

Visual Communication Design

Research Thesis

Presented in partial fulfillment of the requirements for graduation
with research distinction in Visual Communication Design in the undergraduate
colleges of The Ohio State University

by

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Sustainable Stationery

**CREATING AN EDUCATIONAL TOOLKIT TO
INSPIRE PRINT MAKERS TO PRODUCE CARDS
AND STATIONERY IN A MORE SUSTAINABLE
APPROACH BY ADDRESSING THE SELECTION
AND USE OF INK AND PAPER**

Autumn 2019

During the autumn semester, I focused on sustainable ink alternative research and design solutions to express my brand.



proposal/research

Proposal /

Mission Statement
Audience
Research Methods

Research /

Primary
Secondary
Analysis

Objective

The objective of participating in research distinction is to expand upon my thesis to educate and make consumers aware of the impact printmaking inks have on the environment.

Overview

After creating a brand identity, I now will dive deeper into the design of ink making. This includes creating and understanding how natural inks are made. Using resources like *Make Ink* by Jason Logan and *Botanicals Inks* by Babs Behan I will produce block printing, silk screen, dye, watercolor and alcohol inks.



Research

Research Methods



Expert Interview

I called, emailed and did in-person interviews with:

Dublin Farmer's Market, Dublin, Ohio
Cheer Up Press, Columbus, Ohio
Earth Elements, Grandview Heights, Ohio
Michelle Byle, Senior Designer, Method,
San Francisco, California
Emily Datsko, OSU VCD Alum



Publications Research

Online and printed books, journals and articles about sustainability, ink, paper, printing presses, printmaking, chemical compounds, and more.

Make Ink
Designing for Society
Rethinking Paper & Ink
Cradle to Cradle
Inks, Plates and Print Quality

Research Methods



Field Visit

I visited businesses to compare what products they sold and if they're sustainability focused.

Paper Source

Hallmark

Peabody Papers

Dublin Farmer's Market

Earth Elements

Columbus Printed Arts Center



Research Planning Survey

I made a short eight-question survey. I sent it out to over 100+ printmakers.

Candi H.

