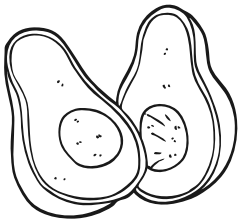
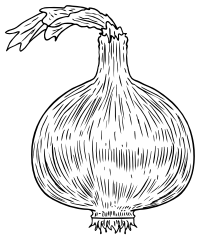


Natural Dyeing



Time: 2.5 hrs+ • All ages (with adult help)

SUPPLIES:

- 1 large pot
- vegetable and/or fruit scraps
- 1 stirring spoon
- white material to dye (cotton, linen, wool, or silk
- water
- knife or scissors
- vinegar or salt

LESSON OBJECTIVE:

To explore the process of natural dyeing and to learn some basic properties of plant cells and pigments.

INTRODUCTION

Natural dyes are are colorants that come from plants, animals, or minerals. Dyeing using natural materials has been used by many for thousands of years. In fact until the mid-1800's, plants were the main source of dye. Now modern chemistry allows us to mass-produce dyes in factories, but the natural dyeing technique is still used globally by many artisans and cultures.

PREPARE YOUR FABRIC FOR NATURAL DYES

STEP 1: First wash your fabric, but don't dry it. it needs to be wet for this step.

STEP 2: Then prepare your fixative. We soak our fabric in fixative so that it will hold the natural dye better. If you are dyeing with berries, your fixative will be salt. If you are dyeing with any other natural material, use vinegar instead. The measurements are as follows:

- Salt: dissolve 1/2 cup salt in 8 cups cold water
- Vinegar: blend 1 part white vinegar with 4 parts cold water

STEP 3: Place your damp fabric in your fixative solution and let soak for one hour. Rinse with cool water when done.

PREPARING YOUR PLANT MATERIAL

STEP 1: First, choose which color you want to dye your fabric! Different plant material will produce different natural colors, some of which you wouldn't even expect!

- Orange-carrots, onion skins
- Yellow- dandelion flowers, bay leaves, turmeric, paprika, celery leaves
- Blue- blueberries, purple grapes, red cabbage, elderberries, dogwood bark
- Reds- beets, basil leaves
- Pink-strawberries, raspberries, avocado skins and seeds (yes really!)
- Brown- coffee, tea, walnut hulls, oak bark,acorns
- Grey-black- blackberries, walnut hulls, iris root
- Green- spinach, artichokes, grass, plantains

You will want to use fresh, not dried, plant material as it will stain best. Consider using leftover plant material from a meal you've just cooked, such as carrot butts, beet leaves, or avocado skins and seeds.

STEP 2: Finely chop up your plant material into small pieces using a knife or scissors.

DYEING YOUR FABRIC

STEP 1: Place your plant material in a large pot. Remember the dye could stain some pots and spoons.

STEP 2: Fill the pot with twice as much water as plant material and place on the stove.

STEP 3: Simmer on the stove for an hour or so, until you get a nice dark color in your pot.

STEP 4: Strain out the plant material and return the dye liquid to your pot.

STEP 5: Carefully place the fabric in the dye bath and bring to a slow boil. Simmer for an hour or so, stirring once and a while.

STEP 6: Turn the stove off after an hour and allow the fabric to sit in the warm water as long as needed.

STEP 7: When you've reached the color you want, take the fabric out and wash it under cold running water. Expect the color to run some as the excess dye is washed out.

STEP 8: Air dry or place alone in a dryer and run for one cycle.

THE SCIENCE BEHIND THE DYEING

WHY DO DIFFERENT PLANT MATERIALS PRODUCE DIFFERENT COLOR DYES?

Different plants produce different colored substances, called pigments. One part of a plant, such as a leaf, may even contain different pigments than another part, such as a flower. The color that our eyes see depends on which light rays are reflected and absorbed by the pigments. The light rays that bounce off the pigment molecules are what our eyes pick up. For instance, we perceive chlorophyll as green because it poorly absorbs green light.

WHY IS IT IMPORTANT TO FINELY CHOP THE PLANT MATERIAL BEFORE DYEING?

Cutting plant material into small pieces increases the surface area exposed to the water, which results in more pigment particles available to interact with water particles. More collisions occur between particles which speeds up the dyeing process.

WHAT HAPPENS TO A PLANT CELL DURING THE DYEING PROCESS?

Boiling water damages cell walls and membranes, so the cells lose their water and deflate. Liquid exiting the plant cell allows pigments to mix with the water in the pot. Plant cell membranes are semi-permeable, which means that select substances can move in and out of the cell. Because of this, even if you left chopped plant material in cold water, some pigment would eventually seep out.