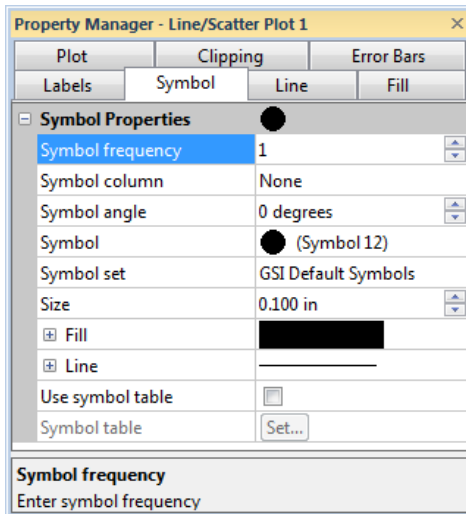
You may need to click on the  or  buttons next to the section names to access the properties, as discussed in the **Property Manager** topic.

Changing Line Plot to a Scatter Plot - Tutorial

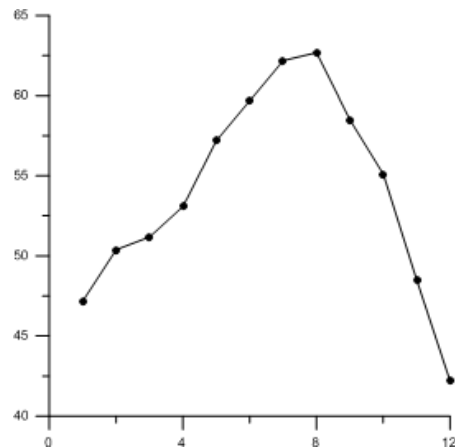
If the **Graphs | Create | Basic | Scatter Plot** command had been originally clicked, a scatter plot would have been created. Any line plot can be changed to a scatter plot or a scatter plot to a line plot by changing the plot properties. A quicker method is discussed in the Changing the Plot Type section in [Lesson 5](#). The method discussed here allows other properties to be changed, if desired.

To change the line plot to a scatter plot:

1. In the **Property Manager**, click the **Symbol** tab to edit the symbol properties.
2. Next to the *Symbol frequency* option, click the up arrow once. Alternatively, highlight the number 0, type the number 1, and press ENTER on your keyboard. The plot is updated with the default symbol at every data value.

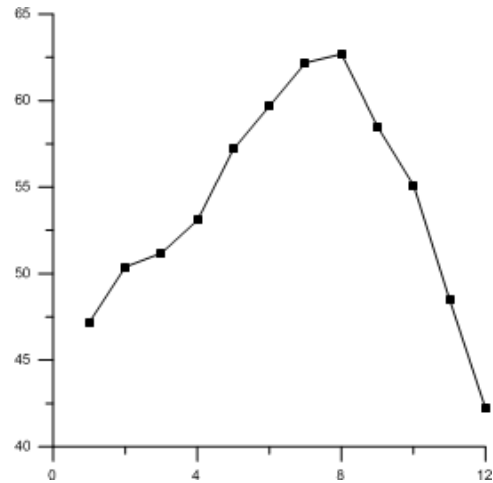
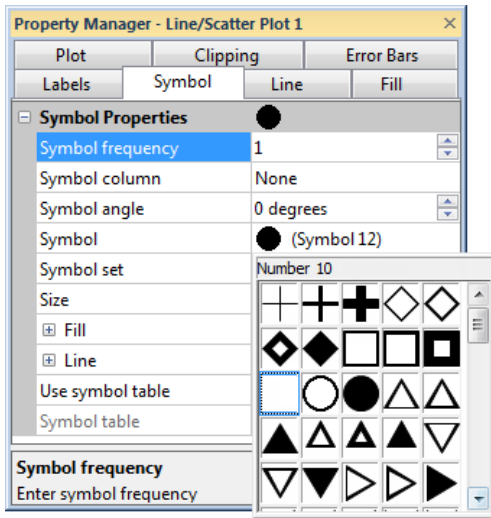


Type the number "1" in the Symbol frequency box to add a symbol at every data point on the line/scatter plot.



The line plot is updated to display the default symbol.

- The current symbol is located next to *Symbol*. Click the current symbol, which by default is a . Clicking on the current symbol opens the symbol palette. Click the filled square, symbol *Number 10*, two boxes to the left of the default symbol. Once you click on the filled square, the symbol palette closes and the plot automatically updates to show the new symbol.

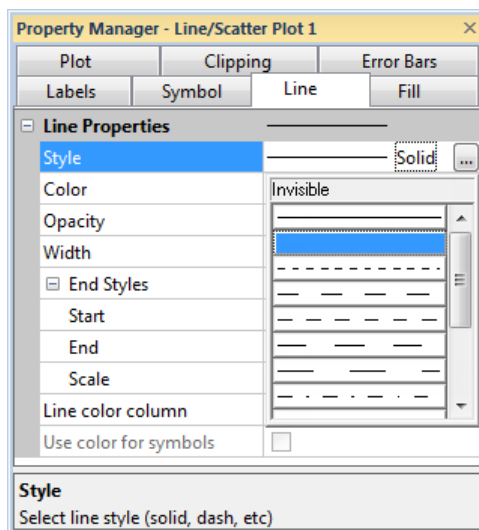


The graph is updated to display symbol Number 10.

- Click the current symbol to open the symbol palette and select a new symbol to use for the plot.

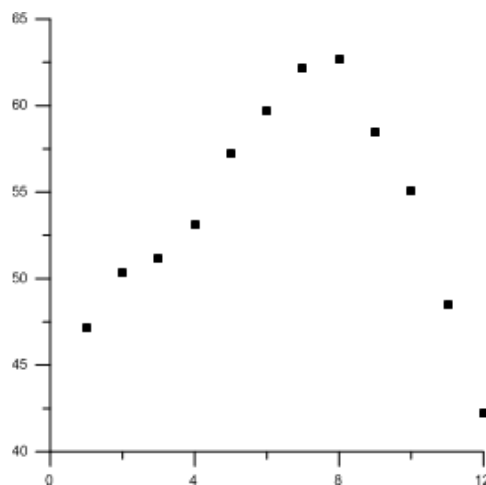
4.

- Click on the **Line** tab to edit the line properties.
- Click on the current line style, which by default is a solid line, next to *Style*, to open the line style palette. Click on the *Invisible* line style, which is the second entry in the line palette list. Once you click on the *Invisible* line style, the line style palette closes and the plot changes to a scatter plot.



Click on the current line style to open the line palette.

Select the Invisible line style.



A scatter plot is created by adding symbols and changing the line to invisible.

Displaying Plot Labels - Tutorial

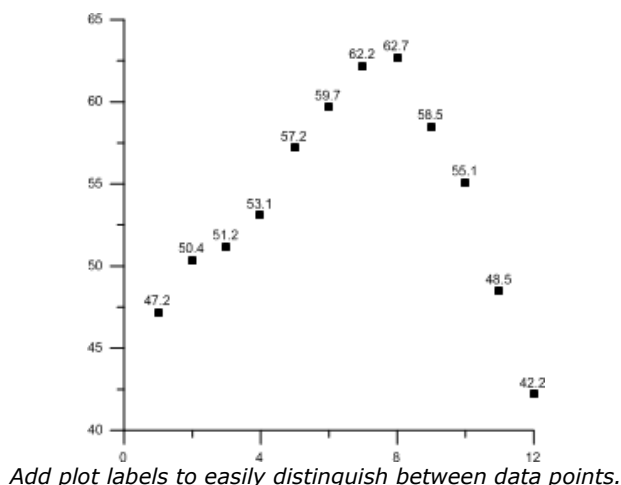
Labels can be displayed at any data point on the plot. Labels can come from the X or Y data columns or from any other data column in the worksheet.

To display labels for the data points:

- Click on the *Line/Scatter Plot 1* in the **Object Manager**.
- In the **Property Manager**, click on the **Labels** tab to display the plot labels properties.
- Check the box next to *Display labels*.

The Y data values are shown as labels to the data points on the plot. By default, the column used for the labels is the Y data column, although you can uncheck the box next to the *Labels in the Y column* and set the *Column* to any worksheet column to

display the label from that column. This is useful when you are wanting to display point names or IDs.



Moving Labels

Grapher allows you to manually move labels that are displaying for plots and axes. In addition, you can move axis and graph titles.

To move the plot labels:

1. With the plot selected, click on the **Graphs | Plot | Move Labels** command.
2. The first label will appear with a box around it, like .
3. Click on the label, hold down the left mouse button, and drag the label to the desired location. Alternatively, press the **ARROW** keys on the keyboard to move the label a small amount.
4. When you are finished moving this label, click on another label to move it. Repeat the clicking on labels and moving until all labels are in the desired location.
5. When finished, press the **ESC** key on the keyboard to end moving labels mode.

To return the labels to their original position, click the *Reset* button next to the *Reset positions* command on the **Labels** tab for a plot or the **Tick Labels** tab for an axis.

Lesson 4 - Editing Axes

Grapher's axes can be modified to fit any design needs. The axis scale, axis length, tick mark spacing, tick mark labels, axis titles, colors, etc. can all be customized.

Selecting the Axis - Tutorial

The graph from [Lesson 2 - Creating a Graph](#) should already exist in the plot window before you proceed with this lesson. Click on *Y Axis 1* in the **Object Manager** to select it and display the axis properties in the **Property Manager**. The axis can be selected in the plot window or in the **Object Manager**. The tutorial will use the **Object Manager** method.

To select the axis:

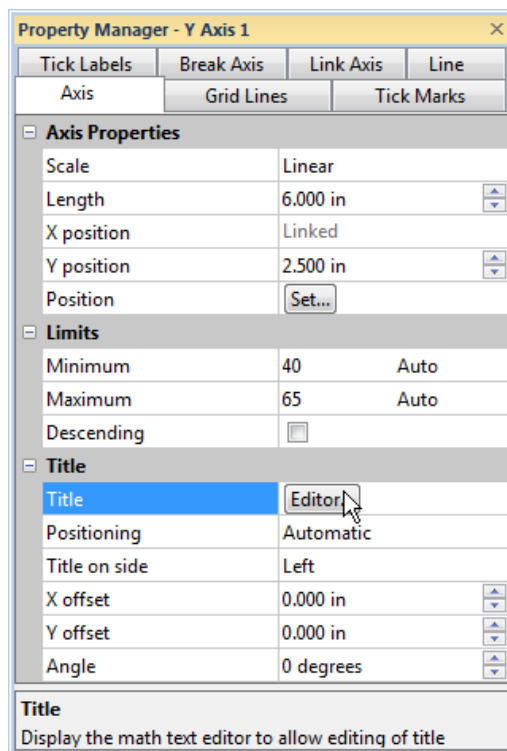
1. Make sure the **Object Manager** is open. If you do not see the **Object Manager**, check the **View | Display | Object Manager** command. A check mark is displayed next to the visible managers.
2. In the **Object Manager**, left-click the *Y Axis 1* object. This selects the axis and displays the axis properties in the **Property Manager**. When the axis is selected, a selection box appears around the axis.

Adding an Axis Title - Tutorial

Once the axis is selected, all of the axis properties are displayed in the **Property Manager**. Standard axes have **Axis**, **Grid Lines**, **Tick Marks**, **Tick Labels**, **Break Axis**, **Link Axis**, and **Line** tabs. The axis title options are on the **Axis** tab.