Flora/Plants and Colour

Sleepersharks

Allison/Rewind Press

Printmakers Alternative

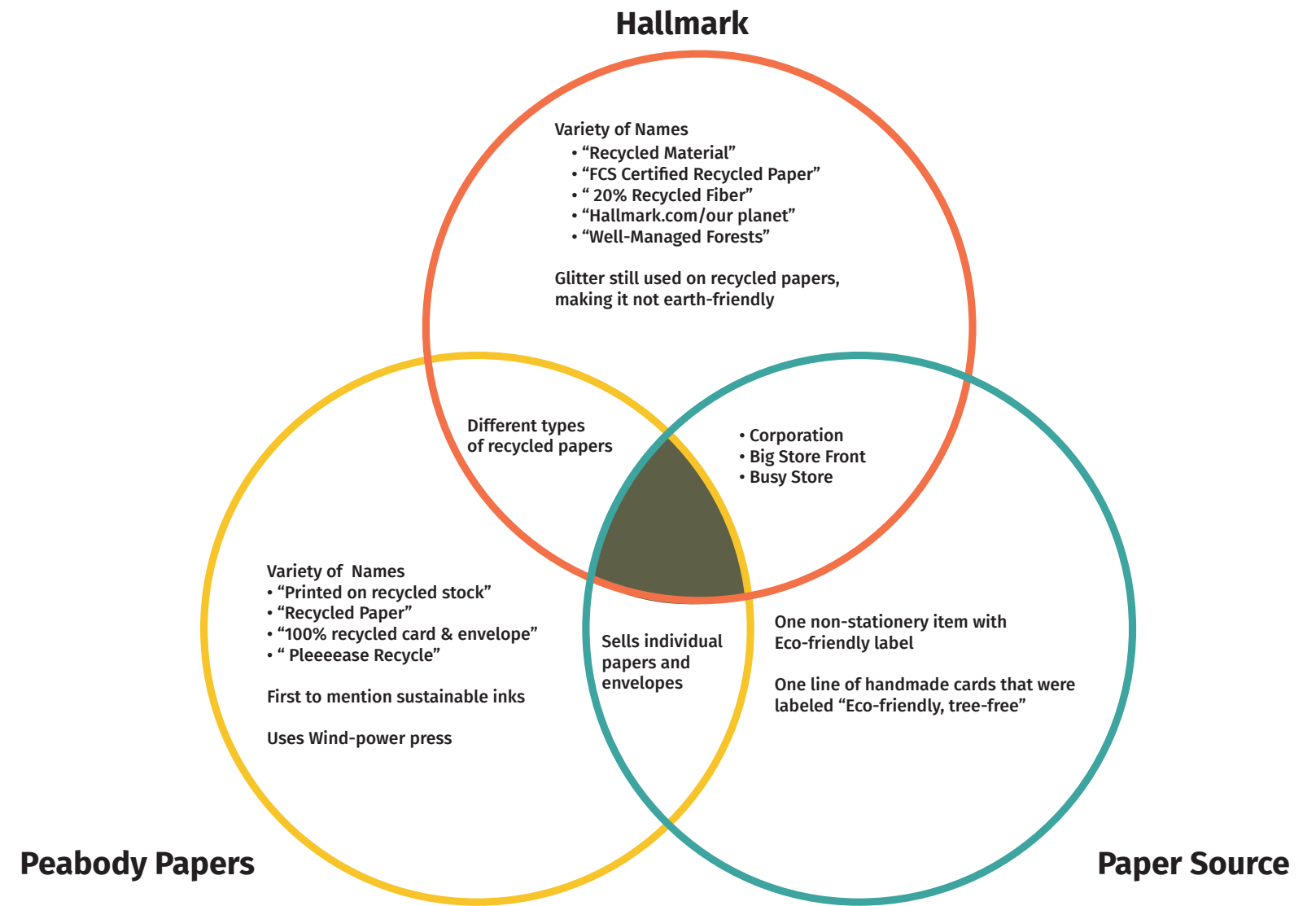
Freckled Fuschia

Analysis

Venn Diagram

In the Middle Results

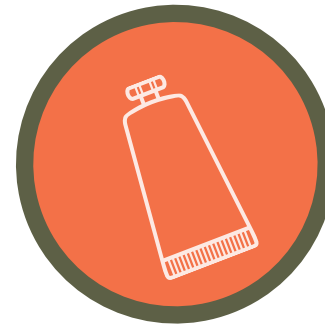
These businesses sold products like household items, decor, clothing, art supplies and more. Most of the items were not sustainable. There was, however, a few things I found that were sustainable, mostly recycled papers.



Design Principles

Three Principles

These principles are based on the observation and publication results I analyzed. The principles are key ideas to keep in mind.



Ink comes in **wasteful** packaging that's too small and not **reusable**



Try to **avoid** using colors with **hazardous** pigments



Some printmakers have to use **Oil/Petroleum-based** inks

Users & Personas

Oil-Based Printmaker

Aliana

Letterpress Printer

“I am a small business owner. I need to keep costs down, but I would like to transition into more sustainable materials”

Wants:

A more sustainable alternative to purely petroleum-based ink.



Non Oil-Based

Miles

Screen Printer

“I have been printing for over twenty years. I use water-based inks for an easy clean.”

Wants:

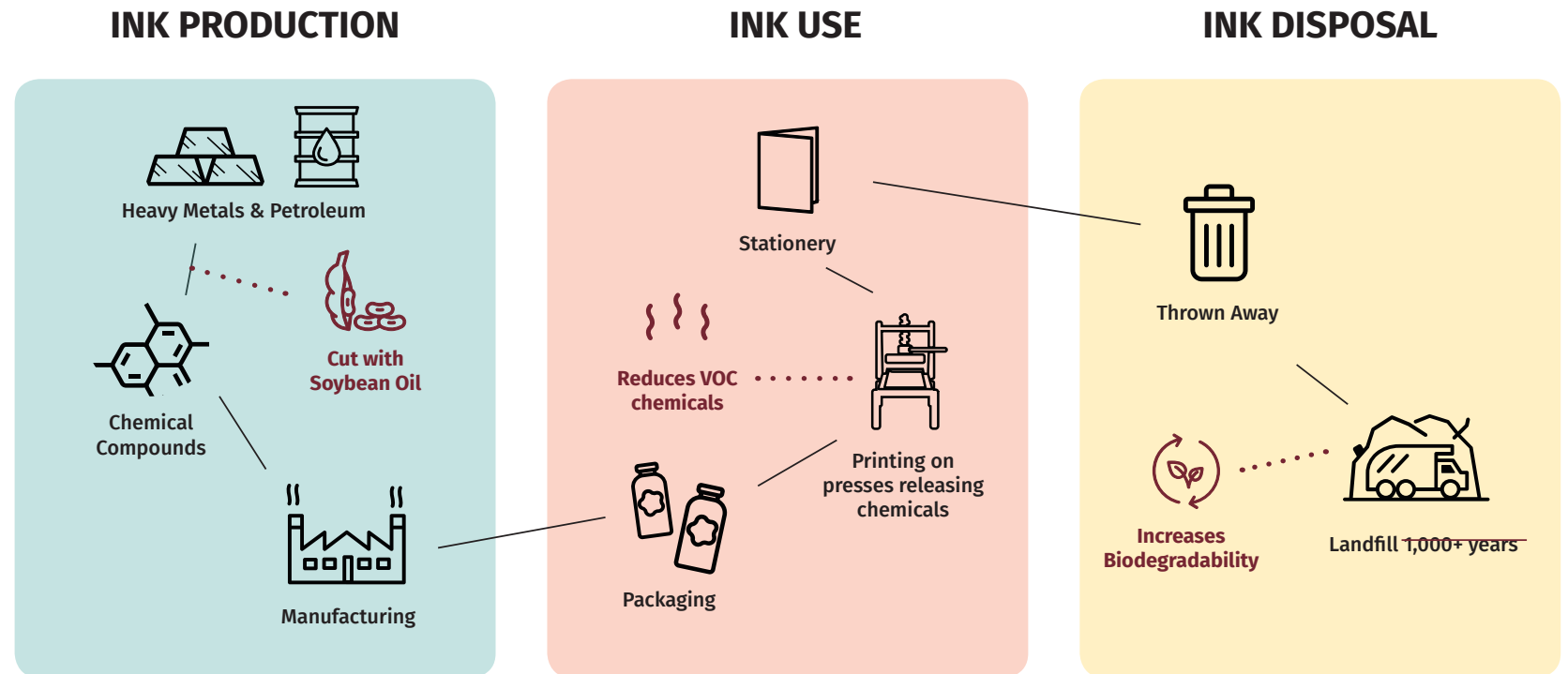
Ink packaging to be reusable and not wasteful.



