The Public

AN INTRODUCTION TO:

SCREENPRINTING

The Public is an activist design studio specializing in changing the world.

This zine, a part of our *Creative Resistance How-to Series*, is designed to make our skill sets accessible to the communities with whom we work. We encourage you to copy, share, and adapt it to fit your needs as you change the world for the better, and to share your work with us along the way.

Special thanks to Vy Dang from the York-Sheridan Design Program in Toronto, for developing this zine on behalf of The Public.

For more information, please visit thepublicstudio.ca.

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Introduction

Screen printing: Printing a picture with a stencil by transferring ink through a screen of fine material such as mesh or silk.

> "Screen printing is arguably the most versatile of all printing processes,"
>
> - Printer's National Environmental Assistance Center.

This is because screen printing is affordable and easy to learn for many.

From the time of its development, printing (the production of multiple copies) changed the world because it allowed for dispersion and accessibility of knowledge. Printing technology has taken on many forms and iterations, as people looked for easier and more accessible modes of reproduction.

Printing used to be a very specialized skill exclusive to craftspeople and artists. There was a lot of specialized technical knowledge that went into printing that required lots

of time and dedication. After chromolithography [printing with colour] had been introduced, printing illustrations and imagery rapidly grew in demand as people wanted to be able to communicate with vibrant visuals. Through the 1900s, mass printing increased in demand. Both World War I and II popularized propaganda poster art, and the rise of consumerism meant that governments and businesses alike were competing for attention. After all, a picture could be worth a thousand words. Printing was no longer used only in fine arts.

Screen printing dates back to the Song Dynasty (960-1279 CE) in China and made its way to Europe in the late 1700s. Centuries later, in 1907, an Englishman named Samuel Simon patented his screen printing technique and it was used exclusively for the upper class to print high-quality wallpaper, silk and linen materials. His method is essentially what we know as screen printing today. Simon mounted a stencil onto a silkscreen and brushed ink through the stencil to print. In the early 1910s, a new and improved photo-reactive stencil technique was introduced by Roy Beck, Charles Peter and Edward Owens, this technique was revolutionary as it made screen printing a photo-imaged stencil possible. This technique works by using photosensitive emulsion and allows for reproduction of more detailed imagery. With the cut stencil technique, the artist would have to manually cut out a stencil which has limitations to how the artwork could look. By using photosensitive emulsion, the artist is free to draw whatever they want and easily expose it to get an accurate stencil. Today, this technique has been even more developed which uses safer chemicals for exposure. We'll be outlining these techniques in this zine.

A PERSON SCREEN PRINTING ON A T-SHIRT

MARILYN MONROE, ANDY WARHOL (1967)

Screen printing became popularized in the mainstream western art world in the 1960s thanks to Andy Warhol's iconic multicolored print of Marilyn Monroe. Before its rise into mainstream culture, screen printing was commonly practiced in underground cultures and its DIY look had grown to a popular cultural aesthetic over the years. To keep up with the demand of the time, Michael Vasilantone invented the rotary machine so that printing multiple layers would be faster, especially for garments. Due to the fact that screen printing is a process of layering,

CAMPBELL'S SOUP CANS, ANDY WARHOL (1962)

ROTARY PRESS WHICH UTILIZED MULTIPLE SCREEN, EACH WITH A LAYER OF COLOUR. THOSE SCREENS ROTATES TO PRINT THE NEXT LAYER.

FLAT-BED PRESS USES A SQUEEGEE THAT PRESS AGAINST A MESH TO PRINT THE IMAGE.

CYLINDER PRESS USES TUBES WHICH CONTINUOUSLY ROLLS AND PRINTS THE IMAGE THAT HAS BEEN WRAPPED AROUND IT.

each layer can only be printed with one colour. The artist would have to print multiple layers to get all the colours they wanted on their artwork. The rotary press helps speed up this process. There is now another type of rotary printing press for printing on long and large sheets of fabric. Screen printing is still a popular tool for printing logos and t-shirts today. There are 3 types of screen printing presses for commercial printing: the flat-bed, cylinder and rotary press.

FUN FACT

In screen printing, the artist could use a machine to create a stencil. This would save a lot of time and makes it easy to prepare the artwork for printing. However, in commercial printing, screen printing isn't the fastest method even with a machine.

Social and political use

There have been many social and political uses of screen printing around the world. Between 1935 and 1943, the Federal Arts Project of the Works Progress Administration (FAP/WPA) of the U.S. made a rare effort to fund public arts. The purpose of this was to provide jobs to unemployed artists. At that time, teaching art was a priority and they chose printmaking to teach the public. Screen printing was favoured over lithography and other printmaking techniques because it's accessible, and learning can be made easy and enjoyable. (Not only that, it is also a productive choice because at the time, screen printing was one of the best choices to produce large quantities of prints.) Thus, artists were encouraged to use screen printing (or other printmaking) as a tool for social democracy.

After World War II came the Cold War, and this was a time when activists spoke up for all reasons from anti-war to women's rights. In order to advocate for their causes, people needed media, and turned to screen printing. An example would be Paris students who screen printed posters to advocate for the worker-student strike in 1968. This event came about after a conflict broke out when students and teachers couldn't negotiate with the administration staff of Sorbonne University. This also contributed to an increase of tension between the people and the French government. Similar situations also happened at schools such as Harvard and Berkeley where students used this medium to raise public awareness and build movements throughout history. A few protest movements in the 1900s also used screen printing such as the Civil Rights Movement in 1969, Anti-War Movements in the 1970s and much more. In the mid-1970s activist artists began to start community workshops such as San Francisco's La Raza Silkscreen and Kearny Street Workshop to create posters for their causes. Activists still use screen printing for protests when there is injustice. An example would be the Occupy Wall Street Movement in 2011 in New York City. Their slogan for this protest is "I am the 99%" referring to income inequality in the U.S where 1% of the population owns the majority of wealth; or the current events in Palestine, that have sparked thousands of international artists to screen print their work against the on-going genocide by the Israeli government.