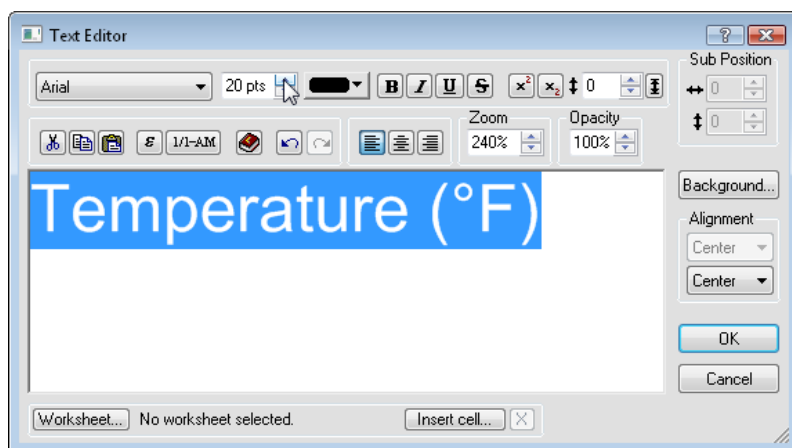
To add an axis title:

1. Click the **Axis** tab in the **Property Manager** to edit the axis properties.
2. Open the *Title* section by clicking the  next to *Title* if necessary.
3. In the *Title* section, click the *Editor* button next to the *Title* option. The **Text Editor** opens.



Click the Editor button to open the **Text Editor** and add an axis title.

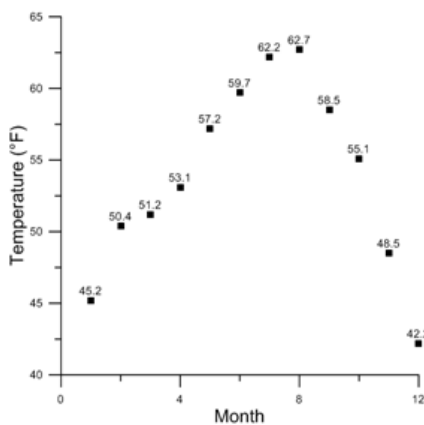
4. In the **Text Editor** dialog, type the word *Temperature (F)*.
5. Click in the space just before the *F* and click the  button.
6. In the **Symbol Properties** dialog, change the *Symbol Set* to *Arial* and select the degree symbol, *Number 144*. Click *OK* to return to the **Text Editor**. Alternatively, you can click in the space before the *F* and press and hold the ALT key. Type the number *0176*. This will also insert the symbol, without opening the **Symbol Properties** dialog. This is a good method to use when inserting Unicode or international characters in any text box.
7. Next, let's change the properties of the axis title. In the **Text Editor**, highlight the text *Temperature (° F)*.
8. Highlight the current font size and type 20, to make the font 20 points. The font size is located to the right of the font name in the upper left corner of the dialog. Only the highlighted text changes size, so be sure to select all of the text.



Highlight the text in the **Text Editor** and then change its properties.

9. Click *OK* to close the **Text Editor** and save the axis title.

The text *Temperature ° (F)* now appears along the Y axis. Use this same procedure to add the title "Month" to the *X Axis 1*. Your graph should appear similar to this one:



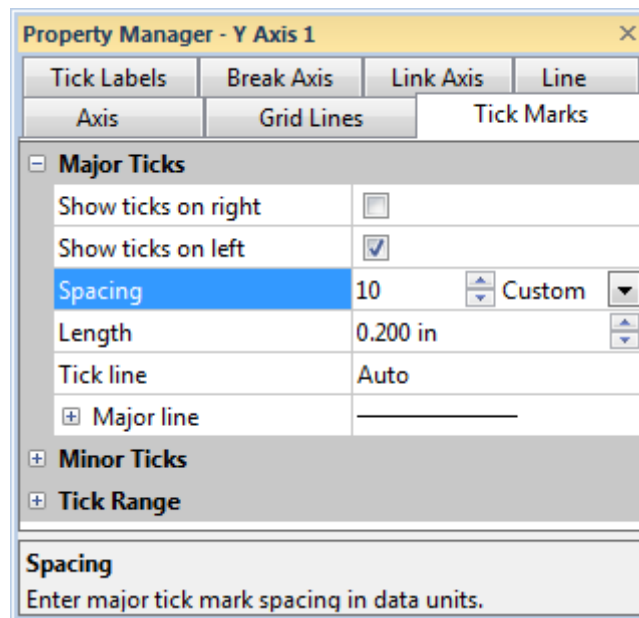
Axis titles are added by selecting the axis and then using the **Property Manager** to open the **Text Editor** to add and edit text properties.

Changing the Tick Mark Spacing - Tutorial

Tick marks are a means of indicating units of measure and are typically equally spaced like the lines on a ruler. Tick marks are the lines that emerge perpendicularly from an axis. Normally, the major tick marks are longer and the minor tick marks are shorter and appear between the major tick marks. In the graph created in Lesson 2 - Creating a Graph, the major tick mark spacing on the Y axis is five units, i.e., 40, 45, 50, 55, 60, and 65. In addition, there is a single unlabeled minor tick mark between each set of major tick marks. In the following exercise, the tick spacing is changed to ten units. The number of minor tick marks is changed to five.

To change the tick mark spacing:

1. Click on the *Y Axis 1* in the **Object Manager** to select it.
2. In the **Property Manager**, click the **Tick Marks** tab to open the tick mark properties.
3. Click the $\pm$ next to *Major Ticks*, if necessary.
4. Change the *Spacing* from 5 to 10. To change the *Spacing*, highlight the existing number 5, type the new number 10, and press ENTER on your keyboard. The word *Auto* is automatically replaced with the word *Custom*, indicating a custom spacing value.

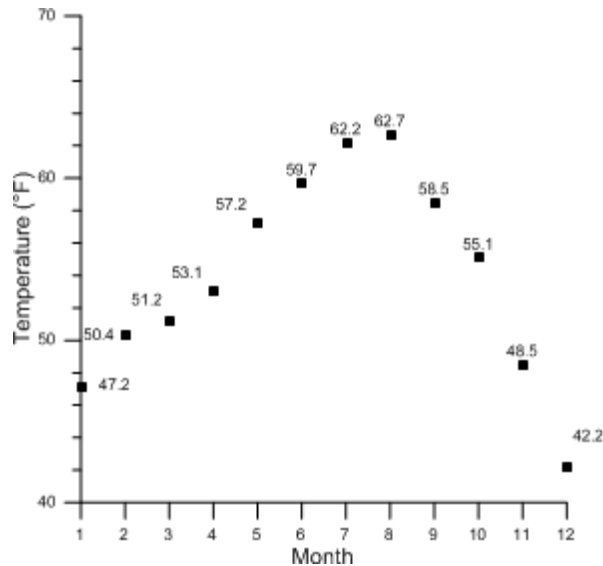


You can type a new value for the tick mark Spacing or click the up or down arrows to scroll to a new value.

5. Click the  next to *Minor Ticks*, if necessary.
6. Change the *Divisions* from 2 to 5. To change the *Divisions*, highlight the existing number 2, type the new number 5, and press ENTER on your keyboard.

The *Y Axis 1* tick mark spacing changes to ten in the plot window and additional minor tick marks are added. In addition, the axis limits automatically adjust so that an even number of tick marks are displayed on the axis.

Apply this same procedure to the *X Axis*, changing the major tick mark *Spacing* from four to one and the *Divisions* to 1, so no minor tick marks are displayed. Your graph should appear similar to this one:



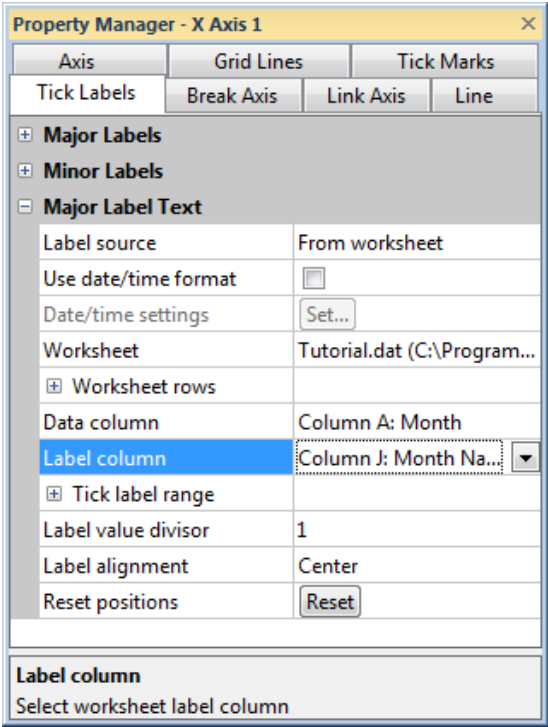
*You can customize the axis properties,
including changing the tick mark spacing.*

Changing the Tick Labels - Tutorial

Tick labels can be displayed using different label sources including *Automatic*, *Date/Time*, and *From worksheet*. Automatic labels are the default, however there may be situations where either using either a number to represent date/time values or labels directly from a worksheet source may be useful. For this tutorial, we will change the X Axis labels to use a data column from the worksheet where we have tick label names specified.

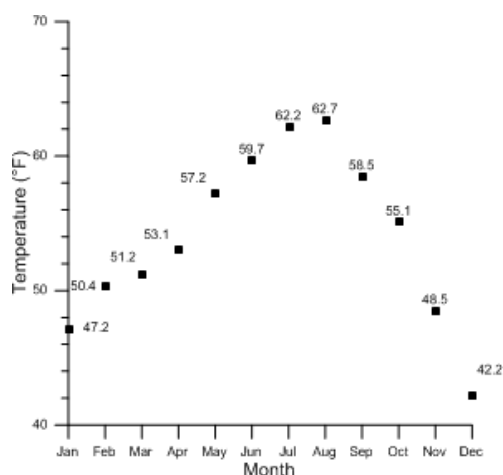
To change the tick labels source:

1. Click on the *X Axis 1* in the **Object Manager** to select it.
2. In the **Property Manager**, click on the **Tick Labels** tab to open the tick label properties.
3. Click the **+** next to *Major Label Text*, if necessary.
4. Click the word *Automatic* next to the *Label source* option. In the list, select *From worksheet*. This activates the *Worksheet* option.
5. Next to *Worksheet*, click the word *None* to display a list of open worksheets and the *Browse* option. The *Browse* option would be used to select a worksheet that is not already open. In this tutorial, the worksheet we want to use is already open. Select the *Tutorial.dat* file from the list.
6. Next to the *Data column* option, click the existing column and select *Column A: Month*.
7. Next to the *Label column* option, click the existing column and select *Column J: Month Name*.



The Major Label Text section controls the tick mark labels.

The graph updates with the worksheet labels defined by the text in Column J of the worksheet.



You can customize tick labels to display information from a column in the worksheet.

If the axis labels or the axis title overlap or need to be moved slightly, click the **Graphs | Plot | Move Labels** command. Click on the label or axis title, hold down the left mouse button, and drag the label or title to the new location. Press ESC on the keyboard when all of the labels are in the desired location.

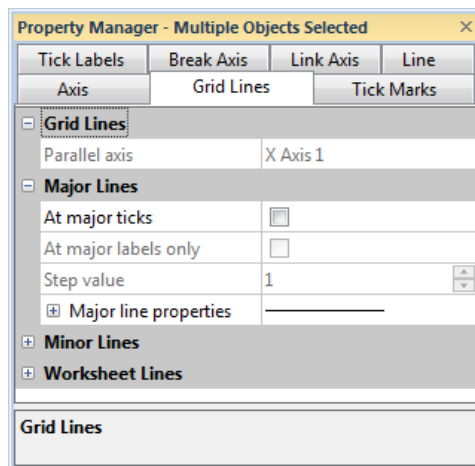
Adding Grid Lines - Tutorial

Grid lines make it easier to see how the data relate to the axes. You can add grid lines at major tick marks, minor tick marks, or at values specified in a data file. All of the line properties, such as color, width, opacity, and style, can also be edited for each type of grid line separately.

