

DIG ART!

CULTIVATING CREATIVITY
IN THE GARDEN



Natural Fibers & Dyes: Clothes Dyeing

Overview Your flower patch or vegetable garden is quite possibly a dyers garden in disguise. Dozens of common plants can be harvested and made into colorful dyes. Experimenting with natural dyes derived from your garden offers great opportunities for integrated learning, including art projects and scientific exploration.

This is a series of three dyeing experiences. You can use one dye process on its own, or try several to create color charts and opportunities for hypothesizing, comparing, and contrasting. See the worksheet on the last page for an idea of how students can organize their findings.

Part I: Natural Plant Dyeing (no mordant involved)

Part II: Plant Dyeing with Heat (no mordant)

Part III: Plant Dyeing with Heat and Mordants

Objectives

Students will:

- explore natural dye processes
- identify plants for their dye-color properties

Time

1.5-2 hours for each activity

Tips

Always take care when using a blender, or any other appliance or tool, with or around youth. Be sure to go over all important safety guidelines before getting started.

If students take their dyed item home, send a note along with it to inform parents/guardians that the item should be washed by hand.

This project can be messy so make sure the work space is appropriately protected, as are you. You should wear clothes that you don't mind getting stained and cover all work tables.

Black walnuts are extremely hard. This may lead to use of a hammer to break them open. Always practice safety precautions when using tools. Use gloves when handling the black walnuts, as they are also very staining.



**Plant & Dye
Color Chart**

Garden Plants	Dye color
Alder leaves	Yellow
Birch leaves	Yellow/Tan
Black Walnut hulls	Black
Red Cabbage	Pink
Carrot tops	Green
Coffee grounds	Tan
Elderberries	Blue/Gray
Mint or Parsley leaves	Yellow
Onion skins	Yellow/Orange/Tan
Spinach plants	Green
Tomato leaves and stalks	Blue
Turmeric	Orange
Wild Grapes	Purple
Wild Mustard	Yellow
Garden Flowers	Dye color
Aster	Yellow
Black-eyed Susan	Yellow
Chamomile	Yellow
Coreopsis	Orange
Marigolds	Yellow
Sunflowers and seeds	Gold
Zinnias	Yellow
Other Common Plants	Dye color
Bindweed	Yellow
Cocklebur	Brass
Dandelion Roots	Magenta
Dock	Brass
Giant Ragweed	Brass/Gold
Goldenrod	Brass
Mullein	Yellow
Redroot Pigweed	Brass/Gold

Part I: Natural Plant Dyeing

Materials

- plants that have natural dye properties (see chart on previous page)
- containers for each dye bath (plastic tubs work well but may be permanently stained, large metal pots often clean up without staining)
- an item to dye, such as a t-shirt, socks, cloth, bandana, etc.
- a mortar and pestle or rocks (for time's sake a blender may be used)
- a stirring rod or spoon
- cheesecloth or a sieve
- measuring cup for water
- access to water
- pruning shears or scissors to cut the plants
- plastic or rubber gloves (some dyes may be staining)
- rubber bands or string to tie up the cloth, creating a design or pattern
- washable tablecloths
- plastic bags to carry the item home in
- permanent markers (optional)
- straws or eyedroppers (optional)

Instructions

1. Explore some of the history of using plants as dyes (see Resources). Discuss what it means to naturally extract plant dyes like we will be doing today.
2. Introduce each plant you will dye with to the students. Brainstorm together what each plant is and what dye color it might produce.
3. Next, students can prepare their item to dye, using rubber bands and string to fashion patterns in the cloth. It is important to do this step before the dyes are prepared so that there is a clean dye-free space to work in.
4. Gather students together in small groups, the size of which depends on how many plants/dye baths you have. Distribute gloves and demonstrate how to get started by smashing up plants with the mortar and pestle or using the blender. Add a small amount of water to the plants while smashing/blending to begin making a dye bath. It is difficult to give an exact plant material to water ratio since each plant is different in terms of size, density, and other properties.

Note:

- If you are using black walnuts or onion skins, use the dye that extracted overnight.
- Smashing up beets may be hard if you have fresh beets. Cut them up and place them into the blender or buy canned beets.