SCREENPRINTERS DURING THE OCCUPY WALL STREET PROTEST
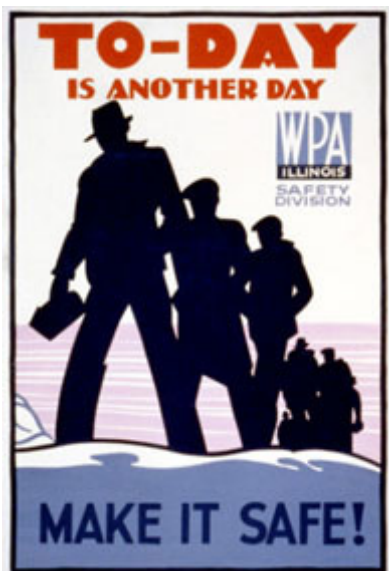
SCREEN PRINT, ILLINOIS FAP/WPA, 1937

STREET POSTER IN 1968 FAVOURING THE PROTEST IN FRANCE

PRINT MAKING TECHNIQUES
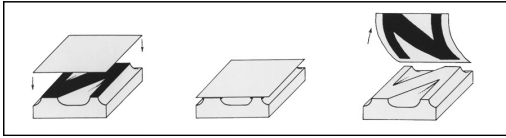
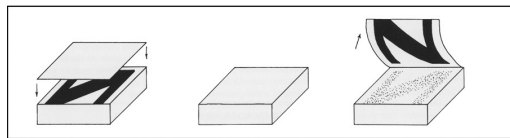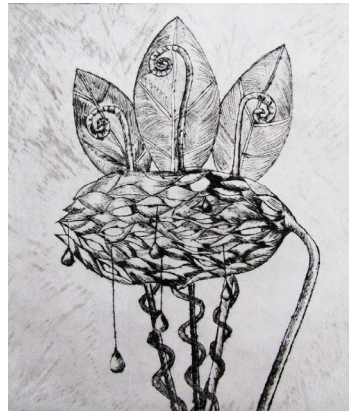**Relief printing:** printing off a raised surface, this technique is used in woodcut/woodblock and linoprint etc.
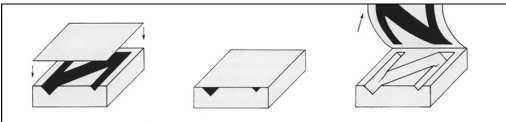
Intaglio printing: this is opposite of relief printing, intaglio printing is printing what's below the surface. This technique is used in etching and engraving etc.

Planographic printing: this technique is printing from a flat surface such as stone or metal, lithography and monotyping printing are categorized under planographic printing.

IMAGES FROM KURIM.COM, EASTERN MICHIGAN UNIVERSITY ART DEPARTMENT, TATE.ORG.UK, GRAPHICS ATLAS
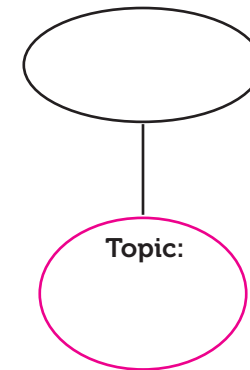
Getting started

WORKSHEET: WHAT TO PRINT

Start with a list of subjects you are interested in. Make a list here:

- _____
- _____
- _____
- _____
- _____

ⓘ

If you want to learn more about research, see the 'Research' Zine!

Pick one and create a mind map of what you want to say about this topic. Use the one below to create a network of your ideas. Use the internet/books to help to research if you needed.

Topic:

Once you've pinned point your message, think about how will you communicate that message. Answer some of these questions:

Who is your target audience?

_____

What is the tone of your print?

_____

Is there a piece of information that you want people to remember?

_____

How do you want to make them feel after they walk away?

_____

Do you want to move people action? What is it?

_____

Please read ahead in this zine to learn about some restrictions of screen printing and which technique would work for you. Before start your sketches, consider the following about the look of your print:

What would your style be? (pop art, hand-drawn etc.)

_____

Would you include text? What do you need or want to say?

_____

Would your imagery be like: symbolic, abstract, or representational?

_____

What colour palette would you use? (Remember one colour is one layer of printing)

_____

Any effects (such as a blend of colours) you want to achieve with the imagery?

Emotion exercise
What emotions do you want to evoke or what is the tone of your print? Try this exercise to help you with some visual elements. Label an emotion you want to achieve in the box, close your eyes and move your pen, pencil or marker in a way that represents that emotion to you.