Ink Journey Maps

Oil Based Inks

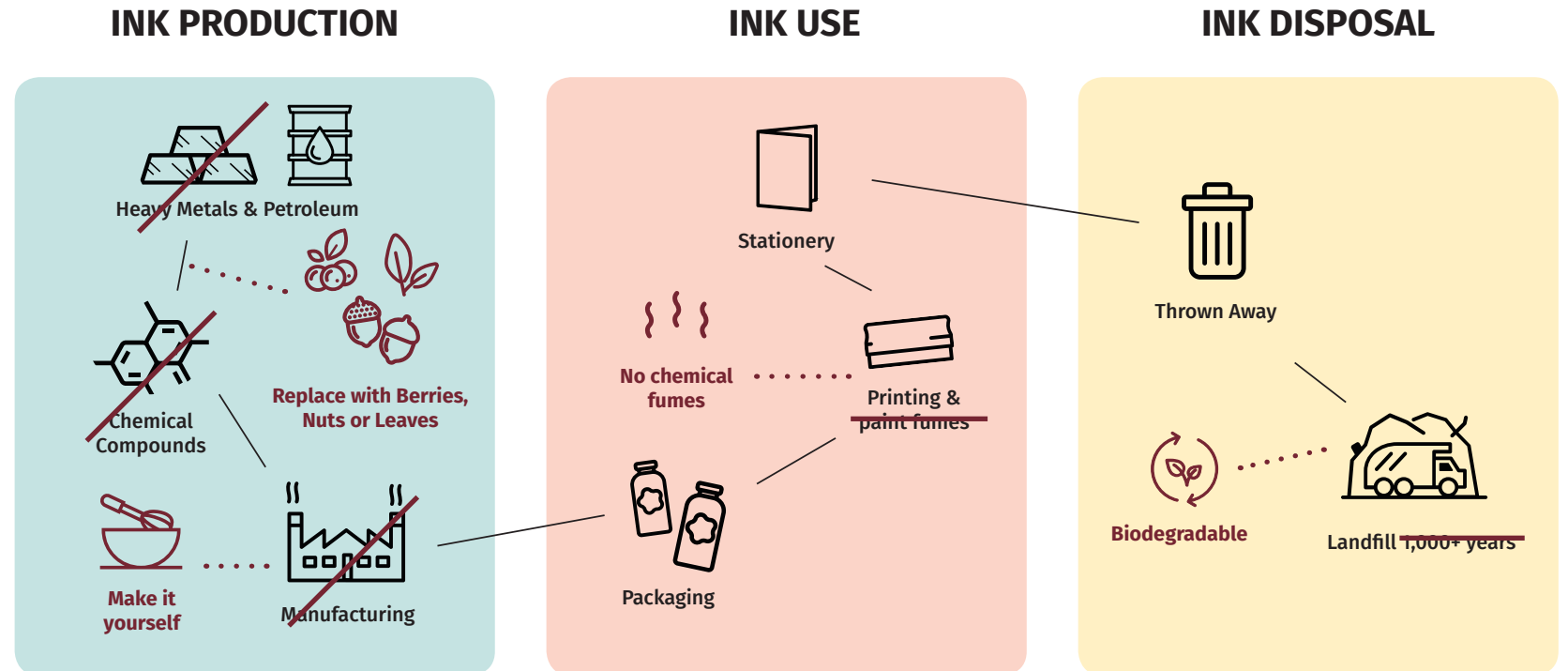
With my research, I was able to find opportunities in the journey of ink from start to finish to make it more sustainable. These pain points are highlighted in red. If you cut the petroleum-based inks with soybean oil, then you reduce the Volatile organic compounds (VOCs) and increases its biodegradability.



Ink Journey Maps

Non-Oil Based Inks

With my research, I was able to find opportunities in the journey of ink from start to finish to make it more sustainable. These pain points are highlighted in red. If you use natural materials like nuts and berries and make them at home or studio, then you cut out any chemical fumes and most inks become 100% biodegradable after useage.





concept/context

Brand Identity /

Type
Mark
Color Palette

Design Solution /

Packaging
Ink Kit
Point of Purchase

Primary & Secondary Type

Regattia & Fira Sans

I choose these two based on the immediate differences in the weights of the fonts create when used together.

Regattia has a very old fashion, wood type style, the other is very modern and slick. I wanted to express how the original processes of printmaking are now combined with modern technologies. The character that compares the most in the alphabet is “g”. It has a very similar form in both typefaces.

Regattia typeface is a contemporary fat display didone style font.

Fira Sans is a humanist sans-serif typeface.

Brand Identity

fo•li•age

/fōl(ē)ij/

noun

'design resembling
leaves'

The primary mark consists of a heart-shaped leaf. The mark pairs with the modern fir sans typeface.

I have designed three different logotypes that can be applied to a variety of applications like packaging.