5. Smash up the plants and mix with water until you have a liquid, smoothie-like mixture. Strain the plant material out before dyeing your item. Pour the dye bath into the extra containers using the cheesecloth or the sieve. Line these up and you are ready to dye.
6. Optional: Create a color chart before starting. Students can use eyedroppers or straws to put a small dot of the dye onto an extra piece of cloth and label each sample. This is an important tool for comparisons with other dye methods and as a reference for future dye projects.
7. Taking turns at different dye baths, students can dye different parts different colors or soak their whole item in one container. There are any number of ways to be creative throughout this process.
8. Wring out excess dye and let it soak in for awhile before you take the rubber bands off. The longer you let it sit, the more color will stay in the cloth. If your program only has a ten minutes or so, that can work, but an hour is more ideal. Rinse the item in cool water until water runs clear. Hang to dry.

Part II: Plant Dyeing with Heat

Materials

- stove
- pot that can hold 4 gallons of water (stainless steel will give the best results)
- item to dye, such as a t-shirt, socks, cloth, bandana, etc.
- plants that have natural dye properties (see chart)
- stirring rod or spoon
- cheesecloth or a sieve
- measuring cup for water
- plastic or rubber gloves

Instructions

Begin by discussing with students how heat might affect the outcome of the dye.

At each dye bath, students can dye a small piece of cloth. This can be used to create a comparison chart of dyeing methods and as a reference for future projects. Make sure to label it once dry.

Black Walnut

Preparation for dyeing:

1. Collect a bushel of nuts after they have fallen from the trees in the fall. They will still be bright green, but it is advised to wear gloves when harvesting so that they do not stain your hands.
2. The nuts need to be broken open using a hammer. Be sure to wear safety glasses. Collect the broken husks until you can fill a pot 12 quarts or larger two-thirds of the way with husks.
3. Pour water over the husks so they are completely covered and let them steep overnight. Place the pot on the stove and boil for an hour or longer. You need to watch the pot as to replace water as needed. The dye bath will be complete when the liquid is extremely dark brown. Let cool and strain out the husks from the dye bath.

Dyeing:

4. Place the pot back on the stove and bring to a boil.
5. While waiting for the dye bath to boil, students can prepare their cloth for dyeing using the rubber bands and string to make patterns.
6. Soak cloth in water then add to dye bath and simmer for about 30 minutes. Gently stir the dye bath with a rod or spoon from time to time.

7. Remove the cloth using a rod and let it drip over the dye bath.
8. Let the dye soak in until the desired color is reached (this may take an hour or so). Wearing gloves, remove the rubber bands and string and rinse in cool water until it runs clear.
9. Hang to dry.

Goldenrod

Preparation for dyeing:

1. Collect a paper grocery bag full of goldenrod flowers and stems, when the flowers are almost in full bloom.
2. To create a dye bath, wrap the flower heads and stems (no leaves) in cheesecloth and cover with water.
3. Simmer 2 pounds of flower heads and stems for 30 minutes. Be careful not to get leaves in with the flowers and stems—they will take up space in your dye bath but not add to the dye color. Boil until the dye bath is golden yellow.
4. Remove the cheesecloth and plant materials and add enough hot water to make the dye bath 4 gallons.

Dyeing:

5. While waiting for the dye bath to boil, students can get their cloth ready for dyeing by using the rubber bands and string to make patterns.
6. Soak cloth in water before placing it into the dye bath. Simmer for about one hour, gently stirring with a rod or spoon from time to time.
7. Remove the cloth on a rod and let it drip over the dye bath.
8. Let the dye soak in until the desired color is reached. Remove the rubber bands and string. Rinse in cool water until it runs clear.
9. Hang to dry.

Onion Skins

Preparation for dyeing:

1. Collect 2 pounds of onion skins. Collect them over time at home or ask the produce manager at a local grocery store.
2. To create a dye bath, wrap the skins in cheesecloth and cover with water.
3. Simmer for 30 minutes until dye bath is yellow.
4. Remove the cheesecloth and plant materials and add enough hot water to make the dye bath 4 gallons.

