NEMETSCHEK Vectorworks

JONATHAN PICKUP

VECTORWORKS ESSENTIALS

SAMPLE

7TH EDITION TUTORIAL MANUAL | WRITTEN WITH VERSION 2015

VECTORWORKS ESSENTIALS
TUTORIAL MANUAL

SAMPLE

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written with version 2015

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There are several people I would like to thank: Steve Scaysbrook, Roger Williams, and Bill Vincent. Without them, none of my manuals would be as good as they are.

A big thank you to my wife, Marie, and my children. I need your support and understanding in order to invest the hours necessary to create these manuals.

Jonathan Pickup, January 2015

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1.0 Introduction to Vectorworks

In this chapter you will look at the basic interface of Vectorworks and learn about basic concepts for creating, selecting, and deleting objects and how to assign graphic attributes to objects.

This chapter is important because it covers the most basic concepts in Vectorworks, the concepts that make it different from other programs.

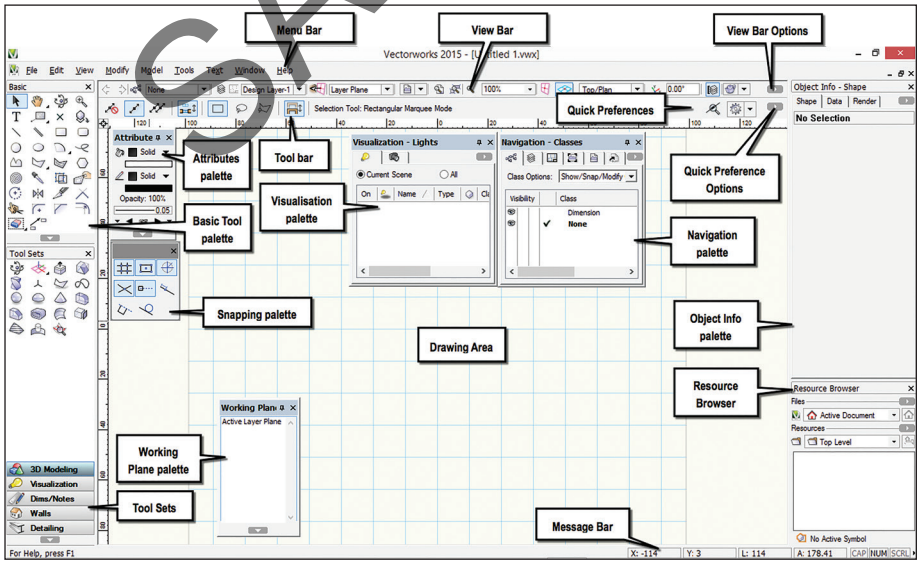
Vectorworks is a powerful program that can be utilized by those in a range of professions—from engineering and landscape to set and lighting design and architecture. Vectorworks uses a combination of tools and concepts to create sophisticated drawings and models. It includes a database/reporting component and a built-in scripting language that allows you to make your own custom tools.

Vectorworks can be used to create simple drawings for joinery, a whole set of contract documents for a large commercial building, landscaping design, or a virtual model of a building that you can walk around or fly through.

1.1 Vectorworks Interface

When you start Vectorworks it looks like this on a Windows machine:

movie
movie001.mov



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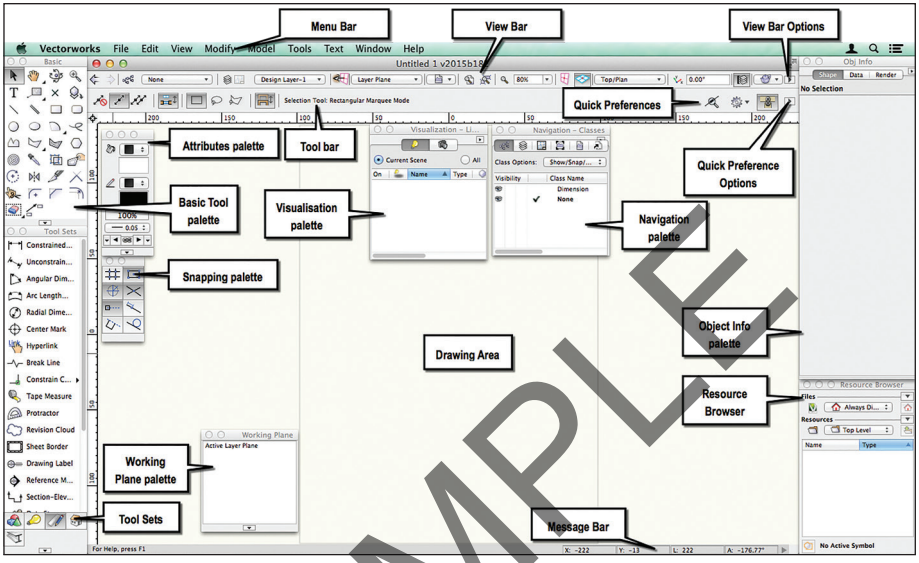
And like this on a Macintosh:

movie
movie002.mov

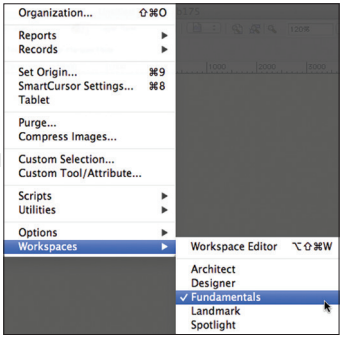


Workspaces

movie
movie003.mov

The arrangement of the Menu bar and Tool palettes is called a workspace. There are workspaces for architects, landscapers, and engineers. You can choose from a range of workspaces by going to the Tools menu, clicking on Workspaces, and then clicking on the workspace that you want.

- Go to the Menu bar.
- Choose **Tools > Workspaces > Fundamentals.**



Since it is so easy to change workspaces and create your own customized workspaces, you should get into the habit of changing the workspace to one that you like.

This manual uses the Fundamentals workspace. If you do not change to the Fundamentals workspace, you may find that the instructions in this manual do not work correctly.

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Menu Bar

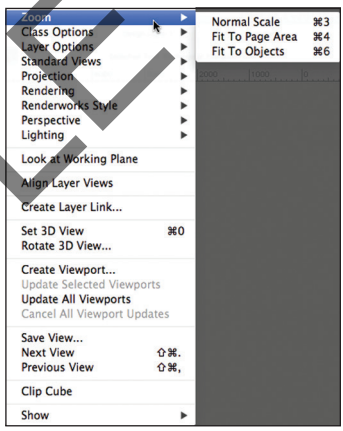
movie
movie004.mov

The Menu bar is at the top of the screen.

These are the menus for the Fundamental workspace.

These menu commands instruct the computer to carry out the required action, such as opening a document, rendering an object, and so on.

When you click on a name in the Menu bar, the commands in that menu drop down. You will see that some are black and some are gray. The "grayed out" commands are unavailable or are inappropriate for the current tool or mode that you are presently working in. All of the available commands are shown in black. As you move the pointer down the list of commands, they will be highlighted. To choose the highlighted command, just release the mouse button on a Macintosh, or click on the desired command on a Windows machine.



This is standard Macintosh and Windows interface so far. If you are currently using a computer, all of this will be familiar.

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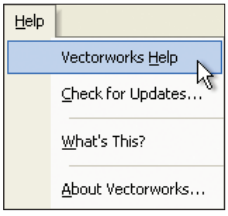
Help Menu

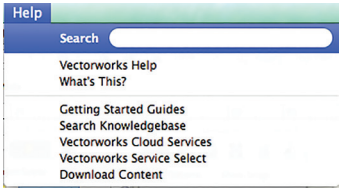
movie
movie005.mov

The last option on the Menu bar is the Help menu. This command will open your Vectorworks Help. You need Internet access for this.

- Go to the Menu bar.
- Choose **Help > Vectorworks Help...** (Windows).

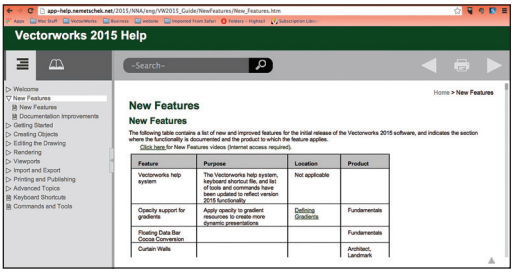


- Choose **Help > Vectorworks Help...** (Macintosh).



You will see a list of bookmarks.

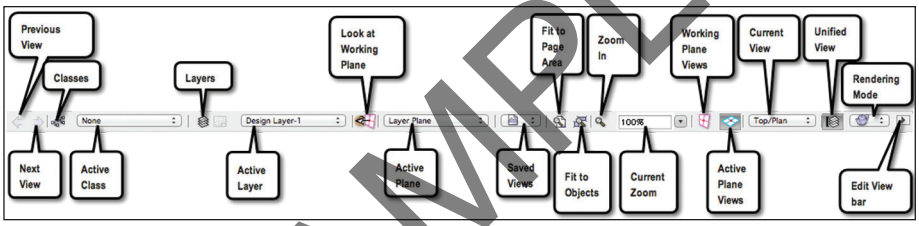
- Click on the topic, click on the index, or click on the search button to give you the ability to search for a specific word or phrase.



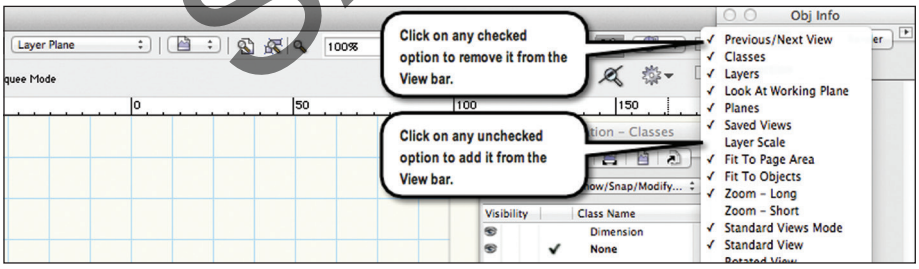
View Bar

movie
movie006.mov

The View bar contains many of the view functions into one area. It allows you to save and retrieve views and choose settings for what you see on the drawing, the rendering, zoom, and so on.