If you are making the same change to multiple objects, all of the items can be selected and edited simultaneously. Since we want grid lines on both axes, we can select both axes and add grid lines to both at the same time.

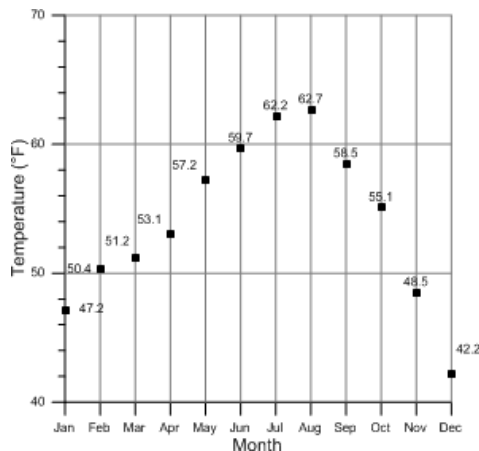
To add grid lines to both axes:

1. In the **Object Manager**, click on *X Axis 1*, hold down the CTRL key on your keyboard, and click on *Y Axis 1*. Both axes are selected.
2. Note that the **Property Manager** title bar contains **Multiple Objects Selected**. Only properties common to all selected objects appear in the **Property Manager** when multiple objects are selected. Since both objects are axes, all of the axis properties are displayed. Click on the **Grid Lines** tab to open the grid line properties.



The words *Multiple Objects Selected* appear in the **Property Manager** title bar when multiple objects are selected in the plot window or **Object Manager**.

3. Click the ☒ next to *Major Lines*, if necessary.
4. Check the box next to the *At major ticks* option. A check mark should be displayed in the box and grid lines appear on both axes on the graph.
5. Click the ☒ next to *Major line properties*, if necessary.
6. Click on the current color next to the *Color* option. In the color palette, click on the *20% Black* color, which is the color directly below *Black* in the color palette. Once you click on the *20% Black* color, the palette closes and the graph is updated with the newly colored grid lines.



The grid lines can be a custom line color or line style.

Lesson 5 - Adding Additional Plots to the Graph

You can add several plots to one graph in **Grapher**. In *Tutorial.dat*, columns B through I are additional Y data, making it simple to add additional plots to the graph.

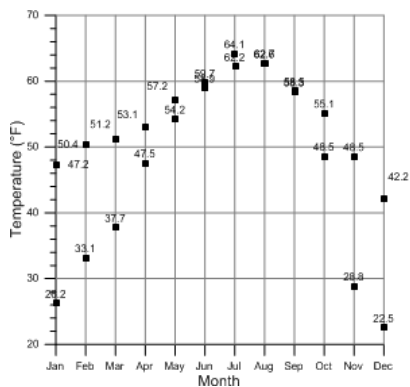
Adding a New Plot to an Existing Graph

To add a plot to the graph created in Creating a Graph:

1. Click on *Line/Scatter Plot 1* in the **Object Manager** to display the properties in the **Property Manager**.
2. Click the **Plot** tab in the **Property Manager**.
3. Click the *Create* button next to the *New plot* option to add a new plot to the graph.

Clicking the *Create* button creates a new line/scatter plot using the same worksheet as the original plot. The same axes and plot properties are also used for the new plot. The *X column* stays the same and the *Y column* increments to the next column with data. The new plot is selected after the command is executed. The **Property Manager** title changes to **Property Manager - Line/Scatter Plot 2** and the *Y column* changes to *Column C: Site B*.

All of the data must be contained in one data file to use the *New plot* feature. In addition, not all plot types have this option. When many plot types are selected, the **Graphs | Add to Graph** commands are available. These allow additional axes, duplicate axes, plots from a different data file, legends, summation plots, and magnifiers to be added to the selected graph.



The second line/scatter plot is added to the graph using the same axes and properties as the first plot.

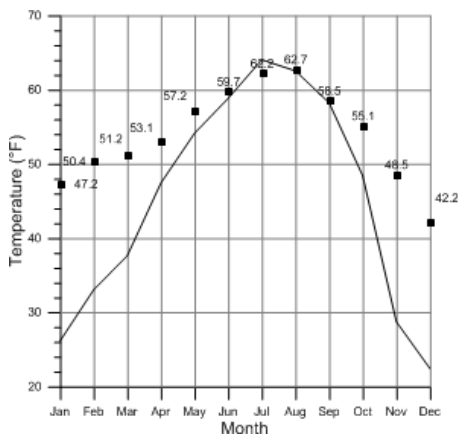
Changing the Plot Type

Let's change the new scatter plot into a line plot to help differentiate between the two curves. Previously, we changed from a line plot to a scatter plot by editing the **Line** and **Symbol** properties in the **Property Manager**. There is also a shortcut to changing between plot types.

To change the scatter plot into a line plot:

1. Click on the *Line/Scatter Plot 2* in the **Object Manager**.
2. Click the down arrow next to the **Graphs | Plot | Change Plot To** command . Select *Line* from the list. The scatter plot changes to a line plot.
3. Click on the **Labels** tab in the **Property Manager**.
4. To remove the labels, uncheck the box next to the *Display labels* option.

The **Graphs | Plot | Change Plot To** command is not available for all plot types. It can be used to convert line, scatter, line/scatter, step, and bar charts to other line, scatter, line/scatter, step, and bar charts. It can also be used, when the entire graph is selected, to convert a 2D graph to a 3D graph, or vice versa.



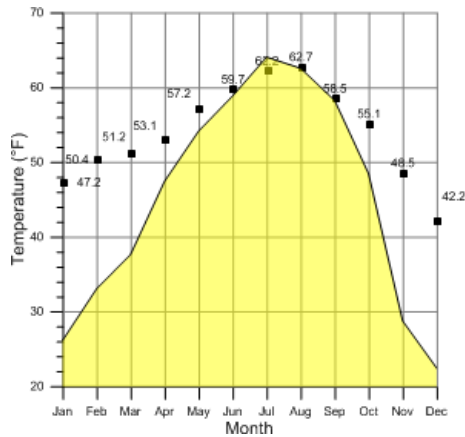
You can change the properties in the new plot to distinguish it from the first plot.

Adding Semi-Transparent Fill

Adding a semi-transparent fill to the line plot will help distinguish it from the scatter plot.

To add fill to the line plot:

1. Click on *Line/Scatter Plot 2* in the **Object Manager**, if it is not already selected.
2. Click on the **Fill** tab in the **Property Manager** to display the fill properties.
3. Next to *Foreground color*, click the current color, *Black*, and select *Yellow* from the color palette.
4. Next to *Foreground opacity*, highlight the existing value, type 50, and press ENTER on the keyboard. Alternatively, drag the slider to the left until it is as 50%. The line plot is now filled with semi-transparent yellow.



Fill the line plot with semi-transparent yellow fill.

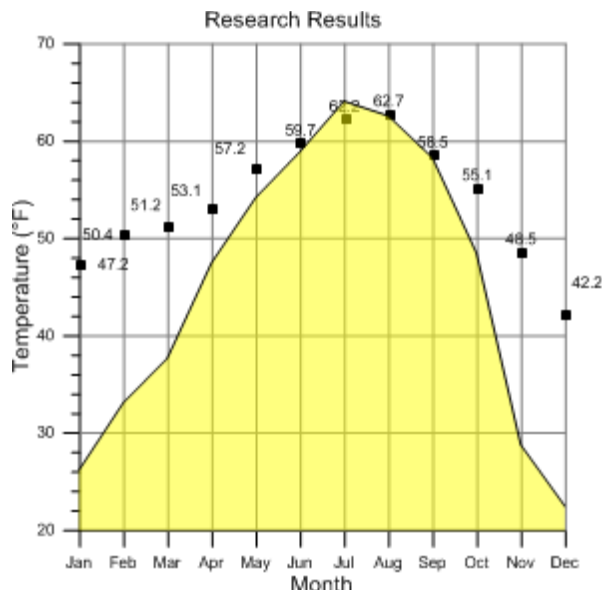
Lesson 6 - Editing Graph Properties

Graph properties control settings that affect the entire graph, such as titles, background line and fill colors, and fill patterns that fill between multiple plots. Let's add a graph title and set the background fill and line properties for the graph.

Adding a Graph Title

To add a graph title:

1. Click on the *Graph 1* object in the **Object Manager** to select the entire graph.
2. Click on the **Title** tab in the **Property Manager**.
3. Click the *Editor* button next to the *Title* option.
4. In the **Text Editor**, type the graph title, *Research Results*.
5. Highlight all of the text.
6. Highlight the existing font size and change it to 20.
7. Click *OK* and the title appears on the graph.
8. By default, the title contains a box around it. To turn off the display of the box, click the  next to *Box Line Properties* section, if necessary.
9. Click on the line sample next to *Style* and select the invisible line. When you select the invisible line, the graph title automatically updates.



Add a graph title to display additional information about the graph.

Setting Background Fill and Line Properties

To set the background fill and line properties:

1. With the *Graph 1* selected, click on the **Background** tab in the **Property Manager**.
2. Click the  next to the *Background Line* section, if necessary.
3. Click on the line sample next to *Style* and select the solid line, the first option.
4. Set the *Width* of the line by highlighting the number next to *Width*, typing a new value, and pressing ENTER on the keyboard. Set the *Width* to 0.020 inches.
5. Click the  next to the *Background Fill* section, if necessary.
6. Set the *Foreground color* to *Pale Yellow* by clicking on the existing color and selecting the *Pale Yellow* color from the palette.

The graph now has a light yellow background, all axes and the graph are labeled. The graph should look similar to this:



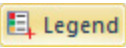
Set graph properties by clicking on the Graph object to add a final finished appearance to a graph.

Lesson 7 - Adding and Editing a Legend

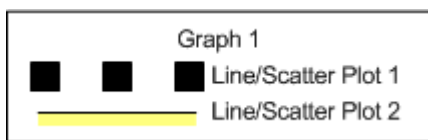
Legends provide information for interpreting a graph. You can add a legend for most plot types. Typically, legends are linked to the graph so that any changes made to the graph are automatically updated in the legend. The legend features, such as font and legend placement, can be customized.

Adding a Legend - Tutorial

To add a legend:

1. Select any part of the graph by clicking on an object in the graph, such as *Y Axis 1* or *Line/Scatter Plot 2*.
2. Click the **Graphs | Add to Graph | Legend** command .

A legend is created for the graph using the default properties. These properties can be changed by selecting the legend and using the **Property Manager**. Currently, the legend displays *Graph 1* for the title and *Line/Scatter Plot 1* and *Line/Scatter Plot 2* for the plot names. Let's move the legend, and change the names to reflect the data.