Take note of the visual elements (such as lines, textures, shapes) you've made, you can use these in your print to help visually communicate your message.
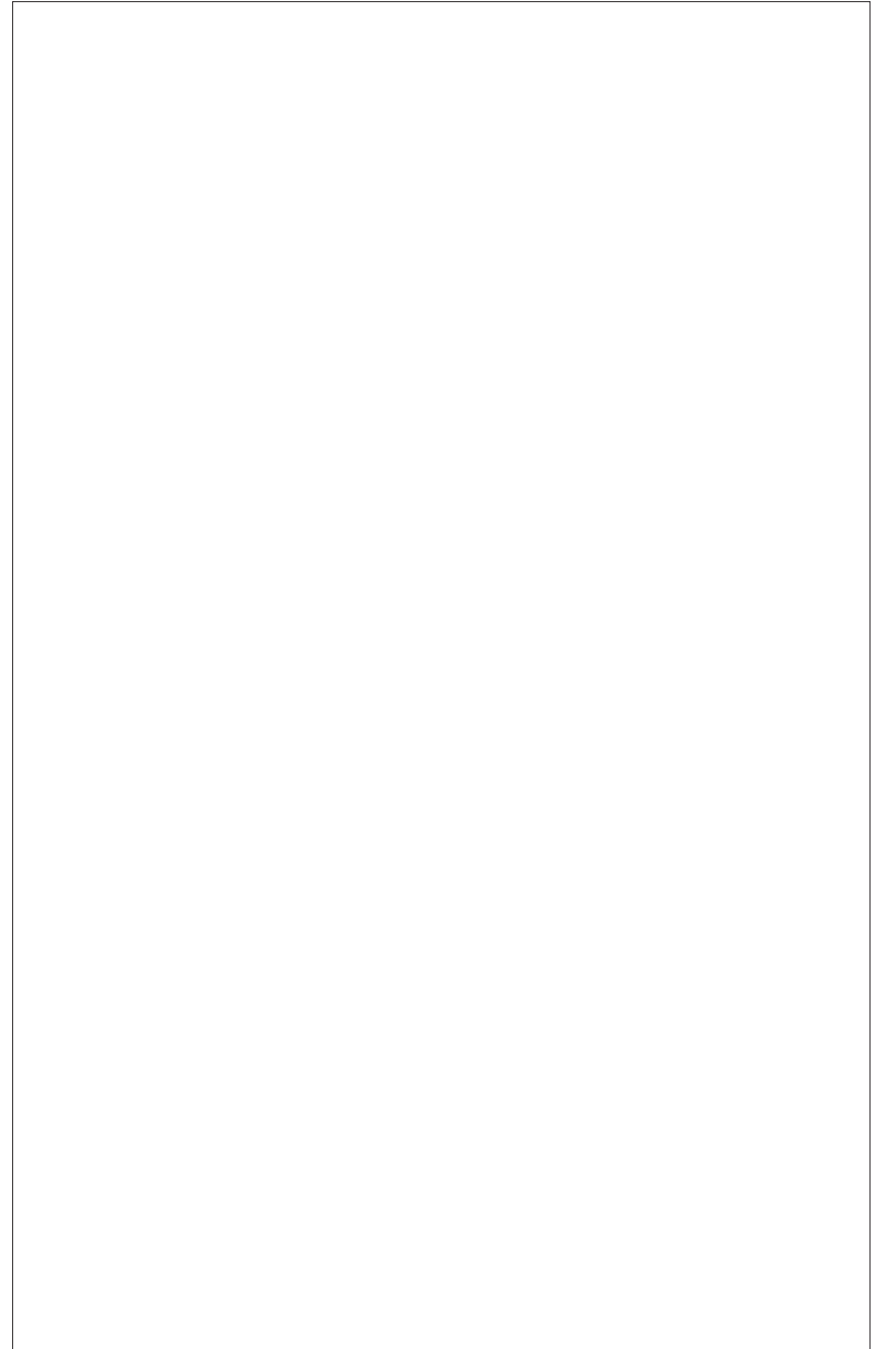
Imagery sketch (any objects or subjects you want for your print)

Text sketch (styles of text that you want)
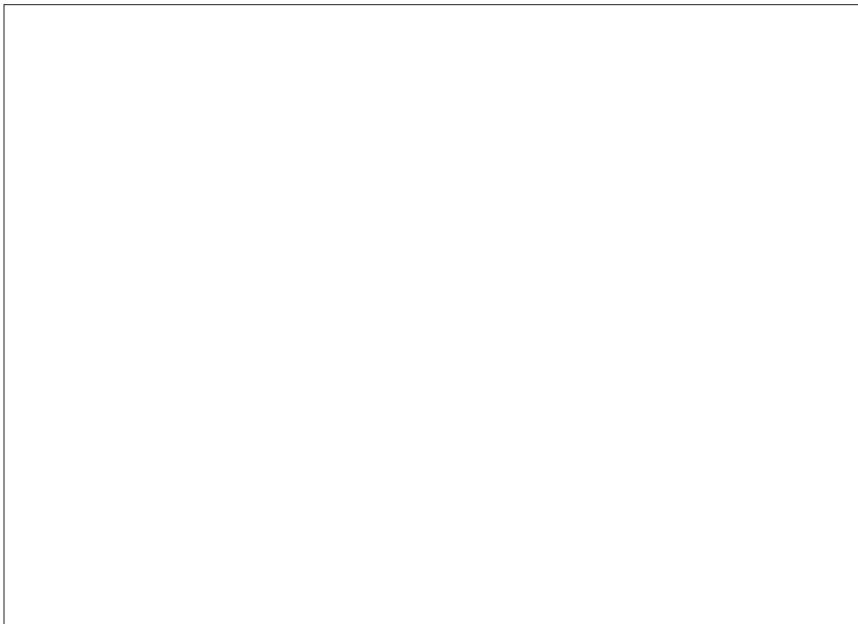
Use the space below to make your final sketch!

What works and what doesn't

There are not a lot of limits on what style or imagery you want to print, the only limits you would have are time and access to certain equipment.

For example, if you are going with the photo emulsion method, it will require a lot of time to experiment with exposures if done at home (you will read about it later). However, screen printing is usually very flat due to the limitation of tones, there are usually very little hint of light and form in screen printing, because you are printing one layer of colour at a time only. To achieve highly detailed print, you will have to print with many detailed layers of tones. This will be extremely time consuming as well, so create your artwork while keeping in mind how much time you have. Try to avoid creating an artwork with various tones on one layer so you can focus on printing only layers with important colours.

Find some inspiration!

Search for 'screen print' on these websites:

• Pinterest
• designspiration.net
• peopleofprint.com
• theinspirationgrid.com

A LITTLE BIT ON COLOUR THEORY

Before we go further into screen printing, let's go through a little bit of colour theory to help you choose the perfect colours for your print.

When you want to mix your ink and create your own colour, refer to this colour wheel to guide you to which colour to mix.

The Color Wheel

Primary Colours

Secondary Colours

Tertiary Colours

Hue: the colour (i.e red, purple, green.)
Chromaticity: the colour's purity in relation to gray.
Saturation: the degree of pureness (intensity of brightness or dullness.)

If you want to learn more about colour theory, see the 'Colour Theory' Zine!

Complementary Colours
Colours that are opposite from each other on the colour wheel. These colour combination are usually used for a 'pop' effect as they have very high contrast.

Analogous Colours
Colours that are next to each other on the colour wheel. These colour creates a harmonious look and feel.

