

Vegetable Dyes Are Hard to "Beet"

Before they were able to purchase glass beads from the white man, many Native Americans dyed porcupine quills. They used these quills to embroider colorful designs on their clothing, moccasins, and storage cases. The dyes they used were all made from natural sources such as plants, vegetables, and certain substances which occurred in the soil.

You, too, can make many different colors of dye from vegetable sources. Follow the directions below.

Materials:

- newspaper
- paper towels
- plain white paper
- white 100% cotton fabric
- white cotton-blend fabric
- $\frac{3}{4}$ cup (190 mL) warm water
- raw carrot, beet, and red cabbage
- measuring cup
- metric ruler
- food grater
- three small plates
- scissors
- 3 zipper-seal sandwich bags
- 6 plastic cups
- laundry detergent

Directions:

1. Wear protective clothing to prevent staining your good clothing and cover your work area with newspaper. Ask an adult to grate $\frac{1}{8}$ cup (30 mL) each of the carrot, beet, and red cabbage onto separate plates.
2. Place each vegetable into a separate plastic bag with $\frac{1}{4}$ cup (65 mL) warm water. Seal tightly. Gently knead or roll the sealed bags with your hands for 2–3 minutes until the water is colored.
3. Open the corner of a bag and pour the colored water into a cup. Repeat this process with the other bags.
4. Cut paper and the two kinds of fabric into three strips about $1\frac{1}{4}$ inch (3 cm) by 6 inches (15 cm). Mark the cotton strips with a notch to distinguish them from the cotton blend strips.
5. Place one strip of each material into each of the cups of dye and soak overnight. On the next day, remove each strip from the dye and place them on clean paper towels to dry. Which dye worked best?
6. Now fill three clean cups with warm water and separately swirl the strips in the water for one or two minutes. Which of the dyes stays longest? Did any of them fade or run?
7. Add laundry detergent to the water and slowly agitate the strips in it. Do you still have color on the materials? Use the chart below to record your data.

DYE	Color stays.	Color fades in water.	Color fades in detergent.
Carrot			
Beet			
Cabbage			