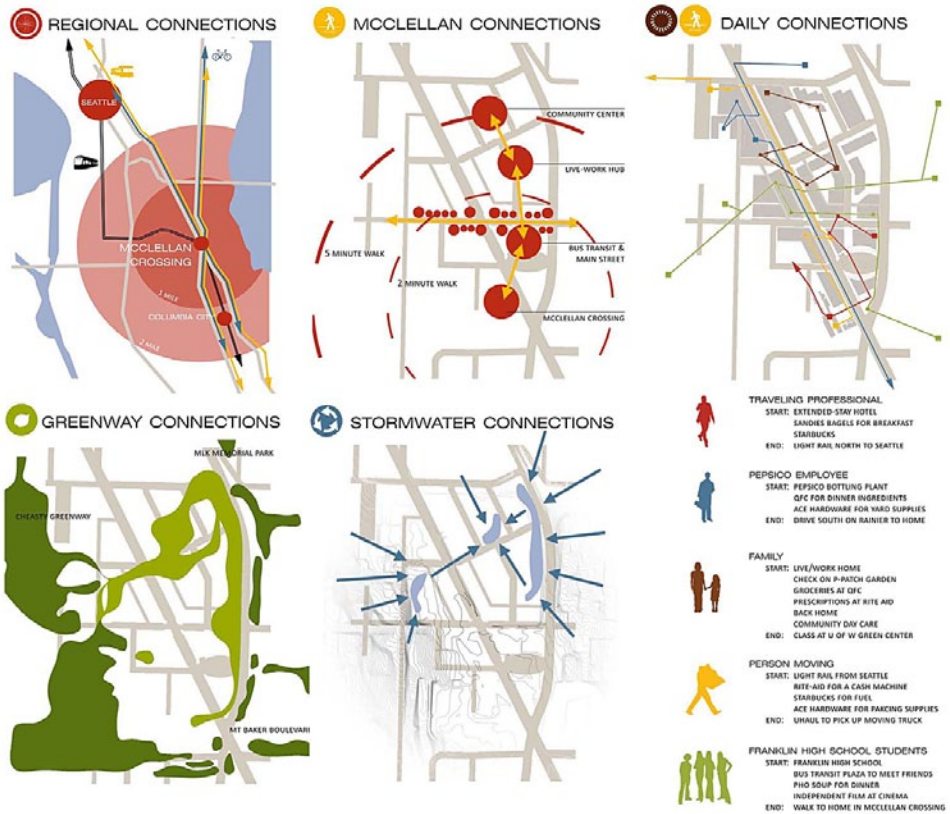


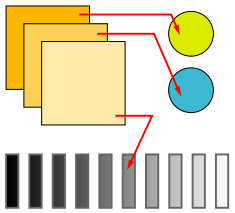
Art Creation

Illustrator is a computer program for creating artwork. Its basic mechanism is an outlined shape. Illustrator is "vector based," meaning it retains knowledge of the shapes you draw, like a CAD program and unlike "pixel based" image editing software such as Photoshop.

Having every mark stay in the drawing as a modifiable element is very powerful and offers great flexibility.

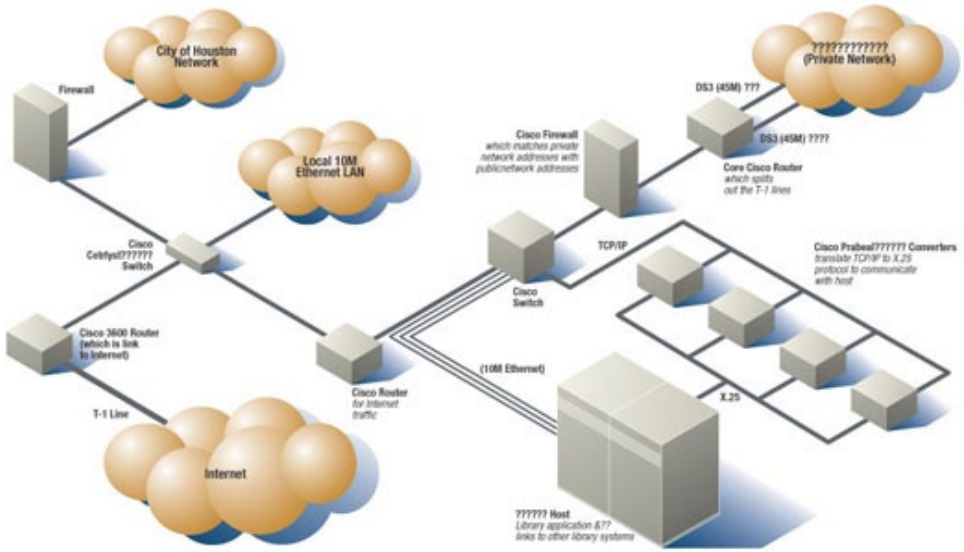
Ilustrator also supports text and bitmapped images

While at first Illustrator may seem suitable only for hard edged diagrammatic work, it is also capable of rather painterly effects and in the right hands even photorealism (see page 3).



So when should you use Illustrator?

- when you are creating a single piece of artwork, such as a diagram, or map.
- when you want to modify or add content to a hard line drawing; perhaps adding entourage and color washes to a SketchUp drawing.
- when you want to trace something



Clean

Trying to explain Illustrator, the word "clean" keeps coming to the foreground. Sure, Illustrator can be messy and ornate, but with its basis in outlined shapes and its ability to handle gradients and text with repeatable predictability combine to make Illustrator very strong at crisp, simple... clean art.

Overlap

Yes, there is overlap with other Adobe products. But the primary strengths are still:

- **Photoshop** - photographic image manipulation
- **Illustrator** - clean outline based artwork
- **InDesign** - type and document creation

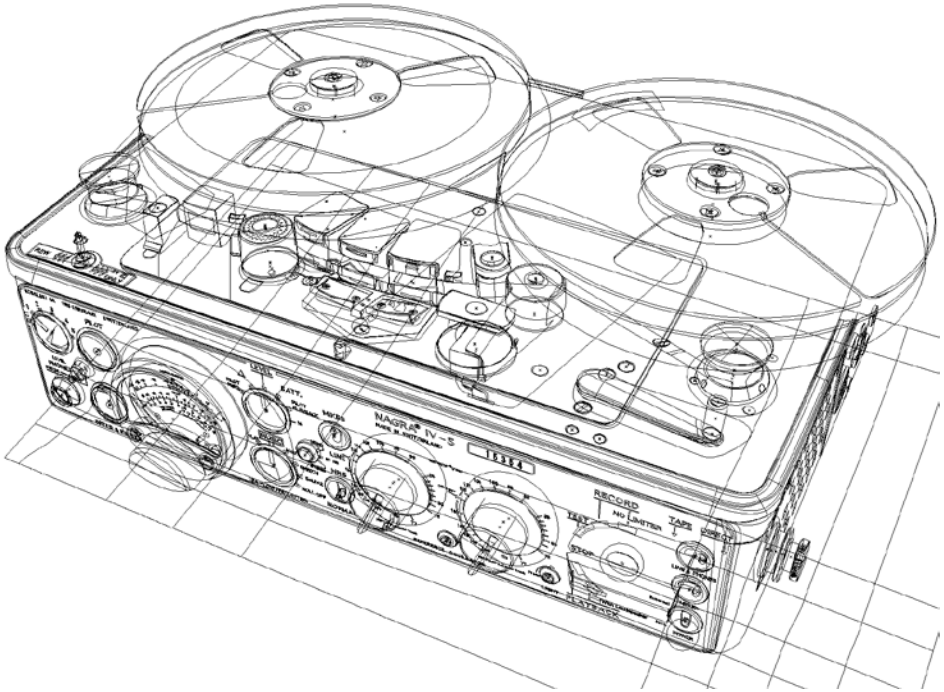
Experience and an awareness of when something is getting too annoying are what tell you which program to use.

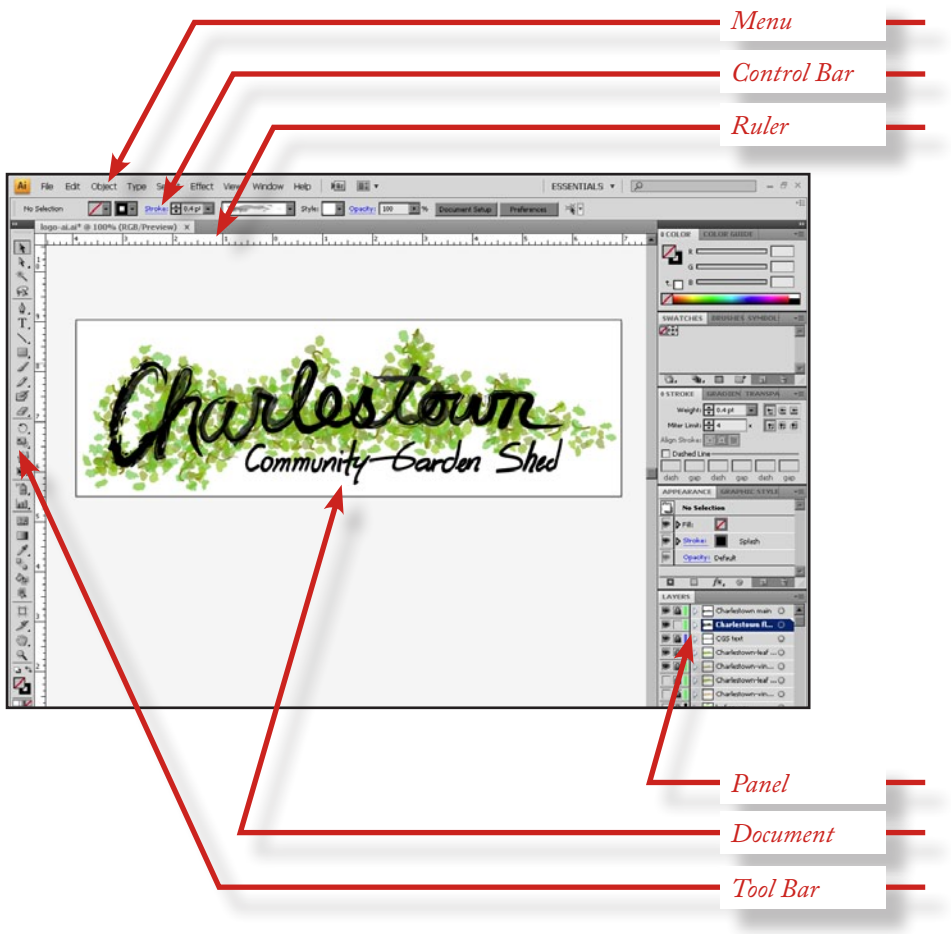
Just Wow

This image is just to emphasize that Illustrator is very capable.

Not Kidding

Here is the line work to try to prove that really is a vector illustration.





Practice

Open up an existing file to help get a feel for the interface. Don't worry, it takes extra effort to mess anything up.

Lots Stuff to Click On

Illustrator uses the standard Adobe Creative Suite interface with six main areas:

- **Menu** - Commands for managing and manipulating the document and its contents.
- **Tool Bar** - Easy buttons for object creation and manipulation
- **Document** - The workspace that shows your creation.
- **Panels** - Where most of the action is.
- **Control Bar** - Options and tools related to the current tool or selection.
- **Ruler** - helps with accurate object placement. The ruler can be toggled on the View menu or by hitting Ctrl-R.

It's All On The Window Menu

Most of what you want to do resides on panels. Since panels can be closed and moved around, it can be easy to lose track of a handy command. When you lose something, look for its panel on the Window menu. Everything is there and it's probably where the thing you want is.

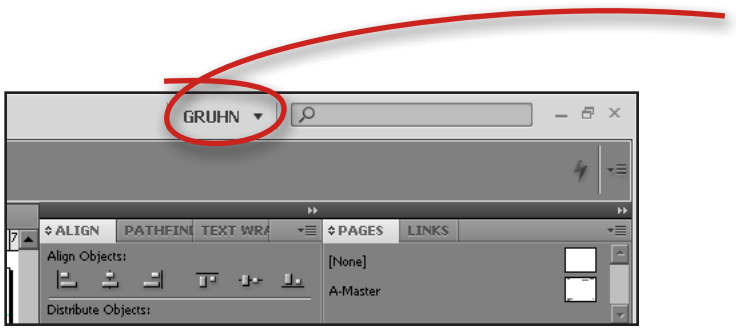
Rearrange

The panels system is very flexible.

Panels can be rolled up by clicking on the blank gray area next to the individual panel names.

Whole panel panes can be collapsed by clicking the tiny double arrow icon on the dark bar at the upper right.

Panels can reordered, torn off and docked by grabbing their tabs. As you move them around, watch for the blue highlighting in the UI to show you how they are going to arrange.



What's Best

How to arrange the interface is a matter of general efficiency combined in large part with personal preference and a dose of current task.

Illustrator provides Workspaces to save different interface configurations. You can access them on the Window menu or use the dropdown in the upper right. You can see here that I have made my own workspace to remember the panels just the way I like them.

No Really, What's Best?

Recommended panels to start with:

- **Color**
- **Swatches**
- **Stroke**
- **Graphics Styles**
- **Appearance**

Or

- **Workspace: Essentials** - is pretty good.

You'll soon find others that you want to keep around. Later when you find your stride, you will start organizing them into different task based Workspaces and you'll really start to own the interface.

The Control Panel and Toolbar can be moved, floated, docked in strange places but so many programs are organized similarly that it probably is not worth breaking with tradition. On the other hand, maybe it's nice to have all the things to click on clustered in one part of the screen.

Panels can also be moved to a different monitor if you have one available.

Pan - Spacebar

Zoom - Alt-Wheel, Ctrl-Equals ...

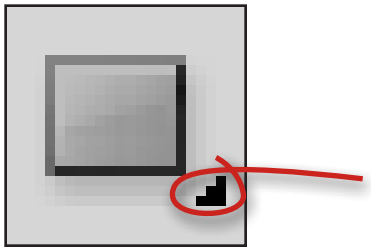
Moving About A Page

Navigation in InDesign is pretty easy. Since the page is two dimensional there are only pan and zoom controls to worry about. There are explicit tools for these functions but it is good to use the keyboard shortcuts.

