## Illustrator Basics

What Is Illustrator?

Adobe Illustrator is a vector-based graphics creation program, intended for making original artwork. Often people confuse it with Photoshop, as the interface is somewhat similar, and both programs use layers, a toolbar and palettes, and both support similar file formats. The big difference between the two is that Photoshop works with bitmapped (also known as rasterized) images only. Illustrator creates vector-based artwork, which can be scaled to any size. It can incorporate bitmapped artwork, however.

The beauty of vector artwork is that it is very small – it's really just mathematical equations of the points and shapes in your artwork. Therefore, Illustrator files themselves are usually quite small. They can have **links** to photos, such as Photoshop files.

If you create a 3x4' poster as a bitmapped image, at 300 pixels per inch (ppi), you would end up with an extremely large file: 445MB! It's simply impractical to create large-format prints in this method.
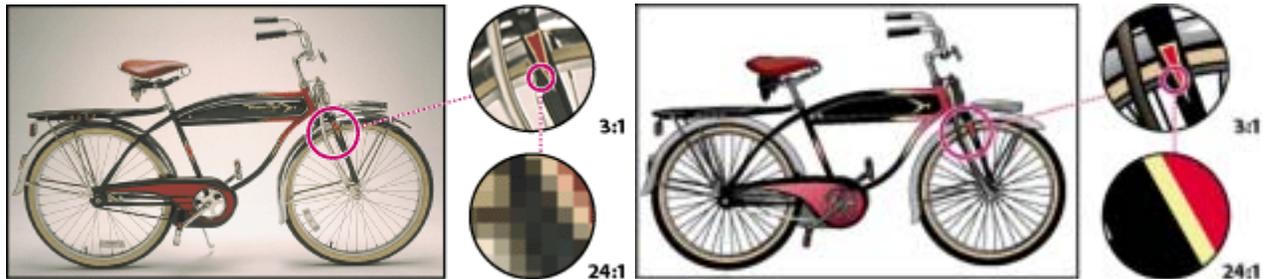
bitmap vs. vector art when scaled up

There are alternatives for doing page layout, such as Adobe PageMaker, InDesign, Quark Express or Macromedia Freehand. These may have a simpler learning curve for text and graphic placement. Some print houses request your files in "Illustrator format," but what they mean is in PostScript format. Check with your printer to see which programs they support.

Basic Steps to Creating a Poster in Illustrator

These instructions are explained in detail below.

1. If possible, prepare all the images as 300 ppi and at the final output size you'd like them to be.
2. Start Illustrator. Specify the color space (CMYK or RGB), the size of the poster ("artboard"), and if you want to tile the printout.
3. Set up the workspace with rulers and a grid, if desired.
4. Add text. Either type in new text, or copy it from a word processed file.
5. Add graphics: photos, boxes, circles, arrows, etc.
6. If you're working with unusual typefaces, convert the text to outlines.
7. Save the file. Make sure to copy it and all original artwork to a disk/CD if you're taking it to a printer.

Preparing Your Photos

If you are scanning photos/negatives/slides, etc., scan them at 300 ppi – at the final output size. For example, if your original is 4x6", and you want it to print at 8x10, you would need to scan it so that you would end up with 2,400 x 3,000 pixels. Plus you would need to crop it to fit the new aspect ratio.

If you are working with images that you collect from a device, such as a CCD, set the resolution to 300 ppi if possible. If that's not possible (some devices have a fixed resolution, such as 72 ppi or 640x480 pixels), you may be able to "resize" the image without losing resolution. Open the file in Photoshop. Click on Image, Image Size. Do not check the Resample image box. Change the print dimensions to what you want, click OK. If it's a screen capture, they are frequently large, 12x14", so you can make them smaller and increase the resolution.

Save your files in either Photoshop .psd, TIFF .tif, or Photoshop EPS .eps format. Illustrator can read many other formats, but these are the most widely recognized by print shops.

