



Texas A&M PVFA/BIOL BioArt Workshop  
March 21–24, 2023

## STEP-BY-STEP OVERVIEW DYEING PROCESS

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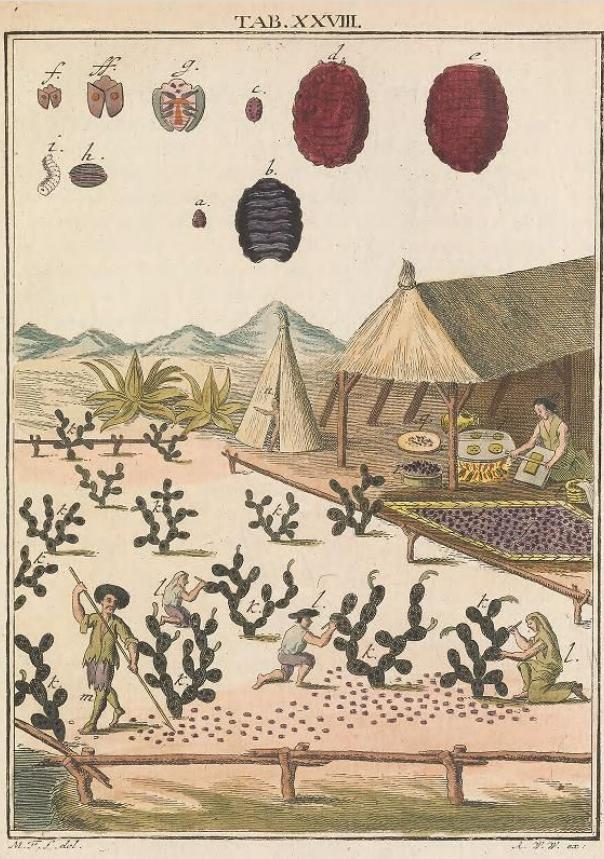
*Last updated 2023-03-19 by NJR*

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Much of this material was initially developed as part of public workshops at [Genspace Community Lab](#) (New York), made possible by the Public Outreach Grant, [Colorant Sustainability Workshops](#) (Naomi Rosenkranz and Sumeyye Yar), from Columbia University's [Center for Science and Society](#).

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# Following 16<sup>th</sup>-century recipes, we will dye textiles with cochineal bugs



## Part 1 (Tuesday)

### Making:

- Prepare mordant bath
- Mordant the textiles
- Prepare dye bath

### Learning:

- Overview of natural dyes
- How to dye textiles with natural colorants
- History of cochineal

## Part 2 (Thursday)

### Making:

- Dye the textiles

### Learning:

- Historical recipe examples
- Other natural colorants
- Your questions!

# Safety

- **Hotplates**

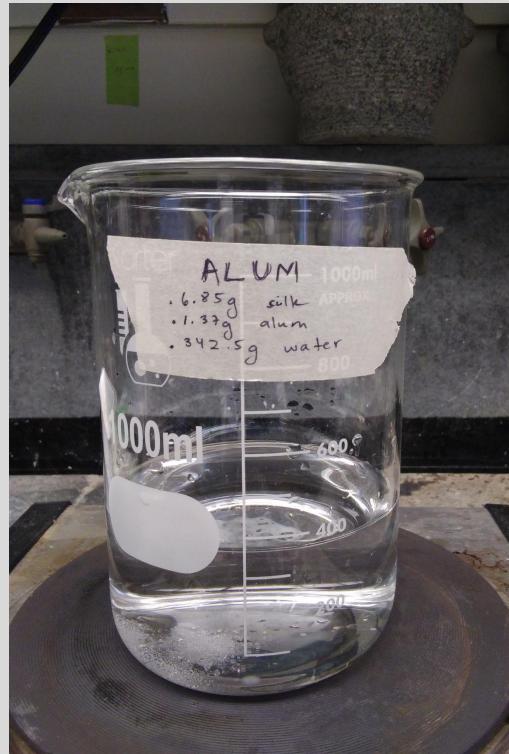
- If a hotplate is turned on, someone should be watching it
- When not in use, unplug the hotplate
- Keep flammable items away from the heating surface (including sleeves!)
- Locate fire extinguishing and fighting methods
- Be careful not to burn yourself or others

