

Classroom Chemistry – Basic Chemistry & Acids Too

Can you determine acidity based on colour?

Materials:

- Red cabbage
- Coffee filters
- Vinegar (CH_3COOH)
- Soda Water (H_2CO_3)
- Antacids (contain CaCO_3 , $\text{Ca}(\text{OH})_2$, $\text{Mg}(\text{OH})_2$)
- Knife
- Large glass jar
- Baking soda (NaHCO_3)
- Cream of tartar ($\text{KHC}_4\text{H}_4\text{O}_6$)
- Household ammonia (NH_3)
- Boiling water
- 7 small glass jars (250 mL)
- Lemon juice ($\text{C}_6\text{H}_8\text{O}_7$)



Procedure: (Remember to have your parent's permission and they have time to watch and help you.)

- Chop the cabbage into small pieces until you have about 2 cups of chopped cabbage. Place the cabbage in the large glass jar and add boiling water to cover the cabbage. Allow at least ten minutes for the color to leach out of the cabbage.
- Filter out the plant material using a coffee filter to obtain a red-purple-bluish colored liquid (the indicator). This liquid is at about pH 7. (The exact color you get depends on the pH of the water.)
- Pour about 50 - 100 mL of your indicator into each small jar.
- Add various household chemicals listed above to your indicator until it changes colour. Use separate containers for each household solution.
- Note the chemicals used in this experiment may be safely washed down the drain.

What's happening?

Red cabbage contains the anthocyanin pigment molecule flavin (also found in apple skin, plums, poppies, cornflowers, and grapes). Very acidic solutions turn anthocyanin a red. Neutral solutions are purplish. Basic solutions appear greenish-yellow.

Red Cabbage pH Indicator Colors:

pH	2	4	6	8	10	12
Color	Red	Purple	Violet	Blue	Blue-Green	Greenish Yellow

The color of the juice changes in response to changes in its hydrogen ion concentration measured in pH. Acids will donate hydrogen ions solution and have a low pH (under 7). Bases accept hydrogen ions and have a high pH (greater than 7).

Extension:

You can make your own pH paper strips using red cabbage indicator. Soak a coffee filter in the red cabbage juice solution. Remove and allow it to dry, cut the filter into strips and use them to test the pH of various solutions.

This activity is based on our "Classroom Chemistry" kit that is currently under development. Our teaching kits (described on our website) are loaned out FREE to provide classroom teachers and parents of home schooled children an opportunity to explore Science in interesting ways. Please consider volunteering as a classroom speaker or allow your business as a field trip location.



Future Event: Praxis sets up the Science Kits used in the [Summer Camps for Kids](http://www.praxismh.ca/MHCsummercamp.html) hosted by Medicine Hat College.

The Annual General Meeting of the Praxis Society will be held at 7:00 pm on June 20, 2012 room B301 at Medicine Hat College. Members of Praxis as well as the general public who may be interested in joining Praxis are invited to attend but please RSVP.

Lorne Cooper, Regional Executive Director

PRAXIS, "Making Science Fun". Contact Praxis at praxis@praxismh.ca, www.praxismh.ca, Tweet or follow us @PraxisMedHat, or friend us on Facebook. Address: c/o 200 7th Street S.W., Medicine Hat, AB, T1A 4K1 Phone: 403-527-5365, Fax: 403-527-6570.