Solid Color

Linework

Halftones

#1 - Screenprinting is a dumb process

Regardless of how complex a screenprint looks, the process only understands two things: to ink or not to ink.

When preparing your art, imagine you are cutting paper to create a stencil. Any open spaces will print, any paper areas will not. This simple process can produce countless variations when layered.

When you finish your file, all elements need to be either 100% black, or 100% white. Only the black areas will print. After being transferred to the screen, black areas become holes in the stencil and can then be printed in any color you choose. For example, the three colors in the image above - red, blue and black - would all have been **black** originally, existing as three separate layers in the file.

Graphic art with sharp edges, strong linework, text or bold imagery is straightforward to print, while converting nuanced art to halftones is a simple way to translate shades of gray for screenprinting.

Adobe Illustrator is the preferred program for preparing graphic files because it uses vectors, which have clean edges and allow for infinite scaling. Photoshop uses pixels, which have soft edges and get blurry when scaled up. Photoshop is great for preparing photographs and artwork that contain shades of gray. Generally, file format doesn't matter too much as long as your image is 300dpi at the size you want to print.

Solid colors are created by wide open areas - think big holes the stencil - while halftones or hatch lines can create a more textured area of color. In the example above, the halftones are printed with the same red as the solid color, but look much lighter because of the spaces between the dots.

Emulsion washout after UV exposure
Green area blocks ink, yellow areas will print
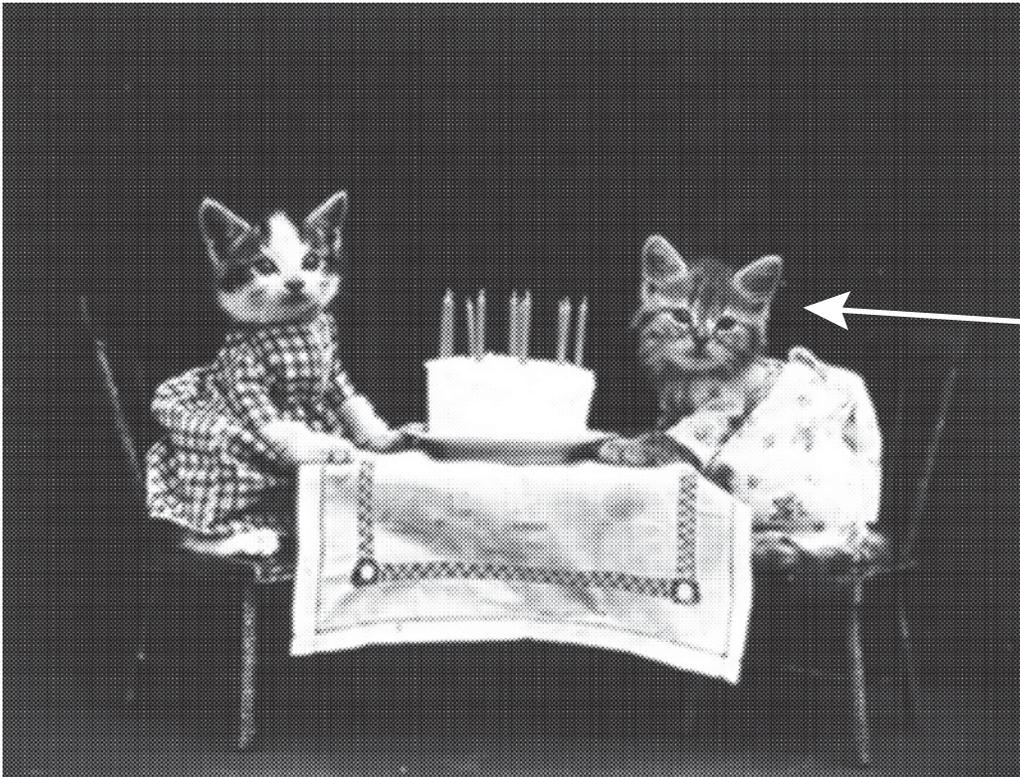
It looks like there are gray tones in here, but this image is actually made of tiny, 100% black dots. Halftones can trick the eye to approximate variations in shade.

#2 - You can cheat with halftones

When preparing a photograph or any artwork that contains shades of gray, converting to a halftone is a good method to retain nuance.

There are several different methods to create halftones in Photoshop or Illustrator.
This is one of the simplest ways, using Photoshop:

Convert image to grayscale. After converting, bump up the contrast to create as bold an image as possible.

