



Colors To Dye For!

ALABAMA OUTDOOR CLASSROOM ACTIVITY

Grade Levels: 4-12

Overview

Before people created chemical dyes, they used the color pigments in plants to color fabrics and make paints. Use this activity to make your own natural dyes from common plants found throughout Alabama.

Subject Areas

Biology, Visual Arts, Environmental Sciences, and Social Studies

Duration

3-4 periods of at least 45 minutes

Learning Objectives

Students will: 1) learn how boiling ruptures plant cells; releasing the color pigments held inside; 2) examine how the amount of time a piece of cloth is left in the colored pigment affects the shade of color created; 3) experiment with a variety of plant materials to see what colors they can create.

Materials

- Assortment of plant materials from which to extract colored pigments
- Food processor
- Cotton fabric for dyeing
- Glass bowls or stainless steel pans
- Spoons for stirring
- Hot plates or oven top
- Alum
- Rubber gloves
- Clothesline on which to hang dyed fabric

Background Info

Throughout human history, people have used plants and other natural objects to create dyes to use in coloring fabrics and creating paints. Historians and scientists have discovered that prehistoric people used plant pigments to create ancient cave drawings as far back as 15,000 B.C.

Preparation

In preparation for this activity, you will need to collect a variety of plant materials (see list at bottom of page) that you want to use in the making of plant dyes. In addition, you will need to purchase some cotton muslin fabric with which to test your dyes. Make sure you wash the fabric in advance so that it will absorb and hold the plant pigments during the dyeing process.

To help prepare the plant materials for the pigment extraction process, you will need at least one food processor or food blender with which to chop up the plant materials. In addition, you will need a glass or stainless steel bowl for each mixture. When you are ready to boil the mixture, you will need a stainless steel pan for each mixture as well as a hot plate or other heat source. (Do not use aluminum cookware as this may affect the color of the dye.)

During the dying process, you will need to use a mordant that will help the pigment adhere to the cotton fiber in the fabric. The best mordant for classroom use is alum. You can find alum in the spice section at the grocery store.



Plant List and Color Chart

Plant Materials	Potential Color	Plant Material	Potential Color
Red onion skins	pink	Goldenrod flowers	Yellow
Strawberries	Pink	Carrots	Yellow
Beets	Rose	Onion skins	Yellow
Red cabbage	Purple	Osage orange (wood)	Yellow
Elder berries	Purple	Marigold flowers	Yellow
Muscadines or grapes	Purple	Lichen	Gold
Red cedar root	Purple	Wild plum roots	Reddish brown
Blackberry	Strong purple	Walnut hulls	Brown
Pokeweed berries	Purple-red	Coffee	Brown
Blueberries	Blue-purple	Acorns (boiled)	Brown
Sumac fruit	Light red	Plantain roots	Green
Sumac leaves	Black	Spinach	Green



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Outdoor Classroom Connections

Students will experiment with various plants that can be found in the outdoor classroom as they make natural dyes. They will also learn how past generations used these same plants to dye their clothing and make paints

Alabama Course of Study Objectives

Science:

Fourth: 5

Fifth: 1,2, 3, 4, 7

Seventh: 1, 4

Eight: 1, 6, 7

Vocabulary

Flower, stem, root, bulb, mordant, solution

Literature Connections:

Epp, Dianne N. **The Chemistry of Natural Dyes.**

ISBN-10-1883822068

Senisi, Ellen B. **Berry Smudges and Leaf Prints.** ISBN-

10:0525461396

Other Related Conservation Education Activities

Project Learning Tree

⇒ *Looking at Leaves*

Discovering Alabama Videos

⇒ *Fort Toulouse*

⇒ *Native American Festivals*

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Procedure

1. Discuss how various plant materials were used to make plant dyes with which to color natural fibers such as cotton, flax and wool.
2. Collect a variety of plant materials from around the school. If you can not find the plant materials needed on the school grounds, bring plant materials from home. The chart on the previous page lists some plant materials that can be used for this activity, but feel free to experiment with other plants.
3. Prepare the cotton material or wool by washing it in plain detergent with no fabric softener so that it will absorb plant dyes.
4. Cut up, chop up or crush the plant materials and then place them in a glass or stainless steel bowl and cover with water. Let it soak overnight.
5. On the next day, pour the plant material and the water into a stainless steel pan and bring it to a boil. Once it starts to boil, lower the heat and let it simmer for about an hour. Throughout the cooking process, add water to keep the plant material covered.
6. Once the cooking process is done, carefully pour the liquid through a strainer to remove plant material. Allow the liquid to cool.
7. Once the liquid is cool, measure and add one tablespoon alum for every quart of dye. (The alum is considered a mordant which helps the cloth accept the plant dye.)
8. You are now ready to dye your fabric. Wet the fabric and then wring it out. Place it in a stainless steel pan and then cover it with the dye. Place the pan on the stove and bring it to a simmer.
9. Keep the pan simmering and leave the fabric in the pan until you reach the desired color. (Remember that the color will be lighter once the fabric dries.)
10. Once you are satisfied with the fabric's color, carefully pour the contents of the pan (liquid and fabric) into a strainer. Run cold water over the fabric to cool and rinse the fabric.
11. While wearing rubber gloves, wring out the fabric, then rinse and wring out again.
12. You will now want to hang the fabric outside (make sure you hang it where the dripping liquid won't stain anything) so that it can dry.
13. You have now dyed the fabric using natural plant materials.

Extensions

Social Studies:

- Research the importance of natural dyes in different cultures.

Visual Arts:

- Create a color wheel using the plant dyes and by varying the length of time pieces of fabric are allowed to sit in the pigment bath.

The Alabama Outdoor Classroom Program is a partnership between:



Alabama Cooperative
Extension System



Alabama Wildlife Federation

www.alabamawildlife.org/classrooms/



Alabama Department of
Conservation & Natural Resources