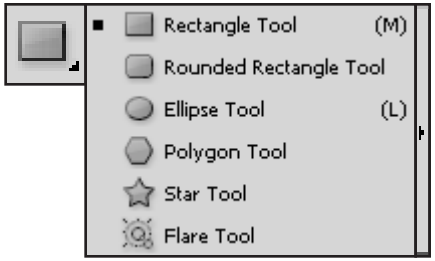
- **Pan** - hold down the spacebar to bring up the pan tool. Unless you are typing text, in which case holding down the spacebar makes a lot of spaces.
- **Zoom** - the Z key gets the zoom tool. Ctrl-Equals and Ctrl-Minus (I think of it as plus and minus, but the '+' is actually shifted version of the '=' key) will always zoom in out one step at a time.
- **Fitting** - Ctrl-Zero zooms so the current artboard fits in the window with very little white space around it. Ctrl-Alt-Zero zooms to show all artboards. There are a number of other fitting options which you can browse on the View menu. In time you will decide how you like to work.

Even More

Note that double clicking on the Zoom button zooms to 100% and double clicking on the Pan button zooms to current artboard.

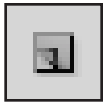


Fly-out Menu



Fly-out Menu. Click and hold.

Tear Off Button



New Button

Panel Menu Button

Ruler

Fly-Out Menu

You'll notice that some of the toolbar buttons have a little black triangle on them. This indicates that if you click and hold (or right click) on this button you will get a menu with other, related, buttons. For instance, the Rectangle button is part of the Shape group which also includes seven other shapes.

Whichever button you last used in a group appears on the toolbar. This can get a little confusing. Sometimes you have to hunt "under" the buttons to find the tool you are looking for. With a little experience you learn which tools are grouped together.

Tear Off Button

In Illustrator the flyout menus show a narrow button at their right edge. Click this to turn the menu into a floating panel. This is especially useful for the Pen and Direct Select menus when you are editing shapes.

New Button

Many panels contain lists of things you can create. At the bottom of each panel is a row of buttons. There's a trash can for deleting items. Often there's a new button which may not be obvious to the new user. I think it looks like somebody peeling off the top sticky-note to get a brand new one.

Panel Menu

Every panel has its own associated menu in the upper right corner on the light gray next to the panel tabs. Lots of useful stuff hides here.

Ruler Units

By default the ruler is measured in sixths of an in (picas). You can change this. Either go to the menus, Edit: Preferences: Units & Increments where you can change the ruler units (but don't change type units, you are already familiar with using points for that). Or you can right click on a ruler and change its units right there in the interface. You can do each ruler separately or right click at the corner where they meet to do both at the same time.

Preview

Preview

Many of the dialogs in InDesign have a Preview checkbox. Turn it on.

Panel Expander

Panel Expander

Some Panels have different configurations. The ones that do have this button right next to the panel name. Click on it to show more or different options for a panel. If you find yourself thinking "I thought there was a tool for that on one of these panels" you may be right. Click a few Panel Expander buttons and you may find the missing tools.

They may look the same...

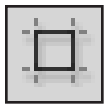
But one is filled with None. The other with white.

The None swatch.

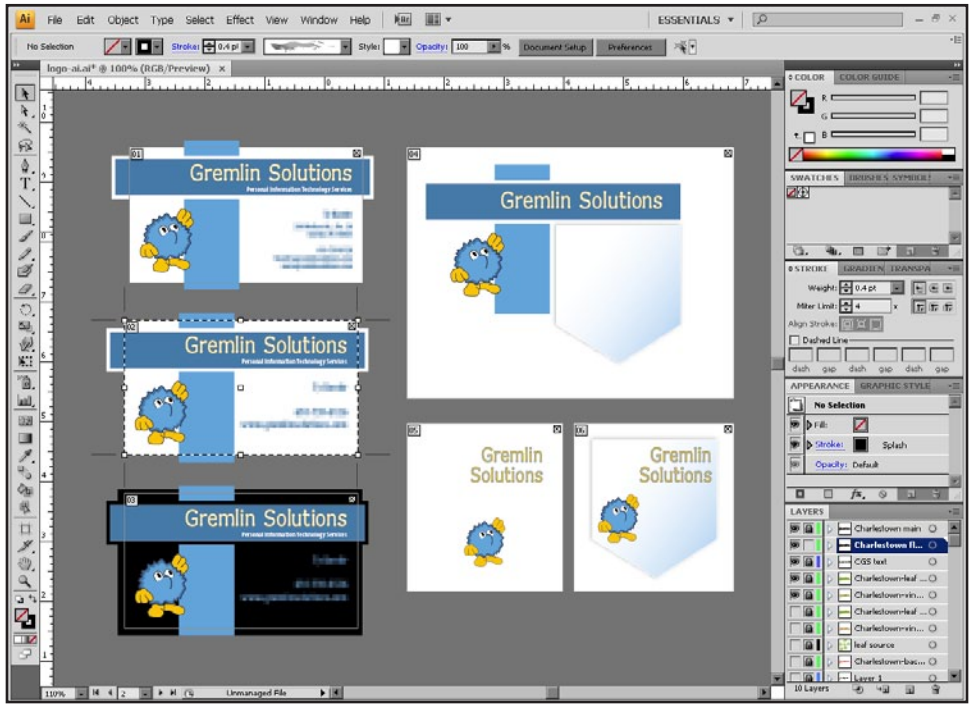
The Color of No Color

Rather than have a separate settings for whether something should have a color and what that color is, InDesign just has a special color called None. It shows in Swatches as white with a red diagonal line. It doesn't show in your artwork. There's nothing there. Its name is always None. You can not change the name or the color. Why would you want to?

Navigation - Artboards



Artboard tool



Related Artwork

Illustrator does not have a concept of a sequence of pages. It offers, instead, Artboards. An Artboard is just special area on the drawing surface. They are useful for organizing a project, for exploring variations. Artboards are also used like pages for exporting to PDF and for importing to InDesign.

For instance, the different illustrations on page 26 are all in the same Illustrator file but each on a different artboard. This made creating them and bringing them in to InDesign easy by keeping them all in the same place but able to be treated separately.

For the project at the left, I was able to work on variations of the business card and shirt pocket without having to switch around a bunch of different files. When I was ready for client feedback, I only had to export one PDF which he was able to page through.

How

Click on the Artboard tool and you can edit Artboards. Artboards are always rectangles. Click and drag on empty space with the Artboard tool to create a new Artboard. Click and drag on an existing artboard to move it. Click and drag on an existing Artboard's grips to resize it. Click on the little 'x' at the upper right of an existing Artboard to delete the artboard, but not the art inside it. The Delete key works too.

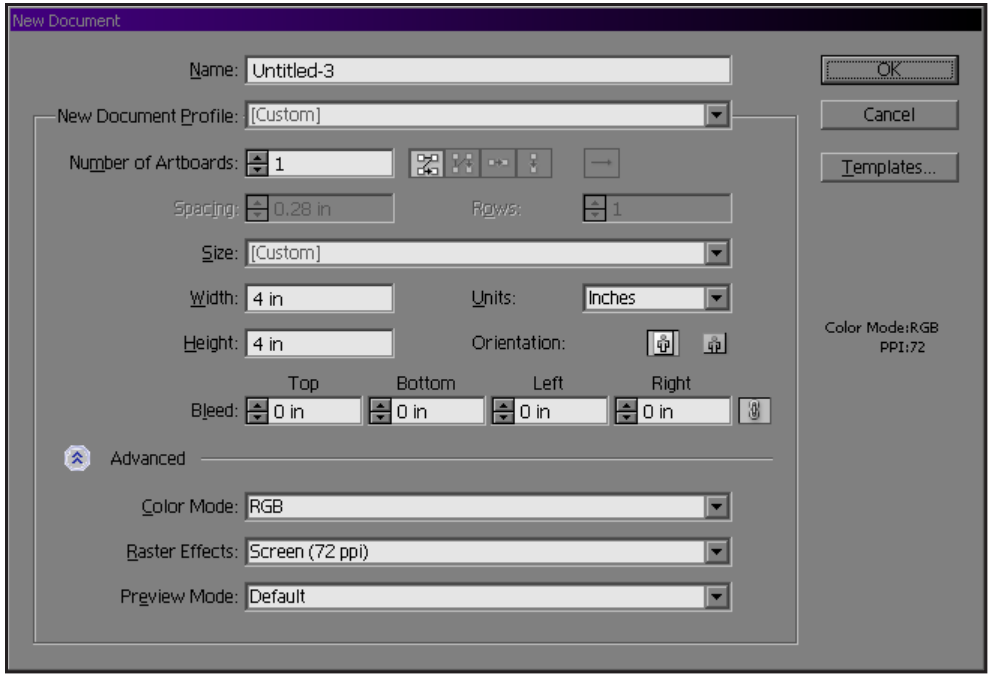
Move an artboard while holding down Alt to make a copy of both the artboard and all of its contents.

When you move an Artboard, any artwork even partly inside of it moves with it. If you have overlapping Artboards Illustrator does not keep track of which Artboard owns which art. This can be surprising at first. It is probably best just not to overlap artboards.

But wait...

It is possible to use Illustrator for years and years without ever even knowing or caring about artboards.

New Document Dialog



Let's Make Something

Illustrator's starting dialog has an option to create a new document, or you can find it on the File menu.

What Values?!

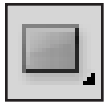
The New Document dialog can be a little daunting at first, especially if you click the More Options button. Turns out it isn't that bad. There are only two settings you need to look at:

- **Width** - How wide you want the artboard to be.
- **Height** - How tall you want the artboard to be.

If you need to later you can just use the Artboard tool to change the size. Here's the rest of the settings if they interest you.

- Name - Will be used when you save. If you want. Can be ignored safely.
- Document Profile - You can pick the word that sounds most like what you are making the art for, but I don't know about this.
- Number of Artboards - If you are just creating one picture leave this at 1. If later you start making alternates you can just add Artboards.
- Size - There are some handy presets in here if you want.
- Units - Pixels for screen, probably inches for print.
- Orientation - Swaps Width and Height if they need to be.
- Bleed - Ignore this.
- Color Mode - Probably best to use RGB for screen and CMYK for print. I think I've always used RGB and it's been okay.
- Raster Effects - Affects apparent quality of things like Drop Shadow. Use 72 ppi if working for screen, 150 or 300 ppi if going to print.
- Preview Mode - Leave on Default

Line



Rectangle

Ellipse

Polygon

Star

Brush

Basic Shape Tools

Fresh

Time to start making things. Create a new document and let's get drawing.

The Basics

Illustrator includes tools for creating various common shapes. Sometimes these shapes are all you need. Maybe you have to add some simple transformations. They are a good place to start because the are easy to understand and fairly predictable.

Try them all out.

Click vs. Drag

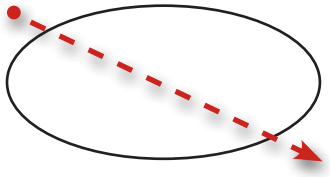
If you select a shape tool the click and let go on the canvas, Illustrator gives you a dialog to enter the shape size numerically.

If you click and drag, Illustrator lets you draw out the shape.

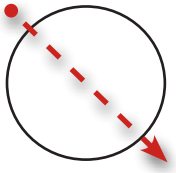
Appearance

You can change appearance settings while nothing is selected and new shapes are drawn with that appearance. See page 19 for more information on appearance.

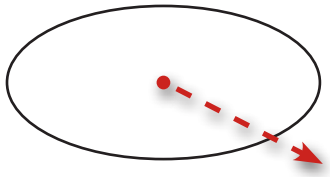
Shape Creation



Click and drag

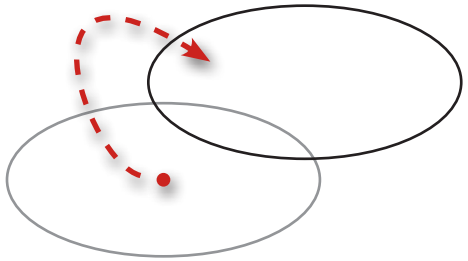


Shift-Drag



Alt-Drag

Alt-Shift-Drag



Space-Drag

Make a Shape

Pick the Rectangle tool or maybe the Ellipse tool on the fly-out menu (see page 8).

To make a shape just click and drag on your document somewhere. This draws the shape from corner to corner.

Make a Shape Differently

If you hold down Shift while making a shape, it's width and height are forced to be equal. This makes rectangles into squares and ellipses into circles.

If you hold down Alt while making a shape the first point you clicked becomes the center, not a corner.

You can hold down Shift and Alt at the same time.

If you hold down space while creating a shape you can move the shape before it is finished. This is great for tweaking position as you go. Yes, it really is better than just making the shape then moving it.

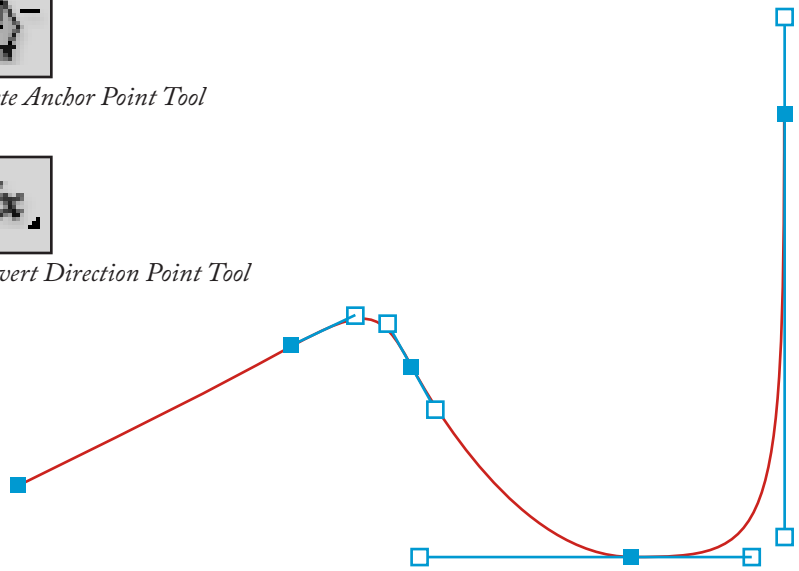
Pen Tool

Direct Selection Tool

Add Anchor Point Tool

Delete Anchor Point Tool

Convert Direction Point Tool



Pen Tool

Click and Drag

The Pen tool is for making complex shapes by manually placing and smoothing all the corners.