Triadic Colours
3 colours that are evenly spaced out on the colour wheel. These colour schemes are usually vibrant and lively.

Tints: colour mixed with white.
Tones: lightness and darkness of color by adding gray to a hue. (the effect of light and shade suggests 3D form.)
Shades: colour mixed with black.

Remember to take into consideration what kind of message/emotion colours could convey. Colours also have different meanings in different cultures so be wary of that and choose colours that will help you express your message clearly.

You will need:
This is a compiled list of the materials used for the two screen printing techniques that we will discuss. (you can find these materials at most art supplies stores and even at home!)

First and foremost, you will need a screen, you can buy one or make your own!

TIP!

You can make your own DIY screen! Here's how:

1. You will need a frame that is flat and silk fabric. When you go to buy your fabric, please choose a mesh that is ~110. This is an indicator of how dense your screen is so that it would give you enough detail and a good amount of ink transfer.

2. Stretch out the silk over the frame. Start by stapling one side, followed by stapling the exact opposite side, and then work your way around, so you're alternating staples across. Make sure that the silk is stretched out tight and secured. Be careful not to pull to hard, that would rip the fabric! Lastly, make sure your screen can lay completely flat without wobbling at all.


Fabric types:
Silk and cotton: These type are easily destroyed by chemicals and wear out with frequent use They are mostly for printing art.

Nylon and polyester: Most durable, strong and stable when stretched. However, polyester is used most in commercial printing.
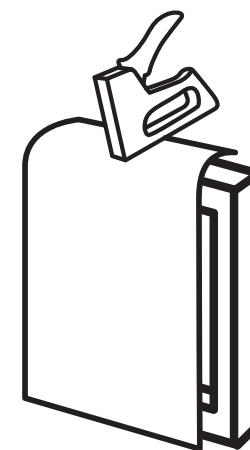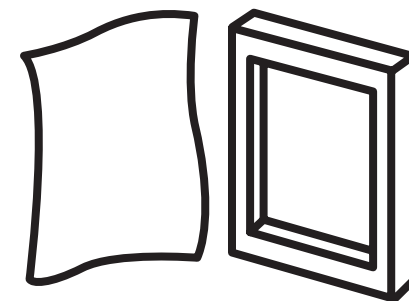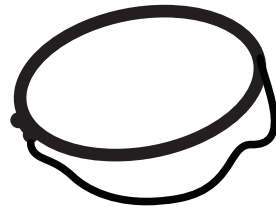
3. Cut the excess edges of the fabric if necessary. Tape over the staples on all the sides and also the edges on the backside of the screen (painter's tape works well here and won't leave a residue on your screen).

1

2   3   4
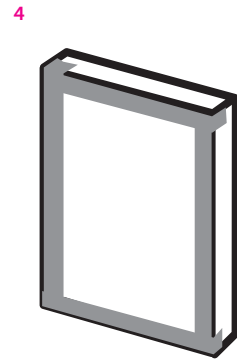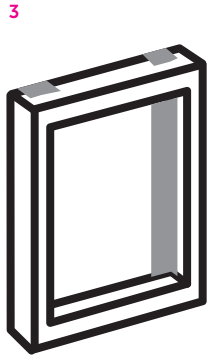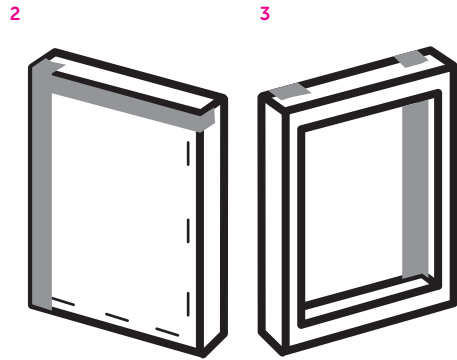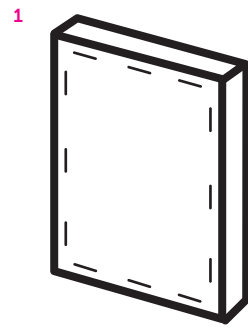
There you have it, your homemade screen!

TIP!

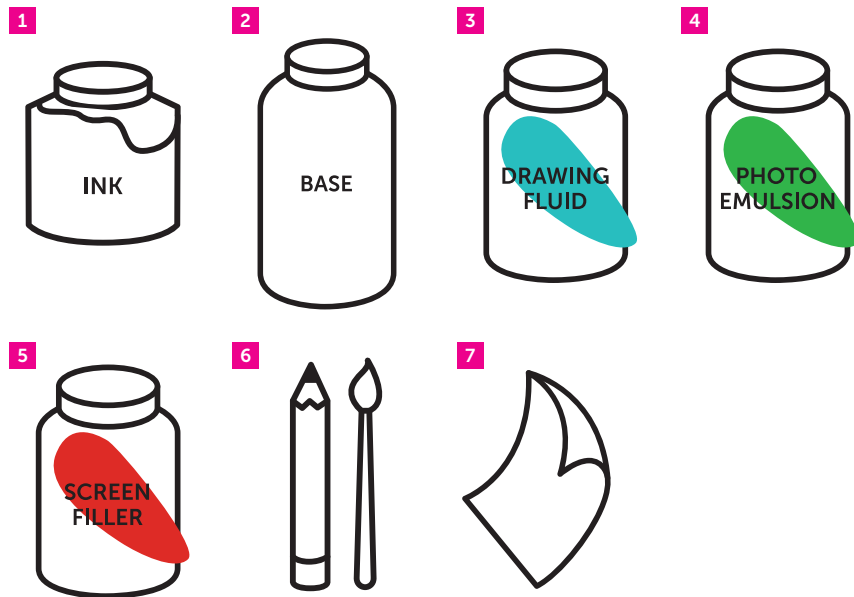For small prints, you could use an embroidery hoop.