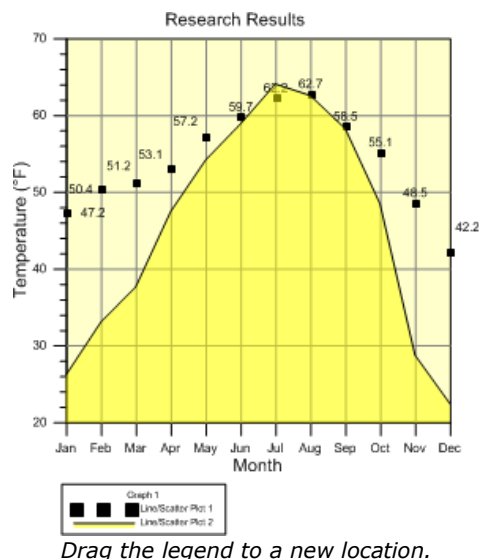
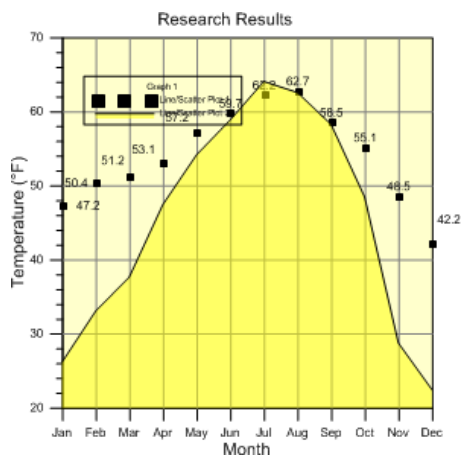


*When a legend is first created, it contains the graph and plot names listed in the **Object Manager**.*

Moving the Legend - Tutorial

To move the legend:

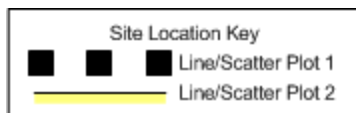
1. Click on *Legend 1* in the **Object Manager** to select the legend.
2. Once the legend is selected, position the cursor over the legend in the plot window. Click and hold the left mouse button.
3. Drag the legend to a new location. Release the mouse button to position the legend in the new location.



Editing the Legend Title - Tutorial

To change the legend title:

1. Click on *Legend 1* in the **Object Manager** to select the legend.
2. In the **Property Manager**, click on the **Legend** tab.
3. Click the *Editor* button next to *Title*. This opens the Text Editor and allows you to edit the legend title.
4. In the **Text Editor**, highlight *Graph 1* and type the title *Site Location Key*.
5. Click *OK* and the legend is updated.

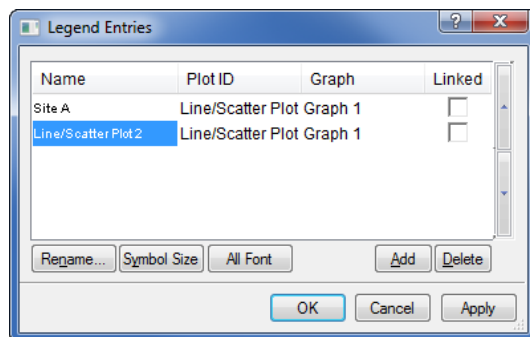


*The legend title is updated with the changes made in the **Text Editor**.*

Editing the Plot Names - Tutorial

To change the plot names in the legend:

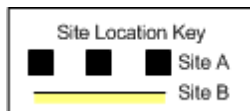
1. Click on *Legend 1* in the **Object Manager** to select the legend.
2. In the **Property Manager**, click on the **Legend** tab to open the legend properties.
3. Next to the *Entries* option, click the *Edit* button. This opens the Legend Entries dialog.
4. In the **Legend Entries** dialog, click *Line/Scatter Plot 1* under the *Name* column.
5. Click the *Rename* button. This opens the Text Editor.
6. Let's change the text to *Site A* to match the worksheet. Highlight *Line/Scatter Plot 1* and type *Site A*.
7. Click *OK* to close the **Text Editor**.



*The **Legend Entries** dialog is used to edit the legend entry names.*

8. In the **Legend Entries** dialog, click *Line/Scatter Plot 2* under the *Name* column.
9. Click the *Rename* button. This opens the **Text Editor**.
10. Another way to change the text is to link the text from a worksheet cell. Highlight the *Line/Scatter Plot 2* text and press the DELETE key on your keyboard.
11. Click the **Worksheet...** button.
12. Select the *Tutorial.dat* file and click *Open*.
13. Click the **Insert cell...** button to open the **Enter Cell** dialog.

14. In the **Enter Cell** dialog, type *C1* and click *OK*. The text <<@C1>> will be displayed in the **Text Editor**, indicating linked worksheet text.
15. Click *OK* in the **Text Editor**. The *Line/Scatter Plot 2* is updated to *Site B*, as indicated in cell *C1* of the specified worksheet. This text will automatically update if the text in cell *C1* of the worksheet changes.
16. Click *OK* to close the **Legend Entries** dialog. The legend updates with the modified names.



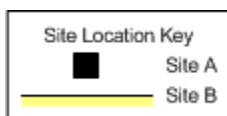
*The legend is updated with the changes made in the **Legend Entries** dialog.*

Changing the Number of Symbols - Tutorial

The number of symbols in a legend can be set from zero to three.

To change the number of symbols:

1. Click on *Legend 1* in the **Object Manager** to select the legend.
2. In the **Property Manager**, click on the **Legend** tab to open the legend properties.
3. Click on the number 3 next to the *Number of symbols* option and select 1 from the list. The legend is updated displaying only one symbol.



The displayed number of symbols in a legend can be 0, 1, 2, or 3.

Changing the Symbol Size - Tutorial

To change the symbol size to match that of the symbols on the plot:

1. Click on *Legend 1* in the **Object Manager** to select the legend.
2. In the **Property Manager**, click on the **Legend** tab.
3. Click the *Edit* button next to the *Entries* option to open the **Legend Entries** dialog.
4. Select the *Site A* in the *Name* column and click the *Symbol Size* button to open the **Symbol Size** dialog.
5. Change the *Size* from *Fixed* to *Plot size*. If the other plot also displayed symbols, checking the *Apply to all entries* option would make all plots show the symbols at the size they are displayed in the plot.
6. Click *OK* in the **Symbol Size** dialog to make the change.
7. Click *OK* in the **Legend Entries** dialog.



Set the symbol size to match the plot size.

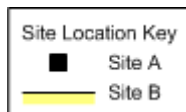
The symbol sizes in the legend now match the symbol sizes in the plot.

Changing the Line Length - Tutorial

In addition to changing the number and size of the symbols, the length of the displayed line can be changed.

To change the line length:

1. Click on the *Legend 1* in the **Object Manager** to select the legend.
2. In the **Property Manager**, click on the **Legend** tab.
3. Highlight the value next to the *Line length* option. Type the new value of 0.5 and press ENTER on the keyboard. The line next to *Site B* is shortened to .5 inches.



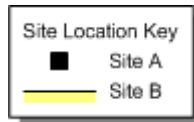
The line length is now shorter in the legend.

Adding a Drop Shadow - Tutorial

To add a drop shadow behind the legend:

1. Click on the *Legend 1* in the **Object Manager** to select the legend.
2. In the **Property Manager**, click on the **Legend** tab.
3. Check the box next to *Display shadow* to add a shadow behind the legend.
4. Click the color next to *Shadow color* to open the color palette and change the shadow color if desired.

The drop shadow is added to the legend.

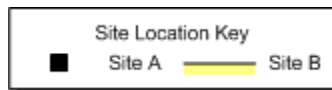


A drop shadow can be added to a legend.

Creating Multiple Columns in the Legend - Tutorial

Longer legends may need to be split into multiple columns to make the best use of the page space. To separate a legend into multiple columns:

1. Click on *Legend 1* in the **Object Manager** to select the legend.
2. In the **Property Manager**, click the **Legend** tab.
3. Highlight the value next to the *Number of columns* option. Type a new value, such as 2, and press ENTER on the keyboard. The legend is updated to show the new number of columns. The typed value is the number of columns used to display in the legend.

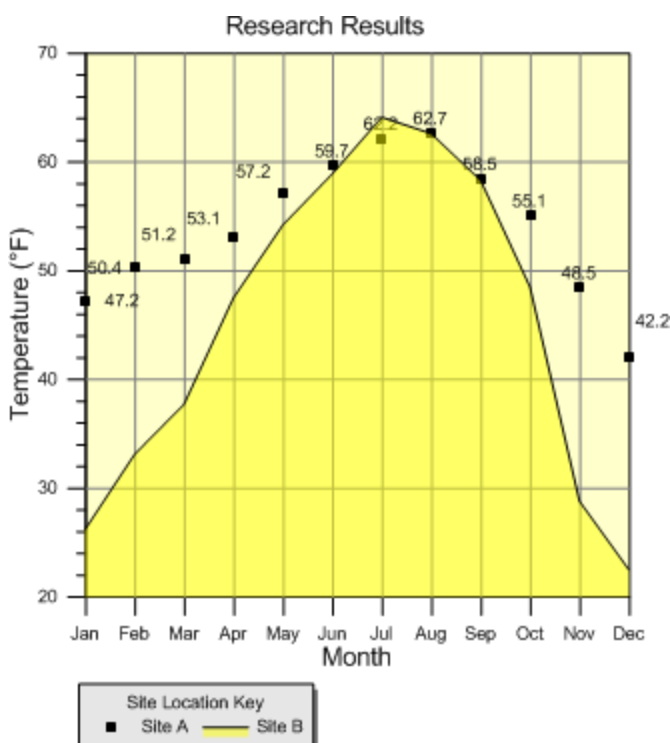


All properties of the legend are fully customizable, including the number of columns.

Filling the Legend - Tutorial

To add fill to the legend:

1. Click on *Legend 1* in the **Object Manager** to select the legend.
2. Click the **Fill** tab in the **Property Manager** to open the fill properties.
3. On the **Fill** page, next to *Foreground color*, click the existing color, *Black*, to open the color palette. Choose *20% Black*. The *Pattern* automatically changes to *Solid* and the legend now has a gray background.
4. Adjust the *Foreground opacity* value if you want the background to be semi-transparent.



The final graph displays with the customized legend.

Refer to the [Saving Graphs](#) lesson for information on how to save a graph. This graph can be used in the [Using Axis Linking](#) advanced lesson.

Lesson 8 - Working with the Script Recorder

Scripter is Golden Software's automation program.

You may record your actions in **Grapher** with the **Script Recorder** rather than writing the scripts manually in **Scripter**. See the *Script Manager*, *Introducing Scripter*, and *Script Recorder* topics in the help for more information about automation.

The *Grapher Automation* book in the table of contents contains all of the help topics related to automation.

*New **Grapher** users should go through the steps in this lesson to learn a bit more about **Grapher** - even if you do not intend to use automation.*

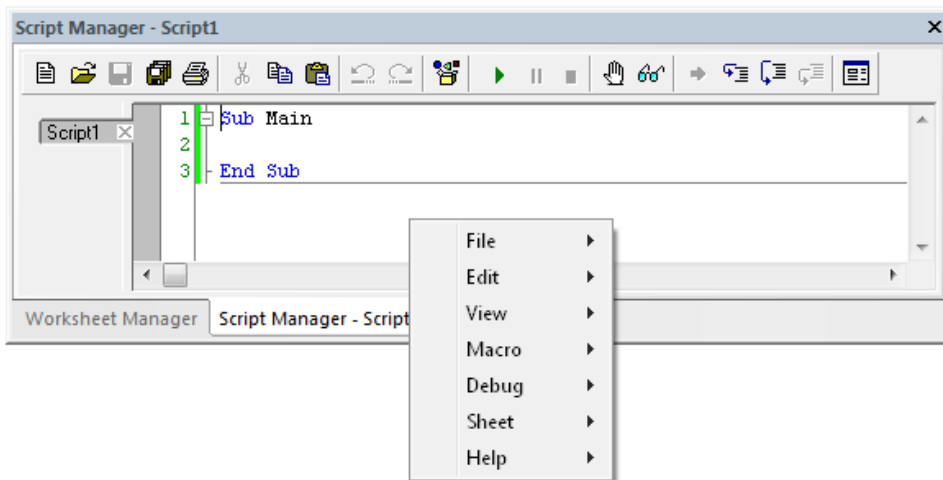
The **Script Recorder** can be used for many tasks. We will provide one scenario to demonstrate the **Script Recorder**. For example, let's say that you receive a data file once a quarter. The file has the same file name each quarter and the same number of columns, but the information contained in the file updates each time. Each quarter you need to create the graphs and then export the graph for reports. You could automate this process with the **Script Recorder** to save time and increase efficiency.