You can edit the View bar by right-clicking (Ctrl+click on a one-button mouse), or you can click on the View bar menu. This allows you to choose the parts that you want to see. This bar is really useful, so watch the movie for a detailed explanation.



Message Bar

movie
movie007.mov

The Message bar at the bottom of the screen shows where the cursor is at the moment and displays alert messages.

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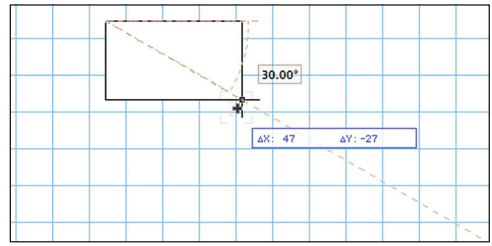
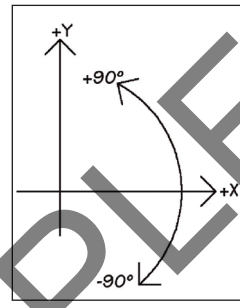
There is also a **Floating Data bar** that can pop up when you create something. This shows you the size of the object you are drawing, and it allows you to enter dimensions directly into the fields using the keyboard. This allows you to accurately control the size of the object you are drawing.



The Message bar and the Floating Data bar use X and Y coordinates. X dimensions are horizontal, and Y dimensions are vertical.

The angular dimensions do not follow surveyor's bearings; they follow the Cartesian coordinate system where 0º is across to the right, 90º is up the screen, and -90º is down the screen.



If you type in a dimension on the Floating Data bar, it will be in your current units. If you want to type in a dimension using different units, just type the dimension followed by the unit mark. For example, to enter 3 feet and 6 inches, type in 3'6" and then hit the Return or Enter key. You can also use simple arithmetic: for example, plus (+), minus (-), divide (/), and multiply (*).

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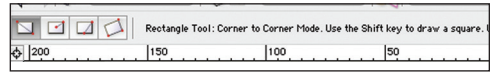
Tool Bar

movie
movie008.mov

The Tool bar tells you what tool mode you have selected and sometimes provides instructions about what to do next. The options or modes are displayed by icons in the Tool bar along with a brief description of each mode as it is selected.



When you select a tool, you have to check the Tool bar to see what mode the tool is in. It may not be appropriate to what you want to do.

The Tool bar has options for quick access to Vectorworks preferences, and it has options for the Data Display bar.

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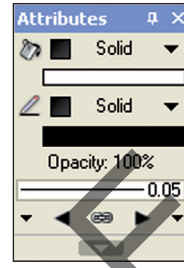
1.2 Palettes

Several palettes control different aspects of your design:

movie
movie009.mov

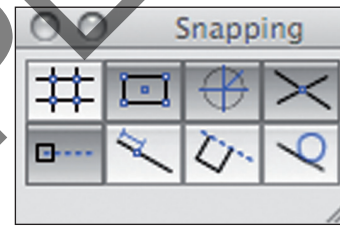
The **Attributes** palette controls the graphic attributes (line style, thickness, color, etc.) of the object that you are creating or modifying.



The **Snapping** palette contains snaps to control the way that a tool is being used.

The Snapping palette controls the way that you snap and create an object (to be perpendicular, parallel, etc.).

If you do not turn on some of the snaps, you will not be able to snap onto any object. The most useful snaps to leave on all the time are the ones shown darker.



The snaps are turned on and off by clicking on them with the mouse.

On the Macintosh, the snaps are darker when they are switched on. On the Windows machine, the snaps are lighter when they are switched on.

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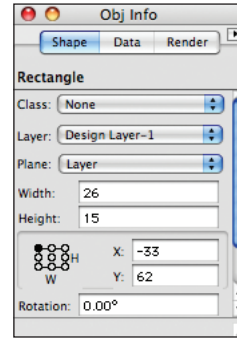
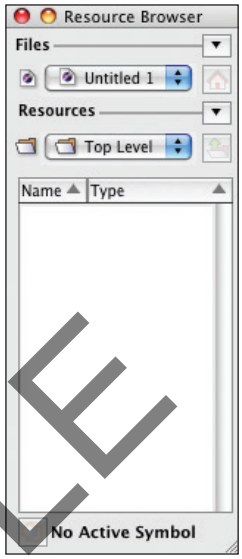
The **Object Info** palette displays information about the object created or selected. You can use the Object Info palette to change the size or location of an object, change the layer or class the object is assigned to, and add or edit database information.



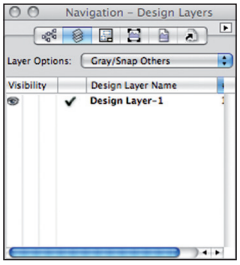
If you have Renderworks, this palette will have three tabs; otherwise, it will have only two. The three tabs are for Shape (to control the size and location of objects), Data (to control information attached to objects), and Render (to control textures assigned to objects if you have Renderworks).

The **Resource Browser** allows you to place, import, and organize resources (gradients, hatches, images, symbols, textures, and worksheets).

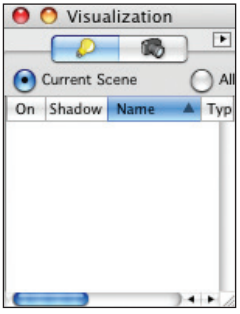
The Resource Browser can be used to look into other files to get these resources.



The **Navigation** palette gives you quick access to various aspects of your drawing (layers, classes, saved views, and viewports). This palette is only available if you have Vectorworks Designer or one of the design series. It is not available if you have Fundamentals.



The **Visualization** palette is used to manage camera and lights.



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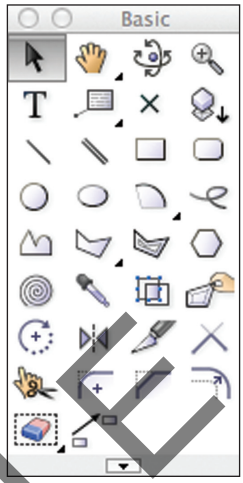
Tool Palettes



The Basic Tool palette contains all the standard Planar tools for creating and editing.

Tools in Vectorworks stay active until a different tool is chosen. So if you select the Rectangle tool, it will stay active until you select a different tool. Clicking on the screen will start creating another rectangle even if you only want to select the Zoom tool.

The strategy is to select the tool first and then click on the screen. When you are finished with the tool, choose the next tool that you want.

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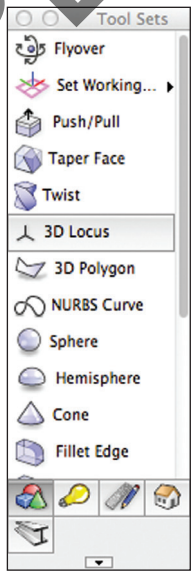
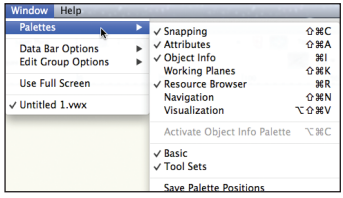
The Tool Sets palette contains tools that are used for creating and modifying more advanced objects. The tools are grouped together in tool sets. The tool sets can be dragged off to make a separate tool palette, sometimes called tear-off palettes.

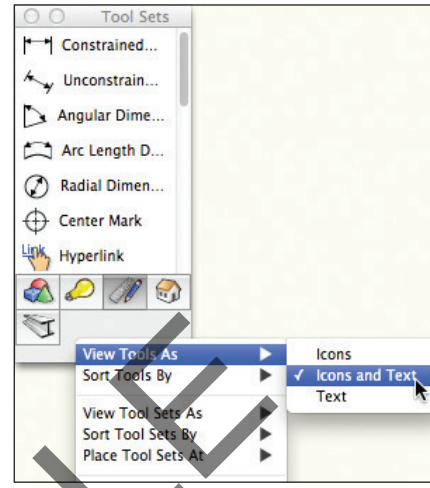


All of these palettes are known as floating palettes because they can be moved anywhere on the screen by clicking onto their title bar and dragging the palette to the desired location. With Windows, many of these palettes can be docked to either side of the screen or at the top of the screen.

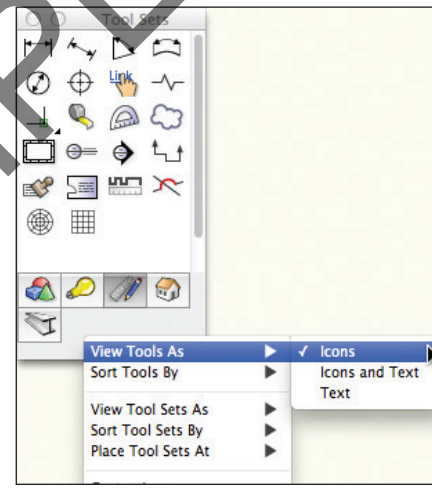
- To find palettes, go to the Menu bar.
- Choose **Window > Palettes** and select the palette that you want.
- If the palette has a tick next to its name, the palette is open. If you choose the palette again, the palette will close. To open the palette, choose it again.



When you first start to use Vectorworks, you might find it is easier to learn the tools by viewing the tools as icons and text.



After you have used Vectorworks for a while, you might want to try viewing the tools as icons only.



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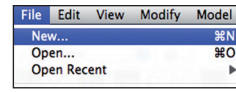
1.3 Filing

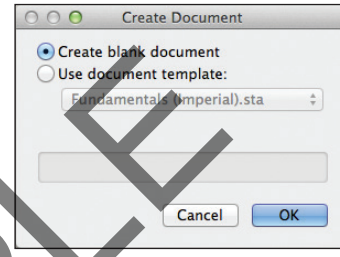
movie
movie010.mov

New File

- To create a new Vectorworks document, from the Menu bar choose **File > New...**



This allows you to create a new file from a blank Vectorworks template. Using a template means that the new drawing will be exactly the same as the template in every way except for its name.