TOOLS

1. Screen
2. Paper (or other surface for printing)
3. Squeegee
4. Painter's tape (for the screen) + Masking tape (for paper)
5. **Registration*** tabs (L) + pins (R)

6. Spatulas (or knives/spoons)
7. Containers (to store your inks)
8. Scissors
9. Hinge clamps (optional)
10. Lamp (with a 150W lightbulb for photo-emulsion)
11. Piece of glass (that would cover your artwork)

1   2   3   4

5   6   7   8

9   10   11

* Please see **Glossary**

IMAGING

1. Inks **(Water soluble, acrylic or fabric)***
2. **Transparency extender base***
3. **Drawing fluid***
4. **Photo emulsion***
5. **Screen filler***
6. Drawing/painting materials
7. Acetate (or use oil method)

About Ink: Depending on the ink you have, they could have specification to what material they work best on. You can get these inks in a wide variety of colours and even glow-in-the-dark ones!

1 INK

2 BASE

3 DRAWING FLUID

4 PHOTO EMULSION

5 SCREEN FILLER

6

7

TIP!

Some of these materials can get costly! Consider purchasing and sharing with a group of friends to help save money and build community!

Cleaning the screen

1. Screen cleanser (or multipurpose cleaner)
2. Emulsion remover
3. Paper towel
4. Sponge
5. Gloves
6. Cleaning brush

1

2

3

4

5

6

WARNING!

If needed, please use a mask when cleaning photo emulsion. These materials are hazardous chemicals when inhaled.

Process

You can print your images in two ways:

1. Create a stencil with light exposure with photo emulsion

Pros: You could get a very detailed stencil .

Cons: If you don't expose with a machine but use natural sunlight or light bulbs instead, it could be tricky to control the results and very time consuming. Give yourself time to experiment in order to get the right exposure.

2. Draw directly onto the screen with drawing fluid.

Pros: If you don't want to go through the hassle of computer generating your artwork and printing on acetate.

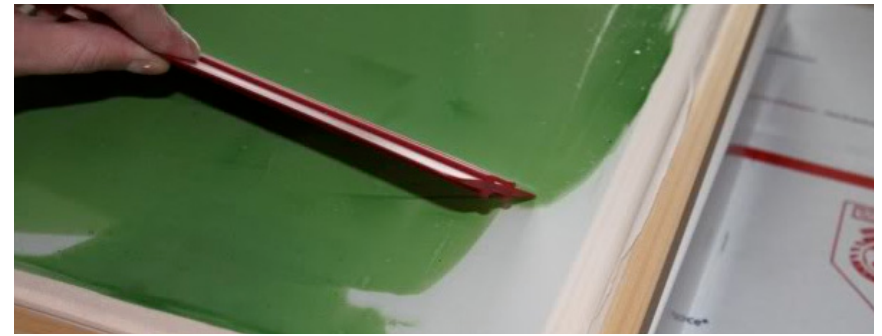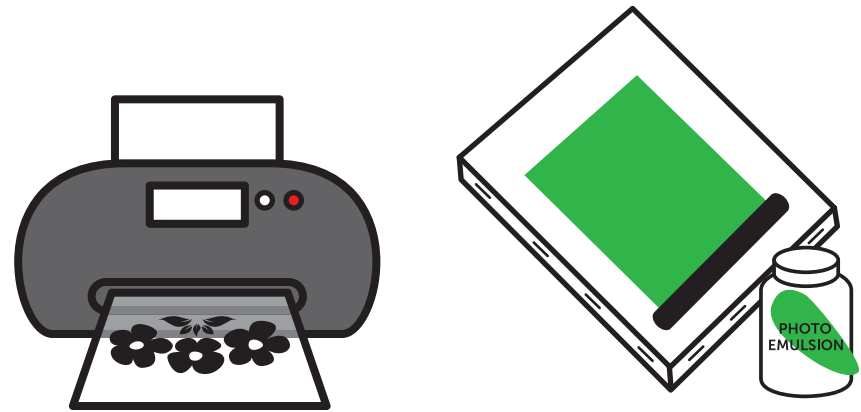**Cons:** Time consuming if you make a big mistake, you might need to wash and redo all over again.

Photo Emulsion Method

1. Laser print your artwork on acetate made for printers or photocopied onto acetate. Your artwork should be printed/photocopied only in the darkest black.

⌐ **Note:** Size your artwork so that will fit within the size of your squeegee.

2. Coat a thin layer of photo emulsion on front side of your screen. Wait for the emulsion to dry. You need to bring your screen into a dark place to dry and expose, therefore, do not leave the screen with unexposed photo emulsion outside with natural light.

PHOTO EMULSION
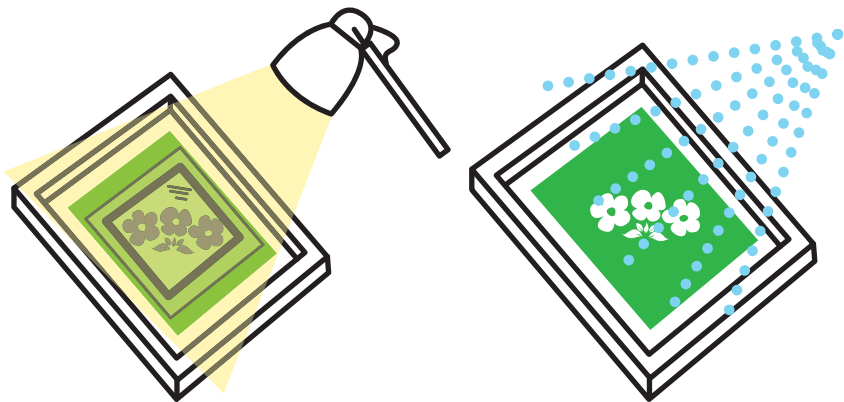
3. When the screen is dry, place your artwork on the back side of your screen. Press the artwork tightly onto the screen with a piece of glass. (Unlike other print making, you do not have to flip your image, what you see is what you will print!) Expose under the sun, a light or a machine (if you have access to one).