The graph in this example is fairly simple for time's sake, but keep in mind that complex graphs are very well suited to automation. We will record the process of creating some graphs, changing some features of a graph, saving the graphs, and exporting the graphs. The creation of this graph uses the features included in the previous lessons and includes a few new items. If you do not understand part of the directions, review the material in the previous lessons or consult the automation information in this help file.

Opening the Script Manager

The **Script Manager** can be used to view scripts as they record. Check the **View | Display | Script Manager** command to display the **Script Manager**. A check mark is displayed next to visible managers. By default, the **Script Manager** is located at the bottom of the **Grapher** window, tabbed with the **Worksheet Manager**. Click the **Script Manager** tab to view the **Script Manager**.

Right-click in the **Script Manager** to access the menu commands.

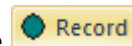


*Click the **Script Manager** tab to view the data used in the plot.
Right-click in the **Script Manager** to access the menu commands.*

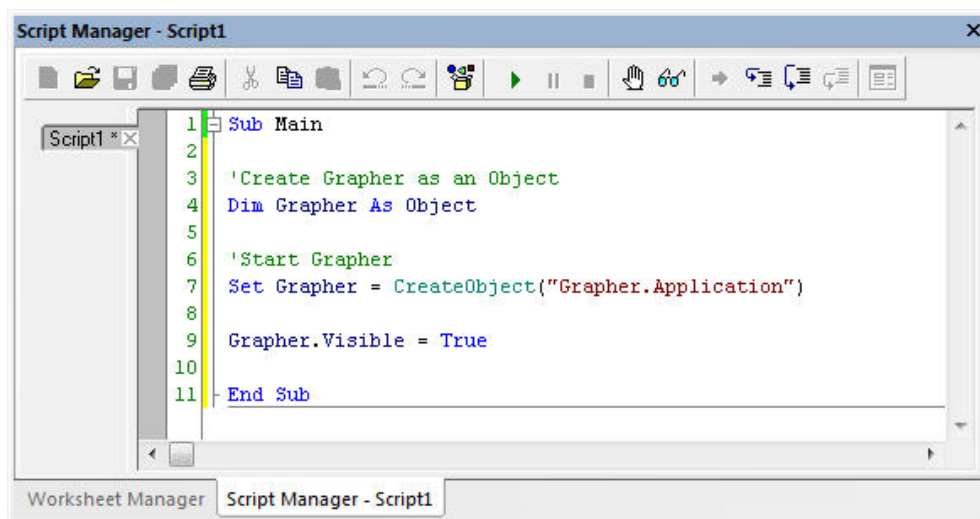
Start Recording

The **Developer** tab is used to start and stop recording scripts. Help for Grapher automation and Basic Language help information can also be accessed on the **Developer** tab.

To start recording, click the Developer | Recorder | Record command. The



button changes to  to indicate that the script is recording. Information appears in the **Script Manager** as soon as recording begins. This code starts **Grapher** when the script is run later. Every action taken will be recorded in the **Script Manager**, until the recording is stopped.



Code is immediately added to the **Script Manager** when script recording begins.
 This information starts **Grapher** when the script is run later.
 The text in green with an apostrophe prefix are comments.

Opening a New Plot Window

Let's open a new plot window to start. To open a new plot window, click the **File | New | Plot** command.

Creating a Line Plot

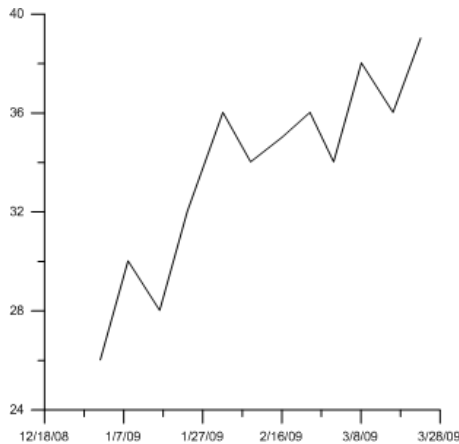
To create a line plot:

1. Click the **Graphs | Create | Basic** command and select the **Line Plot** button



2. The **Open Worksheet** dialog appears. Browse to **Grapher's** Samples folder. The location of this folder varies depending on where the software was installed. If the software was installed in the default folder, the path is C:\Program Files\Golden Software\Grapher 11\Samples.
3. Click on the *tutorial script recorder.xls* file and click *Open* to create the default graph.

A line plot is created with the first two available columns using the default properties. **Grapher** can create graphs from data containing date/time information. In this example, column A contains dates so dates are plotted on the X axis.



The original graph is created with the default properties.

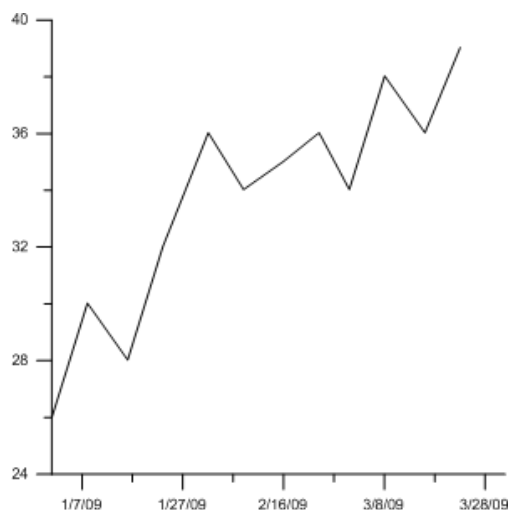
Changing the X Axis Date/Time Limits

The axis limits can use the default limits or can be changed to show only a portion of the graph. Limits can be based on numerical values or on date/time values.

To change the X Axis limits using date/time:

1. Click on the *X Axis 1* in the **Object Manager** to select it.
2. In the **Property Manager**, click on the **Axis** tab to display the axis properties.
3. Click the  to the left of the *Limits* section to expand the axis limits.
4. Click the  next to the 12/18/2008 0:00:00 value next to *Minimum date/time* to open the **Select Date/Time** dialog.
5. Change the date to 1/1/2009 and click **OK**.
6. Dates can also be edited directly in the **Property Manager**. Highlight the 3/28/2009 value next to *Maximum date/time* and type 4/1/2009 and press **ENTER**.

The X Axis limits now range from 1/1/2009 to 4/1/2009.



The axis updates to the new date/time limits.

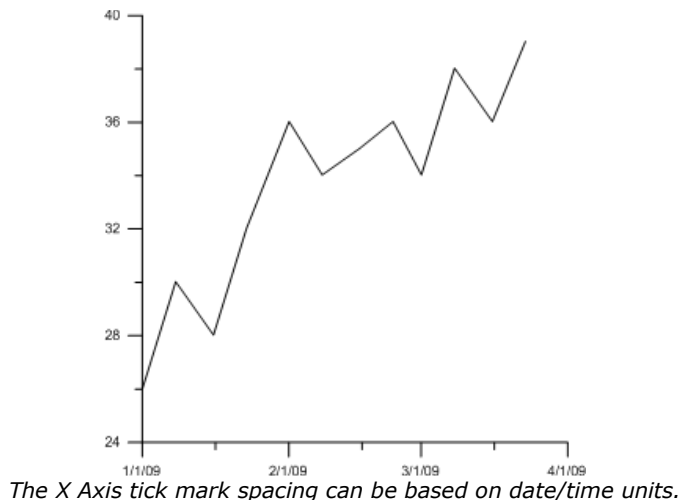
Changing the X Axis Date/Time Tick Mark Spacing - Tutorial

Tick marks can be spaced at any desired interval. Tick marks can be changed to show one tick mark every X number of units or can be based on date/time units, such as minutes, days, months, or years.

To set the tick marks to display one tick and label spacing per month:

1. Click on the *X Axis 1* in the **Object Manager** to select it.
2. In the **Property Manager**, click on the **Tick Marks** tab to display the tick mark properties.
3. Click the  to the left of the *Major Ticks* section to expand the major tick options, if necessary.
4. Check the box next to the *Use date/time spacing* option.
5. Next to *Date/time spacing*, click *Every Year* to open the **Date/Time Spacing** dialog.
6. Change *Year* to *Month* and click *OK*.

The X Axis major tick marks are displayed as 1/1/09, 2/1/09, 3/1/09, and 4/1/09.



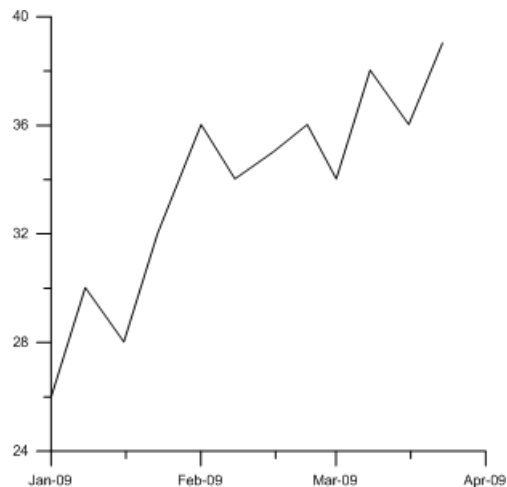
Changing the X Axis Date/Time Tick Label Format

There are a variety of tick label formatting options available. One of the options is to change the display of the date/time labels. There are many different predefined date/time labels available or you could create your own custom label format.

To change the major label format from M/d/yy (1/1/2009) to MMM-yy (Jan-09):

1. Click on the *X Axis 1* in the **Object Manager** to select it.
2. In the **Property Manager**, click on the **Tick Labels** tab to display the tick label properties.
3. Click the  to the left of the *Major Labels* section to expand the major label options, if necessary.
4. Click the  next to *Format* to expand the label formatting section.
5. Click the *Select* button next to *Date/time format* to open the **Date/Time** dialog.
6. Click on the M/d/yy and select MMM-yy from the list.
7. Click *OK*.

The X Axis tick labels are displayed as Jan-09, Feb-09, Mar-09, and Apr-09.



The X Axis date/time labels can be formatted with a predefined or custom format.

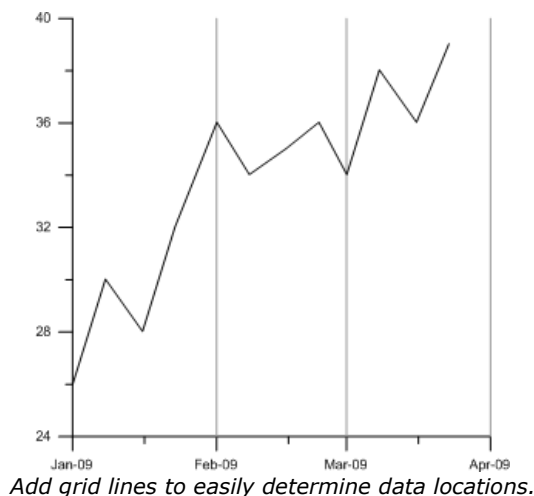
Adding X Axis Grid Lines

Grid lines make it easier to determine the data values on a graph. There are many options for grid lines, such as showing the grid lines at major ticks, minor ticks, or at values defined in the worksheet.