A shape in Illustrator has Anchor Points, these are points through which the shape must pass. An Anchor Point has Handles that describe the amount of curve and its direction as the shape passes through the Anchor.

If you click with the Pen tool you get a hard corner. If you click and drag, you get a smooth curve with extended Handles.

Don't worry about making a mess, most of us find the pen tool hard to get used to at first.

Adjust

Use the Direct Selection tool (the white arrow) to select Anchors and Handles and adjust them. If you hold down Shift while adjusting a Handle, it snaps to 45 degree angles.

Unlike in InDesign you **can** use the Alignment panel on individual Anchors. Direct Select a few anchort then hit the appropriate Align button. See page 44 for more information on Align.

Further Adjust

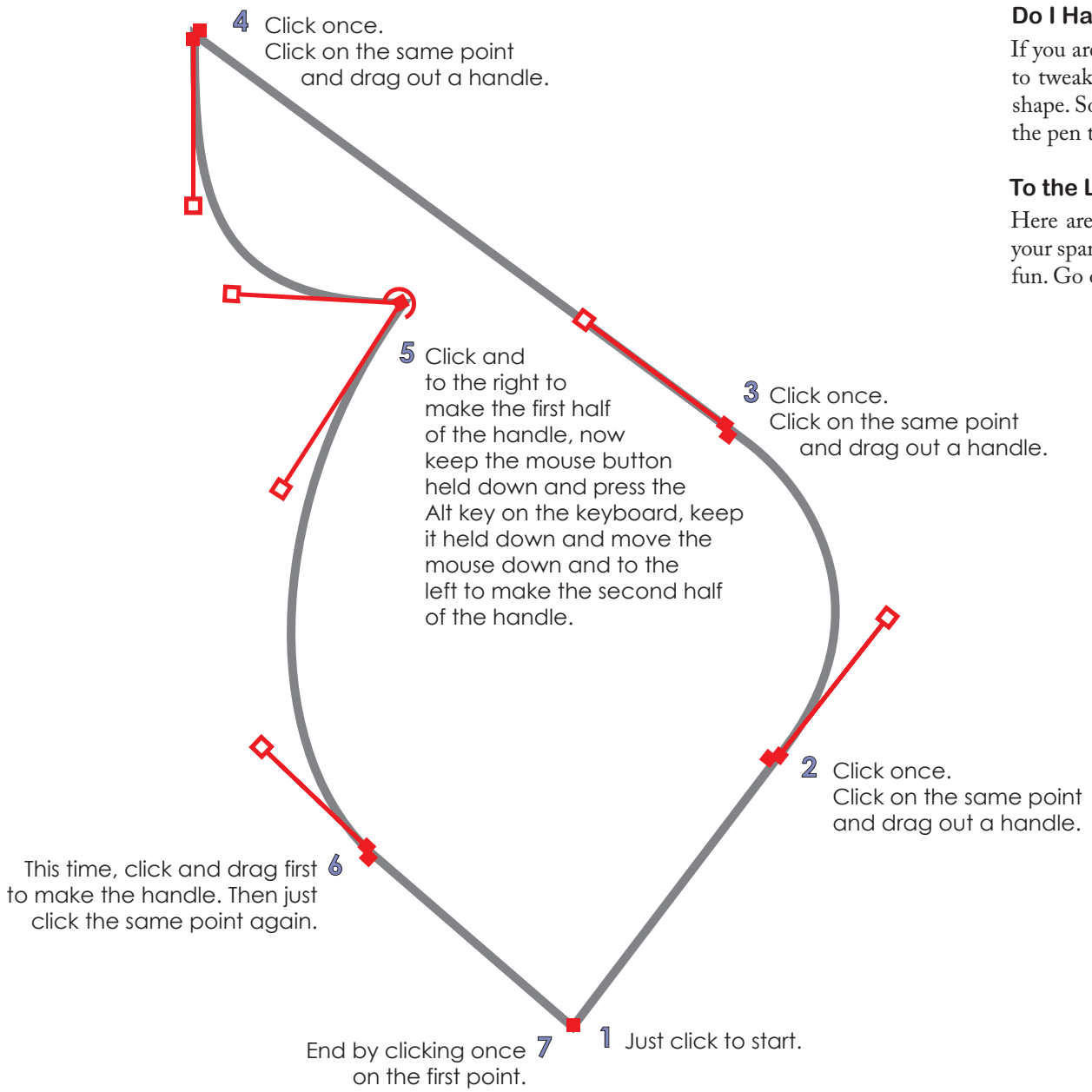
Use the Add/Delete/Convert tools to further adjust your shapes. Add and Delete Anchor tools do just what they suggest. You have to pick pretty close to a shape or anchor for InDesign to figure out what you want to do.

The Convert tool does three related things.

- **Click on an Anchor and let go** - it removes that Anchor's Handles and makes the Anchor a sharp corner.
- **Click and drag on an Anchor** - it drags out new Handles and makes that Handle smooth.
- **Click and drag on a Handle** - it breaks the smooth line between the handles, making a sharp point but it keeps the handles.

Pen Practice

An Exercise Left to the Student



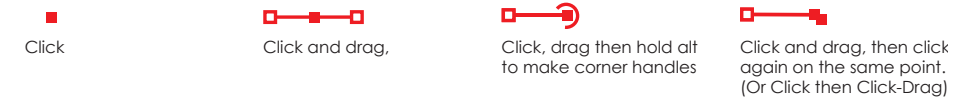
Do I Have To...?

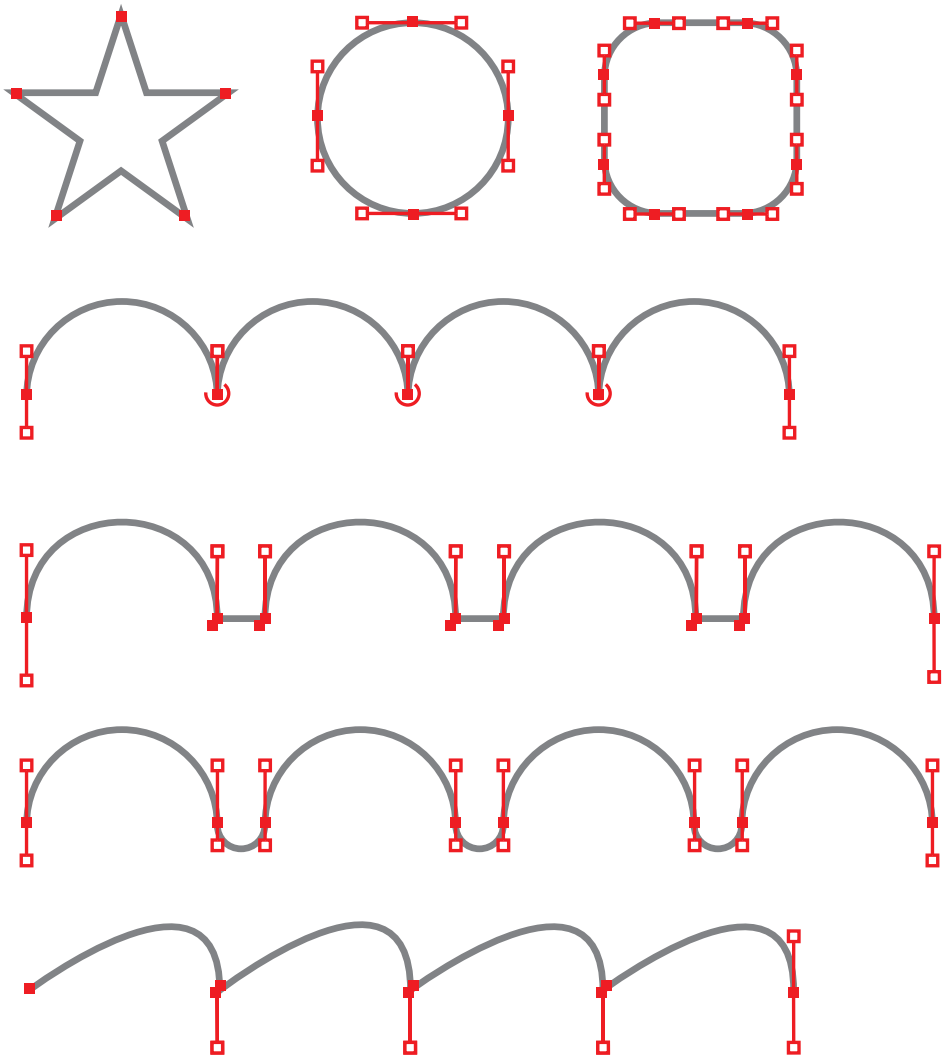
If you are going to use Illustrator it won't be long before you want to tweak a shape. Then one day you will want to draw your own shape. So get some practice in now so you get a little familiar with the pen tools.

To the Left

Here are and on the next page are some exercises to work on in your spare time. At least try to use the Pen tool to make a circle. It's fun. Go on, I dare you.

Pen Practice





An Exercise Left to the Student

Homework That Will Never Be Checked!

You don't have to do it but it is good for you.

Snap Angles

Hold down shift to snap the handles to 0, 45, and 90 degree angles.

What's the Red Stuff?

This is a first try at making a visual language for the different ways you can use the pen tool. An Anchor isn't simply an Anchor. It may be a hard corner, a hard corner with tangent Handles, smooth with Handles... Each of these different Anchor conditions has a different way to create it as you draw. These red annotations are a way to help specify what to do at each Anchor.

The system is flawed:

- **This form:**  - is used to indicate click-drag-click and click-click-drag.
- **Fourth row** - with the big arcs and little arcs you need to click, drag out a handle then without letting go hold down alt and drag out the other half of the handle.

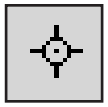
Manipulating Objects

Selection / Move / Duplicate

Rotate

Scale

Reference Point Tool



Reference Point Marker

Move / Duplicate

Rotate

Scale

Select Move Rotate Size

Move

The Selection tool (black arrow) also works as the Move tool in Illustrator. Just click and drag on an object.

Duplicate

If you hold down Alt while moving something, it makes a copy.

Rotate

The rotate tool spins things around on the page. If you hold down Alt after you start rotating, it makes a copy. If you hold down Shift after you start rotating, it snaps the rotation to 45 degree increments.

You can also rotate with the Selection tool by clicking near the corner grip of an object. Watch for the cursor to change.

Scale

The scale tool changes the size of things. You can also change the size of something by selecting it and then dragging the grips that appear.

Reference Point

Rotation and scaling always happen "about" some center. The point which stays where it is. You can set this point two ways.

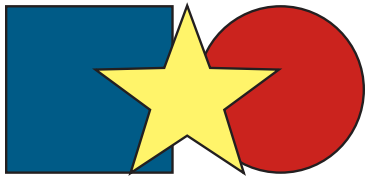
- **Click** - With the Rotate or Scale tool selected just click anywhere in on the document to change the Reference Point Marker.
- **Tool** - With the Rotate or Scale tool selected the Reference Point Tool appears on the Control panel. You can use this so specify corners, edge midpoints, or object center.

Wait - There's More

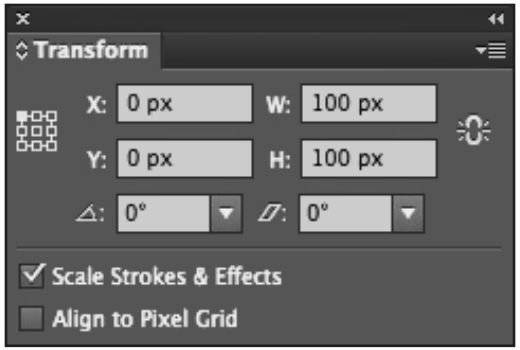
The Control panel has lots of controls on it for transforming objects. If you know you want to rotate something exactly 27 degrees, do it there. If you know you want something positioned exactly 2.718 inches from the left margin, do it there.

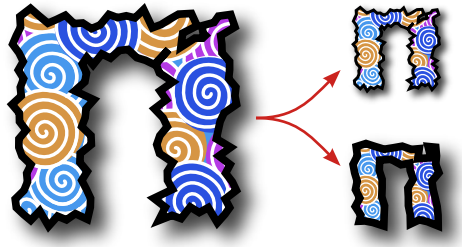
Original

Resize – No modifier keys



Scale – Shift held down





With Scale Strokes & Effects

Without Scale Strokes & Effects

Resize vs. Scaling

Only One Way

Unlike InDesign, Illustrator has only one idea for changing the size of an object. There are different physical mechanisms, you can move grips to stretch an object to a new size or you can use the scale tool to shrink/grow it, but in the end the result is the same.

Proportions

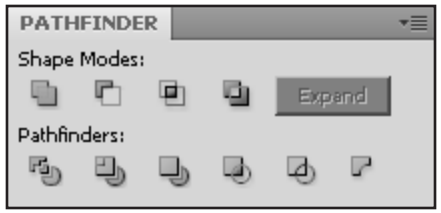
Use the Select tool and the grips on an object. If you hold down Shift the object will be resized proportionally. Its shape will not distort. If you hold down Alt after you start resizing an object it will resize about the object's center, not the opposite corner.

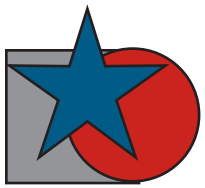
Stroke Weight

When you resize an object you will notice that patterns applied to the object resize with it, but the stroke weight remains constant. This can be changed.