Exposure chart for the Speedball diazo photo-emulsion system:*

4. After exposure is done, wash your screen with water to reveal the stencil you've made. Let the screen dry.

> **Note:** To get an accurate stencil, your screen must be placed on a completely black surface.

 150W Incadescent Bulb

Screen size (in.)	Light bulb height (in.)	Exposure time
8" x 10"	12 in.	45 min.
10" x 14"	12 in.	45 min.
12" x 18"	15 in.	1 hr. 14 min.
16" x 20"	17 in.	1 hr. 32 min.
18" x 20"	17 in.	1 hr. 32 min.

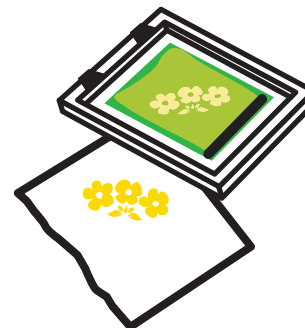**From:** instructables.com/id/Photo-emulsion-Screen-Printing/step5/Expose-your-screen-then-rinse

* Note: different brands of emulsion will have different exposure times for each screen size. Please read the fine print—including best practices for storage between use—with everything you purchase!

5. After it has dried, secure your screen with the clamps (optional). Put your paper underneath the screen.

6. Place an adequate amount of ink in a line above your artwork that would cover the entire width of it.

7. With the screen lifted, **flood*** the screen by pulling the squeegee once.

8. Place the screen down and give another good **pull*** with the squeegee at 45° angle to print.

> **Note:** You should test print on scrap paper (like old newspapers) before printing on your final paper or surface.
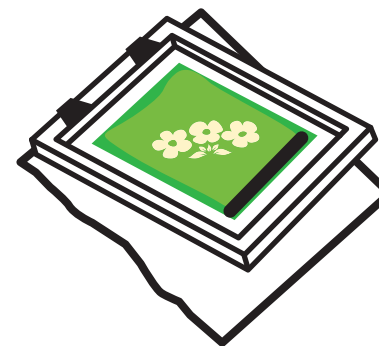
(i) You can always create your own hand cut stencil and place it underneath the screen to print. Learn more about stencils in the 'Stenciling Zine'!
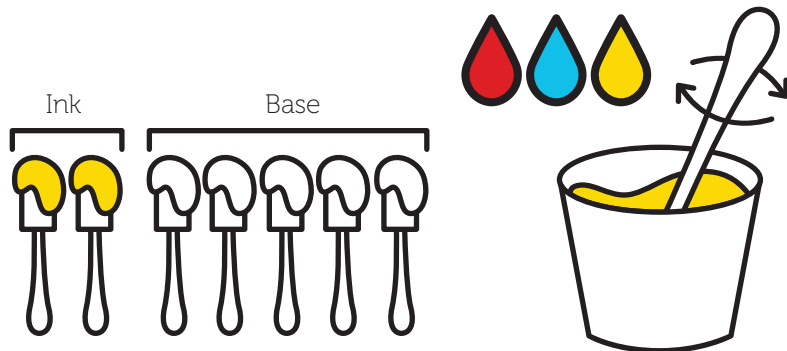
9. Carefully lift the screen and flood your screen while it is still lifted Then, take your print out to dry.

* Please see **Glossary**

Mixing Water Soluble Inks with Transparency Base

Mixing your inks can take a while, therefore, it is best to prepare it beforehand.


Ink   Base

1. Use a ratio of 2:5 to mix your ink. 5 of base and 2 of ink. If you use too little ink, your ink will turn out very transparent when printed.

2. Use your spatula and mix really well until the colours are all blended. Add in more of which ever colour you need to achieve the colour you want. Refer to the colour to help you with mixing colours. Adding 2 primary colours will make the complimentary colour in between. Add more or less of either primary colours to achieve the tertiary colour of your liking.

3. Remember to test print on scrap paper to check your ink. Store your ink in an air-tight container so they won't go dry.

Note: If you have different paper for the test print and final print, the ink on the test paper might not look the same on final print paper.

Ink drying: Lighter colored inks will dry very fast when you print, so you can use **extender base*** to help slow down the drying of the ink.

Test!

Label
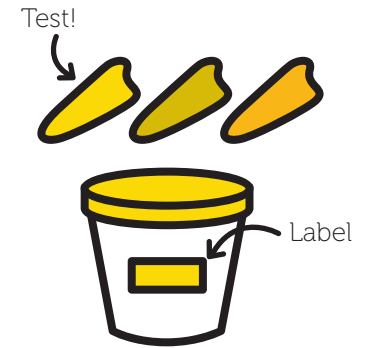
Washing your screen

Washing would be the most painful process of screen printing. However, a clean screen will ensure that your stencil will be perfect and inks will flow through properly and you'll have a beautiful print! If you have access, it can save a lot of time to use a faucet with a lot of pressure, or "spray" mode.

- Washing your screen after exposure only requires water to reveal your stencil.
- Washing drawing fluid only requires water to reveal your stencil.
- Washing screen filler requires multipurpose cleaner.
- Washing ink requires multipurpose cleaner (you can rinse with water only if you want).

- After you've completed your project and you want to wash off you photo emulsion. Use photo emulsion remover, removing the emulsion will require a lot of time and scrubbing.
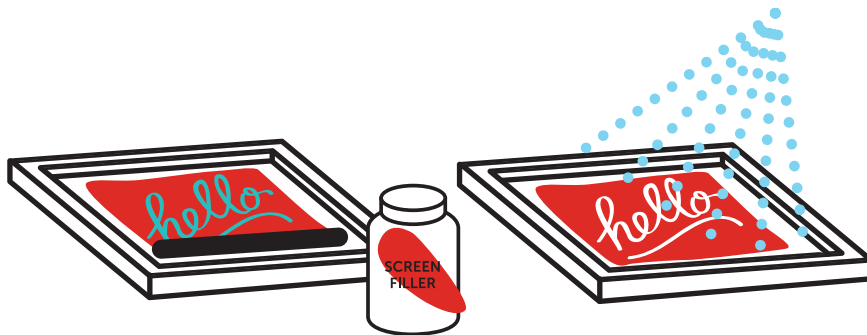
Drawing Method

1. Place your drawing underneath your screen. With a pencil, lightly trace your artwork onto the back side of your screen.