Primary Logo



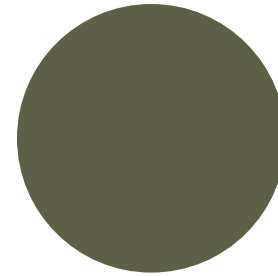
Secondary Logo



Color Palette

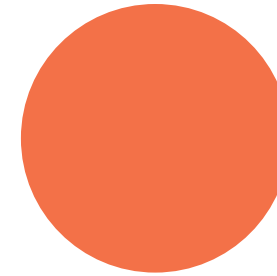
Color Choice

I decided to go with a vibrant color palette to reflect a 60's vibe, but in a more contemporary way. This also provides eye-catching colors that users can easily identify.



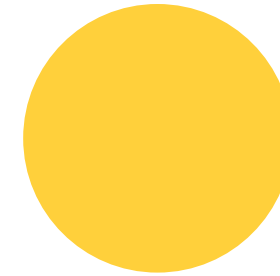
Forest Green

#5D5F46
R93 G96 B70
C59 M47 Y73 K31



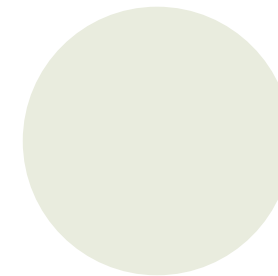
Sunrise Pink

#F37048
R243 G112 B72
C0 M70 Y77 K0



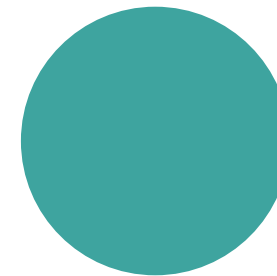
Warm Yellow

#FFCF3A
R255 G207 B58
C0 M18 Y87 K0



Pale White

#E9ECDD
R233 G236 B221
C8 M31 Y13 K0



Cool Blue

#3EA49E
R62 G164 B158
C73 M16 Y42 K0

Design Solution





distinction/2020

Ink & Dye Making /

Resources

Preparation

Berries

Turmeric Powder

Onion Skins

Vine Extract Powder

Conclusion /

Reflection

Materials & Process

Spring 2020

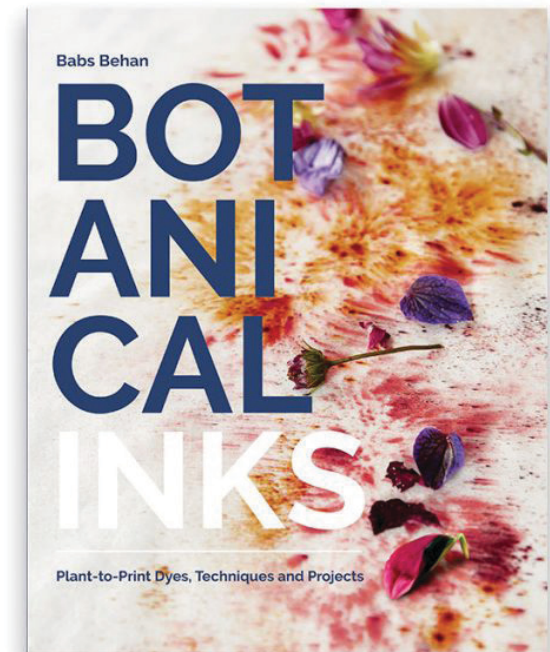
During the spring semester, I wanted to learn more about natural ink making. I made a few different types of inks for water color, dye, block and screen printing. This allowed me to learn more about the processes and the time and practicality of making sustainable inks is.

Reading Resources

Make Ink & Botanical Inks

To learn more about the process of natural ink making, I followed recipes and step by step guides listed in *Make Ink* by Jason Logan and *Botanical Inks* by Babs Behan.

These books explained all the tools needed from collecting, making and storing the inks. *Make Ink* is a great book about the fundamentals for beginners. Most inks were based from easily found objects like nuts, berries and leaves. *Botanical Inks* goes more in depth, using natural extract powders and more complicated ways to make ink and dyes for a variety of needs like fabrics, paper and print making options.



Reading Resources

Big ideas that I learned:

- Process to make ink from natural ingredients such as berries, leaves and nuts
- Preservation of inks
- Soy inks replace % of petroluem for oil based inks
- Acrylic inks for presses, but can create rust
- Responsible forestry papers
- Micro-plastic and cotton alternatives
- Recycled papers may not justify “sustainable” due to processing afterwards
- Natural powders like Agar to make thicker inks



Making Ink: Preparations

Big ideas that I learned:

One of the key points I learned about was making sure you have a set of utensils just for ink making. Some natural ingredients used to make ink are not safe to humans, such as walnuts.

Another thing to keep in mind is making sure all utensils are properly cleaned. In the photo to the right shows a process of cleaning by boiling water with soap. This kills any bacteria that could produce any mold in the inks.



Making Ink: Berries

1. Prepare the Base Color

Crush berries using a potato masher. Add 1/2 cup water and 2 cups of berries.



Making Ink: Berries

2. Filter the Color

Remove any large pieces of plant matter using a colander.



Making Ink: Berries

3. Bottle It

Bottles used for inks should be glass with a tight fitting lid. Using a funnel is the best option to bottle up the ink.

After bottling the ink, you can add an optional binder like gum arabic to help preserve color. I opted out of the binder since I wanted to use this ink for water colors. I did, however, add wintergreen oil, a well known natural oil that keeps the ink from molding.



Making Ink: Berries

4. Make it Permanent

After bottling the ink, you can add an optional binder like gum arabic to help preserve color. I opted out of the binder since I wanted to use this ink for water colors. I did, however, add wintergreen oil, a well known natural oil that keeps the ink from molding.