On the Transform panel there is a checkbox for "Scale Stroke and Effects" that will resize stroke weight in keeping with the new object size. Also such effects as Drop Shadow distance and amount of Roughness.

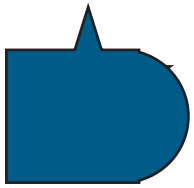
Shape Combination

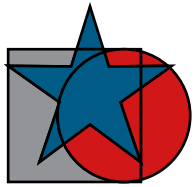



Original shapes


Exclude


Crop


Unite


Divide


Minus Back


Minus Front


Trim (expanded for clarity)


Outline


Intersect


Merge (expanded)


Divide (expanded for clarity)

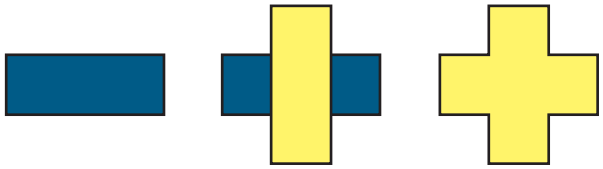
Pathfinder Panel

How

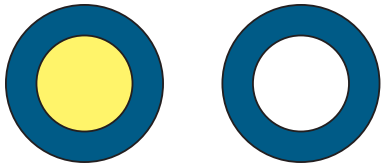
Make some shapes. Select them all and then press a Pathfinder button.

- **Add** - is straight forward.
- **Minus Front**- removes all of the shapes from the rearmost shape. Only areas of the rearmost shape with nothing in front of them remain.
- **Intersect** - retains only the area where all shapes overlap.
- **Exclude** - keeps only the places where an odd number of shapes overlap. This can lead to some interesting patterns.
- **Divide** - Cuts every shape by every other shape, even hidden ones.
- **Trim** - Removes all of the hidden parts of shapes and clears the stroke settings.
- **Merge** - Removes all of the hidden parts of shapes, clears the stroke settings and then does Unite for shapes that overlap and have the same fill. *Note: The example here is not designed to show this last step well.*
- **Crop** - Removes all areas outside the topmost object. Removes the topmost object. Performs Trim on what remains and removes any Stroke.
- **Outline** - Divides objects into groups of edges based on where shapes overlap. Similar to Divide but without Fill. Removes Fill, sets Stroke width to zero and Stroke color based on fill color.
- **Minus Back** - is like Minus Front but the base shape is the frontmost one. Only areas of the frontmost shape with nothing behind them remain.

Shape Combination



Using simple shapes and simple transforms with Pathfinder (Union) to make a complex shape.



Using simple shapes with Pathfinder (Minus Front) to make a complex shape.

Using simple shapes with Pathfinder to make a complex shape. And then some Anchor and Handle tweaks.

Different numbers of overlapping shapes used with Pathfinder's Exclude mode.

What For

Build Up Complex Shapes

If you need a greek cross you could draw it carefully with the pen tool, or you could just use Pathfinder to combine two identical rectangles. If you need a donut you have to use Pathfinder to combine two circles.

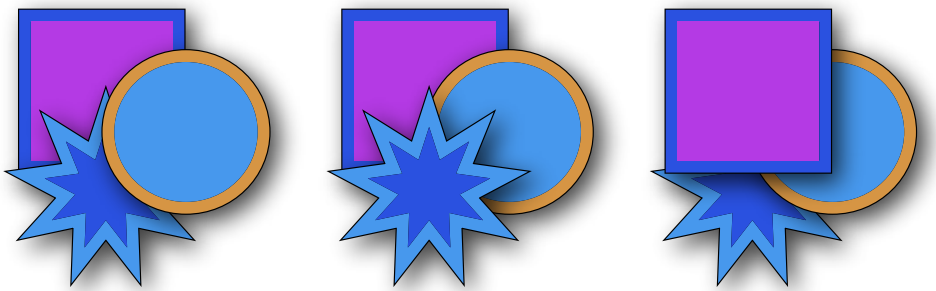
Examples

Just a few simple examples to help illustrate the idea the Pathfinder can be used to create more complex shapes than the built in basics just by breaking the end result into simple starting shapes.

One More Thing

When you use Pathfinder, Illustrator automatically Groups the results. This may be what you want. It may not. You can Ungroup them easily. The right click menu has it, the Object menu has it and the hot key is Ctrl-Shift-G.

Display Order



Volunteers Step Forward

Illustrator draws objects one after the other. As one gets drawn, it might cover over something that was drawn before. This drawing order gives rise to the idea that objects are "in front of" some objects and "in back of" others.

By default, objects are drawn in the order they are created. This makes newer stuff in front. It is a natural behavior but sooner or later you will want to move something either forward or backward. Turns out it's easy. But first...

You can move objects either one step at a time, just in front of or behind the next object in the pile, or all the way to the front or back.

How?

There are a number of ways:

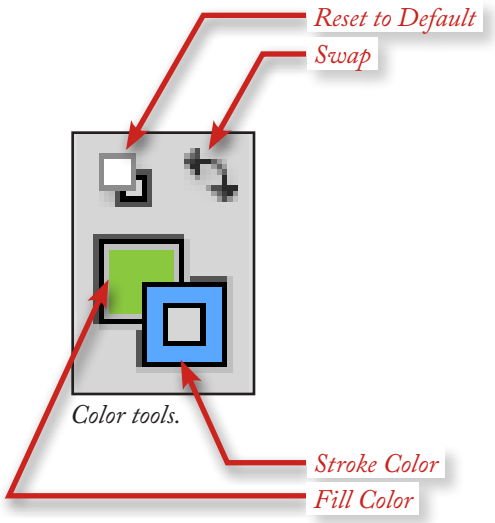
- **Menu** - Select an object and on the Object menu, Arrange and then pick the movement that you want. The Arrange commands are also available on the right click menu.
- **Keyboard** - On the menu you'll see that there are keyboard shortcuts. Backward: Ctrl-[, Forward: Ctrl-], To Back: Ctrl-Shift-[, To Front Ctrl-Shift-].
- **Layer Panel** - All objects appear in the Layer Panel. The drawing order is the same as the list in the Layer Panel. It starts at the bottom - the back - and moves to the top of the list - the front.

Why?

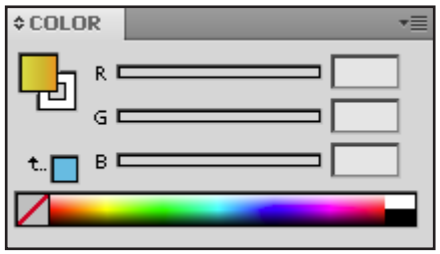
You may care just for appearance purposes. Sometimes the things you draw do go in front of or behind one another logically according to the image you want to create.

Also, a number of commands for combining shapes act specifically on frontmost or backmost objects.

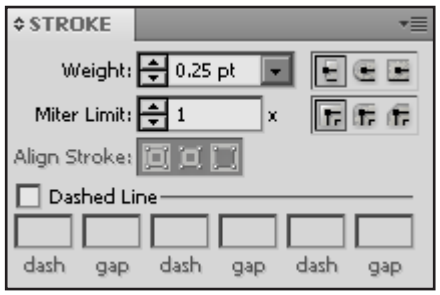
Shape Appearance



Color tools.

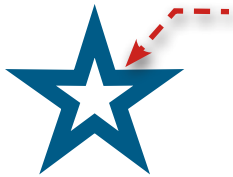


Color panel.

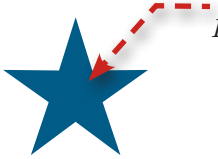


Stroke panel.

Typical default appearance. Slim black stroke with white fill.



Wide blue stroke.



Blue fill.

Blue fill with wide yellow stroke

Red fill with yellow stroke, dashed with blue gap color.

Simple line with wide blue stroke and red fill.

Very Expressive

A shape starts as just an outline, but then it gets an appearance applied to it. Every shape has two primary parts:

- **Stroke** - the line that traces around its edge. This line can not be drawn or it can have a thickness, called weight, and a color. It can also have a Type for a more ornamental look and it can be dashed.
- **Fill** - color applied to the area a shape encloses. If a shape is open, like a U, then the fill stops at an invisible straight line connecting the start and end of the shape.

How

Select an object then change the attributes you want.

You can access Stroke and Fill color on the toolbar. If you double click the tiny color indicators a color picker pops up to let you set a color.

Under the tiny color indicators are the even tinier frame and text buttons. Text in InDesign lives in a frame and the frame can have its own color different from the text. See the next page.

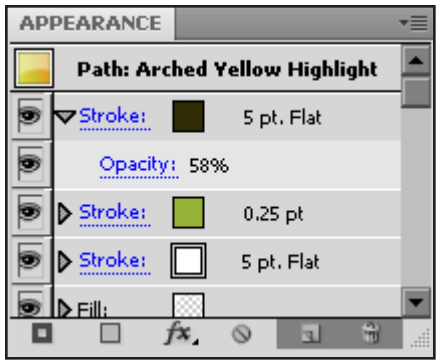
Or you can go to the Color and Stroke panels where the buttons are all a little bigger.

The pair of squares represent Fill and Stroke color. Which one is in front is the one you are changing. Just click on the one you want then pick a new color.

The tiny curved arrow to the upper right of the two squares swaps places, Fill becomes Stroke, Stroke becomes Fill.

The Color panel seems to have a mind of its own. If you go to the Panel Menu you can tell it which color picker you want.

The Stroke panel has all the controls for Stroke Weight, Type and even if you want a shape to be an arrow.



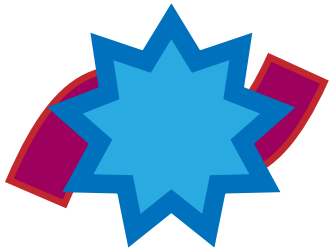
Appearance Panel

Very Expressive

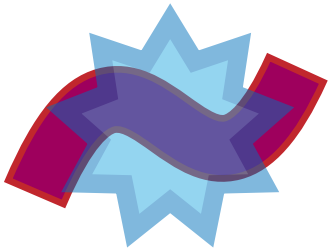
A shape starts as just an outline, but then it gets an appearance applied to of its own. If you go to the Panel Menu you can tell it which color picker you want.

The Stroke panel has all the controls for Stroke Weight, Type and even if you want a shape to be an arrow.

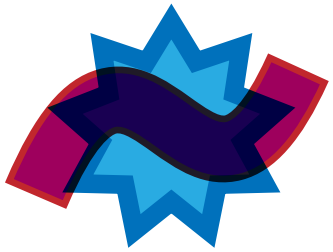
Transparency panel



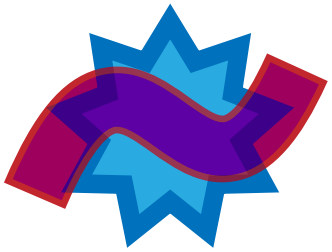
Normal. 100%



Normal. 50%



Multiply. 100%



Overlay. 100%

Simple Transparency

A very common desire is to have text on a transparent frame partly blocking out the background but still allowing it to show through. This is accomplished on the Effects panel.

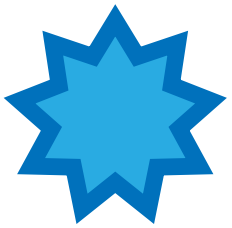
If you just open the Effects panel and change opacity to, say, 50% the whole thing will fade and your words will be hard to read.

See that "Object" is selected? Select "Fill" instead and change its Opacity.

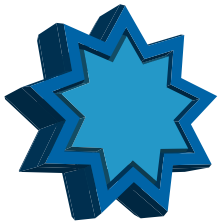
You can also change the blend mode where it says "Normal" for Object, Stroke, Fill, or Text.

Typically text is is drawn as appearing in front of the background. If you need the text to have a transparency effect that interacts with the background but not the frame, Objects and turn on "Knockout Group".

Shape Appearance



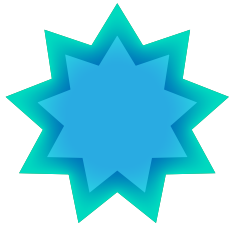
Original



3d Extrude and Bevel

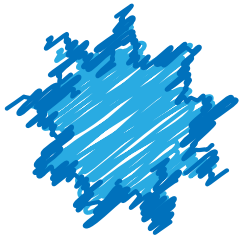
Roughen

Drop Shadow

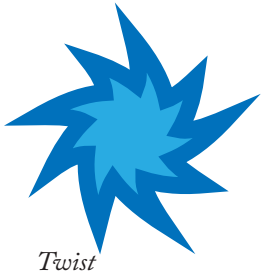


Inner Glow

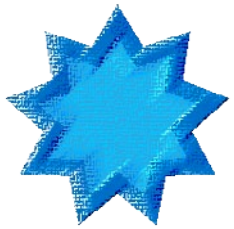
Rounded Corners



Scribble

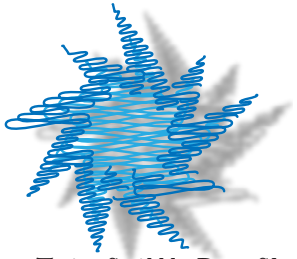


Twist

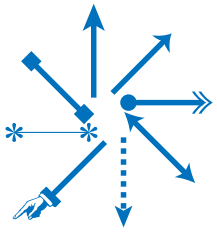


Rough Pastels

Radial Blur



Twist, Scribble, Drop Shadow



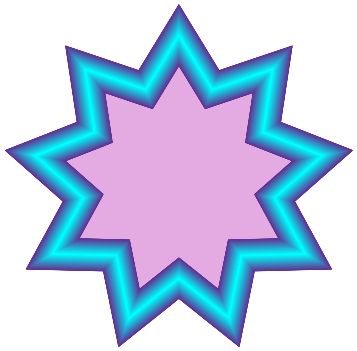
Add Arrowhead

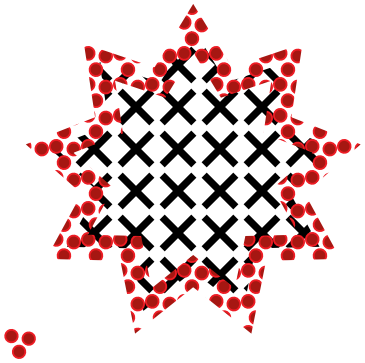
Other Stuff

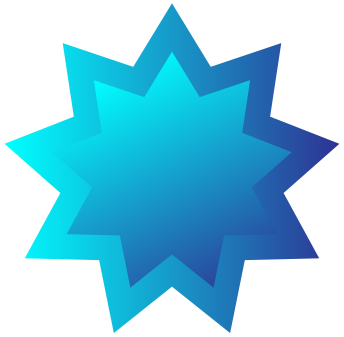
On the Effects panel there is a little button with "fx" on it. It hosts a long list of effects that can be applied to objects or parts of their appearance.