Template drawings can be created with all your favorite settings and saved as a template so that you don't have to set them up in every new drawing that you create. They can even have drawn objects in them, such as title blocks and symbols.

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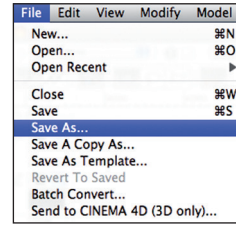
Saving Files

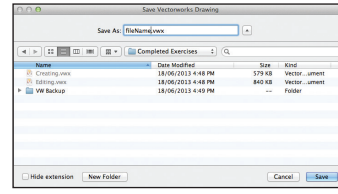
movie
movie011.mov

Once you begin a drawing in Vectorworks or open an existing file, you will need to continually save your drawing. Until you save a file, anything you have drawn will not be stored. When you use the "Save" command, you are storing the file onto your hard drive.



- Go to the **Menu** bar.
- Choose **File > Save** or **Save As...**

The first time you save a file, you get the opportunity to decide where you want to store it.



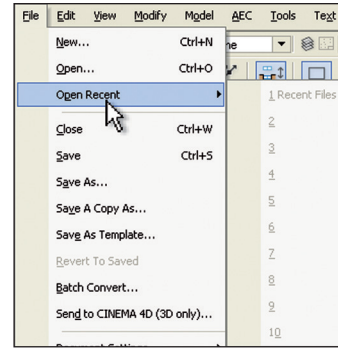
- Make sure that you store the drawing into the correct folder on your hard drive or in the correct folder on the server—if you are using Vectorworks in a network.

Opening Existing Files

When you create files with Vectorworks, you should remember to store them in a separate place on your hard drive from where Vectorworks is stored.

- To open an existing drawing file, from the **Menu** bar, choose **File > Open...**
- Locate the file that you want and click on the **Open** button.

Recently opened drawings are shown on the File menu. If the file you want is listed there, just select it from the list. Otherwise, use the Open command from the File menu. If you have opened the file recently, then you can use the recent file command from the Menu bar.



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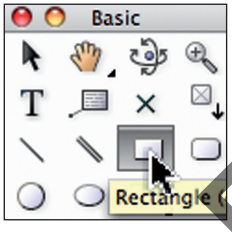
1.4 Creating Objects

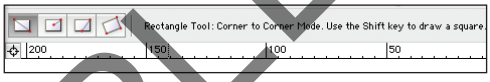
There are three main ways to create objects in Vectorworks. We will create three rectangles using each of the three main ways to do so.

movie
movie012.mov

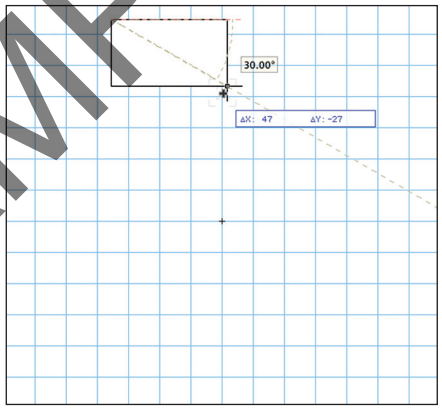
- Go to the **Basic** tool palette.
- Select the **Rectangle** tool.



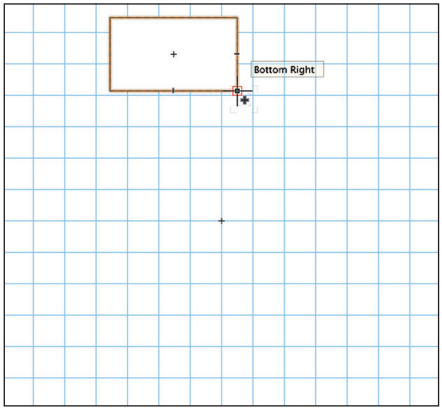
- Go to the **Tool** bar, the area just above the drawing area.
- Click on the **first** mode.



- Click once to start the rectangle.
- Move your cursor down and to the right.

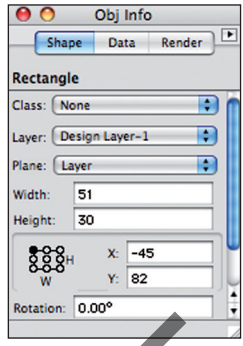


- Click once to finish the rectangle.

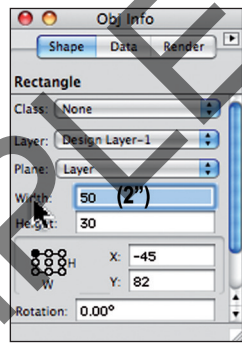


SAMPLE

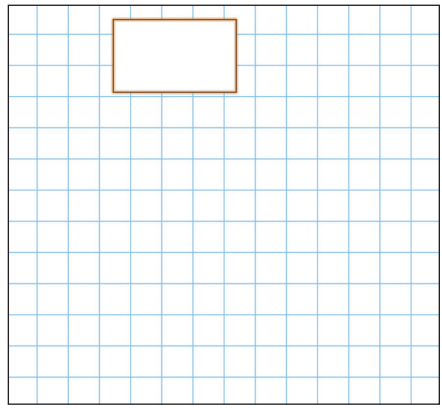
- If you look at the **Object Info** palette, you will see the size of the rectangle that you have created.



- Use the **Object Info** palette to change the width to **50mm (2”)**. Type in the size you want, and then hit the Tab key once to move to the next field on the Object Info palette.



- Notice how the rectangle changed size while one side of the rectangle stayed where it was. This is controlled by the box position control, the series of nine dots on the Object Info palette. The black dot represents the origin of the object.



SAMPLE

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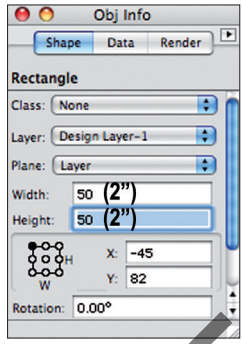
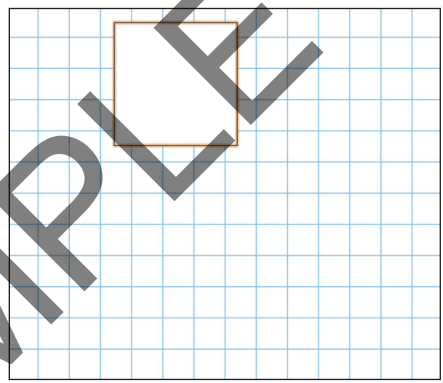
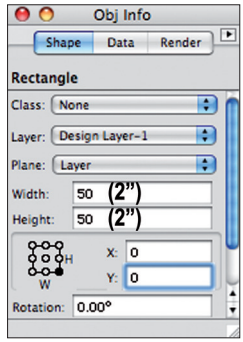
- Use the **Object Info** palette to change the height to **50mm (2”)**. Type in the size you want, and then hit the Tab key once. Vectorworks will apply the new dimension to the rectangle.



- Notice how the rectangle changed size while one corner of the rectangle stayed where it was. This is controlled by the box position control, the series of nine dots on the Object Info palette.

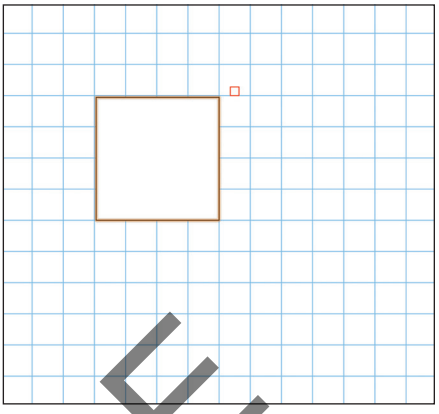


- Now we can use the **Object Info** palette to move the rectangle on the screen. The middle part of the Object Info palette controls the position of the rectangle.
- Set the box position (the black dot in the grid of nine) to the bottom right by clicking on the bottom-right radio button.
- Change **X** and **Y** coordinates to **0**.
- Notice how the rectangle has moved on the screen.



SAMPLE

This is the first way of drawing in Vectorworks. It's accurate because you change the size and location of the object after you have drawn it, but it's not the fastest way.

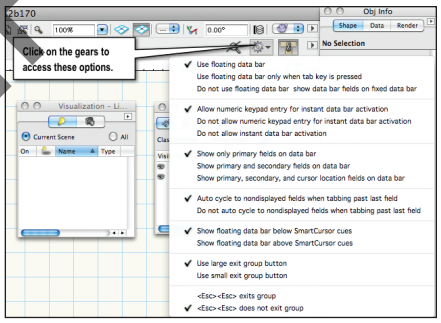


Drawing with the Floating Data Bar

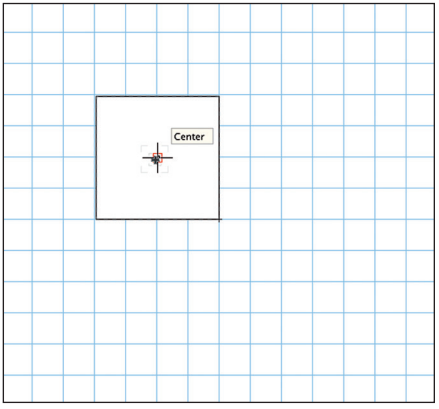
movie
movie013.mov

The second way to draw objects is to use the Floating Data bar.

- Go to the **Tool** bar.
- Click on the gear button at the right side of the Tool bar.
- Check the settings for the Data bar. Click on the option to **Use floating Data bar**.
- Click on the gear button and set each option to match the image.



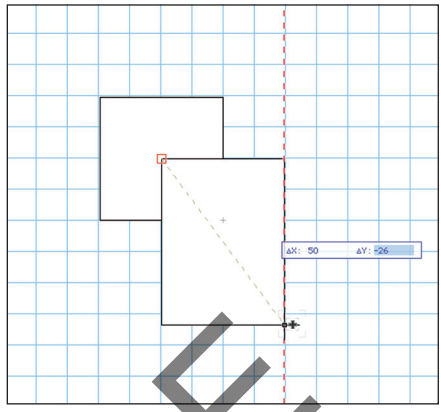
- Make sure the **Rectangle** tool is still active.
- Move to the center of the first rectangle and click once.
- Move down to the right.