Making Ink: Berries

Raspberries vs. Blackberries

I decided to experiment with raspberries and black berries. I followed the same directions listed before for the blackberries. Comparing them, the raspberries made a nice light pink ink and blackberries made a rich purple.

Notes:

The ink itself is thin without any binder added. It does take a few layers to get darker colors, drying in between each layer. This does take some time but the ink is an effective water color.



Making Ink: Turmeric Alcohol Ink

1. Preparation

Add 3 tablespoons turmeric powder to 1 3/4 cup isopropyl alcohol (90 percent or higher). Add a tight lid and let the mixture sit overnight.

After the mixture has sat overnight, shake vigorously.



Making Ink: Turmeric Alcohol Ink

2. Filter and Bottle

Pour the mixture through coffee filter into a container that has a tight fitting lid. Filtering gets rid of unneeded turmeric powder.



Making Ink: Turmeric Ink Reflection

Reflection

This was an easy way to make ink that is vibrant, no layers needed are needed. The alcohol prevents mold and allows the ink to be permanent. I was able to test the color to see how it reacted on different colored papers. The ink maintained a consistent color, however, dries better on thicker paper to prevent any wrinkles.



Botanical Inks: Onion Dye

1. Washing and Scouring

Before any fibers can be dyed, they must go through a rigorous washing process.

Wash the fiber in the washing machine on hot water, or by hand if fibers are delicate.



Botanical Inks: Onion Dye

1. Washing and Scouring

Scour the fiber. To scour, put the pre-washed fiber into a big pot of water. Add an ecological soap to the pot. Allow the pot to simmer for an hour.



Botanical Inks: Onion Dye

1. Washing and Scouring

Once the hour is up, turn off the heat and let it cool. Replace it with clean water and rinse the fiber.

Gently wring out the water and let it dry completely.



What is a mordant?

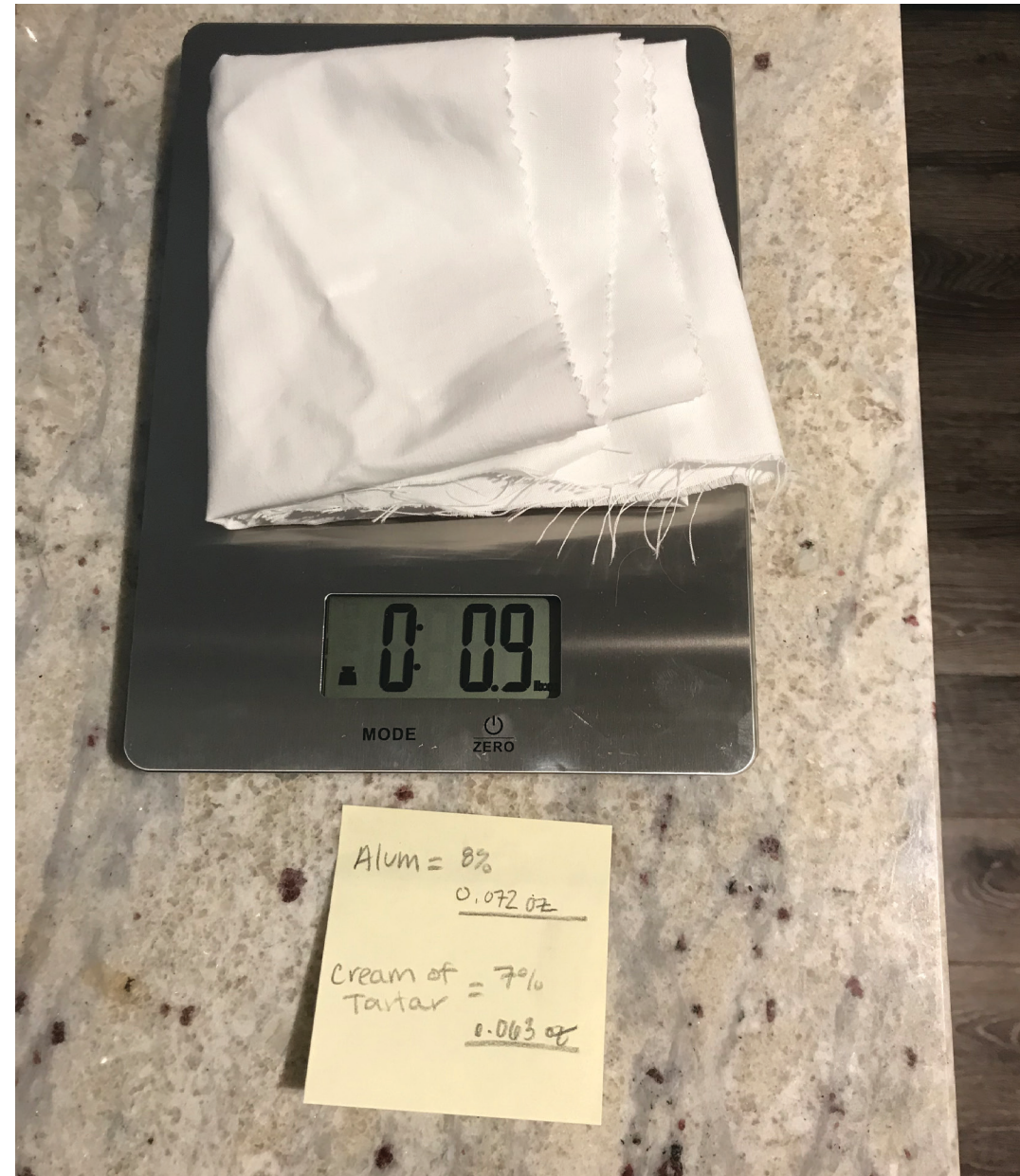
A mordant is a fixative for dyes to help the colors bond with the fibers. It can be applied before, during or after the dye process. Plant based mordants are preferred since they are natural, renewable sources. Plant based mordants are more sustainable because most mineral-based mordants are synthetically versions of the natural mineral and can be toxic. Mordant baths can be reserved for future needs, but must be stored in air tight jars in a cool , dark and dry place.