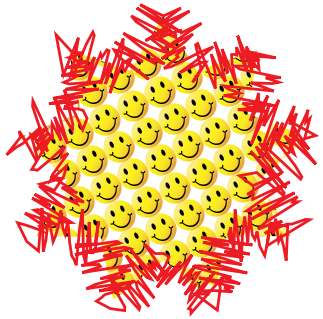
I won't say they are unsuitable for design documentation, but do use them carefully. A bit of drop shadow can help bring something forward in a busy situation. A bit of inner shadow is sometimes a nice effect on title text. They can also be used to make a diagram seem a little more physical... or a little more painterly.

Here is a quick demo of all of them at their most basic and few fancier combinations.



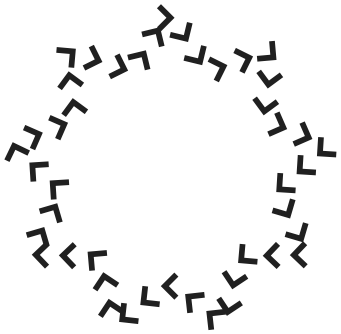






More Other Stuff

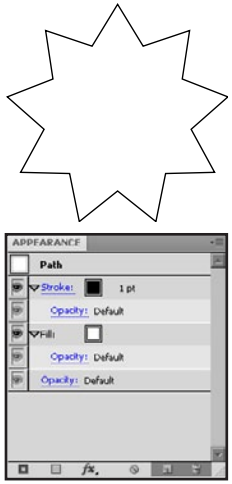
Fills and Strokes do not have to be solid colors. They can be Gradients or Patterns...



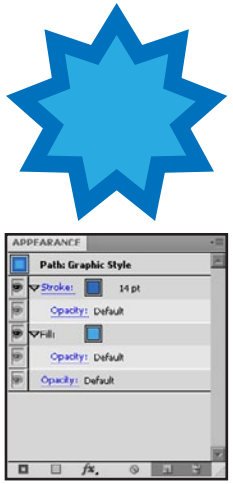
More More Other Stuff

Strokes can be made with Brushes. And Brushes can be pretty fancy.

Shape Appearance



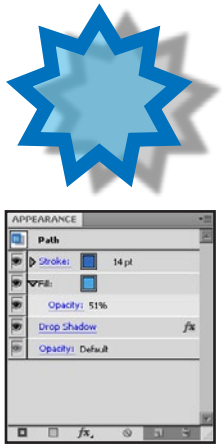
Basic



Still pretty simple.

Same as previous with added effects to whole object.

Same start, but effects added separately to Stroke and Fill.



Same start, with Drop Shadow added to whole object and Opacity adjusted only on Fill.

Two strokes, one wider and one with a Roughen.

Appearance Panel

Starting To Get Powerful

The standard panels offer reasonable flexibility but where Illustrator really shines is on the Appearance panel. The appearance panel is like a little layer stack for each object. It separates Fill and Stroke from each other and allows them to be treated differently. It also allows for the creation of multiple Fills and Strokes to be stacked on top of each other, reordered. Each item in the Appearance panel can have its own effects and Opacity settings.

How?

The basics on the Appearance panel are right there to be adjusted. Pretty much everything is clickable. The Eye icon turns items on and off. The triangle expands and collapses items to allow access to Opacity and Effects. The color pot allows for Swatch selection. The Stroke Width indicator allows for Width selection.

At the bottom of the panel is a new button for creating new Fills and Strokes. You can also create new items from the Panel Menu.

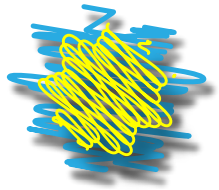
To add effects, select the item you want to add the effect to - either the whole path, Stroke or Fill, or if you select nothing it will get applied to the whole object - and click on the “fx” button at the bottom of the panel to select your effect.

Effects can be moved from one item in the stack to another. If you hold down Alt while moving an effect it makes a copy.

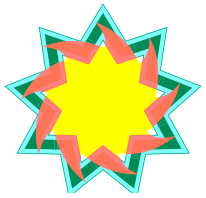
Effects can be adjusted at any time by clicking on their name in the stack.

Visibility

The higher up on the stack in the Appearance panel an item is, the more to the front it is in terms of visibility. If you are stacking Strokes, the wider ones usually go lower in the stack.w



Two Fills. Each with its own effect.



Two Strokes and a Fill with an effect and Blend Mode on Opacity. Also the Fill has been moved above the strokes.

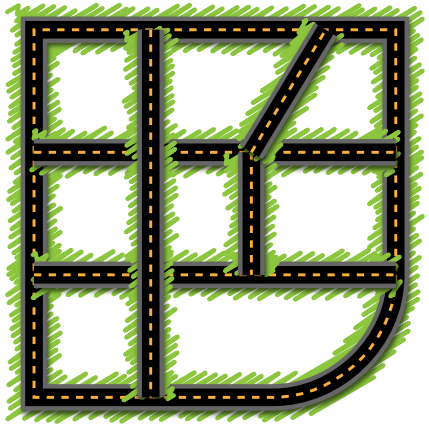
Four Strokes of varying width and style turn a simple shape into an illustration of a road.

Even More

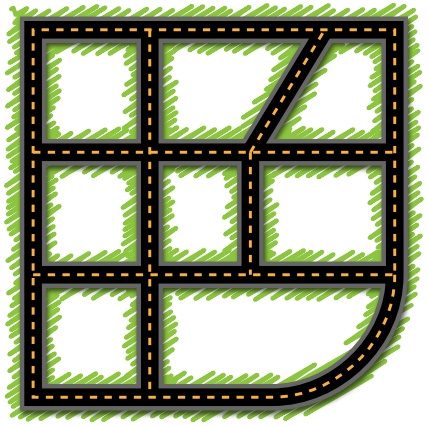
Here are a few more examples with the Appearance panel. Remember - the only thing the user drew for each of these is a single nine-pointed star. Everything else is added Strokes and Fills and Effects.

Separate Objects

Grouped Objects



Separate Objects



Grouped Objects

One By One Can Be Bad

If you select a bunch of objects and apply a drop shadow or complicated Appearance to them each item is treated individually; everything that makes up its Appearance is drawn before the next item is drawn. Sometimes that is not what you are looking for.

How?

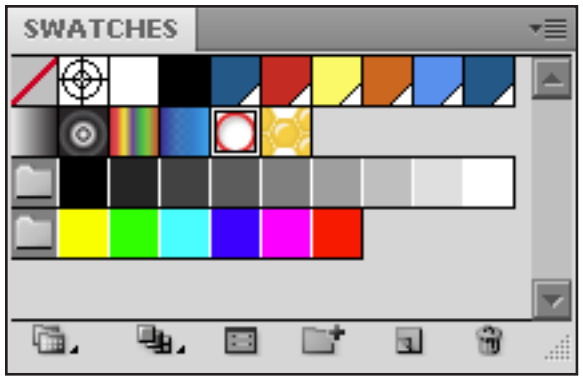
You can get what you may want by grouping the objects first. When you apply an Effect or Appearance to a group rather than the individual items, the items are treated as a whole with no one being higher than another. Every item that makes up the Appearance is drawn for all items in the group before the next Appearance item is drawn.

For instance: The drop shadow is lower than the shapes, so all of the drop shadows are drawn and then the shapes are drawn so no shape casts a shadow on another.

Layers Too

You can also apply an appearance to a layer for the same effect.

Swatches



Use These All The Time

Reusable, Alterable Color

A Swatch is a saved color. You can give a swatch a nice name to help you remember what it is for.

Whenever you do anything with color in Illustrator, fill a graphic background element, draw an important arrow, color a character style... anything, you should consider using a Swatch and not just some color you picked off the color picker.

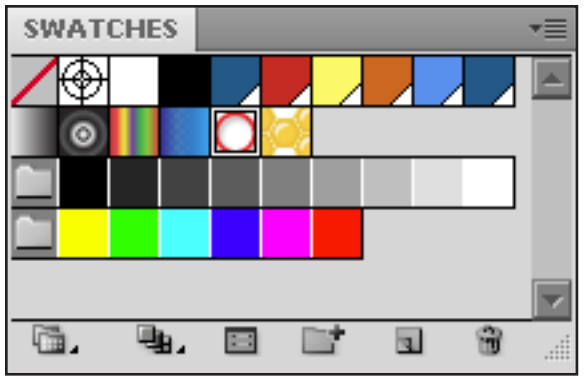
The reasons are meant to make your life better:

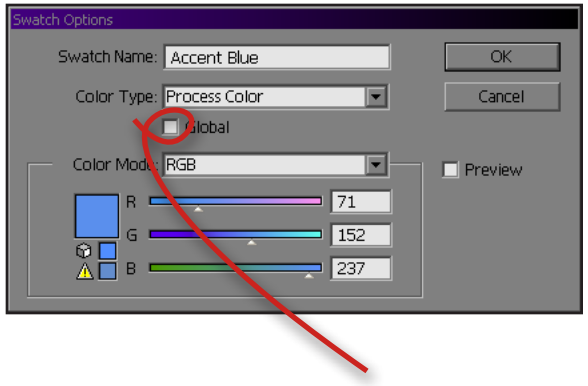
- **Consistency** - You don't want your documents to be a chaotic mess. If there is a color used for some purpose it should always the that color throughout the document. Next time you need it you can use a Swatch to just get the exact right color in one easy click. "Oh, the swatch named 'Bldg Shadow Blue' is the one I want.
- **Modifiability** - You don't have to finalize your colors until the very end. If you have 137 pages written and find out that "Bldg Shadow Blue" is printing a little dark, you can edit just one Swatch, put a little more white and a little less magenta and everywhere in the document that color is used gets corrected.

And a third reason:

- **Ugly Mess** - Using Swatches pushes some discipline on you and prevents your document from using so many colors it looks un-careful.

Swatches





Use These All The Time

How

On the Swatches panel select an existing swatch then click the New button. A new Swatch is made. Double click on the swatch to edit the color and give it a useful name (you have to turn off the "Name with Color Values" checkbox, but that's OK).

...Or...

When you double click on the color chips on the tool bar the color picker dialog that comes up has a button on it to Add Swatch. You can design a color, hit the button and then do another and another. But remember to go to the Swatches panel and change the names.

Modifiability Warning

The default behavior of Illustrator Swatches does not preserve a link between artwork and the Swatch that colored it. If you modify a Swatch, the artwork remains untouched.

Illustrator does have persistent Swatch capability. See the Swatches here with the white triangle in the corner? Those Swatches are linked to the artwork that uses them. They are called "Global Swatches".

To make a Swatch Global, double click the Swatch to get the Swatch Options dialog and turn on the "Global" checkbox.

You can select many Swatches at once and change them all to Global at the same time.

Moving to Other Programs

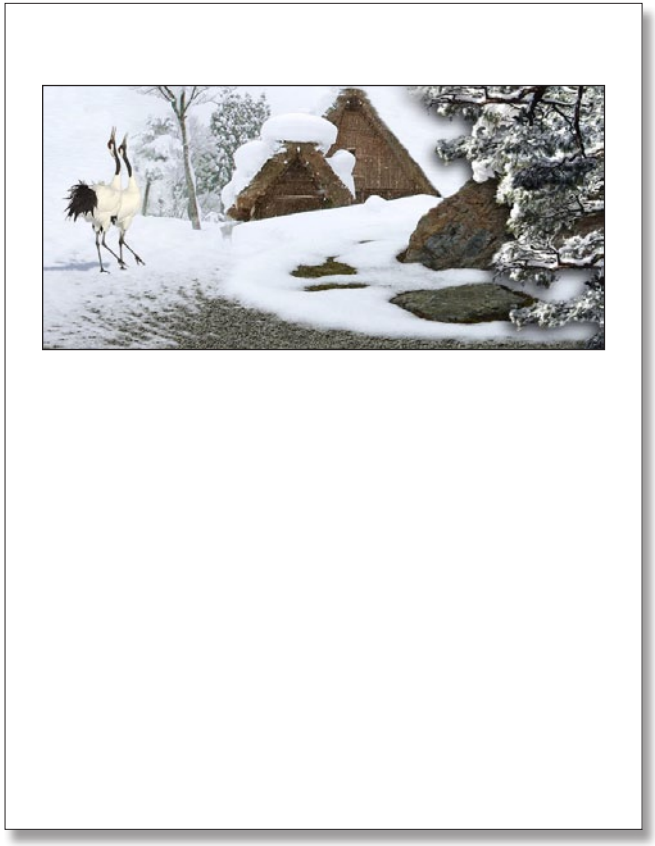
If you are going to make art in many programs (InDesign, Illustrator, Photoshop...) that you want to integrated and consistent it is good to use the same colors in that art. You can share Swatches between different programs by saving to an Adobe Swatch Exchange file.

How

Select the swatches you want to save. Use shift to select ranges and control to select multiple individual swatches.

On the Swatches panel menu select “Save Swatches.”

Be careful where you save the swatches. In testing every program saved somewhere different. You should probably just save the swatches to the same place as your project or primary document.



Simple But Tedious

Go to the File menu. Pick Place and a file open dialog appears. Select your image and click the Open button. The image is dropped on the page at a size that may be inconvenient.