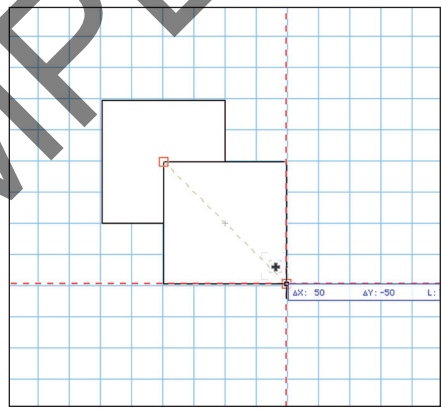
SAMPLE

 © 2015 Jonathan Pickup

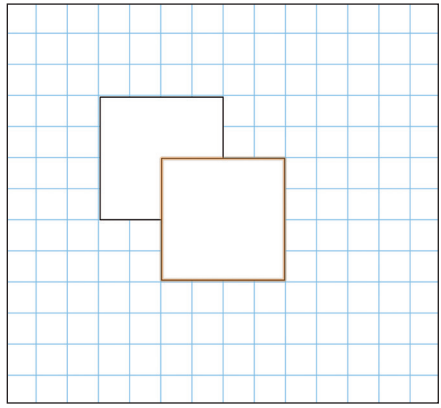
- Notice the Floating Data Display bar.
- Hit the Tab key once. This gets you into the **floating Data Bar**.
- If you set the Data bar option to Allow numeric keypad for instant Data bar activation, you can type directly into the Data bar with the numeric keypad, without hitting the Tab key. This method is really fast.
- Type in the dimension you want for the **X** direction: **50mm (2")**.
- Hit the **Tab** key once.
- Notice the rectangle is fixed in the X direction.



- Type in the dimension that you want for the **Y** direction: **-50mm (-2")**.
- Hit the **Enter** key once.
- Notice the rectangle is fixed in the Y direction.



- Click once to finish, or hit the **Enter** key once more.



This method is faster than the last one, and it is accurate.

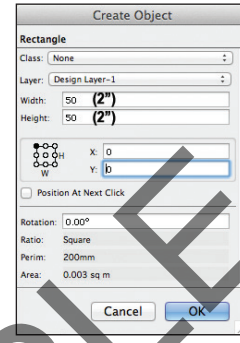
SAMPLE

Drawing with Dialog Boxes

- The third way to draw objects is to use the **Create Object** dialog box. Some tools have the ability to create an object if you double-click on the tool in the Tool palette.

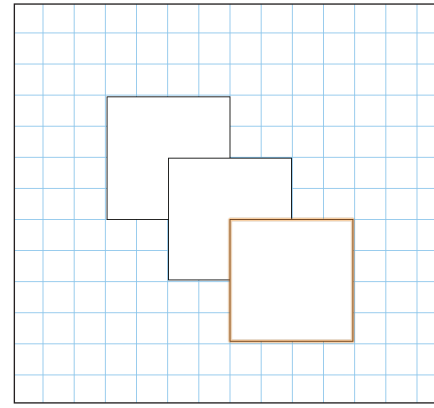
movie
movie014.mov

- Double-click on the **Rectangle** tool.
- The Create Object dialog box opens.
- Type in the dimension you want for the width field: **50 mm (2”)**.
- Hit the **Tab** key once to move to the next field.
- Type in the dimension that you want for height field: **50mm (2”)**.
- Set the box position (the black dot in the grid of nine) to the top left by clicking on the correct radio button.
- Enter the coordinates for the origin of the rectangle:
  X = 0
  Y = 0
- Click on the **OK** button.



The new rectangle is placed in the correct position and to the correct size.

This method is also fast and accurate and works well for some objects but not all (e.g., continuous walls, polygons, etc.).



SAMPLE

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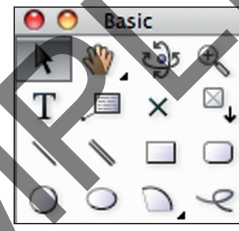
1.5 Selecting and Deselecting

Fundamental to using Vectorworks is the ability to select one or more objects. Without the ability to select an object, you will not be able to move, rotate, or edit the object. Most editing tools require you to select an object before you edit or manipulate it. Some other programs may work differently, but not Vectorworks. You must select the object and then pick the tool.

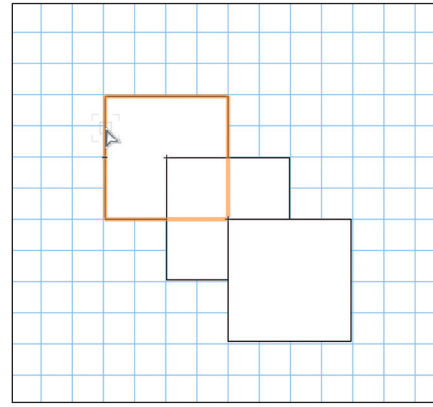
movie
movie015.mov

To select an object, use the **Selection** tool. Move the cursor to the object that you want to select and click once. You will notice that when you move the cursor over an object, the cursor changes shape and the object highlights. It does that to let you know that it recognizes an object that can be selected.

- Use the **Selection** tool to select the first rectangle that we made.

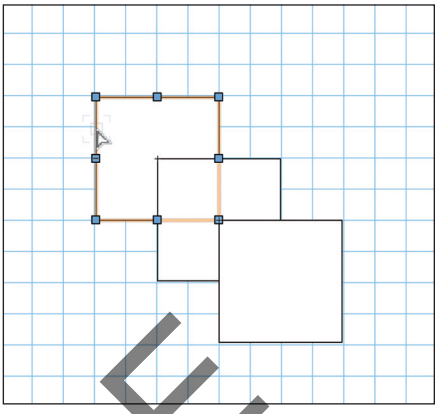


- To select an object, move your mouse to the edge of the object and click once with the mouse.
- Notice that when you get near to an object, it highlights. This is called pre-selection, and it makes it easy to tell which object you will be selecting before you click on it.



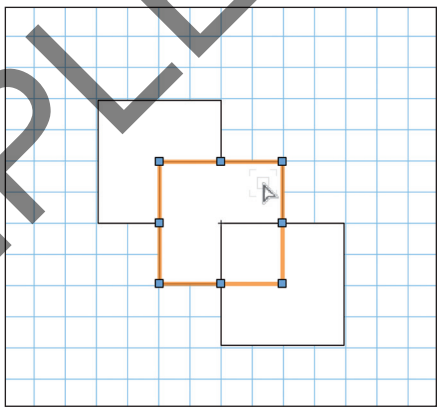
SAMPLE

Any selected object will be shown by the highlight color.



If you have selected the second or third mode on the Tool bar, you will also see blue handles on the object. These allow you to interactively scale (reshape) the object.

- Click on the second rectangle that we made and notice how the first rectangle is no longer selected.
- To deselect objects, click away from everything; that is, click in a blank part of the drawing.



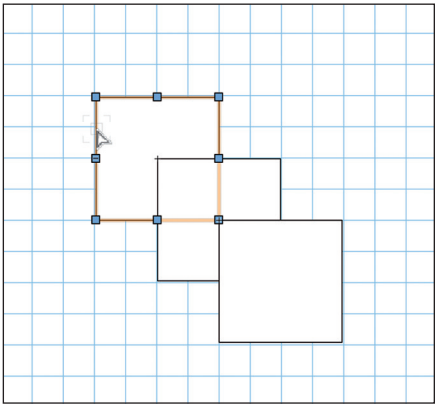
SAMPLE

Selecting More Than One Object

movie
movie016.mov

Selecting more than one object lets you move or edit several objects, to delete several objects, and so on.

- Use the **Selection** tool to select the first rectangle that we made.



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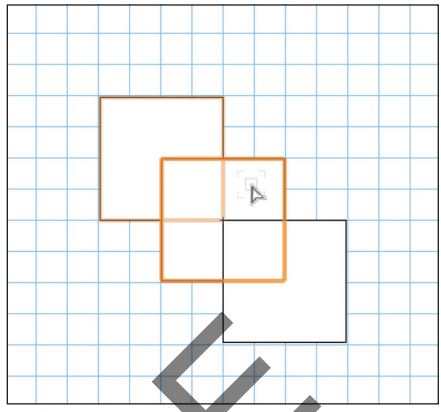
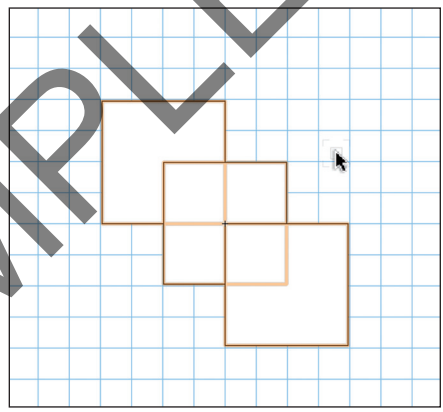
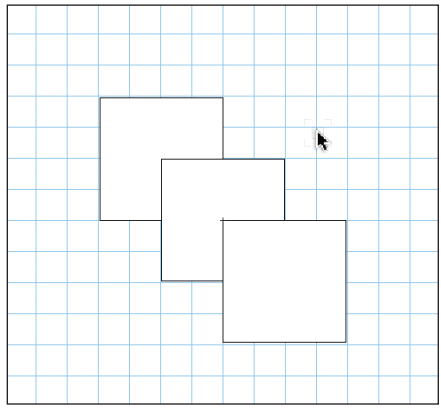
- With your finger on the **Shift** key, click on the second rectangle that we drew. Notice that you have two objects selected.



- With your finger remaining on the Shift key, click on the third rectangle that we drew. Notice that you have three objects selected.



- To deselect objects, click away from everything; that is, click in a blank part of the drawing.