Botanical Inks: Onion Dye

2. Apply a Mordant

Weigh the fiber after it has been washed, scoured and air dried completely.

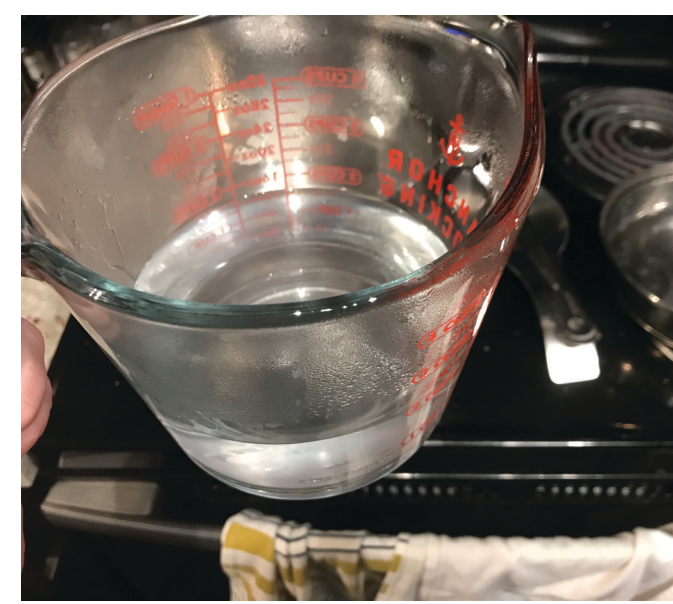
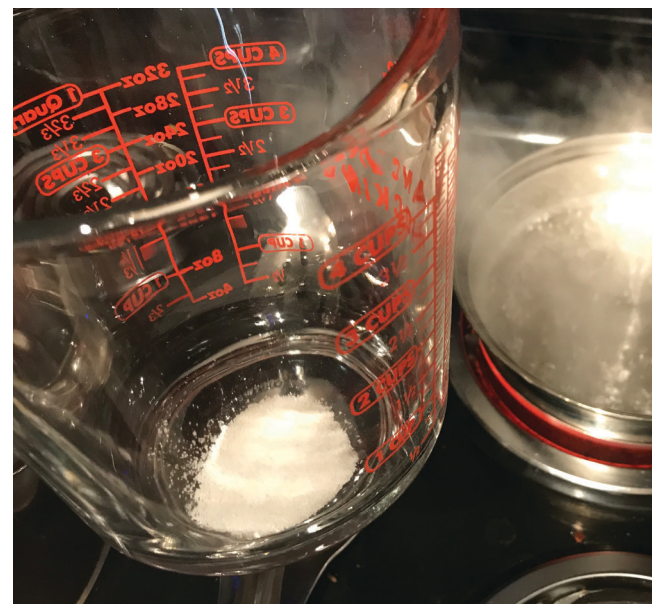
Measure out the amount for the mordant. In this case, I used an alum and cream of tartar mordant for my polyester-cotton fiber. These calculations are based on a percentage of the fiber weight.



Botanical Inks: Onion Dye

2. Apply a Mordant

Put the mordant into heat resistant jars. Add boiling water to both and stir until dissolved completely.



Botanical Inks: Onion Dye

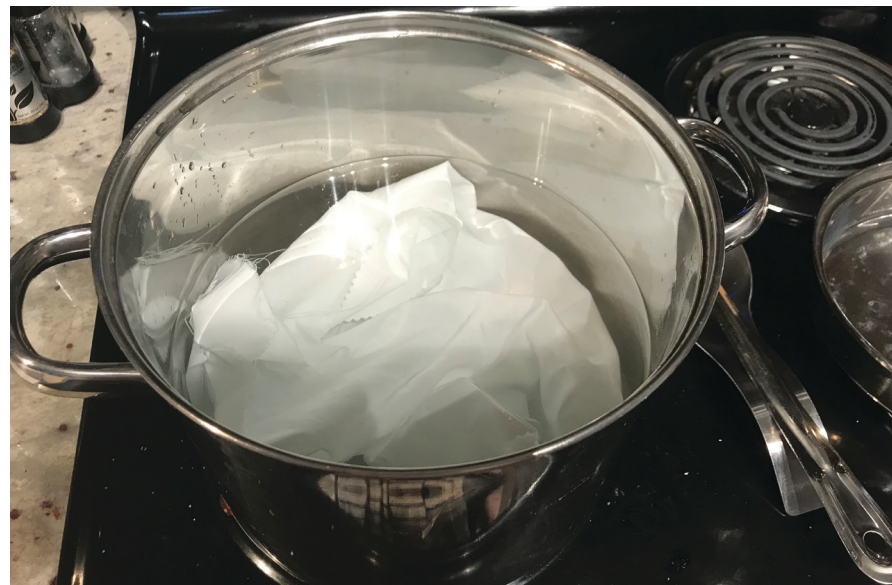
2. Apply a Mordant

Pre- wet the fiber.