- **Glass beakers**

- Risk of shattering due to “shock”
- Don’t place cold beakers on very hot plates OR very hot beakers on cold surface
- Dyeing materials: **metal salts** (aluminum potassium sulfate, potassium carbonate, iron sulfate, and copper sulfate) & **dried cochineal**
  - Ok to be washed down the drain or thrown in municipal trash as per MSDS sheets and safety regulations
  - Do not require PPE like gloves or masks, but should still not be ingested

# Part 1 (Tuesday)

- **Measure water for mordant bath**
  - Start heating
- Measure mordant
  - Add mordant to water
- Mordant the textiles
  - Add textiles
  - Continue heating
- Crush cochineal
- Measure ingredients for dye bath
  - Cochineal
  - Water
  - Additive (if using)
- Prepare dye bath
  - Add cochineal to water
  - Add additive (optional)
  - Leave to soak until day 3



**1 g of water = 1 ml of water**

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<b>Bundle AC1</b>		
Mordant	Alum	
Dye	Cochineal	
<i>Enter weight of textiles in grams --&gt;</i>		11.46
<b>Baths</b>		
Alum		
Material	Amount /1g (g)	Amount (g)
textile	1.00	11.46
alum	0.20	2.29
water	50.00	573.00
Cochineal		
Material	Amount /1g (g)	Amount (g)
textile	1.00	11.46
cochineal	0.13	1.43
water	62.50	716.25



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## Part 2 (Thursday)

- Filter cochineal dye bath
  - Pour through filter and keep liquid
- Dye the textiles
  - Add mordanted textiles to cochineal dye bath
  - Heat
- Wash the textiles
  - Remove from dye bath and rinse
- Leave to dry

# Textiles

## 1. Linen canvas

100% linen Utrecht unprimed Belgian linen canvas [Type 185 \(Blick Art Supplies\)](#)

## 2. Silk fabric

Jacquard Habotai Silk Scarves, 5mm, 100% silk [Jacquard \(amazon.com\)](#)

## 3. Silk thread

Undyed 100% silk lace weight yarn, [Ready to Dye \(amazon.com\)](#)

## 4. Cotton cheesecloth

Cheesecloth grade 50 - 100% unbleached cotton, [Pure Acres Farm \(amazon.com\)](#)

## 5. Cotton twine

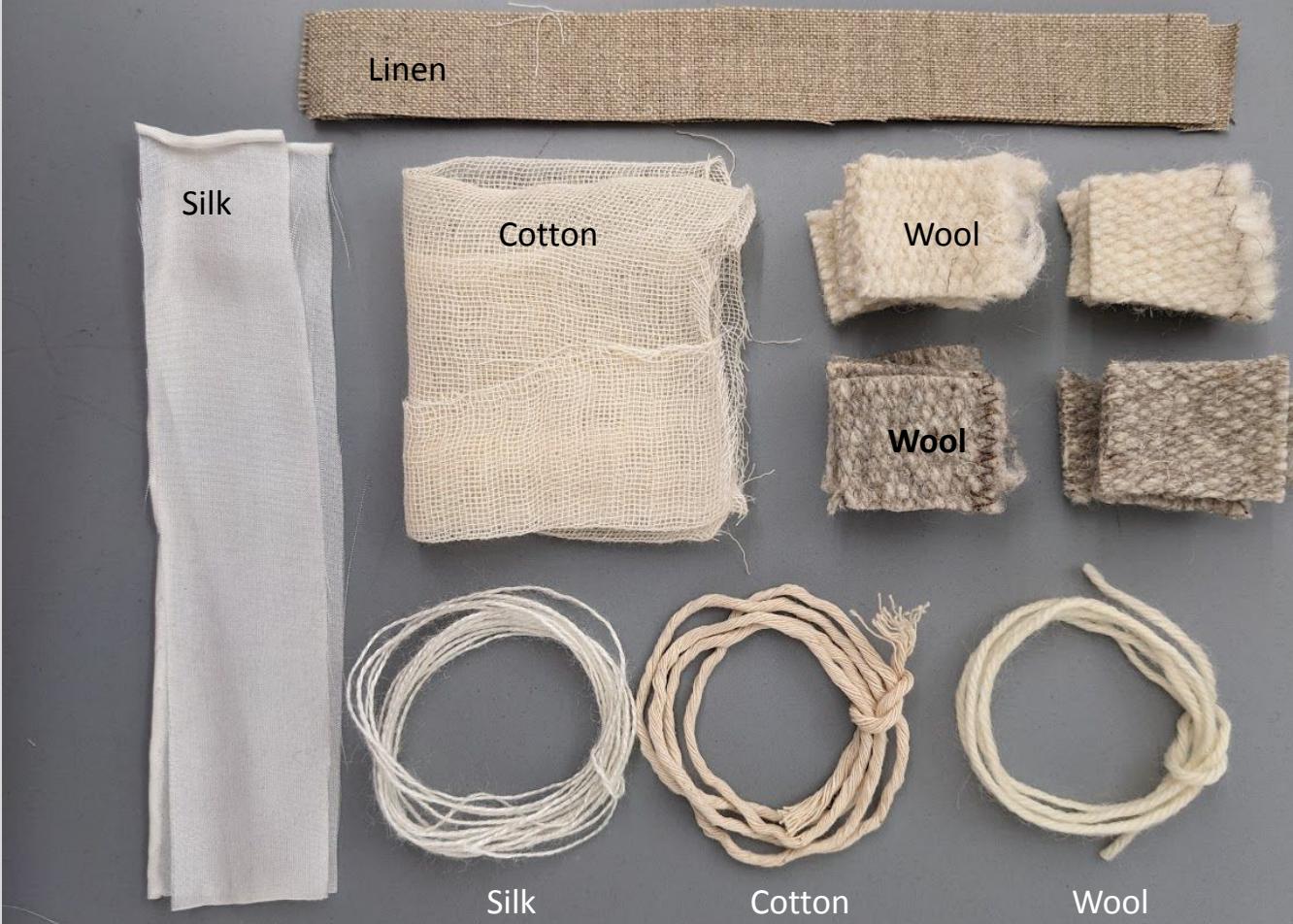
100% cotton, unbleached, [Norpro \(amazon.com\)](#)

## 6. Woven wool

100% wool, undyed, [Ortega's Weaving Shop](#), Chimayo, New Mexico

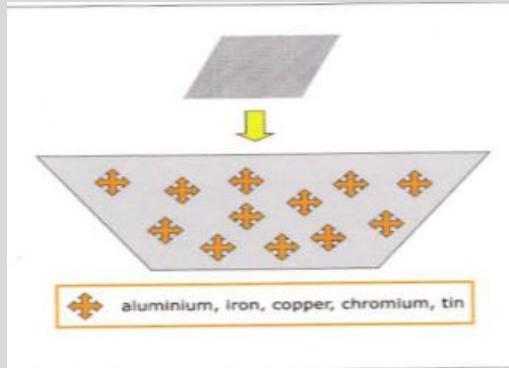
## 7. Wool yarn

100% wool, undyed, [Lion Brand Fishermen's Wool® Yarn](#)

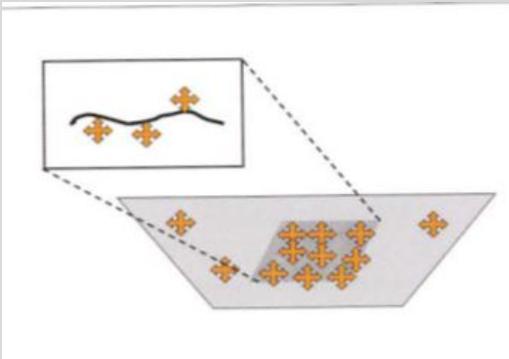


# Mordant dye process

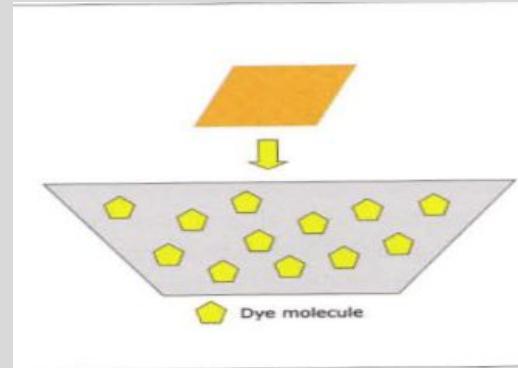
(1) Mordant bath is prepared by dissolving metal salts in water. Textile is then added



