

Early Childhood and Lower Elementary: Dyeing with Red Cabbage

Connections to Standards:

Science K.3S.1, 2; 1.3S.1, 2; 2.3S.2, 3

English Language Arts K.SL.1; 1.SL.1; 2.SL.1

Make a simple and beautiful dye using red cabbages, a blender, some water, and a large pot. Follow the instructions from Cornell Garden-Based Learning's Dig Art! curriculum. Have students bring in an article of white cotton cloth (t-shirt, socks, handkerchief, tote bag, etc.). Make predictions about what color the dye will turn out based on the color of the cabbage. This activity is adaptable to a range of scientific inquiry experiences. How does the number of cabbages used affect the color of the dye? How does the color change the longer a cotton item is immersed in the dye bath? Once the cloth is out of the dye bath, how does the amount of time you let it sit prior to rinsing affect the color?

Dig Art! Natural Fibers and Dyes: Clothes Dyeing
blogs.cornell.edu/garden/get-activities/signature-projects/dig-art/activities/

Upper Elementary: More Dyeing with Red Cabbage

Connections to Standards:

Science 3.3S.1, 2; 4.3S.1, 2; 5.3S.1; 6.3S.1

English Language Arts 3.SL.1; 4.SL.1; 5.SL.1;
6.SL.1

Continue working with the same activity described for Early Childhood and Lower Elementary from Cornell Garden-Based Learning's Dig Art! Curriculum. Opportunities to go farther include making a color chart to compare the outcomes of various inquiries

into the dye process based on selected variables, adding the element of heat, and adding a mordant. Some questions to explore: How did the heat and mordant affect 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?

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Middle School: Cabbage Juice Indicator

Connections to Standards:
Science 6.3S.1; 7.3S.1, 2; 8.3S.1, 2

Use a red cabbage to test whether certain liquids are acid or base. Red cabbage contains a pigment molecule called flavin (an anthocyanin). It's a water-soluble pigment also found in apple skin, plums, and grapes. Very acidic solutions will turn anthocyanin a red color. Neutral solutions result in a purplish color. Basic solutions appear in greenish-yellow. Because of this, it is possible to determine the pH of a solution based on the color it turns the anthocyanin pigments in red cabbage juice.

Bubbles in the Cabbage Juice, Oklahoma Agriculture in the Classroom
oklahoma4h.okstate.edu/aitc/lessons/upper/cabbage.pdf

Cabbage Juice Indicator, PBS Zoom
pbskids.org/zoom/activities/sci/cabbagejuiceindicator.html

Resources/literacy connection:
Green Power: Leaf and Flower Vegetables by Meredith Sayles Hughes

High School: Eat Your Phytochemical Colors

Connections to Standards:
Health Education HE.HS.HS.01, 07; HE.HS.HS.HE.01
English Language Arts 9-10.SL.4; 11-12.RI.7; 11-12.SL.4

As a cruciferous vegetable, cabbage is particularly high in phytochemicals. Many health and nutrition experts recommend eating different colors as a way of getting necessary nutrients from a variety of fruits, vegetables, beans, and grains. Specific colors or fruits and vegetables provide different nutrients and phytochemicals attributed to their color. Students can engage in a variety of research projects related to phytochemicals. Research nutrients in different

cruciferous vegetables. How do the nutrients differ based on what color the produce is? What effect does cooking have on phytochemicals in cruciferous vegetables? What is the best way to consume cabbage to get the most phytochemicals? What colors are associated with which health benefits? Take student research further by pairing high school and elementary classes to learn about the importance of eating your colors. Create cafeteria displays to share learning and promote cabbage at the salad bar.

Adapted from Network for a Healthy California's Harvest of the Month
www.harvestofthemonth.cdph.ca.gov/download/Winter/Cabbages/Cabbage%20-%20Educator's%20Newsletter_Final.pdf

Resources/literacy connection:
Green Power: Leaf and Flower Vegetables by Meredith Sayles Hughes

