

## Test for Acids or Bases Using...Flowers!

Many plants in nature work like litmus paper, changing color in the presence of acids or bases. Called acid-base indicators, these plants are usually mildly acidic or alkaline themselves, and they change color when mixed with a substance that has an opposite pH.

Conduct a simple science experiment using an acid (vinegar) and a base (baking soda) to see if flowers from your garden pass the acid-base indicator test. It's chemistry, but it looks like magic!

### What You Need:

- 3 or more different kinds of red, pink, orange, blue, or purple flowers (you can buy these or gather them outside on a nice day, but make sure you have permission to take them!)
- White vinegar
- 3 or more spoons (you'll need one spoon per kind of flower)
- 5 or more clear plastic cups
- Baking soda
- Water
- Permanent marker
- Safety goggles (optional: this activity is safe, but many chemistry teachers recommend getting into the habit of wearing protective goggles any time you're working with chemicals)



### What You Do:

1. Have your child label one plastic cup with the word "acid" and another with the word "base". Pour about half a cup of white vinegar into the "acid" cup. Mix about half a cup of water with a few teaspoons of baking soda in the "base" cup.
2. Ask your child to choose one kind of flower and crush its petals into a pulp using her fingers or a spoon. Have her divide the crushed petals into the other three plastic cups and add a drop or two of water in each one.
3. Using a spoon, help your child add a few drops of acid to one cup and a few drops of base to another.
4. Compare the contents of these two cups with the contents of the third, which contains just the flower pulp. If the flower is an acid-base indicator, you'll see an immediate reaction in at least one of the cups. Red flowers turn bluish or greenish in a base, and become more vividly red in an acid. Blue flowers, on the other hand, turn red or pink in acids, and more intensely blue in bases.
5. Repeat steps 2-4 with the other kinds of flowers you gathered. Wash the plastic cups thoroughly or use new cups when you change from one kind of flower to the next.
6. Kids love watching science at work, and your child may want to explore on her own by adding more acid or base into the cups. Encourage her to do this—through trial and error, she might discover that the reaction is reversible. After she adds baking soda to red flower pulp and sees it turn blue, she can add vinegar and watch it turn red again!

If you have three or four different kinds of flowers, you're likely to have at least one that will create a reaction. Common flowers that contain acid-base indicators include geraniums, hydrangeas, morning glories, poppies, tulips, violets, petunias, pansies, roses, and hibiscus flowers, among many others. But if you don't get a reaction from the flowers you used, look in your refrigerator: blueberries, red cabbage, and hibiscus tea all work in a pinch.