To add grid lines on the X Axis:

1. Click on the *X Axis 1* in the **Object Manager** to select it.
2. In the **Property Manager**, click on the **Grid Lines** tab to display the grid line properties.
3. Click the  next to *Major Lines* to open the major grid line section, if necessary.
4. Check the box next to *At major ticks*.
5. Click the  to the left of *Major line properties* to expand the major line properties, if necessary.
6. Next to *Color*, click *Black* to open the color palette and select *20% Black*. The color palette automatically closes with the new color line selected.

20% black grid lines are added to the graph at the major ticks.



Adding Linked Text to the Graph Title

It would be a good idea to add text explaining the information contained in the graphs. In this file, cell A1 contains the data's time range, January through March 2009. The next quarter's data file will contain April through June 2009. With linked text, the

information is updated on the graph any time the information changes in the cell in the data file. When the script is run, the date in the data file appears on the graphs.

To add linked text information to the graph title:

1. Select *Graph 1* in the **Object Manager**.
2. Click the **Title** tab in the **Property Manager** to open the graph title properties.
3. Next to *Title*, click the *Editor* button to open the Text Editor.
4. Click the **Worksheet...** button to select the worksheet that contains the text.
5. In the **Open Worksheet** dialog, select the *tutorial script recorder.xls* file from the *Open worksheets* section and click *Open*. The worksheet name is updated in the **Text Editor**.
6. Click the **Insert cell...** button in the **Text Editor**. Type *A1* into the **Enter Cell** dialog and click *OK*. <&@A1>> appears in the **Text Editor**.
7. Highlight all of the text in the **Text Editor**. Change the size of the text to 24 by typing 24 in the size box or clicking the  next to the size box to change the size to 24. The font size box is located to the right of the font name.
8. Change any other properties, such as text color, if desired.
9. Click *OK* in the **Text Editor** to close the dialog and apply the changes.

Although we could add many more features to the graph, we will stop here. Additional features may be added now if you like.

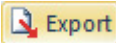


Exporting the Graph

If you are using the demo version of **Grapher** you will not be able to export the graph. Please proceed to Stopping and Saving the Script.

Since the graphs are used to create a report, each graph must be exported for use in another program.

To export the graph:

1. Click the **Home | IO | Export** command .
2. Type *tutorial script recorder* into the *File name* field in the **Export** dialog.
3. Select *PDF (Vector) (*.pdf)* from the *Save as type* list.
4. Check the *Show options dialog* box. Checking this option enables you to make any changes in the exported options.
5. Uncheck the *Use graph coordinates for export (when applicable)* box. The *Use graph coordinates for export (when applicable)* exports the graph using graph coordinates. For reports and images, it is best to have this option unchecked.
6. Uncheck the *Selected options only* box. The *Selected options only* option only exports the items that are currently selected in the graph window.
7. Click the *Save* button.
8. In the **Export Options** dialog, click on the **Vector PDF Options** tab.
9. Check the *Use application page size (if applicable)* box. This exports the entire page, not just the graph.
10. Check the *Compress images* and *Compress pages* boxes to make the file size as small as possible.
11. Click *OK* and the PDF file is created.

Stopping and Saving the Script

Now that the graph has been created, it is time to stop recording and save the script.

To stop and save the script:

1. Click the **Developer | Recorder | Stop** command .
2. A **Save As** dialog appears. Type *tutorial script recorder* into the *File name* box.
3. Click the *Save* button.
4. Right-click in the **Script Manager** and select **File | Close** to close the script in the **Script Manager**.

The recording is stopped and the tutorial script recorder.bas is saved for future use.

Running Scripts within Grapher

Assuming the file name is the same each time; the graphs are automatically created and updated each time the script is run. The script can be run from **Scripter** or from **Grapher**. In our tutorial scenario, when you receive the next set of data, with the same file name, run the script to produce the needed graph.

To run the script within **Grapher**:

1. Click the **Developer | Recorder | Run** command .
2. Click on *tutorial script recorder.bas* in the **Open** dialog, and click *Open*. You can watch the graph as it is created.



*The script will run and recreate what you recorded.
This is what the first quarter sample data looks like.*

Running Scripts from Scripter

Scripts can also be run from **Scripter**.

To run the script from **Scripter**:

1. Click on the Windows Start button.
2. Open the program list, select **Golden Software Grapher 11**, and click the **Scripter** link.
3. Click the **File | Open** command.
4. In the **Open** dialog, select the *tutorial script recorder. bas* file and click *Open*.
5. Click the **Script | Run** command or click the  button to start the script.

Automation Help

Advanced users needing help in **Scripter** can use the **Developer | Help | Grapher Automation Help** command for specific information about Grapher's objects, methods, and properties. Click the **Developer | Help | BASIC Language Help** command for information about BASIC commands. Or click the **Help | Contents** command in Scripter for information about the Scripter program.

Congratulations, you have completed the **Grapher** tutorial!

Advanced Tutorial - Saving Graphs

If you are using the demo version of **Grapher** you will not be able to save the graph.

When you have completed a graph in the plot window, you can save the graph to a **Grapher** .GRF file or a **Grapher** .GPJ project file. These files contain all the information necessary to reproduce the graph. When you save a graph, all the scaling, formatting, and parameters for the graph are preserved in the file.

The difference between a **Grapher** .GRF file and a **Grapher** .GPJ project file is that .GPJ files store data within the file and .GRF files save a link to the data but do not store the data internally in the file. If a .GRF file needs to be sent to a colleague, for example, you would need to send the data file along with the .GRF file. .GRF files are most useful when the data changes, as in the Lesson 8 tutorial. .GPJ files are most useful when the data does not change.

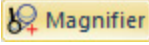
To save a graph:

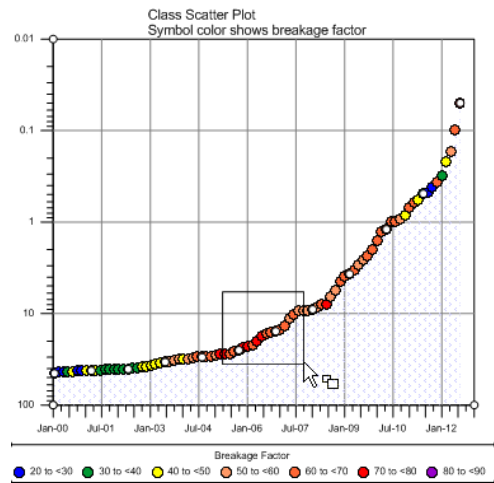
1. Click the **File | Save** command or click the  button in the quick access toolbar. The **Save As** dialog is displayed because the graph has not been previously saved.
2. Type a file name into the *File name* box.
3. In the *Save as type* list, select *Grapher File (*.grf)* or *Grapher Project (*.gpj)*.
4. Click the **Save** button to save the file to the current folder. The saved graph remains open and the **Grapher** title bar changes reflecting the changed name.

Advanced Tutorial - Using the Magnifier

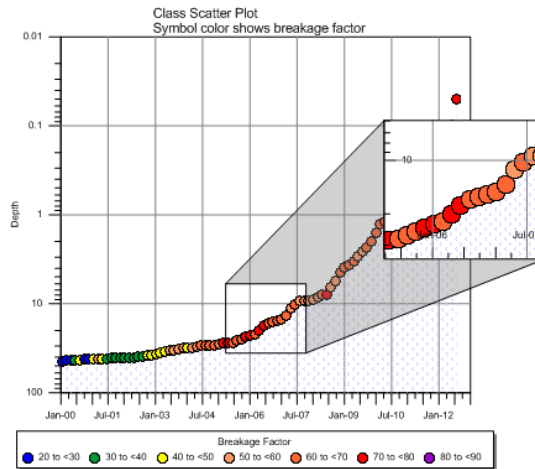
The **Graphs | Add Graph | Magnifier** allows you to magnify a portion of a 2D graph.

To open a sample file and add a magnifier to a 2D graph:

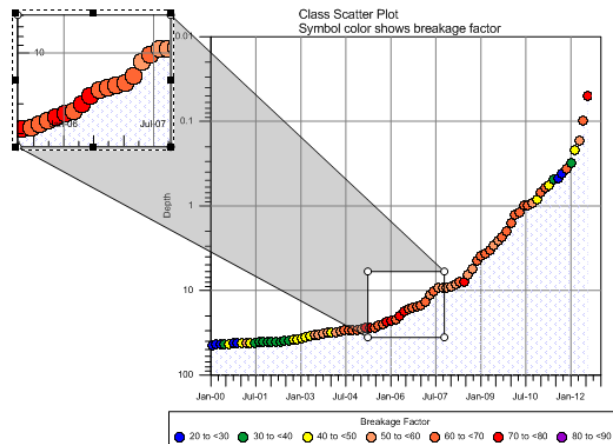
1. Click the **File | Open** command.
2. Navigate to C:\Program Files\Golden Software\Grapher 11\Samples, select *class scatter plot.grf* and click *Open*.
3. Select *Graph 1* in the **Object Manager**.
4. Click the **Graphs | Add to Graph | Magnifier** command  or right-click on *Graph 1* and select **Add Magnifier**.
5. The cursor changes to . Left-click and drag to define an area to magnify.



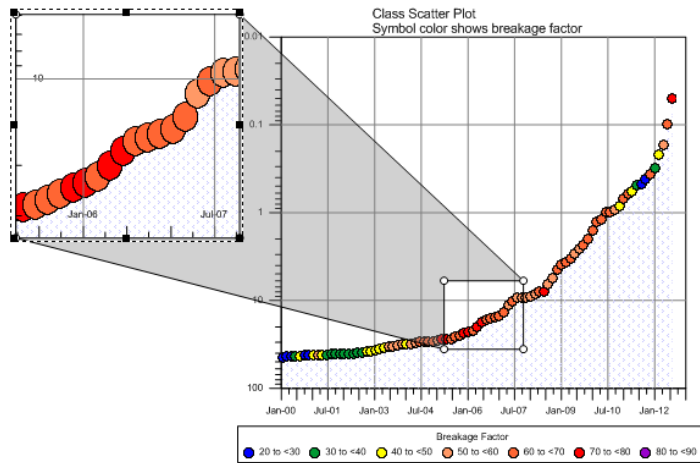
6. Release the cursor and the magnifier is created with the default settings. A *Graph Magnifier 1* object is added to the **Object Manager**.



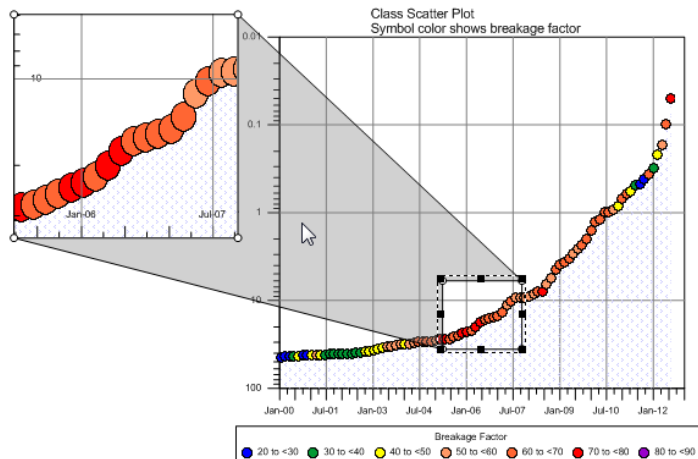
7. Select the *Graph Magnifier 1* in the **Object Manager**.
8. In the **Property Manager**, click the **Magnifier** tab to display the magnifier properties. The *Selected box* is *Zoomed area box* by default. The zoomed area box has six black boxes surrounding it in the plot window, indicating it is selected. Left-click the zoomed area box and drag it to a new location.