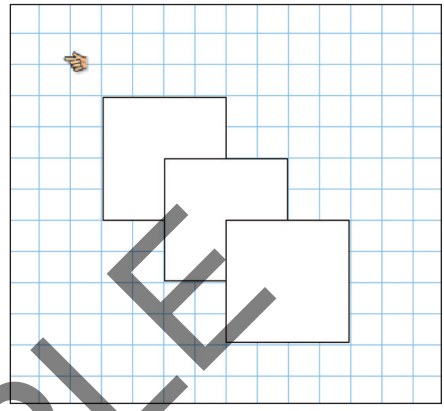


SAMPLE

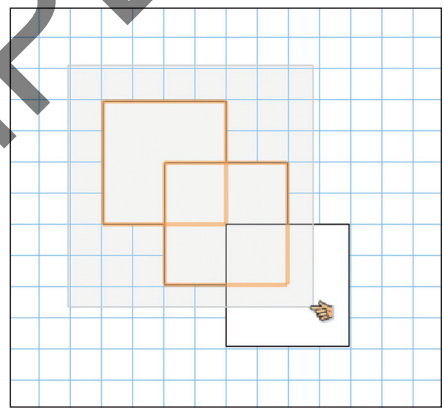
Another way to select several objects is to use the mouse to drag a marquee (or selection box) around all the desired objects.

movie
movie017.mov

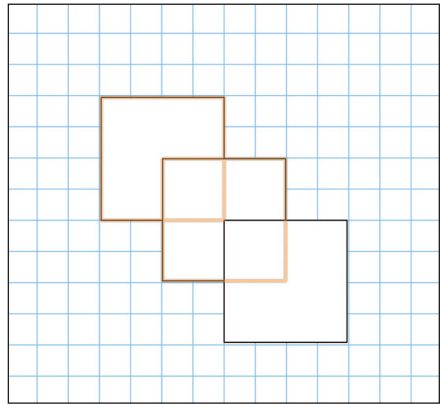
- To start the selection marquee, move beyond the top-left corner of the first rectangle.



- Click and drag your mouse.
- Drag the marquee over the first two rectangles.
- Release the mouse button.



- Notice that only the first two rectangles are selected. Only objects that are totally enclosed by the marquee will be selected this way.



SAMPLE

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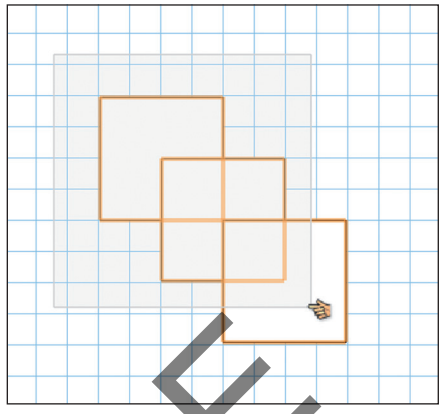
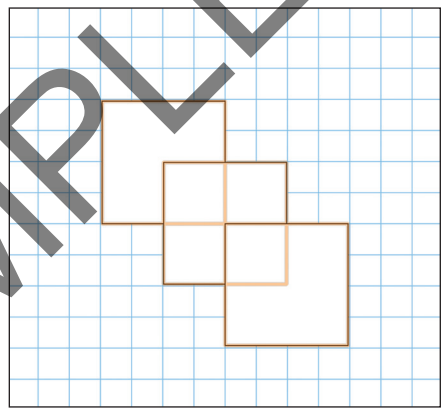
- Drag the same size marquee, this time holding the **Option** key (Macintosh) or the **Alt** key (Windows).



- Notice that everything you touch with this marquee is selected.

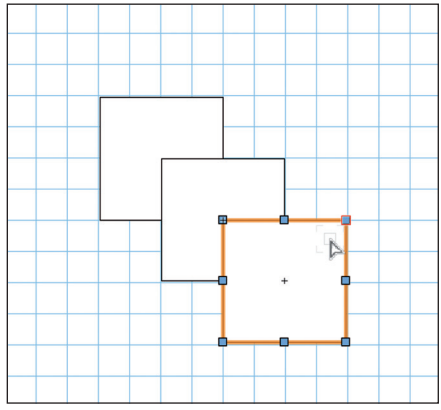


SAMPLE

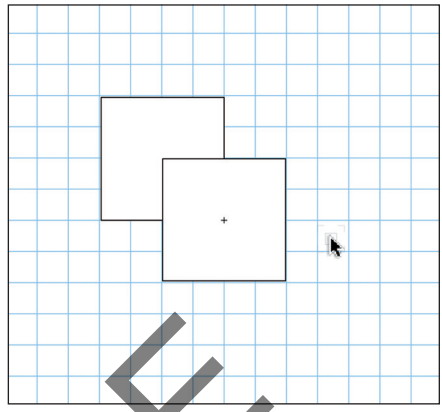
Deleting Objects

movie
movie018.mov

- Select the object to be deleted.



- Hit the **Delete** key on the keyboard, use the **Backspace** key, or right-click and choose **Cut**.



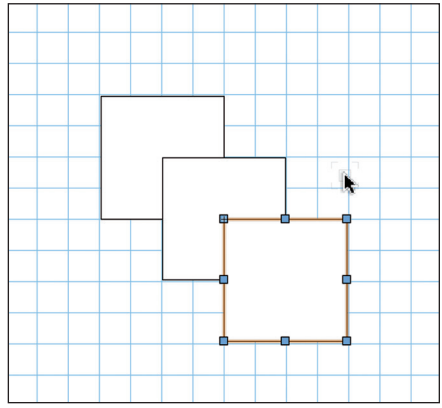
1.6 Undo/Redo

If you draw something that you don't want or if you delete something and then change your mind, you can undo your changes.

movie
movie019.mov

- Go to the **Menu** bar.
- Choose **Edit > Undo**.

- The last thing you did will be undone. You can undo several things this way. There is a limit to the number of times you can undo, and this is set in your Preferences.



The **Redo** command can be used to redo any step that you have undone.

SAMPLE

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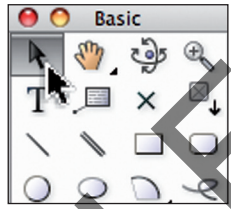
1.7 Cursor Shapes

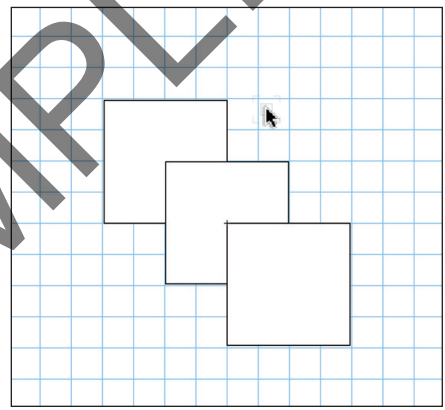
The cursors in Vectorworks are designed to change shape to give you visual feedback as you move near objects, select tools, and so on. To see the cursor change shape as you move over objects, try this: move the cursor to the corner of the rectangle until you notice the changes.

movie
movie020.mov

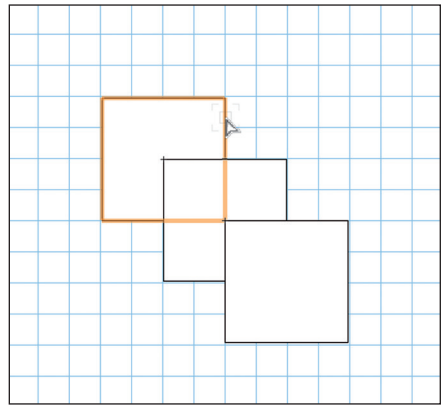
- Go to the **Basic** tool palette.
- Choose the **Selection** tool.



Selection Arrow. The selection arrow is the cursor shape that you will see when you are away from all the objects on the drawing.

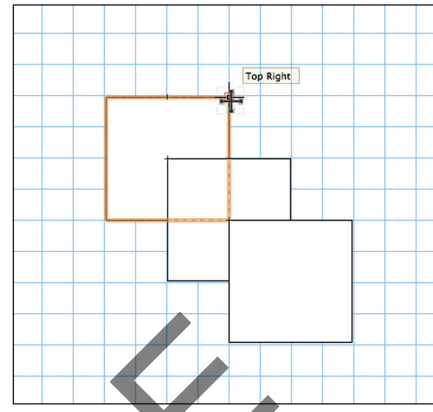


Move Cursor. When you move near an object, you get this cursor. By clicking and dragging with this cursor you can move an object, and this can be combined with the Data Display bar to move the object accurately.

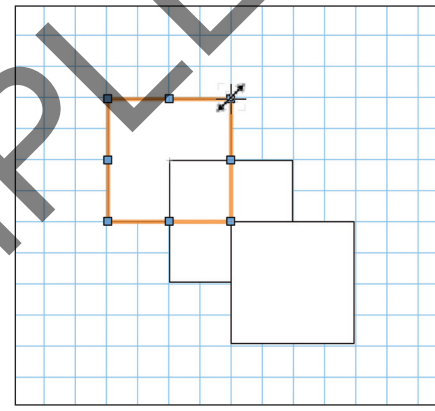


SAMPLE

Snap Cursor. When you move to the corner or center of an edge or center of the object, you get this cursor. By clicking and dragging with this cursor, you can move the object from an exact point—in this case, the corner. You can use this to snap to another object. (Use the information given in the screen hints.)



Interactive Scaling (Reshape) Cursor. After you have selected an object, move near one of the blue handles on the object. By clicking and dragging with this cursor you can scale an object. Combined with the Data Display bar, you can rescale the object accurately.



SAMPLE

To access the Interactive Scaling mode (previously known as the “reshape cursor”), you need to select the correct mode on the Tool bar.

The first mode on the Tool bar allows you to move objects, but not stretch (or interactively scale).

- Select the second mode on the Tool bar. This mode allows you to reshape single objects.