Dyeing: follow 5-9 from Goldenrod

Blackberries

Preparation for dyeing:

1. Collect 2 pounds of full ripe berries.
2. To create a dye bath, wrap the berries in cheesecloth and cover with water.
3. Simmer for 30 minutes.
4. Remove the cheesecloth and plant materials and add enough hot water to make the dye bath 4 gallons.

Dyeing: follow 5-9 from Goldenrod

Zinnia, Marigold, or Coreopsis

Preparation for dyeing:

1. Collect 2 bushels of flower heads.
2. To create a dye bath, wrap the flowers in cheesecloth and cover with water.
3. Simmer for 1 hour.
4. Remove the cheesecloth and plant materials and add enough hot water to make the dye bath 4 gallons.

Dyeing: follow 5-9 from Goldenrod

Compare

Take some time to discuss the two processes—with heat and without heat. How did heat affect the colorfastness of the dye? How did the colors change in comparison to the natural dyeing colors?

Part III: Plant Dyeing with Heat and Mordants

To create vibrant dyes from plant parts, it is usually necessary to add a mordant that binds the dye to the material. Different mordants produce different colors using the same plant materials so there is a range of color possibilities. Some common mordants are alum, iron, and vinegar.

Objectives

Students will:

- process dyes from plant materials with heat and a mordant
- use the dye bath to tie dye a piece of cloth
- record results and compare to other dye methods used

Materials

- stove
- alum (from a fiber craft shop, not from drugstore)
- tartaric acid (cream of tartar from the grocery store)
- 2 pots that can hold 4 gallons of water (stainless steel will give the best results)
- item to dye such as a small t-shirt, socks, cloth, bandana, etc
- plant materials (see chart)
- stirring rod or spoon
- cheesecloth or a sieve
- measuring cup for water
- access to water
- pruning shears or scissors to cut the plants
- plastic or rubber gloves (some dyes may be staining)
- rubber bands or string to tie up the cloth
- washable tablecloths
- plastic bags to carry the item home in
- permanent markers (optional)

Instructions

1. Begin by discussing mordant. How will the addition of both heat and a mordant affect the outcome of the dye? The only change in the dye process from Part II is that cloth will be soaked in a mordant bath before it is soaked in the dye bath.
2. Make mordant by adding 2 1/4 oz. of alum and 2 1/4 oz. cream of tartar and dissolving it in 4 gallons of lukewarm water.
3. As in Part II, students will wet their cloth first in water and then place it in the mordant bath. Cloth should be completely immersed and the mordant bath slowly brought to a boil for 20 minutes.
4. Remove cloth from the mordant bath, squeeze out excess water, and add it into the dye bath. Continue to follow the dye steps, as in Part II.

Compare

Once done, discuss how the heat and mordant affected the colorfastness of the dye. How did the colors change in comparison to Part I with the natural dyeing process? And Part II when just heat was used? What do you think would happen if only a mordant was used without heat?

Taking it Further

Plant a dye garden. Students can research which plants they want to include, what can grow in their area, and then collaboratively design the garden.

Make a quilt. Each student can dye a square using the color and technique that they prefer. They can then work together to make a beautiful class quilt.

Dye with wool or other fabrics to compare and contrast variations.

Go on a plant hunt. Brainstorm other plants that might make good dyes. What colors would they make? How should they prepare the dye?

Dye with a commercial dye, such as Rit, and compare and contrast the results with natural plant dyes.

Resources

Books:

A Dyer's Garden: From Plant to Pot: Growing Dyes for Natural Fibers
Rita Buchanan

Dyes from Plants
Seonaid Robertson

Colours from Nature: A Dyer's Handbook
Jenny Dean

Name _____

Date _____

Investigating Plant Dyes

Hypothesis for Natural Plant Dyeing:

Observations: Plant Name Dye Color Results

1.) _____

2.) _____

3.) _____

4.) _____

Conclusion:

Hypothesis for Plant Dyeing with Heat:

Observations: Plant Name Dye Color Results

1.) _____

2.) _____

3.) _____

4.) _____

Conclusion:

Hypothesis for Plant Dyeing with Heat and a Mordant:

Observations: Plant Name Dye Color Results

1.) _____

2.) _____

3.) _____

4.) _____

Conclusion:
