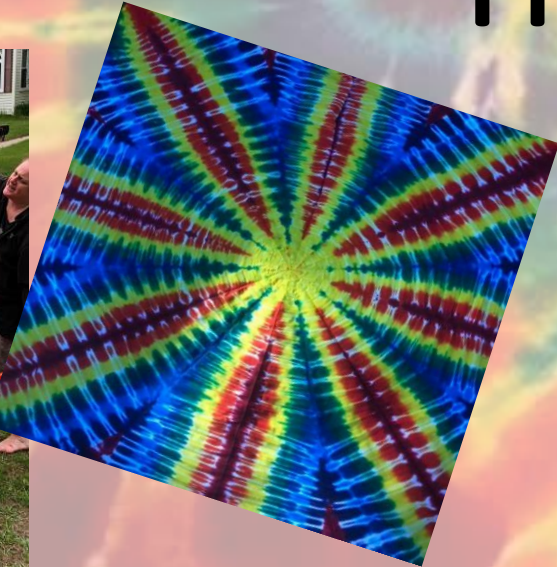




# The Science of Tie Dying



Hosted by Xena Olson with special guest bouncer Heather Lotz!!!

# Origin of Tie Dye

Although tie dyeing is often associated with the 1960's, it has been around for thousands of years

## ➤ 4000 B.C. South Asia *bandhani*

- ❖ People used their fingernails to bind small intricate pieces of fabric
- ❖ Pictures were drawn on caves of tie dye in the Northwest region of South Asia (Indus Valley Civilization)

## ➤ Mid-8th century Japanese *shibori*

- ❖ Numerous techniques of shaping cloth by binding, tying, clamping, waxing, or folding objects within the material
  - ❑ The origin of Tie Dyeing comes from a **shibori** technique called **kanako** which uses thread to bind and secure sections of cloth prior to dyeing
  - ❑ In modern times most people use rubber bands

# Fiber Reactive Dye

- Attaches permanently to cellulose fibers using a covalent bond (shares electrons) and is one of the strongest types of chemical reactions
  - Cotton, rayon, and hemp are some examples of cellulose fiber
  - Molecules from the fiber reactive dye become part of the material
- Dependencies of Covalent Bonding
  - pH level - raises negative hydrogen ions needed for reaction
  - Temperature - heat speeds up the reaction
  - Time

# Soda Ash Solution

Soda Ash raises the pH of the fiber and is necessary for bonding the dye to the material

- A pH of 10.5 is desirable

## **Soda Ash Solution Process**

- Add one cup of soda ash per gallon of warm water
- Soak the material in the solution for at least 20 mins

# Dye Solution

**Urea** commonly known as fertilizer is an organic compound with chemical formula  $\text{CO}(\text{NH}_2)_2$

- Dissolves dye in small amounts of water
- Serves as a humectant, or water-attractor, to help keep fabric damp long enough for the chemical reaction to occur

**Metaphos** Sodium hexametaphosphate is a salt of composition  $\text{Na}_6[(\text{PO}_3)_6]$

- Sequesters calcium and magnesium ions found in hard water

**Sodium Alginate** is the sodium salt form of alginic acid and gum mainly extracted from the cell walls of algae

- Used as a thickening agent to control the flow of the dye

**Solution Process** to make **2 gallons** of urea water:

Water	Urea	Metaphos	Sodium Alginate
2 gal of 110° H <sub>2</sub> O	4.5 Cups	8 Tsp	16 Teaspoons

**Dye Process** Add one TSP of Dye Powder to 8oz of urea water

# Tie Dye Process

- Ring out wet material on the spin cycle in your washing machine
- Fold Material in desired pattern and tie using rubber bands or sinew
- Apply the dye with squirt bottles, syringes, or dipping
- Put wrapped and dyed fabric in a plastic bag
- Let sit for 24 hours at room temperature



# Hippie Christmas

Opening a tie dye after waiting 24 hours is like opening a unique gift at Christmas, thus the phrase “Hippie Christmas” was coined

- Rinse fabric while wrapped in bindings
- Take bindings off
- Rinse out the fabric until water runs clear
- Wash in hot water with synthrapol to get out the excess dye
- Wash again in cold water to ensure all dye is out
- Dry in the dryer on hot for 45 mins



[XenasTieDyes.com](http://XenasTieDyes.com)