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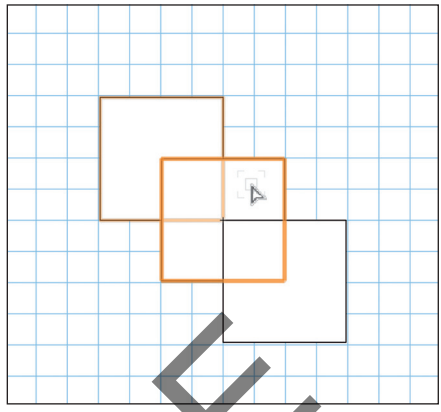
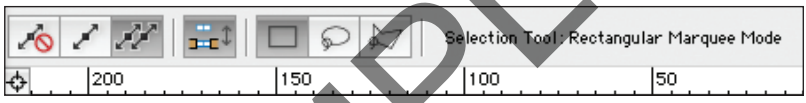
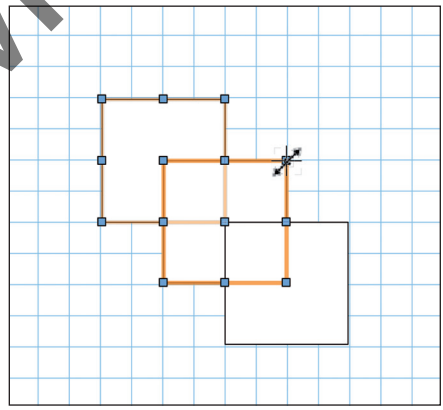
- Select two rectangles. Notice that you can't reshape these.



- Select the third mode on the Tool bar. This mode allows you to reshape multiple objects.

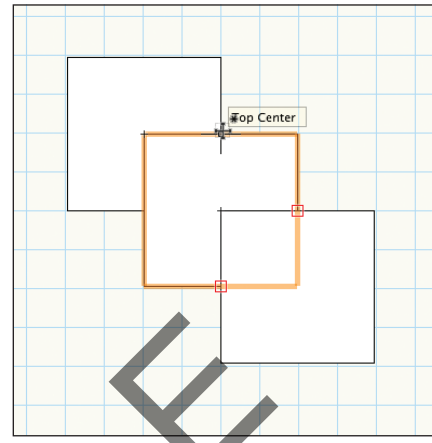


- Move your cursor to one of the blue handles on the objects. By clicking and dragging with this cursor, you can rescale most objects.

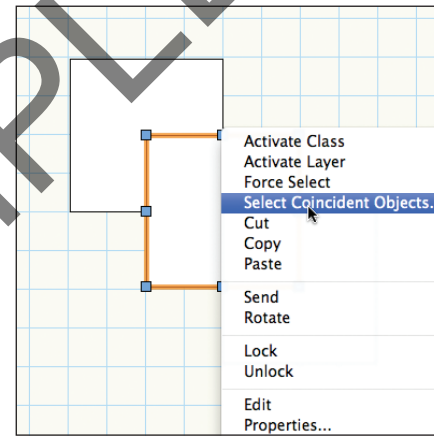


SAMPLE

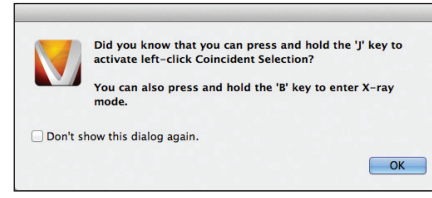
- If you move to the edge of two or more objects, you will see an asterisk next to the cursor. This is to indicate that there are coincident objects.



- Right-click (control+click on a one-button mouse) on the object.
- Choose **Select Coincident Objects...**



- This dialog box tells you how to select coincident objects by using the J-click instead of right-clicking.
- Click on the **OK** button.



SAMPLE

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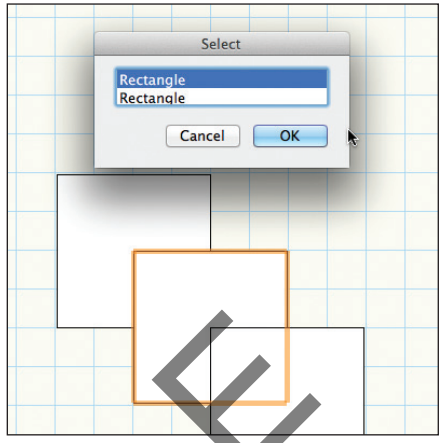
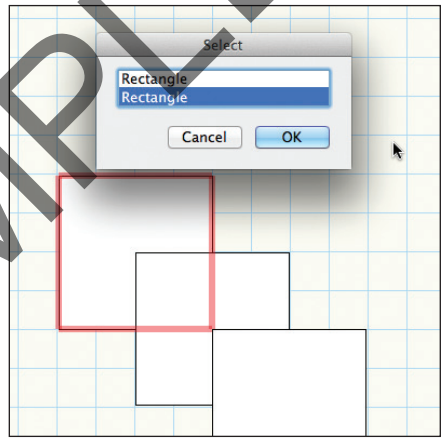
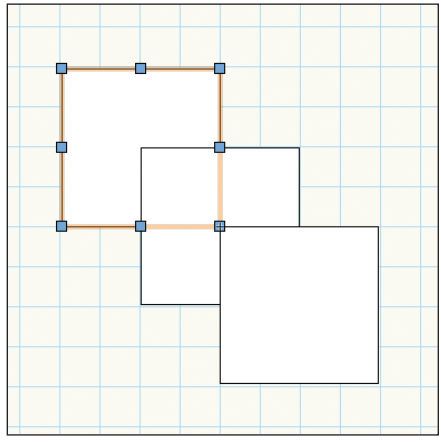
- This dialog box allows you to select the object you want.



- Use the up/down arrows to choose the object you want.
- Click on the **OK** button.

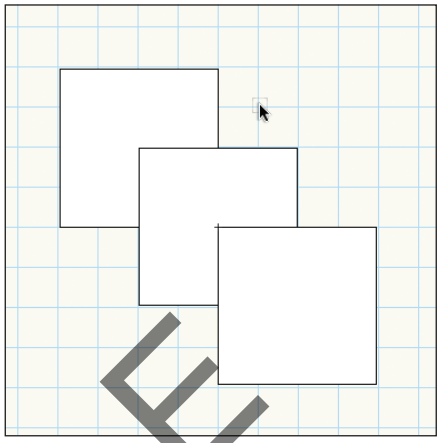


- The object highlighted in the dialog box will be selected.

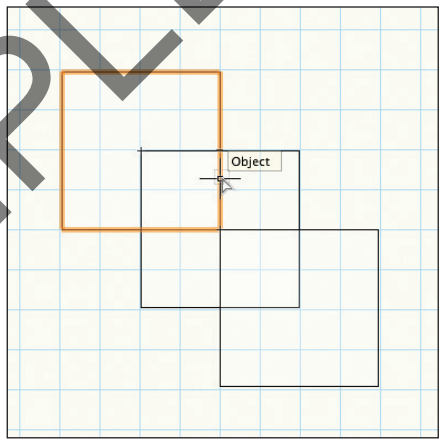


SAMPLE

When you have several objects, it can be difficult to select the object you want.



Hold down the B key to see through the objects. This is called the X-Ray mode, and it makes it easy to select hidden objects.



SAMPLE

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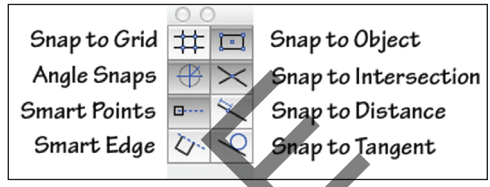
1.8 Snaps

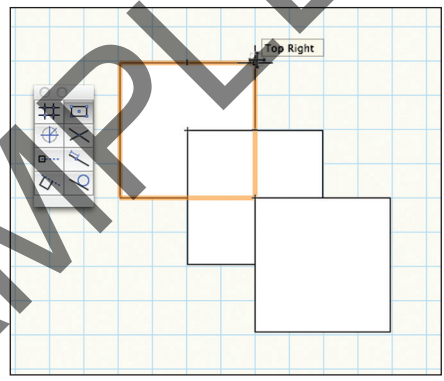
The Snapping palette has eight different snaps, and some snaps have several options. The snaps should be turned on when they can be useful and turned off when they are not.

movie
movie021.mov

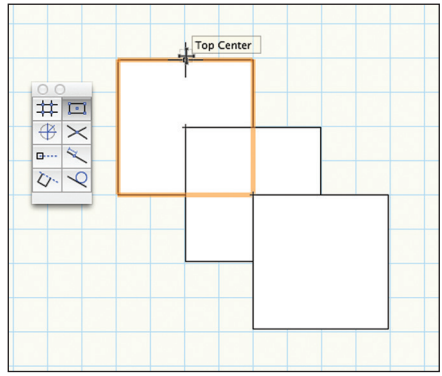
The darkened snaps in this image are the four most useful snaps.



- Move to the corner of the first rectangle.
- The screen hint will say “Top Right.” Don’t click.



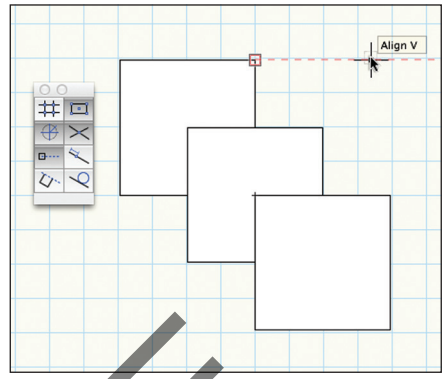
- Move your mouse to the top center of the first rectangle. The screen hint will say “Top Center.” Don’t click.



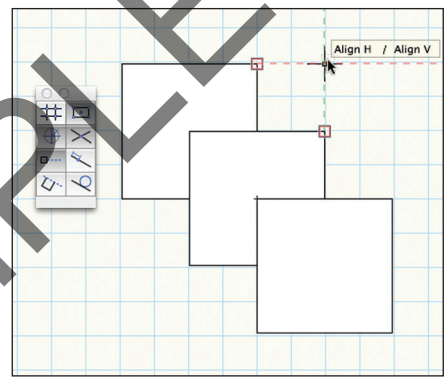
The Smart Points are really useful and should be one of the constraints that you keep on all the time. Smart Points are also known as the SmartCursor. It allows you to draw an object in line with other objects on the screen without having to measure where they are. You might call this a visual align tool.