2. With a brush, paint your artwork with Drawing Fluid, then leave the screen to dry.

3. Once dry, coat the back side of your screen with Screen Filler. Leave the screen to dry.

4. Rinse with water to reveal your drawing. Let the screen dry.


5. After it has dried, secure your screen with the clamps. Put your paper underneath the screen.

6. Make sure you tape off areas that you don't want to bleed through. Place an adequate amount of ink in a line above your artwork that would cover the entire width of it.

7. With the screen lifted, flood the screen by pulling the squeegee once. Place the screen down and give another good pull with the squeegee to print.
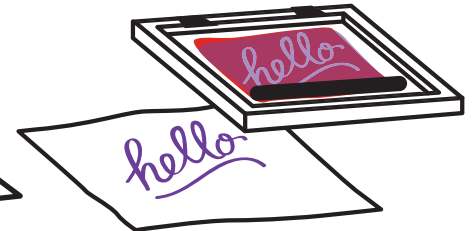
8. Carefully lift the screen and flood your screen while still lifted. Take your print out and let dry.
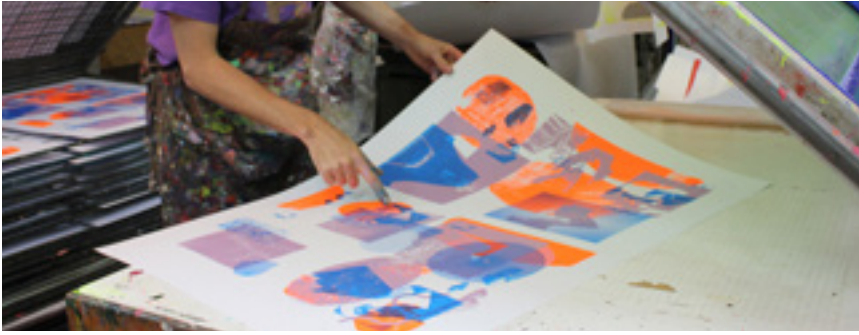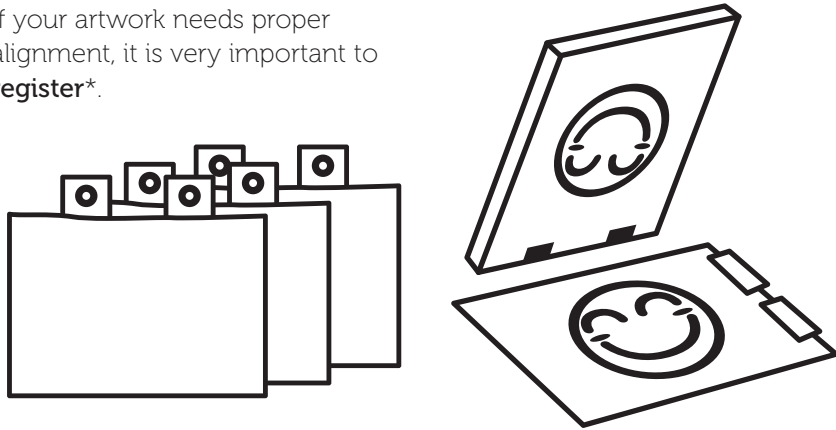
Print Multiple Layers

If your artwork needs proper alignment, it is very important to **register***.

1. On your paper, tape registration tabs on them. You need to place registration tabs at the same place on every piece of paper.

> **Note:** If your screen is big enough you can have multiple stencils for different layers of your artwork. If your screen is not big enough, you will have to wash off your screen and re-expose or draw on a new layer.

2. Place a piece of acetate underneath your screen and tape one side of the acetate onto your table. Make sure the acetate is big enough that your artwork will fit on it. Print onto the acetate and lift your screen.
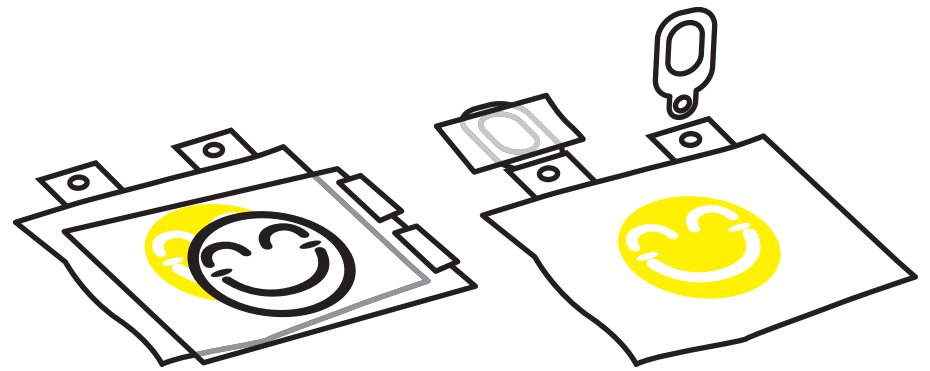
3. Lift the acetate up and place your print underneath. The print on the acetate will be your guide so adjust your paper underneath to align with the print with the acetate.

> **Layering colours:** Try your best to print from lightest colours to darkest. If you print lighter colours over darker colours, the colour underneath will show through. .