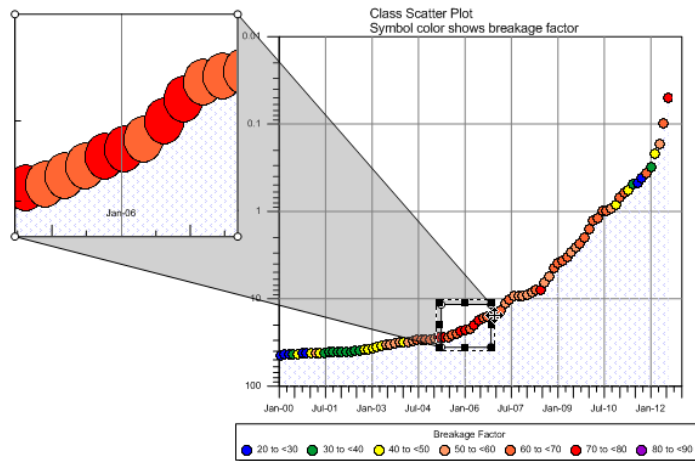
9. Drag the lower left black box and drag the cursor to resize the zoomed area box.



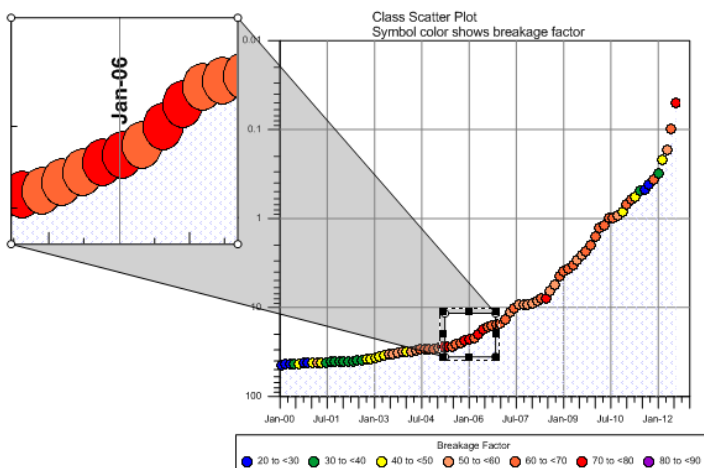
10. In the **Property Manager**, click the **Magnifier** tab to display the magnifier properties. Change the *Selected box* to *Area selection box*. The six black squares now surround the area selection box.



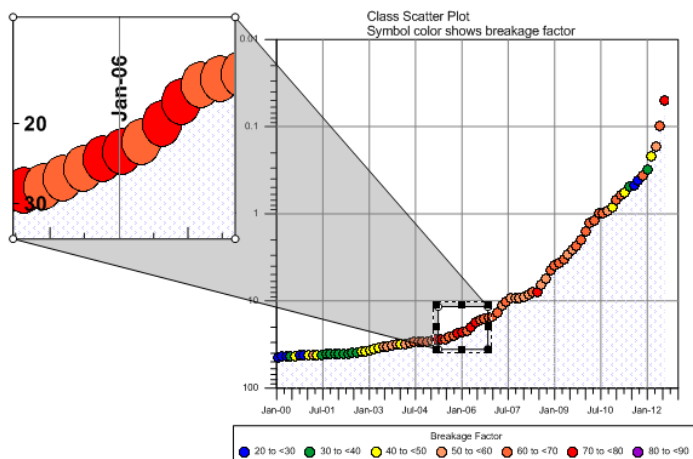
11. Drag the black square to resize the area selection box. The zoomed area box automatically updates to reflect the changes made to the area selection size and location.



12. In the **Property Manager**, click the **Tick Labels** tab to display the tick labels properties. The **X Axis 1** is selected by default.
13. Click the **+** next to **Major Labels** to expand the major label properties.
14. Click the **+** next to **Font** to expand the label **Font** section.
15. Change the **Size (points)** to 26.
16. Check the box next to **Bold**.
17. Next to **Offset**, type 1.80 in and press ENTER. The **Jan-06** label on the X Axis moves up, so it is not overlapping with the data points.
18. Next to **Angle**, type 90 and press ENTER. The **Jan-06** label on the X Axis rotates 90 degrees.

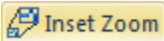


19. Next to *Axes*, click on *X Axis 1* and select *Y Axis 1* from the list.
20. In the *Minor Labels* section, check the *Show labels* box.
21. In the *Font* section, change the *Size (points)* to 26.
22. Check the box next to *Bold*.

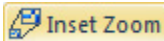


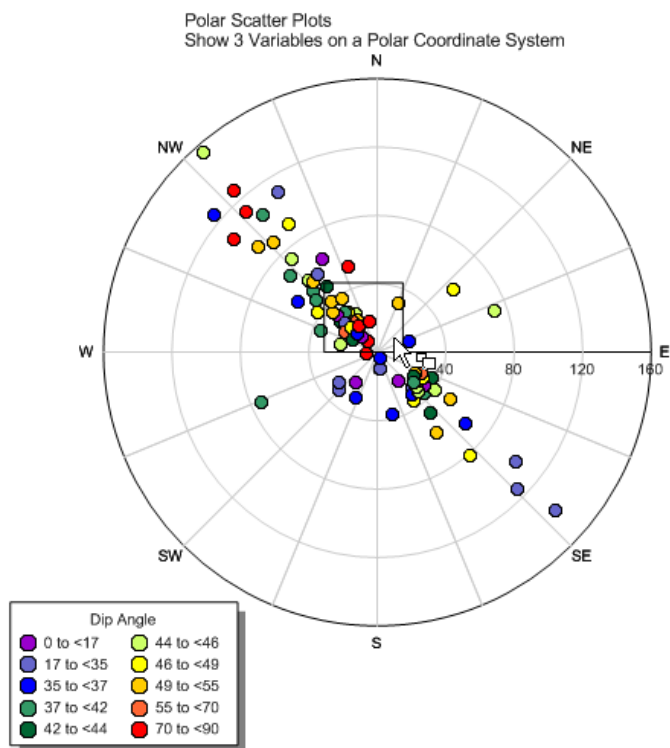
23. To magnify a portion of a 3D graph or polar plot, see the [Using the Inset Zoom](#) advanced tutorial lesson.

Advanced Tutorial - Using the Inset Zoom

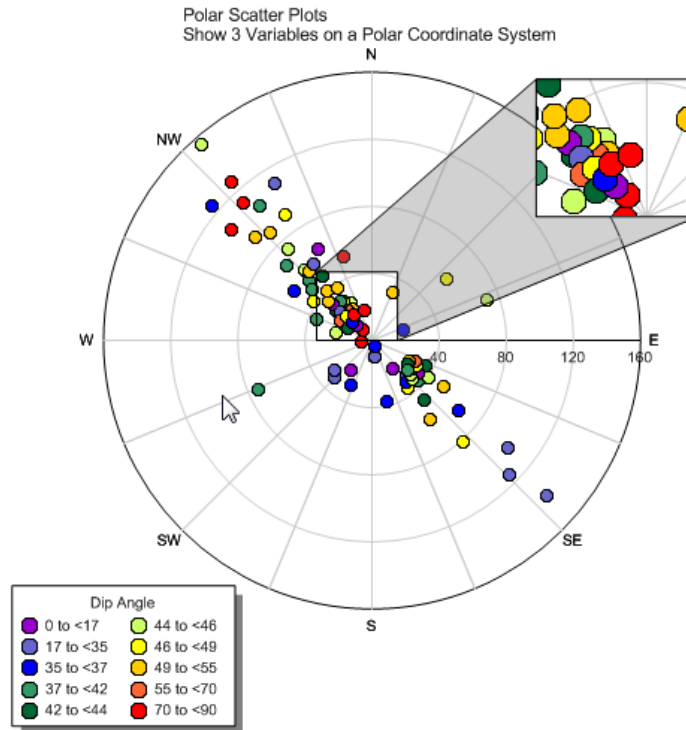
The **Draw | Inset Zoom** command  allows you to magnify a graph or any portion of the plot page. This type of inset is similar to changing the zoom level of the screen.

To open a sample file and draw an inset zoom:

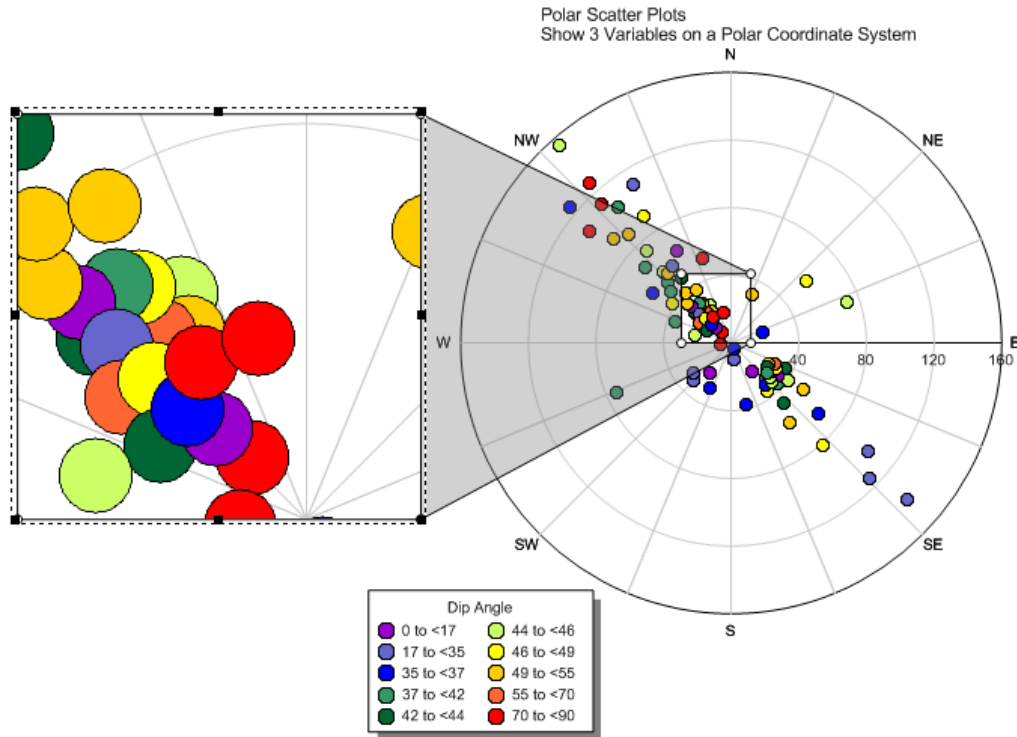
1. Click the **File | Open** command.
2. Navigate to C:\Program Files\Golden Software\Grapher 11\Samples, select *polar class scatter.grf* and click *Open*.
3. Click the **Draw | Inset Zoom** command .
4. The cursor changes to . Left-click and drag to define an area to zoom in on.