SAMPLE

- To align with an object on the screen, move your mouse to the end or corner of the object that you want to line up with, but do not click the mouse button. Just touch the end of the object.
- Move the cursor across the screen, and you will get a screen hint to show that you are lined up with the start points.



- You can line up with two points if you want to: touch the first point that you want to line up with, and then touch the second point that you want to line up with. You will get screen hints that tell you that you are lined up with both points.

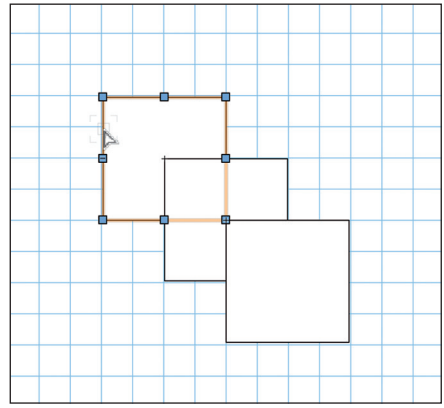


SAMPLE

1.9 Applying Graphic Attributes

movie
movie022.mov

- Select the first rectangle we created.



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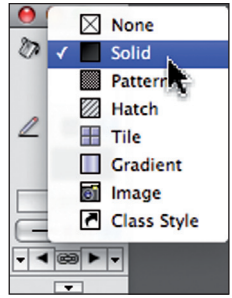
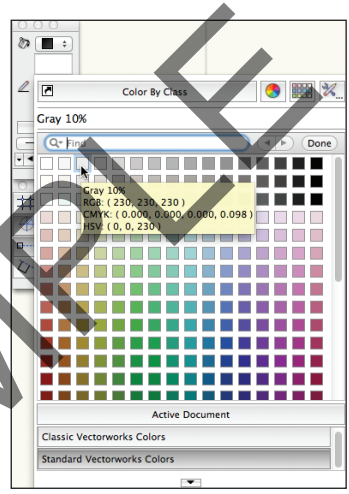
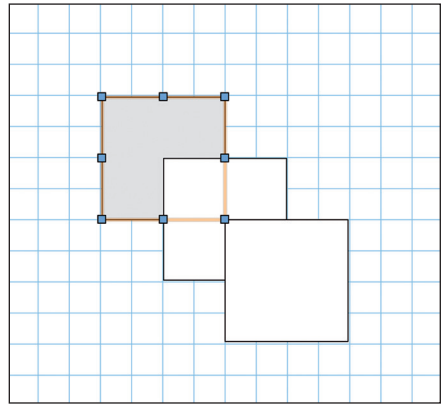
- Go to the **Attributes** palette.
- Click on the **Fill Style** drop-down menu.
- Choose **Solid**.



- Click on the white rectangle below the Fill Style drop-down. This opens the color palette to choose the color.
- Click on a gray color.

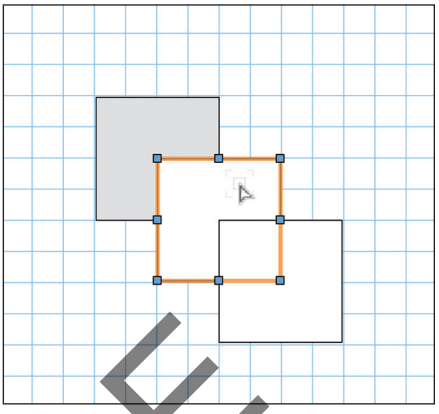


- Only the selected rectangle will have the gray color, not the other rectangles.

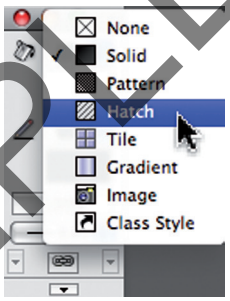


SAMPLE

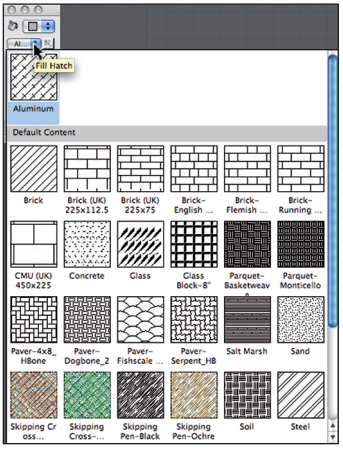
- Select the second rectangle we created.



- Go to the **Attributes** palette.
- Click on the **Fill Style** drop-down menu.
- Choose **Hatch**.



- Click on the **Hatch** drop-down menu below the Fill Style drop-down. This opens the palette to choose the hatch.
- Click on a hatch.



SAMPLE

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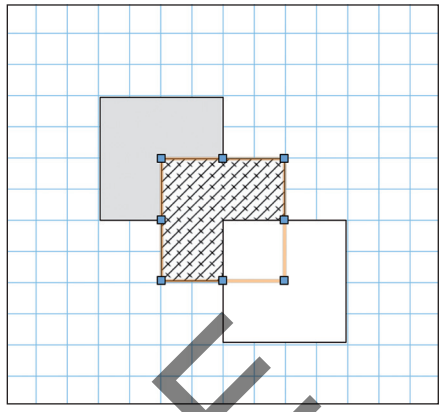
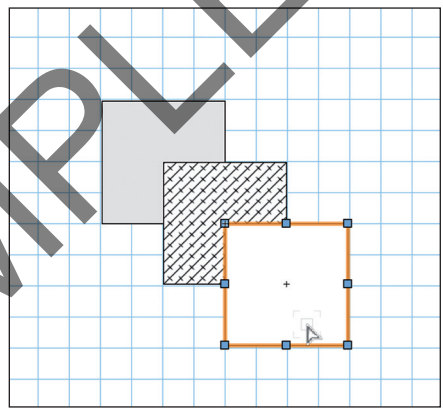
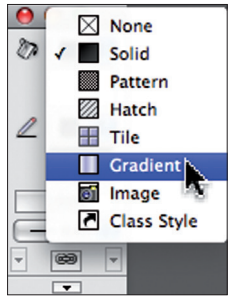
- The selected rectangle will have the hatch, not the other rectangles.



- Select the third rectangle we created.

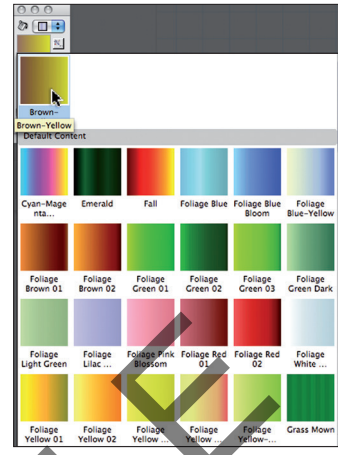


- Go to the **Attributes** palette.
- Click on the **Fill Style** drop-down menu.
- Choose **Gradient**.

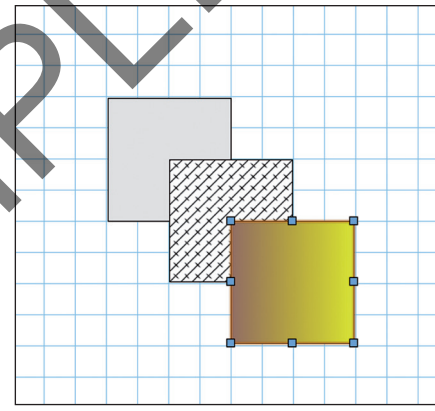


SAMPLE

- Click on the gradient color below the Fill Style drop-down. This opens the palette to choose the gradient.
- Click on a gradient you want to use.



- The selected rectangle will have the gradient, not the other rectangles.



SAMPLE

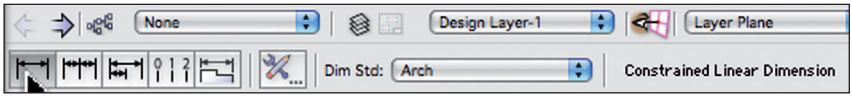
1.10 Dimensions

movie
movie023.mov

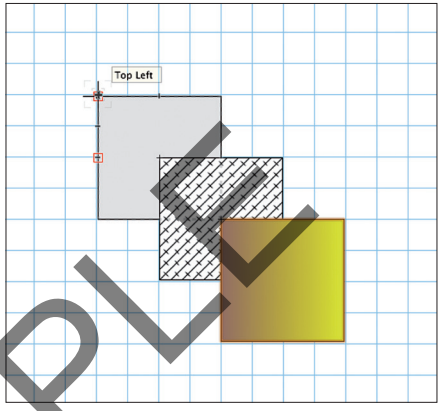
A drawing without dimensions is pretty useless. So, let's have a quick look at dimensioning.

- Go to the **Dims/Notes** tool set.
- Click on the **Constrained Linear Dimension** tool.

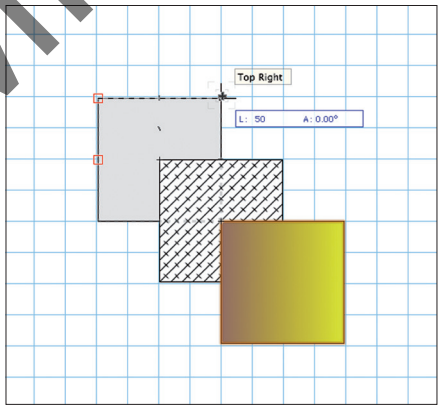
- Go to the **Tool** bar. Make sure the **first** mode is selected.



- Move your cursor to the top left of the first rectangle we created. It is important to make sure you are directly on the corner of the rectangle.
- Click once.

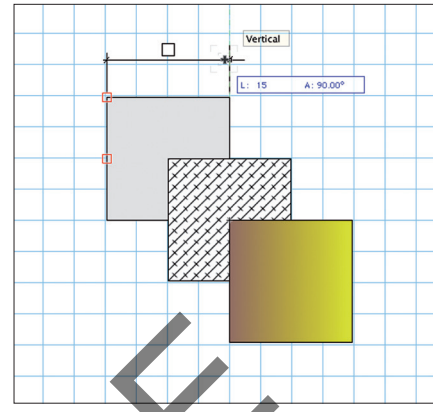


- Move your cursor to the top right of the first rectangle we created. It is important to make sure you are directly on the corner of the rectangle.