Creating a New File

After you start Illustrator, click on File, New… You will be determining the color space and size of your entire canvas, known as an *artboard*. Type in a name for your new file, and check the following options:

CMYK or RGB Color Spaces

If you will be printing to a color desktop printer, it is most likely a CMYK printer, or 4-color printer. If you'll be printing at a print house, where they are using an RGB printer (such as a 6-color or 8-color inkjet printer, or a pictrography printer), choose RGB. If you're working in the CMYK environment and you import a photo from Photoshop, which is RGB, its colors will be converted to the CMYK color space.
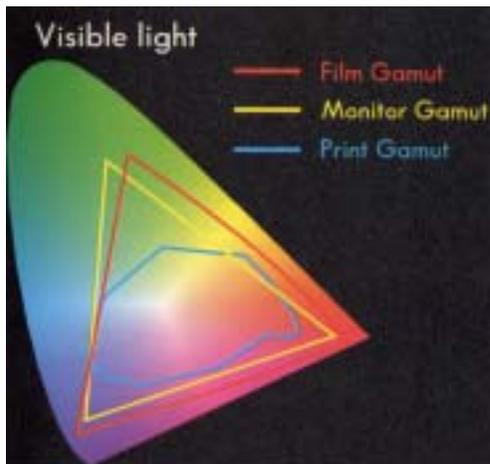
Color spaces on computer monitors and printers are smaller than the entire range of visible light. Here, the yellow line encompasses RGB, and the blue line encompasses CMYK.[1] Note that the CMYK color space is smaller than the RGB space, so you some of your colors may shift in the conversion. It is a good idea to test a leter-sized version/slice of your poster beforehand at your printer.

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[1] Taken from *The Color Mac Book*, by Marc D. Miller and Randy Zaucha, Hayden Press, 1992.

CMYK (left) and RGB color. Here you can see the dot pattern produced on a desktop printer vs. the pixels you will see on an RGB computer monitor (RGB printers produce dots, however).

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Artboard Dimensions

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You can specify the size of your artboard in inches, cm, mm, pixels or picas.

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Tiling Options & Page Setup

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If you want to create a large-format poster on your own desktop printer, you can divide it up into printable regions. Click on File, Document Setup, and click on Tile Imageable Areas. You will see a dotted grid appear on your artboard. These boundaries are tied to your specific printer. Click on File, Page Setup and make sure that the page orientation (portrait or landscape) and the page size (usually Letter) are set correctly. Unfortunately, you can't mix some areas of the artboard as landscape and others as portrait.

Important Tools

Important tools in the Toolbox: Select /Direct arrow, Text, Free Transform, Hand, Zoom

To select an object or text, you'll mainly use the **Select arrow**. To select specific points in an object, such as lengthening a text container, use the **Direct Select arrow**. Usually, you will also get handles on the boundary of the object which you can use to scale the shape. **Warning**: with text, you might scale the text unintentionally. You should use the Direct Select arrow, only choose the points you want to extend – do not select the baselines of the text – and then resize.

The "**T**" tool lets you click on the artboard and begin typing. You can also use it to click on a shape, and convert it to a *text container*. A tip: you can jump back and forth between the Text tool and the Select tool by holding down the *command* (Mac) or *Ctrl* (PC) key.

The **Free Transform** tool allows you to scale an object. Sometimes, an object won't have handles just by clicking on it with the Select arrow. Click Free Transform to see the handles.

The **Hand** tool lets you "pull" the part of your file you want to see onto the screen. This is especially useful with large format posters, where you won't be able to see the whole poster at one time. Shortcut: hold down the *Spacebar* to temporarily turn on the hand tool. Keep the Spacebar depressed while you drag around, then release the spacebar.

The **Zoom** tool is also very handy to see detail. You can click on the Zoom (magnifying glass) and click on an area you want to zoom in on; or you can drag a rectangle around the area of interest and it will fill the screen. To zoom out, hold down the *option* (Mac) or *Alt* (PC) key while clicking. Shortcuts: hold down the *spacebar and the command/ctrl key* to temporarily turn on the zoom tool to zoom in; hold down *spacebar, command/ctrl and the option/alt key* to zoom out.

Customizing the work space

Ruler

To turn on the ruler, press Ctrl-r (PC) or command-r (Mac). To change the unit of measurement, click on File, Document Setup, and in the Setup box, change the Units box appropriately.

Moving the 0 point

In the upper left corner of the ruler is a symbol of a cross-hair. You can click on this and move the 0 point to be the upper left corner of your poster. It's easier to measure this way.

Grid & Guides/Aligning Objects

The grid and guides are enormously helpful when laying out a poster. To turn on a grid, click on View, Show Grid. To drag out a guide, either horizontally or vertically, make sure that the Ruler is visible. Click with your mouse in the ruler and drag down, or right. When you let go, the guide stays put.