Fill a large pot with room temperature water. Add both mordant mixtures and fiber to the pot.

Simmer for an hour with lid. Turn off heat and cool the fiber in the pot overnight.

Rinse and scour the fiber before adding to the dye bath.



What is a dye bath?

A **dye bath** is a dye solution or liquid made to dye materials. There are different types of dye baths.

A **hot dye bath** using a process of simmering both plant products and fabric to exert the natural dyes and dye the fabric.

A **cold dye bath** is a longer process, 1 - 3 weeks. It allows the fabric to sit in the dye until the fabric is the desired color.

Solar dyeing uses the sun's natural heating rays to heat up the dye and fabric mix over a period of a few weeks.

All-in-One dyeing combines fresh dye plant material and boiling water

Botanical Inks: Onion Dye

3. Make a Hot Dye Bath

Weigh the dry fiber. For a deep shade, weigh an amount of onion skins that is equivalent to 50% of the fiber weight.



Botanical Inks: Onion Dye

3. Make a Hot Dye Bath

Fill a large container with water. Add onion skins and bring to a simmer for 30 minutes. Strain out the onion skins. Use the leftover liquid for a dye bath.



Botanical Inks: Onion Dye

3. Dye Bath

Add pre-mordanted and pre-wetted fiber to dye bath. Simmer for one hour.

Turn heat off and let the fiber sit in the dye bath overnight.



Botanical Inks: Onion Dye

3. Dye Bath

Rinse fiber in lukewarm water and air dry.

Notes:

I was really surprised how easy it was to get the color from the skins. I had to let the cloth sit a little longer than over night to get a darker color, but in the photo you can see the original white fabric and the onion dyed fabric next to each other.

The fabric only used up a little of the dye, so I can keep the leftover dye for any future fabric dye projects.



Botanical Inks: Printmaking Inks

1. Preparations

Measure out the required plant-based binder powder (I used corn starch) and boiling water in to a bowl.

Mix well until dissolved.

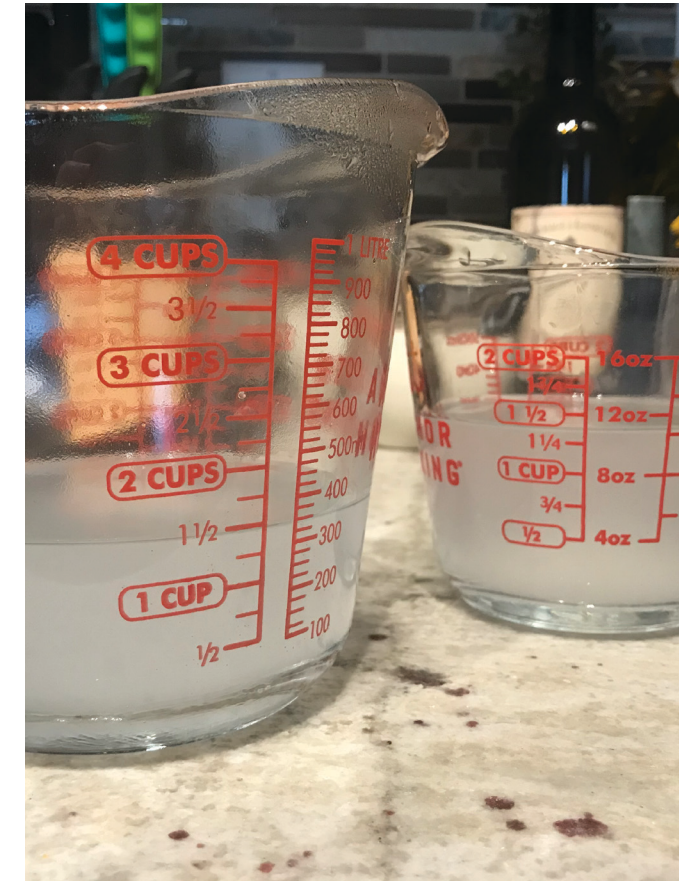
Leave mixture overnight in fridge to thicken.

Block Ink:

1/2 tsp of binder
8 1/2 fl oz boiling water

Screen Ink:

1 tsp of binder
8 1/2 fl oz boiling water



Botanical Inks: Printmaking Inks

2. Making

Measure out 1 tsp of extract powder with a few hot drops of water to make a paste, and then add little more water till a liquid consistency.

Mix the liquid color with 4 1/4 fl oz of the binder mixture from the fridge.

Notes:

For my powder I bought non-toxic, natural vine extract. The mixture didn't turn out a nice thicker consistency like regular block printing ink found in stores. It was very watered down with the corn starch binder clumping.



Botanical Inks: Printmaking Inks

Notes:

I decided to try and use a gelatin packet since gelatin solidifies when combined with water. I tried a few different ratios of gelatin to water until I found a consistency I was happy with.