Go to **Filter -- Pixelate -- Color Halftone**. Here you can adjust the size of the dots and the angles of each color. Because we're using a B+W image, set each angle to 45 degrees.
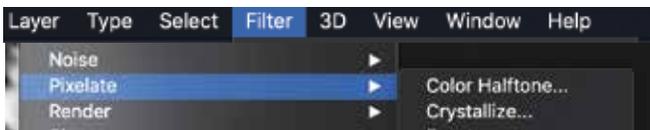
You can play with the Max Radius to acheive the desired level of detail. Super small dots may not print well depending on the type of screen and the ink being used.

Standard screen meshes range from 40 to 305. 40-180 mesh screens have a loose weave and are typically used for fabric printing with lower detail and thick inks. 200-305 mesh screens are good for detailed graphic printing on paper with thin inks. If you had to choose just one screen for multiple uses, a 200 mesh screen is a versatile option.

Screenprint by Alex Katz... sooo many layers!

#3 - LAYERS and TRAPPING in Illustrator

Illustrator is great for creating graphic work directly on the computer, or working with images that require sharp outlines or easy scaling.

Each color in a screenprint gets its own screen, and each screen is made using a separate layer.

You can keep it simple with a single color print = one screen, one layer. Or you can go nuts, like with this Alex Katz print above, made with 23 colors (23 layers = 23 screens = 23 pulls = 23 chances to mess it all up!).

More time is usually spent preparing to print than actually printing, and being thoughtful about how to create your layers can save a lot of time later. For example, it's possible create additional colors by layering, such as printing with blue and yellow ink, but overlapping some areas to make green.

You can minimize printing problems by adding TRAPPING.
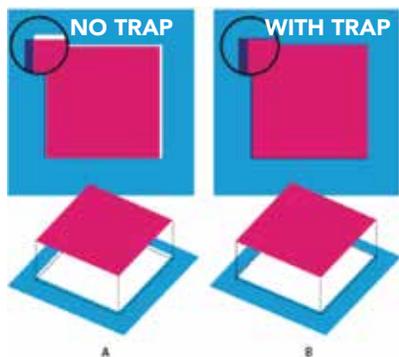
Trapping to correct misalignment

When printing, it's nearly impossible to line up each layer perfectly, and gaps can occur between colors. Trapping adds a buffer by expanding the edges of shapes and helps prevent those gaps from happening.

Not all art needs to be trapped. You can overprint (print one color on top of another = zero chance for misregistration), however this may effect the appearance of the top color, as explained above about overlapping colors.

In Illustrator, trapping is done by adding an Offset Path:
Object -- Path -- Offset Path and add at least 1mm.

Not all layers should be offset. In this example, the red layer would be expanded, but the black layer would not = the black is printed last and 'traps' the red underlayer in the final print.

In Illustrator, add a 1mm Offset Path to expand shapes

#4 - LAYERS and TRAPPING in Photoshop

Photoshop is great for converting photographs or artwork with graytones, as well as working with scanned images that need to be separated into layers.

In this example, we started with a two color, single layer image, and used it to create two new layers. (Not shown here, we created the two new layers by: **selecting color with magic wand -- copying selection -- creating new layer -- pasting selection on the new layer**.) We could go ahead and try to print these two layers after we converted them to black, but would run into the frustration explained earlier about printing without a trap - it would be really tough to line them up perfectly and white gaps could show at the edges.

To avoid this, let's make a TRAP!

As seen above, go to: **Select -- Modify -- Expand**
The number of pixels depends on the artwork, but **3 pixels** is usually a good amount to give us a buffer.

In our two layer design, **only the green layer will be expanded**. This is because we'll print that layer first. When we print the purple on top, the purple will 'trap' the green edges under it.
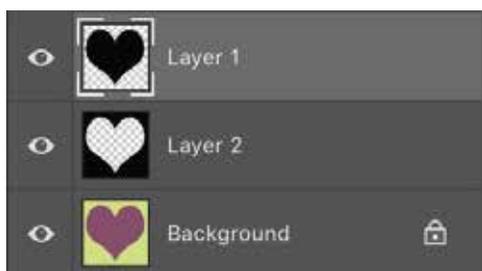
The middle image shows what your selection will look like after expanding. Use the **Eyedropper** tool to load the color, then manually add the green around the edges using the **Paintbucket** tool.
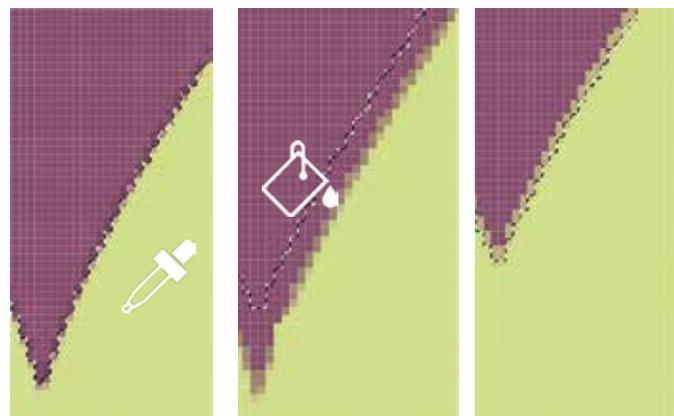
ORIGINAL	EXPANDED	FILLED
green selection	green selection	green selection