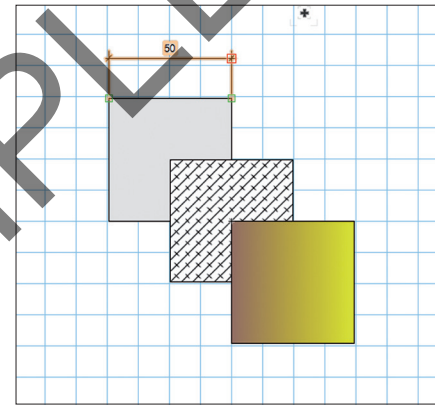


SAMPLE

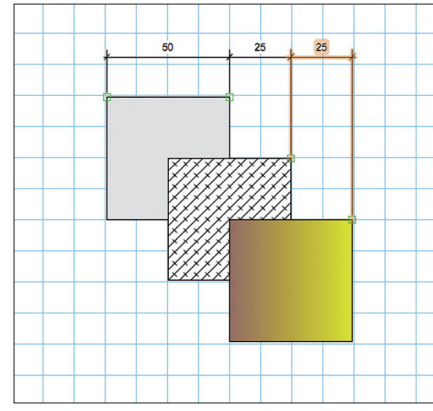
- Move your cursor up the screen. This is where you place the dimension away from the object.



- Click once.
- When the dimension is correctly placed, you should notice small green squares at each corner of the rectangle. These show you that the dimension is associated with the rectangle. If you move the rectangle or change the size of the rectangle, the dimension will update. This is not just a neat trick—it makes the drawing process quicker, and it makes your drawing more reliable.



- Use this technique to add more dimensions.



SAMPLE

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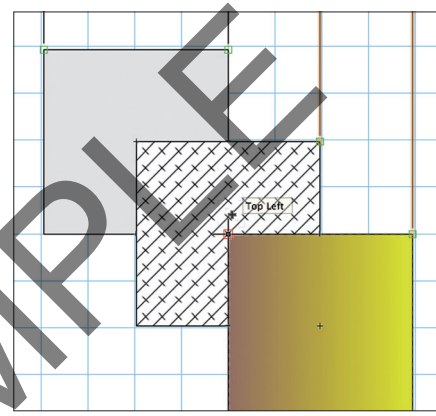
1.11 Viewing

There are several viewing tools. Some of the tools are located on the Tool palette, and some are on the View bar at the top of the drawing window. We will look at the most useful tools and techniques below.

Zooming

movie
movie024.mov

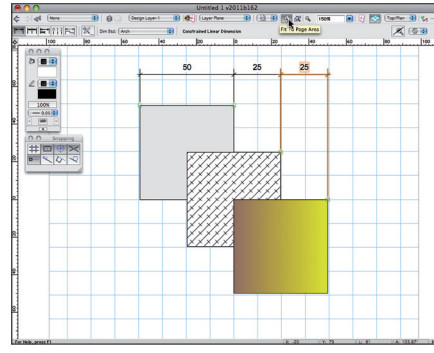
The quickest way to zoom in and out of the drawing is to use the scroll wheel on your mouse. You can use this technique regardless of the tool you are currently using.



- Move the mouse over the object you want to zoom in to.
- Roll the mouse wheel forward to zoom in.
- Roll the mouse wheel backward to zoom out.

Fit to Page Area

The **Fit to Page Area** button is on the View bar. It will show the current printable area of the design. Use this tool to show you the whole drawing within the printable area.



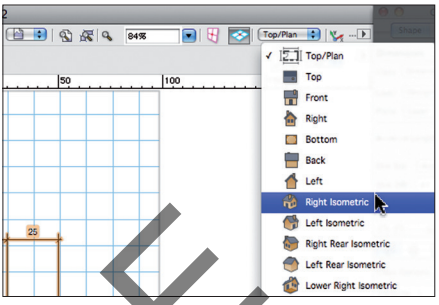
- Go to the View bar.
- Click on the **Fit to Page Area** button.

Whenever you get lost in the drawing, use the Fit to Page Area to get back quickly to your drawing.

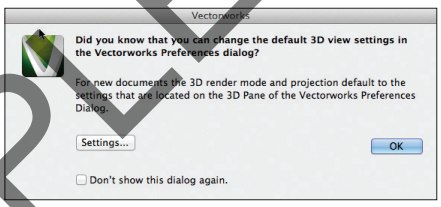
SAMPLE

movie
movie025.mov

- Go to the View bar.
- Click on the **Current View** drop-down menu.
- Choose **Right Isometric**.

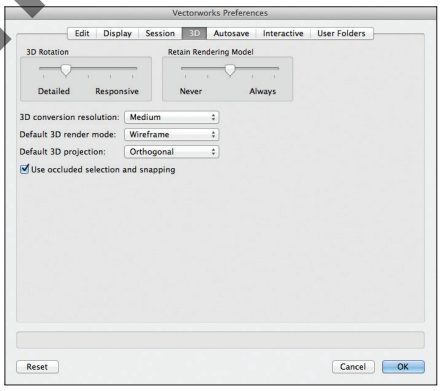


- The first time you change to a 3D view, you might see this message. The settings button on this dialog box allows you to choose how your models will appear in 3D views.

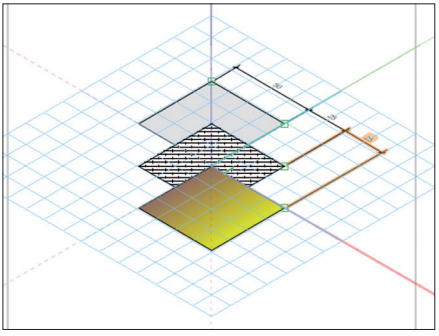


- When you click on the **Settings...** button you will open this dialog. Choose your options for the **Default 3D render mode** and **Default 3D projection**.
- Click on the **OK** button.

If you choose different options from the ones shown, expect the 3D views on your computer to be different from the views in these illustrations and movies.



- You can see all your work in an isometric view.



SAMPLE

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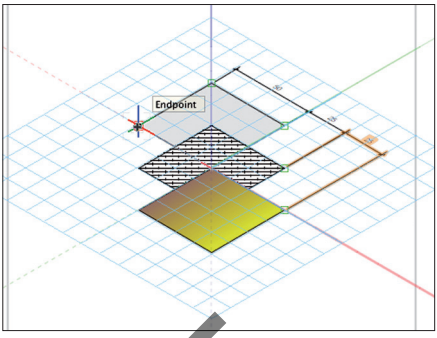
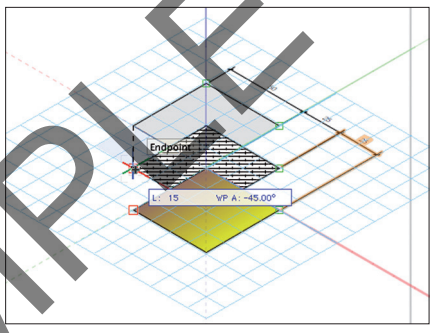
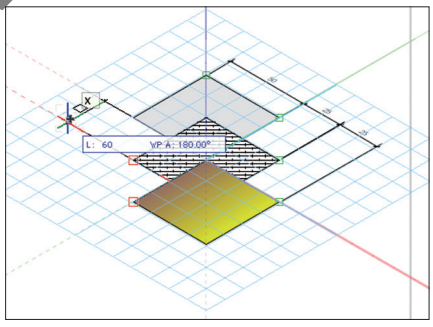
- Go to the **Dims/Notes** tool set.
- Click on the **Constrained Linear Dimension** tool.
- Go to the Tool bar. Make sure the first mode is selected.
- Move your cursor to the bottom left of the first rectangle we created. It is important to make sure you are directly on the corner of the rectangle.
- Click once.



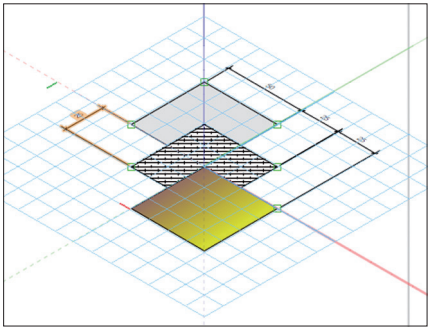
- Move your cursor to the bottom left of the second rectangle we created. It is important to make sure you are directly on the corner of the rectangle.
- Click once.



- Move your cursor across the screen, to the left. This is where you place the dimension away from the object.
- Click once.



- When the dimension is correctly placed, you should notice small green squares at each corner of the rectangle.



Dimensions can be placed, regardless of the view.

SAMPLE

Jonathan Pickup | seventh edition

VECTORWORKS ESSENTIALS Tutorial Manual

written with version 2015

ABOUT THE AUTHOR

Jonathan Pickup is an architect trained in New Zealand and in the United Kingdom with more than 25 years of experience. He received his Bachelor of Architecture (BArch) degree from the University of Auckland in New Zealand. He later spent more than eight years in England where he learned to use several CAD packages, including MiniCad, and began teaching this forerunner of Vectorworks. Upon returning to New Zealand in 1997, he established Archoncad, a Vectorworks training and consulting company. He has written several Vectorworks training manuals for architects, landscape architects, educators, and design students. Jonathan also organizes the New Zealand Vectorworks User Group and provides its main direction.

THIS IS A BASIC TUTORIAL manual and DVD for Vectorworks Fundamentals CAD design software—an essential starting point for learning any of the Vectorworks programs. Written in a simple conversational style of English, the manual uses exercises to lead you through the fundamental concepts used in Vectorworks.

The exercises are designed to teach you how to use tools or techniques in a step-by-step, hands-on series of exercises presented in a written manual with embedded movies.

- Basics of quick and easy drawing
- The use of features such as layers and classes, unified view, and viewports
- A series of exercises that teach the basic concepts of modeling and drawing
- Process exercises such as how to draw simple walls, how to insert doors and windows, and how to create and edit a roof
- How to count and schedule items in your drawings

SAMPLE

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