You will probably have to Scale it before you can do anything else.

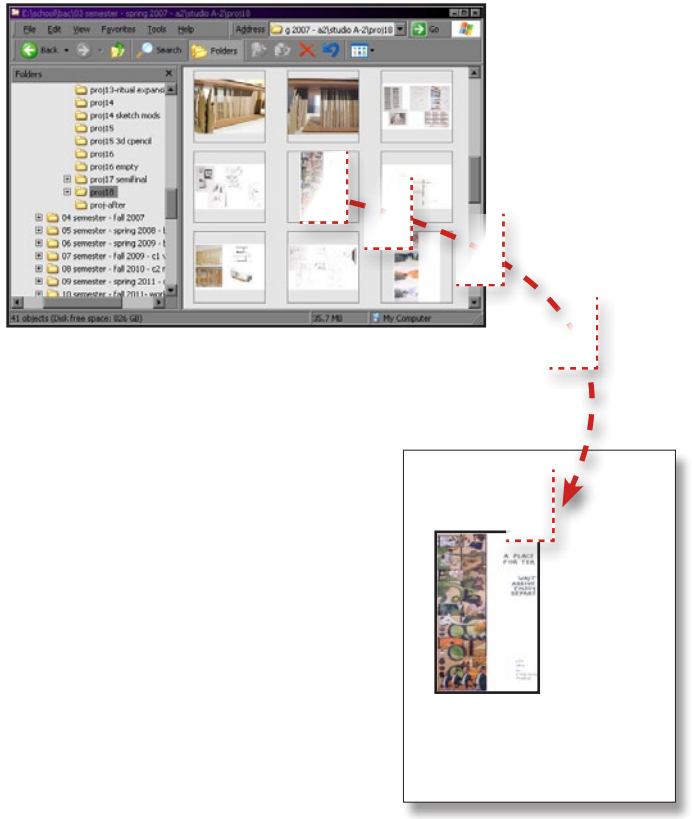
Multiple Images

Illustrator does not allow you to select multiple images in the Open dialog for placing. But you can drag and drop multiple images from your thumbnailer.

Adding Images

Drop From Outside

Bridge - for finding, placing and managing images.



Parts Bin

When you build model, you keep a bunch of useful stuff right there on the table where you are working. Not stuck in some shoebox on a shelf on the other side of the room. Similarly, there are ways of keeping your content available and just grabbing it when you need it.

Well, it's really just one way: Have some program that shows you your images in their folders on the disk and allows you to drag and drop them into your document.

Bridge

Adobe has a program called Bridge that does the job. It has powerful features for working with other Adobe products and since it is Adobe it can thumbnail PDF and Illustrator files with ease.

Mini-Bridge

Illustrator CS6 does not have Mini-Bridge and it does not appear to exist in CC either.

Explorer

If you don't fancy Bridge, you can use your operating system's file browser. Windows Explorer, Mac Finder or what have you. They have ways of showing thumbnails of images and are already familiar to you.

Other

There are third party image thumbnailers which you may prefer for your own reasons. As long as you can select an image and drag and drop it to another application it should work just fine.

How

Open the image browser of your choice. Navigate to where your images are. Select one or more images then drag and drop them onto your document. It is that easy.

Illustrator dumps all the images onto the workspace at once.

If you click and let go, the text is stretchable. It is like art.

If you click and drag, the text is reflow-able. It is like contents in a frame.

If you click and drag, the text is reflowable. It is like contents in a frame.

Just Use A Text Frame

Click and Drag

Illustrator has two different kinds of text:

- **Art-like** - When you select art-like text and resize it, it stretches and deforms. When you are done, it is still editable though.
- **Document-like** - When you select document-like text and resize it, the text size and shape remains unaltered; the text is reflowed to fit the new shape of the bounding rectangle.

When?

The names answer the question. If you are using text to make a art with - maybe a logo, or part of a collage - then you probably want Art-like. This will allow you to tweak the size to better fit the rest of the work.

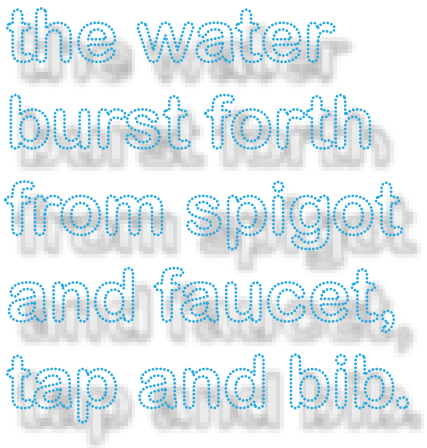
If you are using text as something people are meant to read as part of a document - if you want to make sure that your 10 point type remains 10 point - then you probably want Document-like.

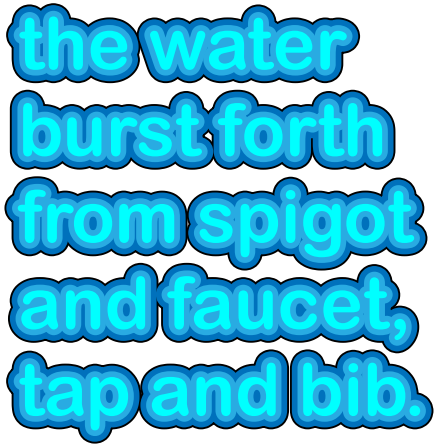
How?

- **Art-like** - Select the Text tool. Click and let go in the document. Now you can type. The typing will remain on one line until you hit Enter.
- **Document-like** - Select the Text tool. Click and drag to make a rectangle. Now you can type. The typing will appear inside the rectangle.

the water
burst forth
from spigot
and faucet,
tap and bib.

the water
burst forth
from spigot
and faucet,
tap and bib.





Appearance

Text in Illustrator has Stroke and Fill. It does not have a containing frame with its own Stroke and Fill like InDesign. Stroke and Fill can be any color or pattern.

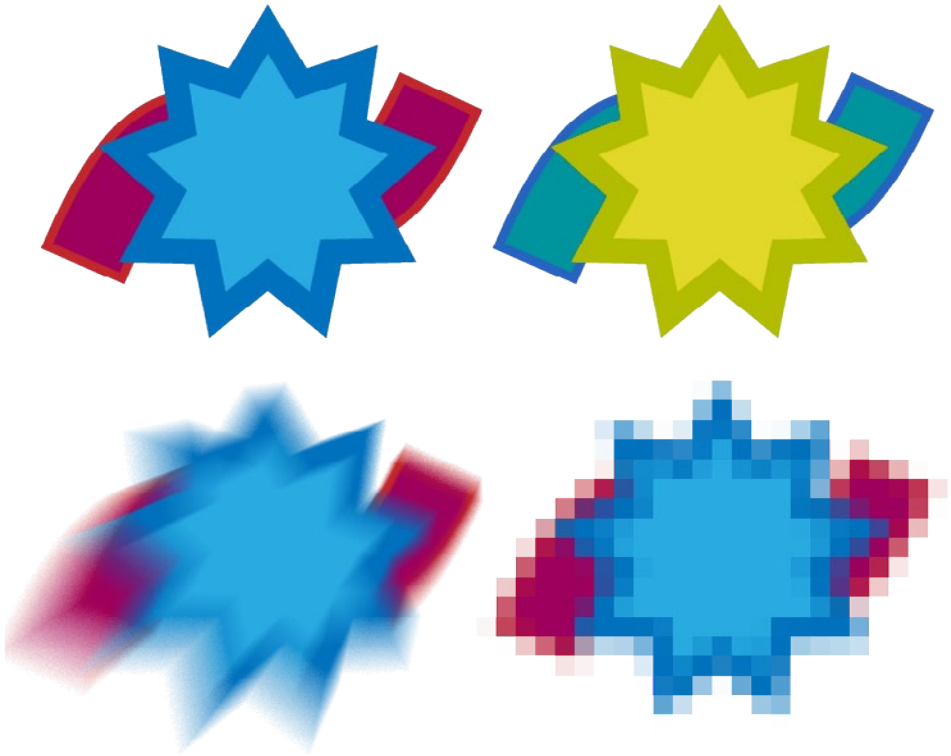
To get a Gradient you have to go into the Appearance panel and apply it as a new Stroke or Fill to the Type object not the Characters.

PDF

Illustrator uses .AI files as its native file format. It also plays nicely with PDF files, but PDF can not support everything that Illustrator knows how to do. Stick with AI files.

Older Versions

After the Save As... dialog, Illustrator displays an options dialog. On this dialog there is a drop down to let you specify an older version of Illustrator. Newer features, for instance image brushes from Illustrator CC, or Gradient Strokes from Illustrator CS5, will not be able to save correctly to earlier versions. Typically Illustrator tries to save something so your file will at least look similar even if it can not be edited the same ways.



One Illustrator file placed four times in Photoshop with different Smart Filters applied. The parameters for these filters can be adjusted and the basic art can be edited.

Into Photoshop

You can place an Illustrator file in Photoshop. This makes the Illustrator file a Smart Object (Photoshop's version of a linked file) in Photoshop which can be freely transformed and subject to effects that are applied non-destructively.

You can also add Photoshop layer masks to a Smart Object.

A placed Illustrator file should look exactly like it did in Illustrator. It can be used as a clipping mask for layers above it.

Paste

You can copy objects in Illustrator and then paste them into Photoshop. There are four options when you paste:

- **Smart Object** - Photoshop creates a new Smart Object in the Photoshop file. If you tell Photoshop to edit the object it will save the object to a temporary file and open it in Illustrator. This is pretty cool.
- **Pixels** - lets you transform the object and then rasterizes it to a regular Photoshop layer.
- **Path** - puts the shape, outline only, into a new Path, at actual size. You can use Edit: Transform Path if you want to change the size. The path can then be colored with Fill or Stoke path, turned into a selection, and edited as a normal Photoshop Path.
- **Shape Layer** - creates a new shape layer with the current foreground color and the pasted shape(s) as a vector mask.

And Other Image Formats

The horn is a PNG file with transparency brought into Illustrator, converted to a Symbol and used with the Symbol Sprayer.

From Photoshop

Images can be included in an Illustrator file. They can retain transparency information, be transformed, accept certain effects.

There are two kinds of images in Illustrator:

- **Linked** - The image is a separate file on disk that is displayed in the Illustrator document. A Linked image can be turned into an Embedded image by Rasterizing it. Use a Linked image if you may want to edit the image in future.
- **Embedded** - The image data is hosted in the Illustrator file but it is harder to edit and loses layer content. Embedded images are nice because they go wherever the .AI file goes.

Both types of image can be used for Live Trace but there are some restrictions.

Restrictions

Linked images can not be used for brushes and patterns and must be Rasterized first.

When Rasterizing, you need to pay attention to your desired DPI and whether you want to retain transparency.

Just Place

From InDesign

It doesn't look like you can place an InDesign document in an Illustrator document directly, but that might not come up too often. But if you really need to, you can save a PDF from InDesign and place that in Illustrator.

To InDesign

Just place your Illustrator file as regular image content.

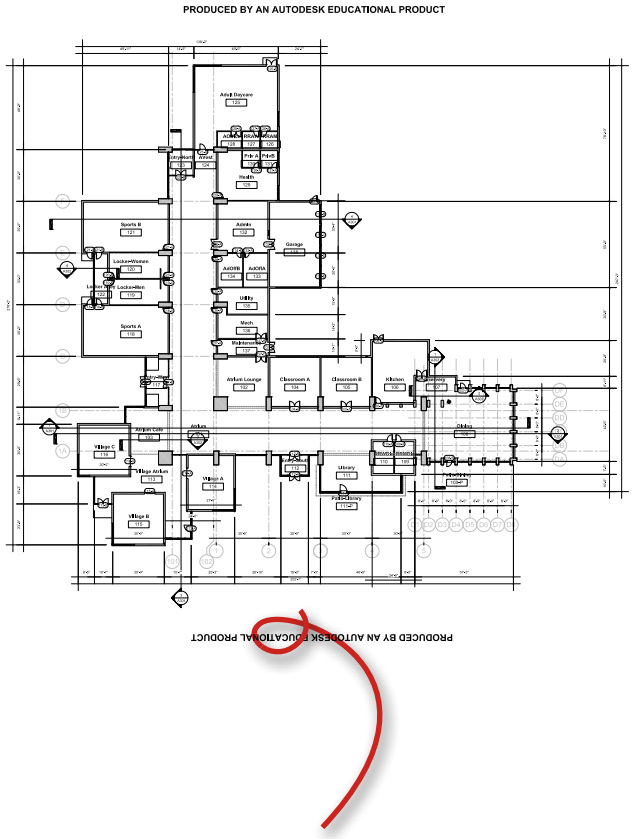
Multiple Artboards

If your Illustrator file has multiple artboards do not place it with drag and drop, use the File: Place command off the menu and on the dialog check the "Show Import Options" box. This lets you chose which artboard you want and

Cropping

...provides some cropping options which can be nice.

Print to PDF



Clean Up

For a lot of students their introduction to Illustrator is as a way to get rid of the student label on their AutoCAD plots. Plot to PDF, open the PDF in Illustrator and delete the offending marks.

Is It Good?

Plotting to PDF is a mixed bag for going to Illustrator. The PDF maintains all of your line weights, etc. The PDF looks plot ready. It is plot ready. But what lines are connected to what other lines and which ones aren't seems pretty random. Solid hatches come in as lots of triangles. There may be multiple shapes in one place. It can be hard to make edits in a way that seems to make sense.

Simple things like "select all the lines this big and make them a little lighter" work well.

Vector is better

It is generally better to keep vector art as vectors rather than go to bitmap like JPEG or PNG. You can tweak vector art more easily. It scales and rotates better.