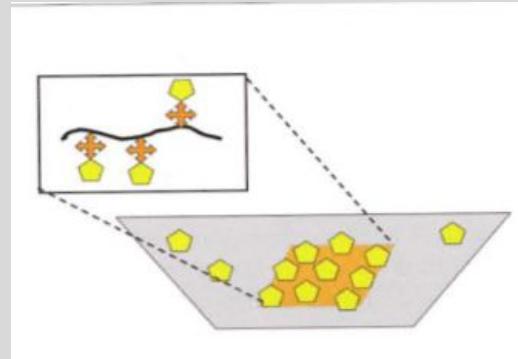
(2) Metal is bound to the



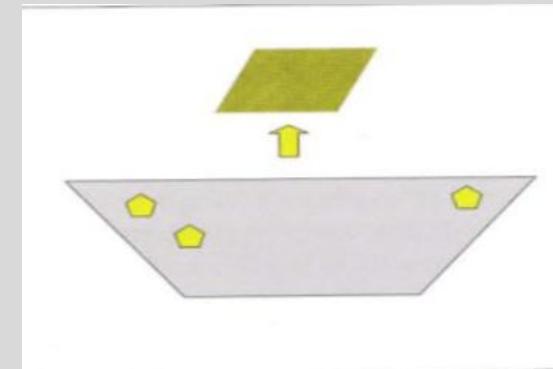
(3) Mordanted textile is added to dye bath



(4) Dye molecules bind to coordination metals of mordanted



(5) Dyed textile is removed



Name	Mordant	Dye
NC1	None	Cochineal
NC2	None	Cochineal
NCP1	None	Cochineal + potash
NCP2	None	Cochineal + potash
AC1	Alum	Cochineal
AC2	Alum	Cochineal
ACP1	Alum	Cochineal + potash
ACP2	Alum	Cochineal + potash
IC1	Iron	Cochineal
IC2	Iron	Cochineal
CC1	Copper	Cochineal
CC2	Copper	Cochineal





# Natural Colorants

for Dyeing and Lake Pigments

PRACTICAL RECIPES AND THEIR HISTORICAL SOURCES



Jo Kirby, Maarten van Bommel and André Verhecken

*Natural Colorants for Dyeing and Lake  
Pigments: Practical Recipes and their  
Historical Sources*

Jo Kirby, Maarten van Bommel, André  
Verhecken

(Archetype, London, 2014)

# Dye recipes: amounts are based on weight of textiles

Mordant bath: Alum	
Material	Amount /1g (g)
textile	1
alum	0.2
water	50

Mordant bath: Iron	
Material	Amount /1g (g)
textile	1
Iron sulphate	0.1
water	50

Dye bath: Cochineal	
Material	Amount /1g (g)
textile	1
cochineal	0.125
potash	0.0625
water	62.5

Mordant bath: Copper	
Material	Amount /1g (g)
textile	1
copper sulphate	0.2
water	50

Recipes adapted from Jo Kirby et al,

*Natural Colorants for Dyeing and Lake Pigments: Practical Recipes and their Historical Sources* (Archetype, London, 2014).

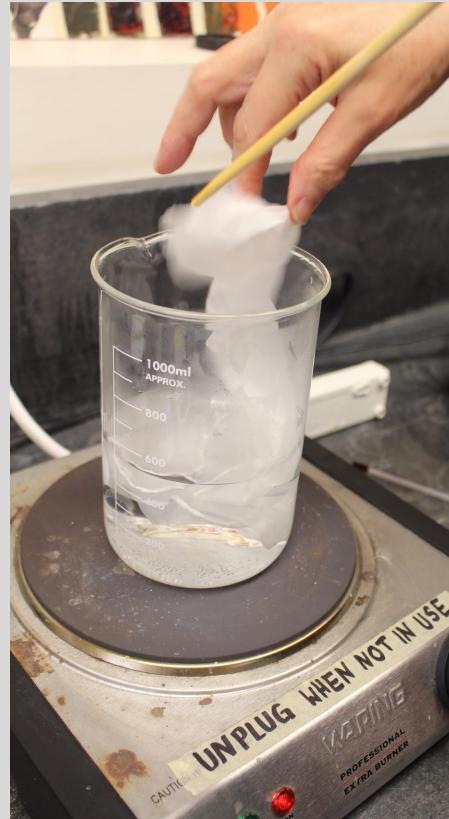
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## Using a mortar and pestle