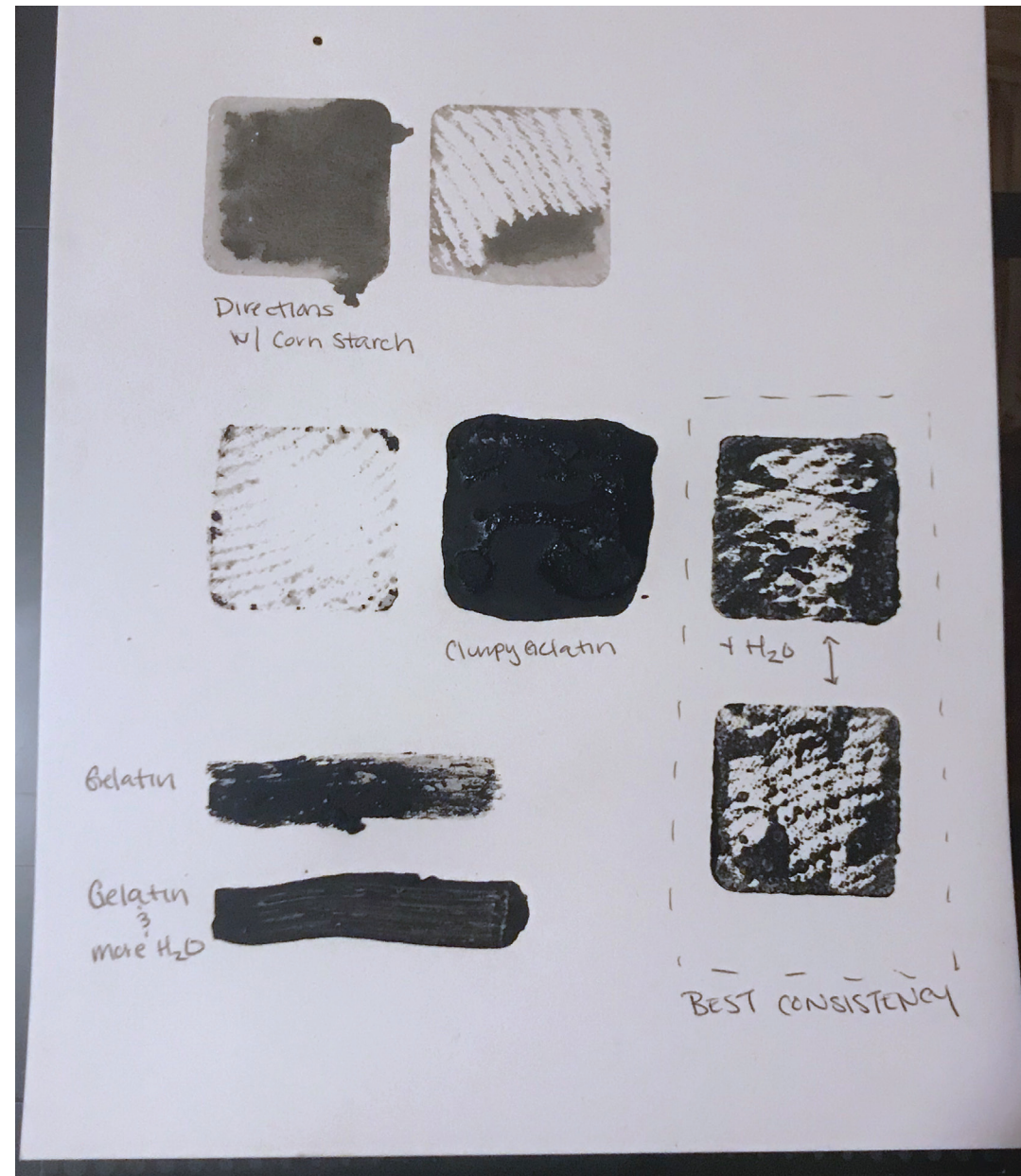


Botanical Inks: Printmaking Inks

Notes:

Using a block of wood, I tested different consistencies of the ink and binder mixture.

Overall, the book recipe makes a more liquid consistency than I usually use for block and screen. Since the gelatin seemed to work well, I am curious to know what other binders are easily available. I think a powder clumps up too much, so another product like gum arabic would be next to test.



Conclusion

Reflection

Creating inks was very informative and fun. Most of the recipes worked out really well, however, there are endless ways to make these inks. I am still determined to find a high quality, thicker consistency for the block and screen printing inks. Since the block printing inks was similar to the screen printing ink method, I need to first find the right ratio for the block ink to be able to then find the right ratio for the screen printing ink.

Process & Materials

Most of the inks were pretty easy to make. The hardest was the onion dye due to the process of washing, scouring, adding a mordant and then dyeing it, with a complete dry time in between. A lot of the materials are easy to find, even if you don't have them at home. I know most of the books collected fresh plants, which is harder here in Ohio during the winter. Fortunately, you can find natural powder extracts of all sorts of colors.

Due to COVID-19, I mainly used items I already had, however, this was a key point in my research. I wanted to see what would be the easiest way to make inks with common household items. This may have limited the ingredients and outcomes. I am determined to try other plant bases and binders once they become readily available again.



Works Cited

Behan, Babs. *Botanical Inks: Plant-to-Print Dyes, Techniques and Projects*. Quadrille, 2018.

Logan, Jason. *Make Ink*. Abrams, 2018.

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