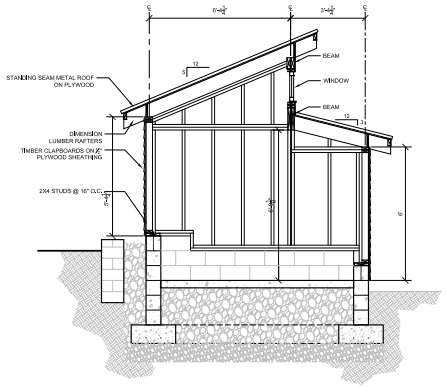
Always look for the vector option. DWG, DXF, AI, WMF...

Raster if you have to

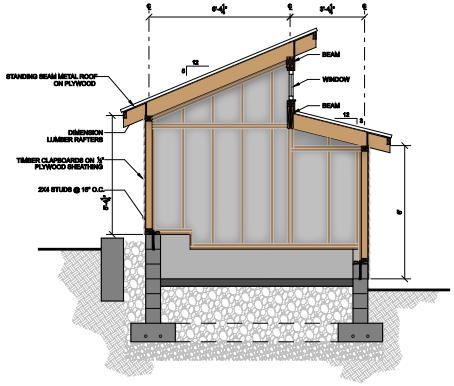
If you are having trouble with vector art, most CAD programs have a way to create a bitmap. From AutoCAD you can plot to a PNG file and you can make it big, like 5000 pixels wide, and it should look pretty good.

CAD work is usually very hard edged with areas of flat color and high contrast (black lines on white backgrounds). Because of this you should use PNG files and not JPEGs. Please.

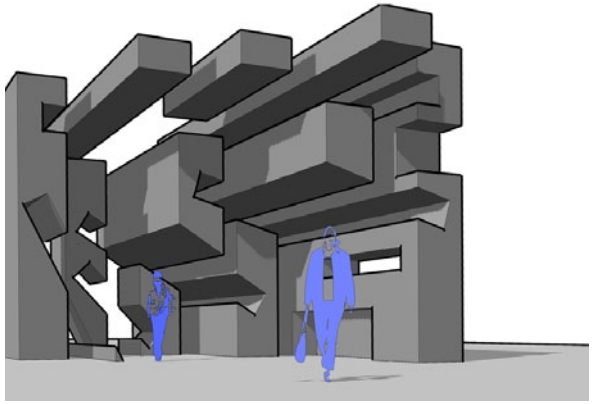
Open the DWG



AutoCAD opened in Illustrator and different Appearances applied.



Same drawing with LivePaint and a bit of Inner Shadow effect applied.



Export from Illustrator to DWG. Opened and manipulated in AutoCAD.

Illustrator shapes used for building and original JPEG entourage LiveTraced in Illustrator before sending to AutoCAD.

It's Cool. But Weird.

Illustrator can open AutoCAD's .DWG files directly. This is probably the best way to get CAD work into Illustrator if you are going to do some heavy editing.

From AutoCAD you have to save as ACAD 2004.

When you open your file in Illustrator there are scaling options. You probably don't need to keep the drawing actual size. If you are just making some art, you can use "fit to Artboard". If you think scale might be important, you can specify a scale.

Remember that the AutoCAD units are probably inches so for quarter scale you say "12 units = 0.25 inches".

3D

If you save your file in AutoCAD with a 3d view, Illustrator will open the AutoCAD file with that view as 2d art. This is particularly nice for axon site diagrams and landscape work.

Illustrator in AutoCAD

You can export AutoCAD .DWG files from Illustrator. It works fairly well.

SketchUp

Using the free version of SketchUp the only direct path seems to be to print to a PDF. There are two ways to do this. They depend on whether the "Use High Accuracy HLR" checkbox on the Print dialog is ticked or not. Think of them as:

- **Technical** - Use HLR. The resulting PDF is vector based and can be worked as artwork in Illustrator. Artistic styles are not preserved, only line weight and solid color fills. It may be best to use SketchUp's plain "Hidden Line" style and do any changes in Illustrator.
- **Pretty** - Don't Use HLR. Creates a PDF with an embedded JPG. This is mostly worthless, because...

SketchUp also offers Export To 2d Graphic. If you do this you can select an appropriate file format and on the Export dialog there is an Options button which lets you set the size of the final image and other useful things. The drawback of this option is that your result is an image not Illustrator objects that can be modified.

You may also want to experiment with moving your SketchUp model through another 3d program.

SketchUp Pro offers direct export to EPS format which is about the same as a technical PDF.

Rhino

Rhino can export directly to Illustrator's .AI file format. Curves come in as curves though maybe not with the Anchors and Handles where you'd expect. Straight linework comes in as multi-segment straight lines. Surfaces come in as curves along edges and major isocurves. The export respects Print Width for line weights. I do not know how to get shaded surfaces or line types exported to AI.

Rhino can read Illustrator files. Appearances are lost but every piece of an Appearance does come in as a separate curve. For instance, a filled shape with a double stroke will come to Rhino as three identical shapes in the same place. One for the fill and one for each stroke.

Print

You can print directly from Illustrator. Typically each Artboard is treated as a separate page and you have the common controls over which pages to print. Or you can select “Ignore Artboards” and Illustrator will just print all your art. There are also controls for scaling.

Presentation

You can save directly to a PDF which will also treat Artboards as pages. The PDF can then be shown fullscreen as a slideshow, making an adequate presentation. If you have the extra time, it is probably a good idea to make the presentation in InDesign with the Illustrator art placed on pages. You have easier control over the presentation as a unified entity this way.

If you know the PDF will only be used on screen you can save with lower quality settings than if you were going to print.

Electronic Distribution

Same comments as for Presentation apply.

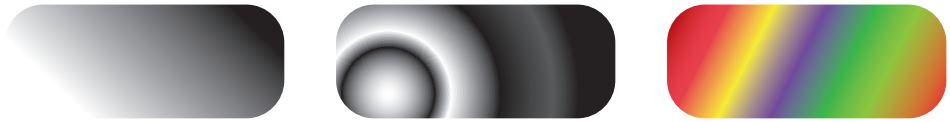
Sharing Illustrator

If you need to share your actual Illustrator file, you can just email it or whatever. **But** if you have embeded images or are using uncommon fonts, you should make a Package which will bundle all the dependencies together into one folder. You can then zip that folder and share it with other parties.

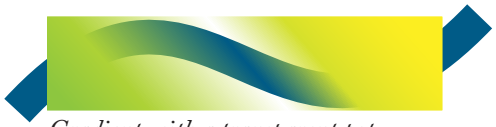
Gradient

Gradient used for Fill, Stroke, Fill and Stroke.

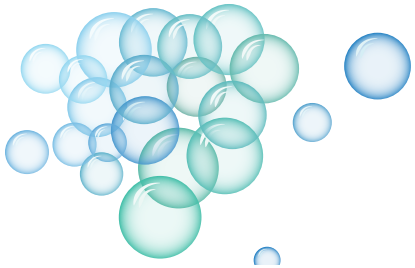
Different gradient modes on a Stroke.



Linear Gradient, Radial Gradient, Linear Gradient with more colors.



Gradient with a transparent pot.



Circle with radial gradient using transparency converted to symbol and used with Symbol Sprayer.

Smooth...

Colors do not have to be solid. You can apply a Gradient to Strokes and Fills. You can make Swatches for Gradients. There is even a Gradient tool.

What?

A Gradient is a smooth blend between colors.

Gradients also have a type. They can be either Linear looking like a planar ramp, or radial looking like a bullseye.

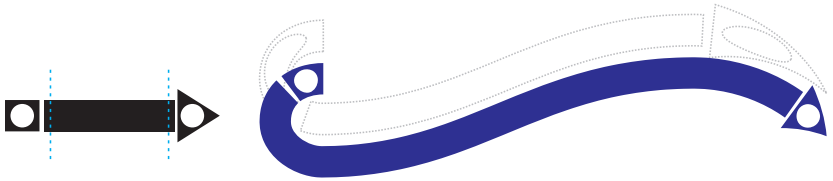
How?

You can apply a gradient to an object by clicking on it with the Gradient tool. The Gradient is applied to either the Stroke or Fill depending on which square is currently forward, just the same as applying color.

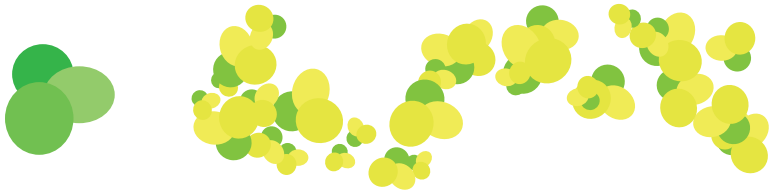
Or you can select a Gradient Swatch the same way you would a color swatch. The Swatches panel menu has an option to create a new gradient swatch.

Brushes

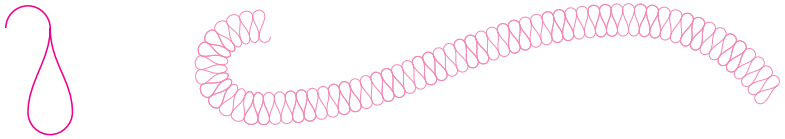
Art Brush



Art Brush Stretched Between Two Guides



Scatter Brush



Pattern Brush

Carve Your Own Tools

How

Select some art then on the Brushes panel menu you can select "New Brush..." Or you can just drag the art to the brushes palette.

Then you have to pick between a few different kinds of Brush:

- **Art Brush** - Stretches the art along the stroke.
- **Art Brush (between)** - Keeps the ends from stretching and only stretches the middle section. You say where the boundaries are.
- **Scatter Brush** - Sprays the art along the stroke. Has settings for random location, rotation, and size.
- **Pattern Brush** - repeats the artwork along the stroke. Has settings for different artwork at start, end, and corners. The artwork you start with works automatically but if you want to take advantage of the terminal and corner options, you have to drag artwork for that onto the Swatches panel to make Pattern Swatches out of them. Then they show up in the options dialog for the Pattern Brush.

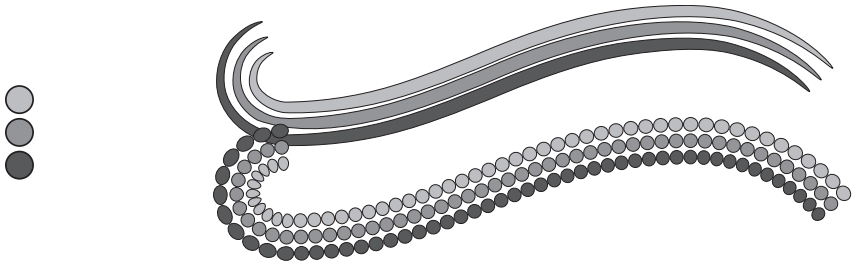
Color

Normally a brush based on artwork will be the color of the original art. But on the Brush Options dialog there is a section called "Colorize."

If you use black art and set the Brush's Colorize to "Tints" then Strokes come out in whatever color the art is set to. Kind of like AutoCAD blocks and Layer 0.

Even More

With Illustrator CC you can make brushes out of Images.



Three objects used to make an Art Brush and a Pattern Brush.

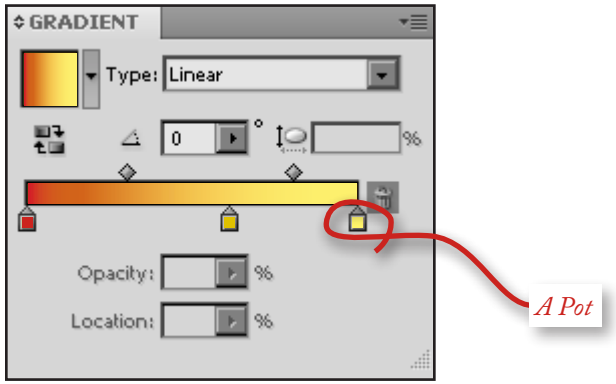
Three objects with transparency used to make an Art Brush.

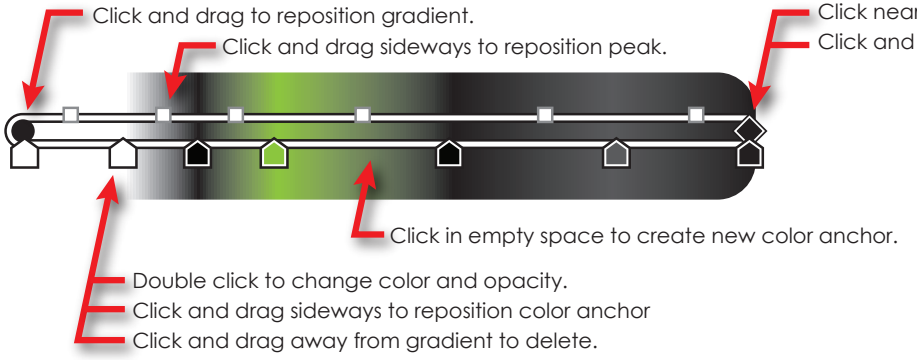
This Is Diagrammatic?

Oh Yeah...

Brushes can be made out of more than one object and if the original art has transparency, that will be built into the brush.

Gradient





Change?

You edit a Gradient by double clicking on the Gradient tool or the swatch, or by opening the Gradient panel.

To add a color to a gradient just click on the space under the gradient. A new pot is made and you can move it.

To change a color in a Gradient select its pot and then change the color on the color panel or drag a color Swatch to the pot. Pots made from Swatches update if you edit the Swatch.

To remove a color from a Gradient, grab the pot and pull it away from the gradient.

In Place

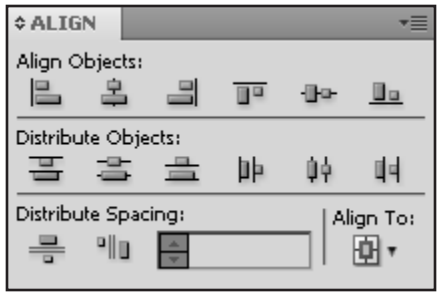
Gradient editing controls can also appear right on top of your artwork. They appear when you select the Gradient tool and hover the mouse pointer over the art. If the Fill Color is selected then controls appear if the shape has a Gradient Fill. If the Stroke Color tool is selected then the controls appear if the shape has a Gradient Stroke.