# Part 1 (Tuesday)

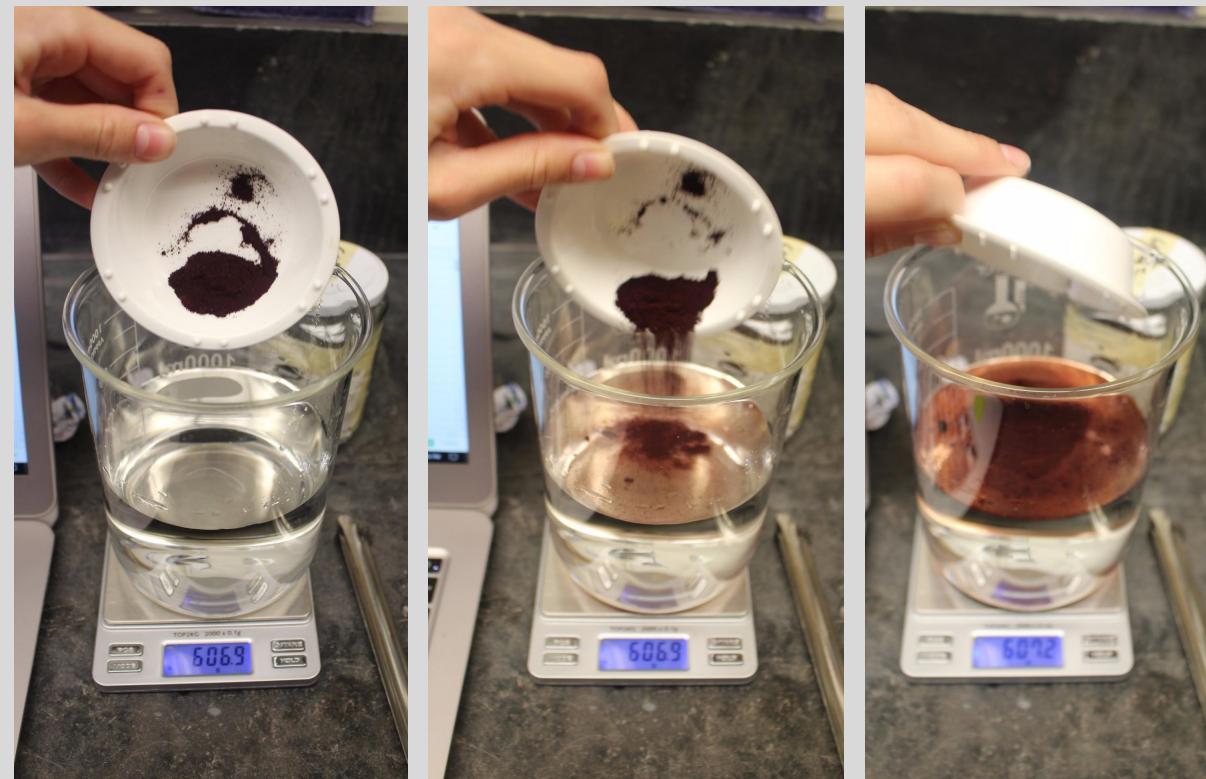
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  - Leave to soak until day 3

Add cochineal (and additive) to water  
Leave to soak



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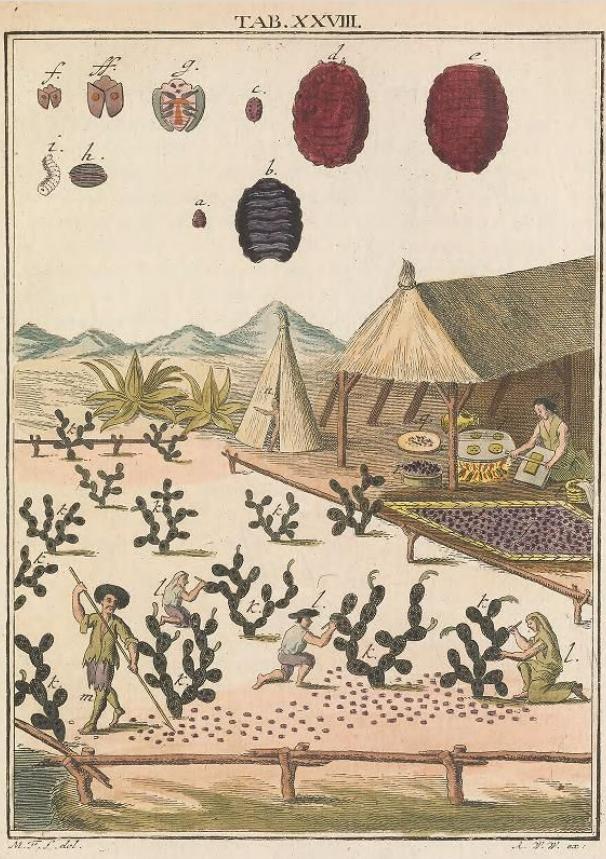
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Extract colorant in water

Either by using heat or by **leaving to soak overnight**



# Dyeing textiles with bugs



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### Making:

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- Historical recipe examples
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- Your questions!