Every color you want to print should now be on its own layer.

Finally, fill each new layer with 100% black.

Two screens will be burned, one for the purple, and one for the green. When printing, you'll use the Background layer as reference for what color inks to mix.

Grayscale, but not printable :(


Printable! Nice job! :D

#5 - Quick conversion with BITMAP and THRESHOLD in Photoshop

Rather than handselecting and filling shapes with black individually, artwork can also be converted using Bitmap and Threshold functions in Photoshop.

You have less control over detail, but the quickest way to prepare an entire image for printing is by either converting it with **Bitmap Mode** or adding a **Threshold** layer. These two techniques translate everything in the image to either 100% black or white = exactly what screenprinting demands!
This is also a great way of converting drawings for printing.
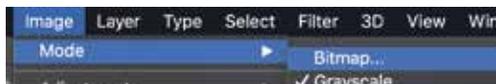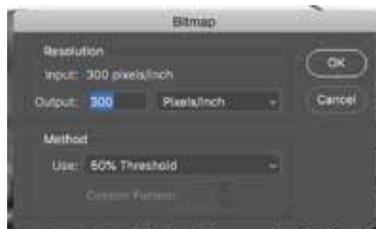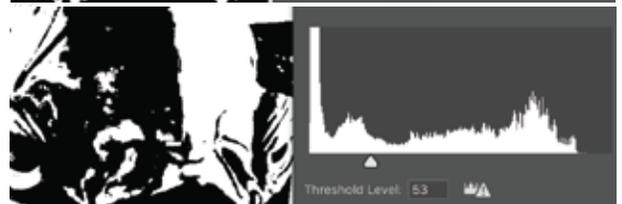
Using BITMAP MODE
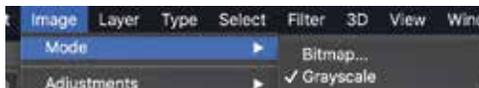
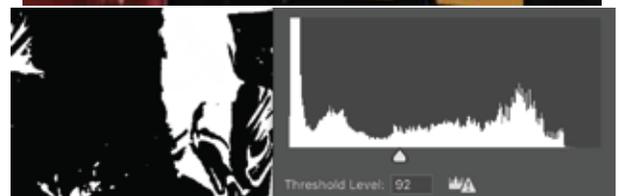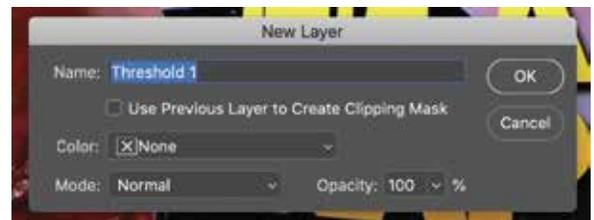**First,** convert to Grayscale.
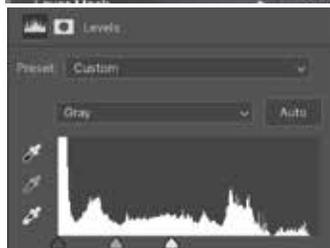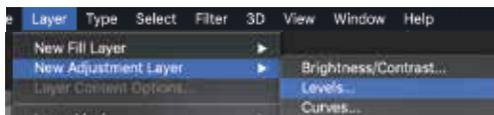
Second, increase the contrast by compressing the sliders in Levels or Curves.

Finally, convert to Bitmap using **50% Threshold**. You can also experiment with any method under the dropdown - they all create usable images.

Using THRESHOLD LAYER

After adding a Threshold Layer, you can **use the slider to control how much of the image is converted to black**. You can see in the bottom example, more texture is retained by sliding the scale to the left.

In this method, you don't need to convert the image to grayscale first, but don't forget to flatten before printing.