To change the dimensions of the grid, or colors of the guides or grid, click on Edit, Preferences, Guides & Grid, and change the Gridlines Every… and Subdivisions fields. You can also change the colors here. Click OK when finished.

The grid and guides do not print; they are just there to help you align objects. You can have objects stick to your grid lines by selecting View, Snap to Grid.

To have objects align along a vertical or horizontal axis, use the Align palette. Click on Window, Align. Select the objects and click on the appropriate setting in the Align palette.

Printing boundaries

A dotted double-rectangle will appear in the center of your artboard. This shows the imageable (printable) area of your local printer. You can ignore this if you are not printing to a local printer. If you want to move it, click and hold on the Hand tool in the Toolbar and select the Page Tool. Then click on the imageable area rectangle and drag it somewhere else on the artboard.

High-resolution image display on or off

When you link a photo to an Illustrator document, a *proxy* of the photo is placed on the artboard. Normally, proxies are displayed at full resolution. This can slow down opening, saving and moving around in a document. If you want to turn this off while you work, click on Edit, Preferences, Files & Clipboard (Windows and Mac OS 9) or Illustrator, Preferences, Files & Clipboard (Mac OS X); and then select Use Low Resolution Proxy for Linked EPS.

Text

In general, text should be fairly large. Body text looks good at 36 points. Titles look good at 60 – 72 points. Captions look good at 24 points. For clarity, choose one or two typefaces (fonts). Good cross-platform choices are Times Roman, Palatino, Helvetica, or Arial. These are easy to read, and are likely to be available on the print house's computer. If you use a font which is not one of the standard 14 fonts, you must provide the font on the disk with your poster. Note that most print houses use Macs, but probably have PCs now as well.

Using the Type Tool for Free-Form Text

Click on the Text tool T, then click anywhere on the artboard and begin typing. When you're finished, click on the Selection Arrow tool. You can re-position the text anywhere you like. Alternately, click and drag a rectangular shape, and your text will fill in that shape.

Using Text Containers

Use either the Rectangle tool ▢ or the Text tool, and draw a rectangular shape to contain the text. If you've used the Rectangle tool, click on the Text tool and click on the border of the rectangle. Then begin typing. The text will wrap within these boundaries.

Using Rows & Columns

You can do a sophisticated text layout with Rows and Columns. This is especially useful if you are tiling your poster to a letter-sized printer. See the handout "Creating rows and columns".

Adding Text Labels to Figures

You will get a better result with labeling your figures if you do it at the final size in your poster. If you have put labels on your Photoshop file, and then place it in your poster – and stretch it – the text generally looks pixelated.

Changing the Text Color

To change the color of text, use the Selection Arrow tool to select it, then click on the Color palette's rainbow to choose a new color.

If you want the text color to match some other color in your poster, select the text, then click on the Eyedropper tool and hold down shift and click on the color you want to use.

Creating Outlines

The safest way to output your text is as *outlines*. This converts the type into a graphic. This is especially useful if you're using an unusual font or symbol font. You do this as a final step before saving the file (preferably with a new name) to be sent to the printer. Select the text with the Selection Arrow tool, then click on Type, Create Outlines.

Graphics

Adding Photos

To add a photo, click on File, Place and select your file; make sure the Link box is checked, and click OK. Click on the Selection Arrow tool to position the photo where you want it.

If you want to resize it, hold down the shift key and drag out one of the corner handles. If the corner handles don't show, click on the Free Transform tool ⤢, and shift-drag a corner.

Copying from PowerPoint

PowerPoint objects and text are in vector format (although they are not PostScript). You can copy and paste between PowerPoint and Illustrator. Sometimes, though, a black bounding box covers objects, which needs to be removed. Use the Direct-Select Arrow tool to select the box, and press Delete. You may need to press Delete up to 4 times to remove it entirely. Also, it does not recognize PowerPoint patterns, so these do not copy at all.

Unfortunately, PowerPoint objects are embedded in the artboard, so the file gets bigger.

Boxes and Circles

Boxes, circles and arrows are what Illustrator is designed to do! Use the Rectangle tool, or for a circle, click and hold the Rectangle tool to get the Ellipse tool ⬭. Then draw the shape on the artboard. To keep the shape proportional (i.e., a perfect square or circle), hold down the shift key while drawing it. Once you've drawn it, select it with the Selection Arrow tool, and you can scale it and/or reposition it.