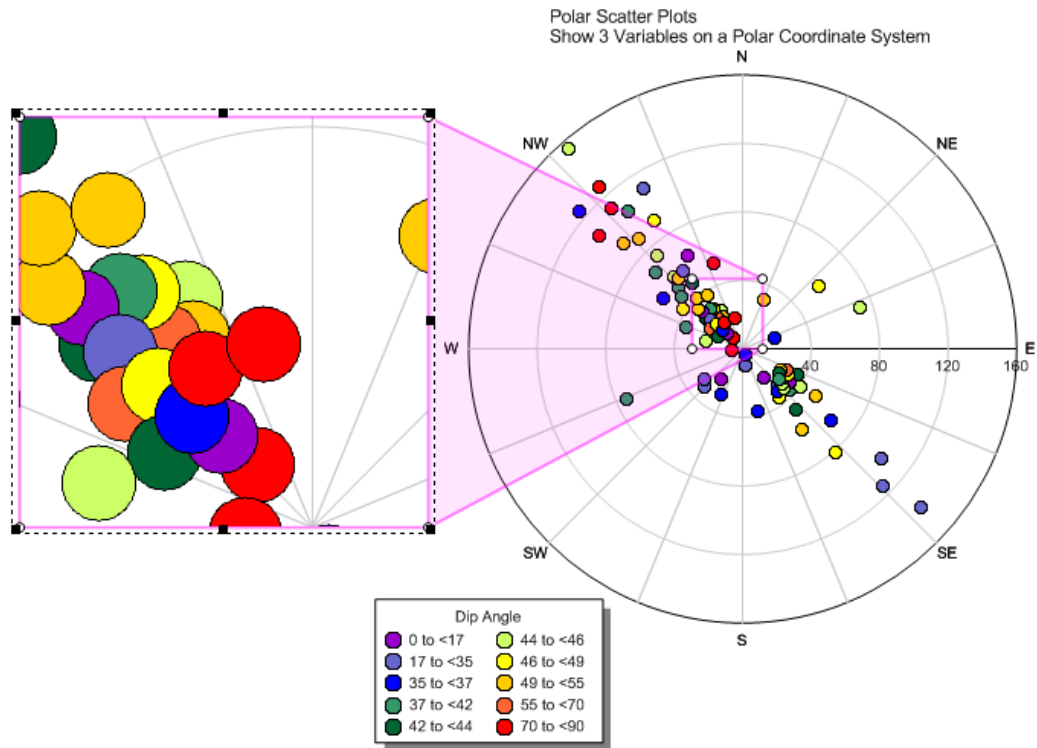
- Release the cursor and the inset zoom is created with the default settings. An *Inset Zoom 1* object is added to the **Object Manager**.



6. Select the *Inset Zoom 1*. In the **Property Manager**, click the **Magnifier** tab to display the magnifier properties. The *Selected box* is *Zoomed area box* by default. The zoomed area box has six black boxes surrounding it in the plot window, indicating it is selected. Left-click the zoomed area box and drag it to a new location.
7. Drag the lower right black box and drag the cursor to resize the zoomed area box.



8. In the **Property Manager**, click the **Lines** tab to display the lines properties.
9. Click the  to the left of *Zoom Box* to expand the zoom box section.
10. Click the  to the left of *Line* to expand the line properties.
11. Next to *Width*, type *0.03 in* and press ENTER.
12. Next to *Color*, click *Black* to open the color palette. Select *Magenta*. The color palette closes and the lines update to the new color.
13. Next to *Opacity*, enter 50% and press ENTER.
14. In the **Property Manager**, click the **Connector** tab to display the connector properties.
15. Click the  to the left of *Fill style* to expand the fill style properties.
16. Next to *Foreground color*, click *50% Black* to open the color palette. Select *Magenta*. The color palette closes and the lines update to the new color.
17. Next to *Foreground opacity*, enter 10% and press ENTER.



Advanced Tutorial - Combining Plots from Different Graphs

In **Grapher**, a *Graph* is an object that contains the plots, axes, legends, summation plots, and other items used to display data as any of the plot types. *Plots* are the lines, symbols, or bars that display the data on the graph. Plots can be added to a graph with the **Graphs | Add to Graph | Plot** command or can be moved between graphs in the **Object Manager**.

Adding a Plot to an Existing Graph

To add a plot to an existing graph:

1. Click on the existing plot, axis, or graph in the **Object Manager** to select it.
2. Click the **Graphs | Add to Graph | Plot** command .
3. Select the plot type and click *OK*.
4. Set the axes to use for the new plot, if required, and click *OK*.
5. Select the worksheet to use for the new plot, if required, and click *Open*.
6. The new plot is added to the existing graph.

Dragging a Plot from One Graph to Another

To drag a plot from one graph to another:

1. Click on a plot in the **Object Manager**.
2. Hold down the left mouse button and drag the plot to a different graph object.
3. Release the mouse button.
4. If multiple axes exist in the new graph, select the *Graph*, *X Axis*, and *Y Axis* in the dialog and click *OK*.
5. The plot is moved to the new graph and is drawn using the selected axes. The old graph still exists, but can be deleted if desired.

Copying a Plot from One Plot Window to Another

To copy a plot from one plot window to another:

1. Open a .GRF, .GPJ, or .GRT file.
2. Click on a plot in the **Object Manager**.
3. Click the **Home | Clipboard | Copy** command.
4. Open another .GRF, .GPJ, or .GRT file.
5. Click the **Home | Clipboard | Paste** command.

6. In the Choose Axes dialog, select the appropriate *Graph*, *X Axis*, and *Y Axis*. Click *OK*.
7. The plot is copied to the new plot window in the appropriate graph.

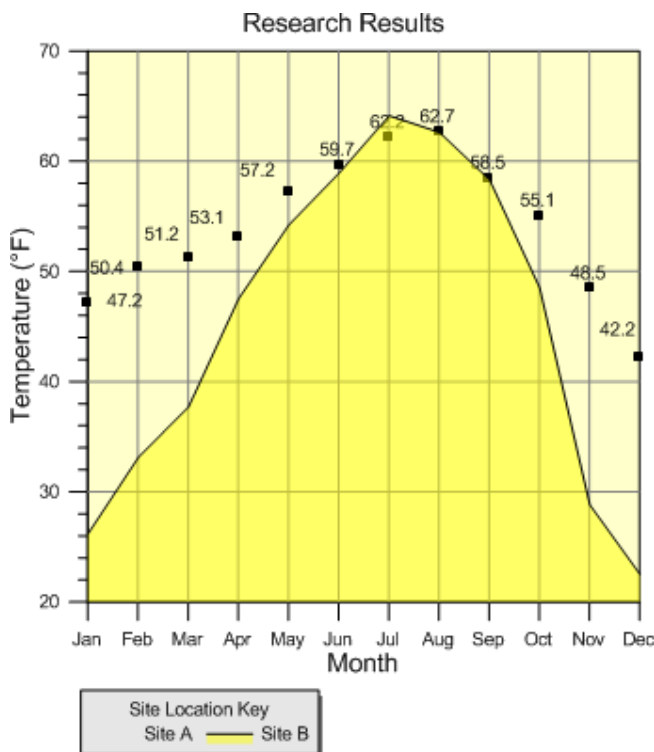
Notes:

- Some plot types, such as radar plots and pie charts, cannot be moved between plots.
- When more than one axis of any type exists on the graph, a dialog appears where you specify which axes to use.
- 2D plots can be moved to 3D plots, but the plot does not become a 3D plot. If you want to move a 2D plot to a 3D plot, first convert the 2D plot to a 3D plot using the **Graphs | Plot | Change Plot To | Convert to 3D** command . Then, drag and drop the 3D plot into the other 3D graph.
- A 3D XYY plot can be moved to a 2D graph. The 3D XYY plot becomes a 2D plot.
- A 3D XYZ plot can be moved to a 2D or 3D XYY graph. If you drag a 3D XYZ plot to a 2D graph, only two dimensions are displayed. If you drag a 3D XYZ plot to a 3D XYY graph, **Grapher** automatically adds a new Z axis.

Advanced Tutorial - Using Axis Linking

If you saved the graph from the previous lessons, that graph can be opened and used for this lesson. If you did not save the graph, run through the steps in [Lesson 2 - Creating a Graph](#) to create the default line plot.

Once a graph is created, you can use the steps below to set up another axis that automatically links to an existing axis. This lesson focuses on adding another Y axis that is using a different scale. Here is the graph created after following Lessons 2 through 7:

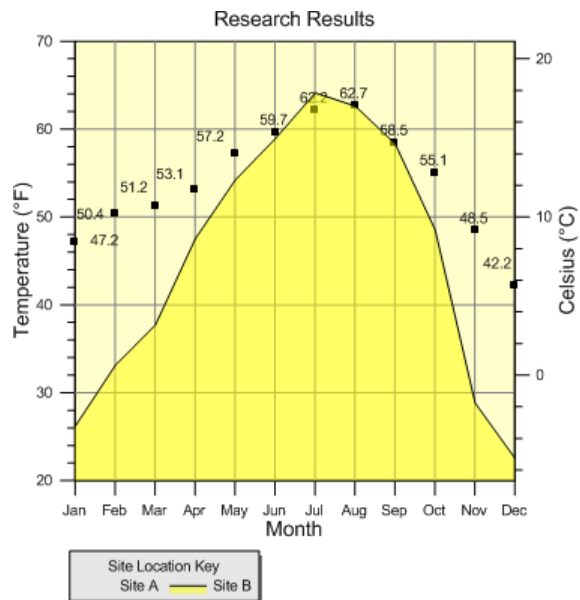


This graph displays a Y axis on the left side that is in Fahrenheit.

1. Click on any portion of the graph in the **Object Manager** to select it.
2. Click the **Graphs | Add to Graph | Axis** command .
3. In the **Axis Type** dialog, set the *Select axis type* to *Y Axis* and click *OK*.
4. In the **Position Y Axis 2** dialog,
 - a. Set the *Position* to *At the right of...* and *X Axis 1*.

- b. Check the box next to *Flip tick marks and labels*.
 - c. Click *OK* and the new axis is added to the graph.
- 5. Click on the *Y Axis 2* in the **Object Manager** to select it.
- 6. In the **Property Manager**, click on the **Link Axis** tab to edit axis linking.
- 7. Change the *Link axis* option by clicking on *None* and selecting *Y Axis 1* from the list. This is the controlling axis. When this axis changes, any linked properties on the current dependent axis will automatically update.
- 8. Check the box next to *Link limits*. This changes the limits on the new axis to match those on the controlling axis. The limits now show 20 to 70.
- 9. Click on the *X* next to *Limits $Y = F(X) =$* box. Type $(X-32)*5/9$. Press ENTER on the keyboard to make the change. The axis limits automatically update to apply the equation to the dependent axis limits. *X* in the equation refers to the controlling axis. So, the *Minimum* value (20) has 32 subtracted from it and then is multiplied by 5/9 to get the *Minimum* value for the new dependent axis. The same process is used with the *Maximum* value (70) to calculate the dependent axis maximum. The new axis *Minimum* is -6.667 and the *Maximum* is 21.111.
- 10. We also want the axis to stay located in the same relative location when the graph moves. Check the boxes next to *Link X position* and *Link Y position*. Now, when any portion of the graph is moved, the axis will also move.
- 11. Edit any other portions of the new axis, such as tick labels, tick marks, axis title, etc.

When the graph is moved or the axis limits change, the *Y Axis 2* automatically updates to stay in the same relative location and the same relative axis limits as *Y Axis 1*.



Adding a linked axis provides additional information to the graph reader and automatically updates when the plot or graph change.

Congratulations, you have completed all of the **Grapher** advanced tutorial lessons!