# Dyeing with Natural Colorants

## Prepare mordant bath



Such as alum



Dissolve in water



Add textile



Wash textile



## Prepare dye bath



Crush cochineal



Extract in water



Add textile



Wash textile

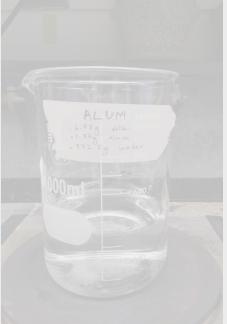


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## Prepare mordant bath



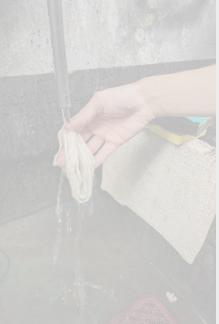
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Dissolve in water

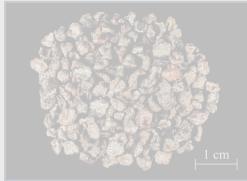


Add textile



Wash textile

## Prepare dye bath



Crush cochineal



Extract in water



Add textile

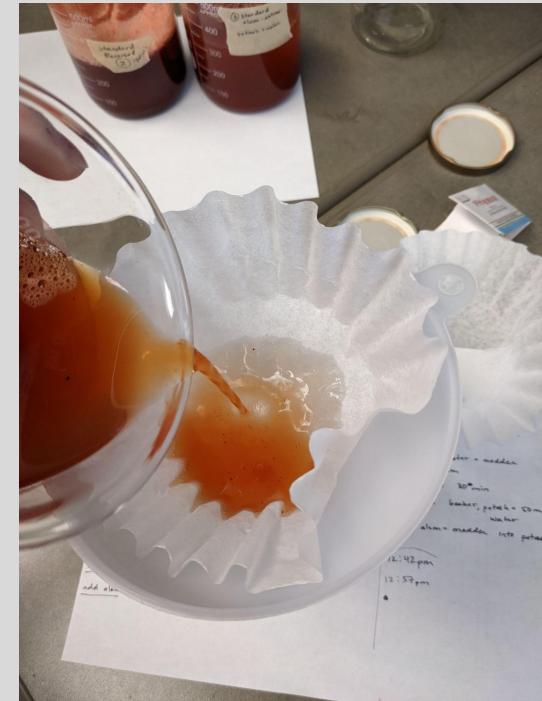
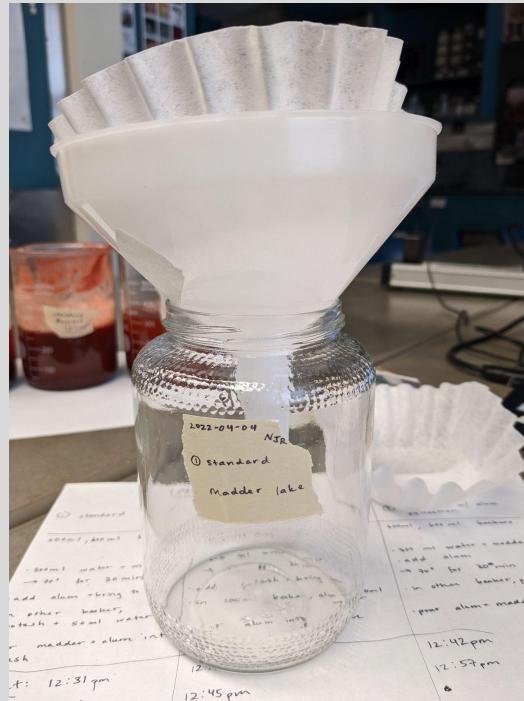


Wash textile



## Part 2 (Thursday)

- **Filter cochineal dye bath**
  - Pour through filter in funnel and keep liquid
- Dye the textiles
  - Add mordanted textiles to cochineal dye bath
  - Heat
- Wash the textiles
  - Remove from dye bath
  - Rinse until water runs clear
- Leave to dry



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