Flowers. Alive With Possibilities.®

Experiment #3 - How does food dye show how flowers take up water?

You can take a peek inside the flower petal and see how water moves up the stem by developing an experiment to color or dye white or light-colored flowers.

Water flows up the flower stem through special tube-like vessels (almost resembling a straw) called xylem. There are some good illustrations of xylem on-line. You can follow water being taken up to the petals, if you could see the water. You can "see" the water travel when you add food coloring to the vase solution. Paint won't work as a dye for flowers. It will be toxic to the flowers or clog the stem. Food color works well because it is safe for the flowers.

Experiment #3 Outline

What you need to buy or find:

Identical glass or plastic containers for vases, one for each color
Identical flowers (ideally 3 stems per vase)
8-16 packets of floral preservative (buy or ask for them when you buy your flowers)
Food dye (0.25 oz container for each different colors)
1 gallon milk jug, empty and washed and rinsed thoroughly
Small bowl filled with warm water for re-cutting stems under water

Several things to consider before you begin:

Hypothesis: A good hypothesis is based on many things that are known and one thing that you suspect or hypothesize will happen (an unknown). Hypotheses should be stated as if nothing were going to happen (called a null hypothesis) where there is no change or everything is the same. Your hypothesis might be that red food coloring added to water will travel at the same rate (no difference) as blue food coloring (blue is your comparison or control treatment). My hypothesis is that red food color will turn a white carnation color at the same rate as blue food color.

Getting Started

Select white or light colored flowers. I like to use standard carnations or even miniature carnations for this experiment. You could use white or light colored chrysanthemums.

Select identical vases to hold the different colored solutions. The vases should be clear glass or plastic.

Before you add any color, mix a gallon of floral preservative solution. This will help the flowers last longer by providing them with a food source and a biocide to reduce the growth of stem-clogging bacteria and fungi. Mix a floral preservative solution by obtaining a number of packets (8-16) of floral food from the place you purchase flowers. Be sure to follow the directions for the amount of water to add to the packets. Also, be sure to use warm water. Mix the packets and the measured amount warm water in your clean milk jug. Stir to mix well.

Next, pour 8 oz. (1 cup) of the solution into each clean vase. Into each vase, empty one whole container (about 0.25 oz.) of food coloring of your color choice. Stir to mix.

Have a small bowl filled with warm water sitting alongside the vases or glasses. Be sure that you re-cut a small amount of the stem off while holding the end under water. This will also help to restart the flow of water up the stem. Simply use sharp shears or scissors and snip off the bottom _ inch of the stem while holding about 2-3 inches of the end of the stem under water in the bowl. Then, transfer the flower to the prepared glass or vase.

You will need to keep all the flowers in the same room to keep them under relatively the same temperature and light conditions. In a 70F room, you should see some color change within a day or two. You will probably need to add floral preservative solution in a day or so, as the level will go down in each vase. Add the same measured amount (about _ cup) to each vase so you dilute the color equally in each vase.

Make observations daily and record them on your observation sheet.