4. Once they've aligned, pull the acetate over to the side. Make sure your paper doesn't move, wherever the tabs are, place the pins underneath and tape them to the table. Continue to print as usual. For every print, place the tabs onto the pins and you're good to go!
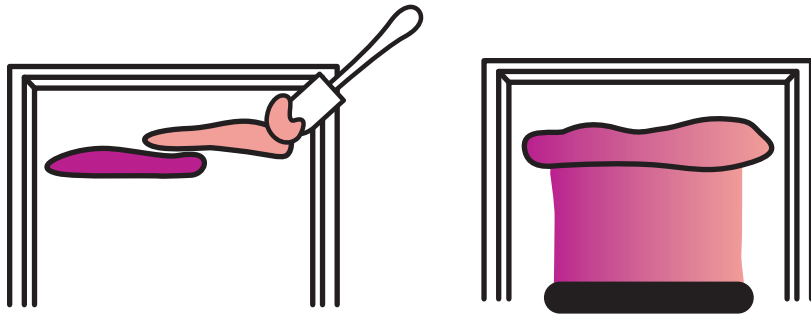
Screen printing Effects

Gradation is a printing technique with 2 colours (or more) blending into each other.

* Please see **Glossary**

1. Place a line of ink (A) half way through your artwork and ink (B) on the other half.

Note: You might need to test print a few times to get the gradation mix that you want

2. Use your spatula, a card or any hard edged tool you have to mix the inks at the midpoint together. Once you're satisfied with your mix, print as usual.

Note: You will need to start with an abundance of ink from the beginning because it will be hard to redo the same gradation when it runs out.

Posterization is a technique which deals with exposure time. For example if you have an image with multiple tones from light to dark and you want to print those layers.

TIP!

You can create this effect for your photos with Photoshop!

Artwork   Short Exposure   Long Exposure

1. You can expose for a short amount of time to pick up the general shapes of the image. The red outline above shows the stencil you may get from different exposures.

2. Exposing for a long time, your result will be a stencil of the most detailed/darkest areas of your image. Print one layer after another for this effect.

Halftones are tiny little dots that make up an image. In screen printing you can't print a detailed image with a spectrum of colours to show shadows, light, contrast etc. on one layer. Therefore, printing a halftone can create this illusion with varying sizes of dots.
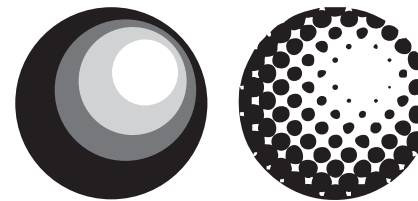
To be able to achieve this, you must generate a black and white halftone image on a computer. Print on acetate to expose and screen print as usual.
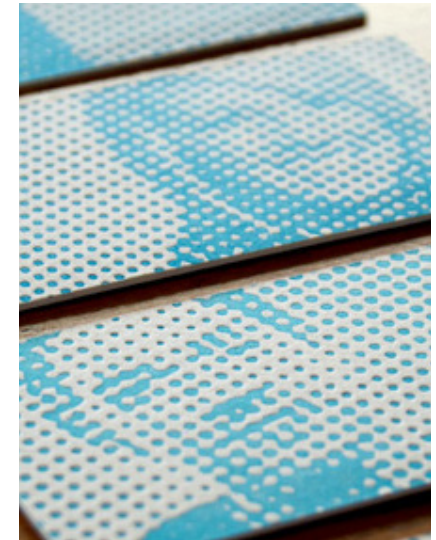
Free halftone pattern/texture: designercandies.net/halftone-dot-patterns

Note: Make sure you have permission to use any online resources.

Glossary

Acrylic ink: Inks that are designed for professional printing. They can be used on paper, wood and fabric.

Bleed: Bleed is inks coming through and printed in unwanted areas. To avoid this, please tape of places that your emulsion/screen filler/stencil doesn't block out.

Drawing fluid: This liquid is used for hand-drawn artwork. Used directly onto your screen and later washed off to reveal your stencil.

Fabric/textile ink: Inks that are formulated to print best on a wide range of materials such as cotton, polyesters, linen etc.

Flood: Flooding is pulling a thin layer of ink through the screen with less force and not onto a surface. Flooding the screen helps prevent the inks on the screen from drying too fast and would not transfer ink fully. If you find when you lift up your screen and it is very sticky and the print comes out with unevenness, it is likely that the ink is dry on your screen. You will have to get water to clean the screen and dry it before printing again.

Photo emulsion: A substance used to coat your screen that is sensitive to light. When you block out areas with your artwork, that part will not be harden by light. Then you can rinse to reveal a stencil you've created.

Pull: The action of transferring ink to your printing surface by pressing down and dragging squeegee across your screen.

Registration: Using tabs and pins as anchor points to align your image if you have multiple layers. Even if you only have one layer, registering will ensure that the image is printed in the same place in each print.

Screen filler: Used with the 'drawing' method. After you've drawn your artwork, screen filler is used to block out areas of the screen where you didn't draw with drawing fluid.

Transparent base (extender): Is a clear medium which lets create a transparency effect with your ink. Use extender base to prolong dry time of your ink.

Water soluble ink: These inks are recommended for schools and homes because they are safe and easy to use. Water Soluble ink can be mixed with transparent base and are usually used on paper and cardboard.

Resources

SCREEN PRINTING WORKSHOPS

JOIN THEIR WORKSHOPS, BECOME A MEMBER TO GET ACCESS TO THEIR FACILITIES! (FEES APPLY)

- Contemporary Textile Studio Co-Op (textilestudio.ca)
- Kidicarus (kidicarus.ca/home/?page_id=2289)
- Open Studio (openstudio.on.ca)
- Peach Berserk (peachberserk.com/wordpress)

ART SUPPLIES

- abovegroundartsupplies.com
- currys.com

INSPIRATION

- dignidadrebelde.com
- Michael Thompson: graphicart-news.com/michael-thompson-the-artist-without-borders-speaks-about-his-creativity-for-positive-change-and-peace-activism/#.VYA7p6VZ_Hg
- Artists from justseeds.org

WANT TO KNOW MORE?

TUTORIALS ON DIY SCREEN PRINTING AT HOME AND MORE ON PHOTO EMULSION EXPOSURE:

- instructables.com/id/Screen-Printing%3A-Cheap,-Dirty,-and-At-Home
- instructables.com/id/Photo-emulsion-Screen-Printing/?ALLSTEPS