Arrows

Draw a line with the Line Segment tool ✎. In the Stroke palette, change its width. With the line selected, click on Filter, Stylize, Add Arrowheads… and scroll through the 27 types listed. Click OK. **Warning**: this takes a little practice – the arrowheads usually appear to be quite large; this depends upon the pixel width in the stroke palette.

Changing the color

To change the color of an object, use the Selection Arrow tool to select it, then click on the Color palette's rainbow to choose a new color.

If you want the object to match some other color in your poster, select the object, then click on the Eyedropper tool and hold down shift and click on the color you want to use.

Using Gradients

A nice visual effect in the background is a gradient. An example is the rainbow background on the "Image Samples" poster. Be aware that many printers have a difficult time printing a smooth gradient, though. See "Creating Gradient Fills" for specific instructions.

Resolution considerations for large sizes

Know the final output size

In general, a 5x7 to an 8x10 image looks good in a 3x4 or 4x4 poster. Of course, it depends upon how many images you want to include in the poster.

Recommendation: 300 pixels per inch (ppi).

Most print houses recommend that your photos have a resolution of 300 pixels per inch at the **final output size**. At the printed size, each file would be between 9 to 24 MB. However, our test posters show that newer inkjet printers are quite forgiving, and files of 72 ppi can look acceptable. However, as stated in the Text section above, you should label the photos in Illustrator so that the text looks crisp.

If you have low resolution imagery, for example, something you've captured from a screen at 72 or 96 ppi, there's often nothing you can do to improve it. Photoshop can interpolate up, so you can create a 300 ppi image out of a low resolution image, but it may not enhance the detail.

Templates for posters, created by John Carpenter (Scott Fraser's lab), Biological Imaging Center

Many thanks to John for his excellent work. These files contain instructions right on the canvas to help you with most changes you'll want to make to these files. You may take a CD which has copies of three pre-formatted files. If you are using a PC, you will get a warning when you open them that the Helvetica and Times Roman fonts need to be substituted. Click OK. They are saved in the Illustrator 8 version, to make them compatible with most systems. (Currently we are at version 10.)

Comparison of different prints from two local print houses, N2 Graphics and Mac Color Lab.

In my humble opinion, the DM6000 8-color print from N2 Graphics looks truer to the original files. However, the gradient is nicer on the HP 5000 printer from Mac Color Lab. If your posters contain color-sensitive photos, I would go to N2 Graphics. If you are mainly dealing with text, or if you need a smaller poster, it's slightly cheaper to go to Mac Color Lab. Both places have experts to help you.

N2 Graphics

1009 E. Colorado Blvd., (on the corner with Catalina), Pasadena, CA 91106. Tel (626) 793-9844, fax (626) 793-1641. Albert is an expert.

Large format prints are done on the ColorSpan DisplayMaker Inkjet Printer, which is an 8-color printer. It can print up to 60" wide. The largest size print they do is 5x9'.

They charge $9.00 per square foot, so a 3x4' poster would be 12' total; 12 x 9 = $108.00 plus tax. Lamination and/or mounting are extra. They suggest a 3 day turnaround time so that the ink has a chance to dry completely.

Mac Color Lab

1292 E. Colorado Blvd. (west of Hill), Pasadena, CA 91106. Tel (626) 405-8004 & (626) 564-1490. Frank is an expert.

Large format prints are done on an HP DesignJet (inkjet) 5000PS, which is a 6-color printer. It can print up to 54" wide.

They charge by specific page layout sizes. A 3x4' print is $90.00. High-gloss paper is $115.00. Lamination and/or mounting are extra. They usually can have the print done the same day or the next day – call ahead.

Other Resources

Caltech Digital Media Center (DMC)

The DMC can print out up to 12x18" in full color. A print costs between $3.00 - $17.00 per page.

The DMC has an extensive training library of video tapes which you can watch in our New Media Classroom and follow along on a computer. Please call x3420 to arrange a time.

Graphic Arts

Graphic Arts can print out a **text only** poster up to 22x30" for $4.40. Call Anna at x3930 for large size posters (they will be sent out to an outside printer).

Adobe's Illustrator site and online help, http://www.adobe.com/illustrator

TotalTraining videos are available at the DMC. See http://www.totaltraining.com for more information.