How

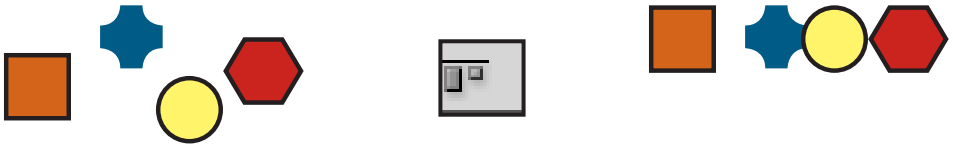
The InPlace Gradient Editor works the same as the Gradient panel with a few extras. You can reposition the Gradient in the object by dragging the circle end of the gradient. You can rotate the Gradient in the object by dragging the diamond end.

Align

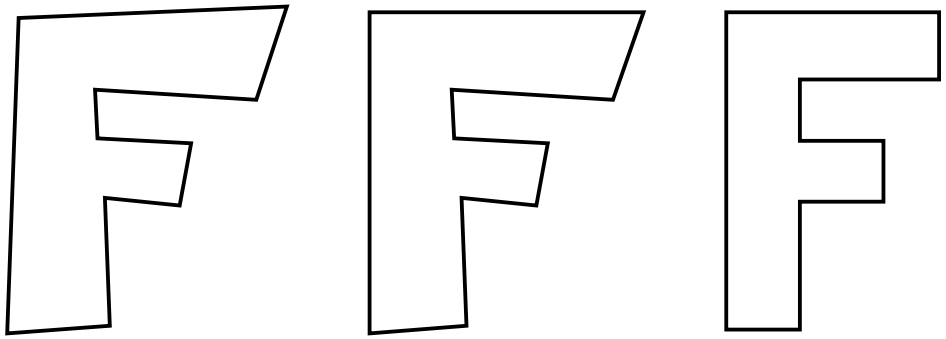
Puts Everything in its Place



hkjkjh



Four objects Aligned to their topmost point.



Using Align tools to straighten poorly placed Anchors.

Your New Best Friend

It starts off seemingly simple. Just select a few objects and push them over to the left of the page. But it is so much more than that. I could try to explain it, maybe show a few tricks, but I think you just need to get some practice in. Play with it. Touch all the buttons. Make mistakes when it doesn't matter.

I'll tell you a bit about how I use it, but I think this is one of those sections where another user might prefer a different set of tools.

- **Align Objects** - I use this group all the time. Align moves objects onto the same line. I align object tops to the top margin all the time. I also like to align a bunch of objects to either their common left edge or centers.
- **Distribute Objects** - I don't use this much. Distribute makes the distance from one thing to the next the same. If things aren't the same size, this looks bad.
- **Align to...** - In Illustrator I use Align To Selection far more than Align to Artboards.

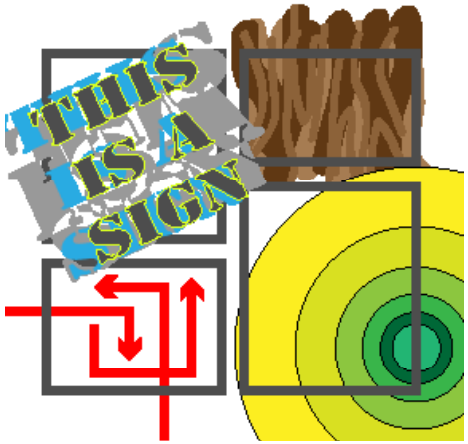
  "To Artboards" moves objects away from where they are and snugs them up against the edge of the artboard.

  "To Selection" leaves the objects roughly in place and makes adjustments as needed. I love this for snugging captions under art, or making sure a column of art is on the same line.
- **Distribute Spacing** - It makes sure the spacing between objects is equal and looks pretty.

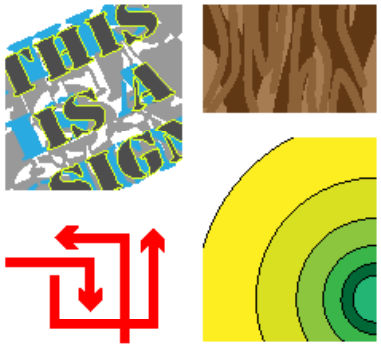
Even Better

Unlike InDesign, you can use the Align tools to arrange Anchors. Use the Direct Select tool to select the anchors then hit an Align button.

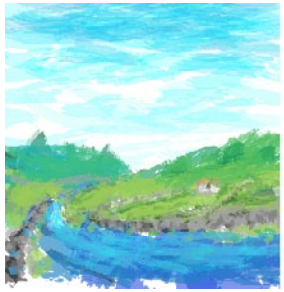
Clipping Path



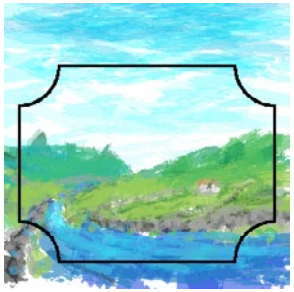
Some Clipping: Before



After



Make art.



Create clipping art.

Embellish.

Don't Cover It Over

Hide it Inside

Sometimes art needs to be limited by an over-riding shape. Sometimes just covering it up with a white rectangle is the easiest thing to do. Sometimes the shapes lend themselves to using one of the Pathfinder options.

And sometimes the art is too complex, or too unrelated to the constraints for those to be good options. (Covering with a white rectangle is probably never a good option.) For those times there are clipping paths. A clipping path is like an InDesign Image Frame or an AutoCAD viewport. The actual artwork is larger than the constraining frame, but it does not appear outside the frame.

How

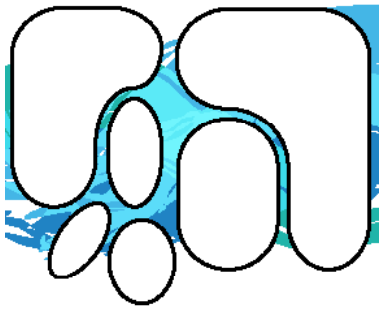
Create the artwork to be seen. Then create the artwork that will become the clipping path. If the path is made up of more than one shape, select all the shapes and convert them to a Compound Path (it's on the right click menu and on the Object menu).

On Top

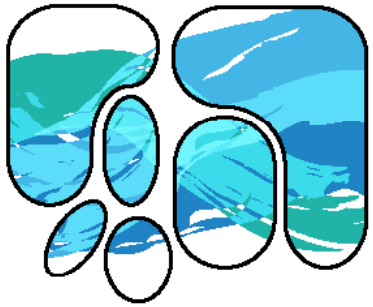
The art that will be the Clipping Path must be in front of anything that is to be clipped. Illustrator just uses whatever is in front for the path; it isn't psychic; "Can't it **tell** that I meant this to the Clipping Path?" "No." See "Display Order" on page 22 for help with this.

All At Once

Select the art to be clipped and the art to do the clipping. Then "Make Clipping Path". It's on the right click menu and on the Object menu. There, you're done.



Multiple shapes works.



Use "Make Compound Path" first.

also be altered.

Don't Cover It Over

Where'd It Go?

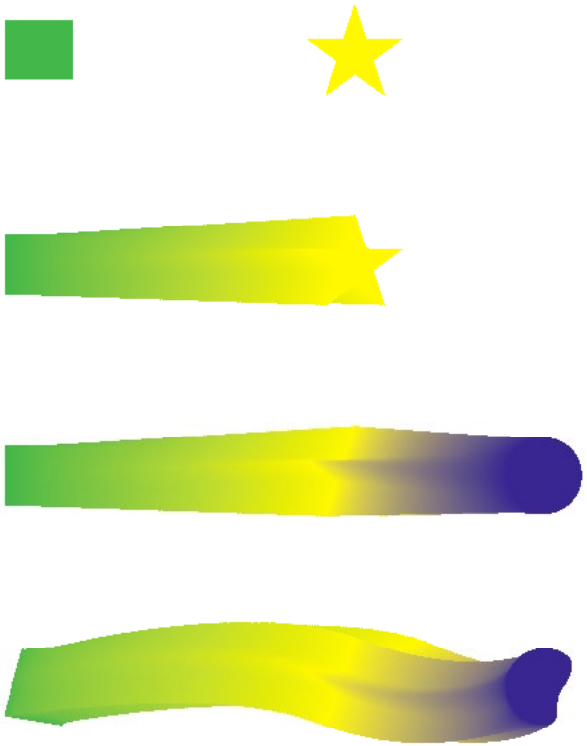
When you make a clipping path Illustrator gets rid of the clipping path's Appearance attributes. You can go back and give it a Stroke if you wish. But nothing fancy: only width, color, and dashed. No brushes or multi-stroke.

Multiple

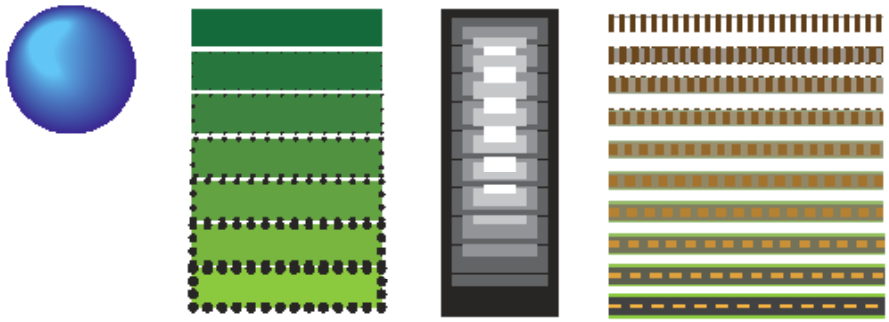
You can make a single Clipping Path out of more than one shape. To do so, select all the shapes that will be the path then Make Compound Path. Make sure the Compound Path is in front and then clip.

Live

The shapes that make up the Clipping Path and the artwork inside it are all still live. You can edit them in any normal way. Some edits are easy to make with the Direct Selection tool. Others may be easier if you go into Isolation Mode, which this document does not talk about.



path of the blend can be edited.

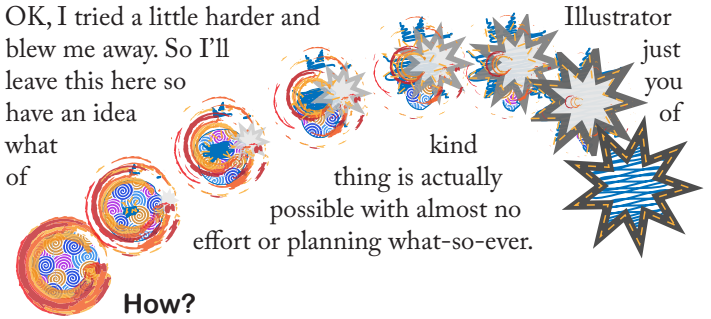


From Here To There

Blend takes two or more shapes and fills in the space between them with a smooth morph from one shape to the next.

Both shape and Appearance are morphed. Sometimes unbelievably. See the example below that Blends between a railroad and a two lane country road.

OK, just now I tried to make a blend that wouldn't make sense. It is possible. Ick.



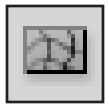
How?

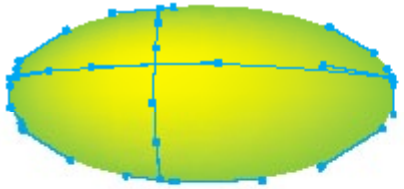
Create the primary art - each end. Select the Blend tool and click on each end. You may not get the blend that you want. Make sure the Blend is selected and double click on the Blend tool, or go to the menus Object: Blend: Blend Options.

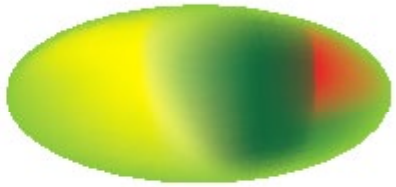
If the Appearances of the end objects are easy enough, Smooth Blend works well, like the first examples to the left. If it's harder, sometimes Illustrator just puts one morph in the blend instead of doing a nice smooth job. You can set the option to Specified Number of Steps and just put in a high number.

For more shapes, just click on more shapes.

Use the Direct Select tool and Convert Anchor tool to adjust shapes and paths.







d.

Color Per Anchor

You can fill an object with a grid of Anchors and give each anchor a color and adjust handles. Some people are doing photo-real portraits this way. It is also helpful where you want a Gradient but Gradients are too limited.

How?

Create a shape. Select the Mesh tool and click on the shape.

Now use the Direct Select tool to select Anchor points in your mesh. Change the Fill color of the Anchors to color your mesh. Move Anchors and adjust Handles to modify the color flow.

Click with the Mesh tool to create more Anchors.

If you like Meshes, look into a plug-in called Mesh Tormentor.

Getting Help

This introduction has been brief and shallow. I hope it has been enough to get you started. Bring your own curiosity and sense of play and you should go far. But still, you can get stuck. I won't even begin to count how many times I went for help just in putting together this little book. So, where can you go?

- **Menu** - Illustrator does have a help menu. You might consider looking at that. But I usually do that second.
- **Google** - Ask the web. Ask long questions. Try to use the best words to describe the problem. Somebody probably had the same question already. Often enough the first thing in the results is the online Adobe Help page for the subject. But you get to it quicker than trying to find it through the Help menu. So I go here first.
- **Ask Around** - somebody in the room or on your favorite social media option might know.
- **Learning Resource Center** - The LRC at the BAC can get you in touch with tutors.
- **YouTube** - there are a lot of Illustrator videos available.
- **AdobeTV** - online training from Adobe. Most of it is pretty good. Some of it is geared towards a long episode rather than a quick thirty second tip, but it's worth watching.
- **Podcasts** - there are podcasts for tips and tricks. I don't use them to look up answers, but you can pick stuff up and file it away for later.
- **Dedicated Sites and Blogs** - These have tutorials and forums where you can find answers. They often come up in search results for specific questions.
- **Professional Training** - there are many good web sites offering training videos and DVDs. I have used a few of the free videos on Lynda.com and liked them.
- **IRL School** - take a class in real life