1. Promote NCW (teachers will be given NCW ACS 2015 booklets and Date/Flier info)
2. Promote You Be the Chemist Challenge ([www.chemed.org](http://www.chemed.org)) program
	1. Quizzes on each chapter for Extra Credit
	2. Preliminary exam in Jan./Feb.
	3. Challenge at KSUA in March
3. Periodic Table Activity in classroom

**Intro Activity: WHY? Does disappearing ink fade when put onto cloth/paper?**

Supplies: Disappearing Ink, scrap cloth/scrap paper, cotton balls, small bottles of Windex

Add several drops of Disappearing Ink to scrap cloth/scrap paper (also need cotton balls, small bottles of Windex)

Explain WHAT? Is happening…Explain WHY?

Breathe on the ink spot…how does that affect the persistence? Waft a Windex soaked cotton ball over the spot…did the spot really disappear?

*Disappearing ink is a water-based*[*acid-base indicator*](http://chemistry.about.com/od/acidsbases/a/Acid-Base-Indicators.htm)*(pH indicator) that changes from a colored to a colorless solution upon exposure to air. The most common pH indicators for the ink are thymolphthalein (blue) or phenolphthalein (red or pink). The indicators are mixed into a basic solution that becomes more acidic upon exposure to air, causing the color change. Note that in addition to disappearing ink, you could use different indicators to make color-change inks, too.*

*When the ink is sprayed onto a porous material the water in the ink reacts with carbon dioxide in the air to form carbonic acid. The carbonic acid then reacts with the sodium hydroxide in a neutralization reaction to form sodium carbonate. Neutralization of the base causes a color change of the indicator and the stain disappears:*

*Carbon dioxide in the air reacts with water to form carbonic acid:*

*CO2 + H2O → H2CO3*

*The neutralization reaction is sodium hydroxide + carbonic acid -> sodium carbonate + water:*

*2 Na(OH) + H2CO3 → Na2CO3 + 2 H2O*

***Here's what you need in order to make your own blue or red disappearing ink:***

* *0.10 g thymolphthalein for blue ink or phenolphthalein for red ink (1/3 of 1/8 tsp)*
* *10 ml (2 tsp) ethyl alcohol (ethanol) [can substitute 14 ml or 3 tsp of ethyl rubbing alcohol]*
* *90 ml water*
* *20 drops of 3M sodium hydroxide solution or 10 drops 6M sodium hydroxide solution [make a 3 M sodium hydroxide solution by dissolving 12 g of sodium hydroxide NaOH (1 level tablespoon of lye) in 100 ml (1/2 cup) of water.]*

***Here's how to make your own disappearing ink:***

1. *Dissolve the thymolphthalein (or phenolphthalein) in the ethyl alcohol.*
2. *Stir in 90 ml of water (will produce a milky solution).*
3. *Add sodium hydroxide solution dropwise until the solution turns a dark blue or red (might take slightly more or less than the number of drops stated in the* [*Materials*](http://chemistry.about.com/od/demonstrationsexperiments/ss/disappearink_3.htm) *section).*
4. *Test the ink by applying it to fabric (cotton tee-shirt material or a table cloth works well). Paper allows less interaction with air, so the color change reaction takes more time.*
5. *In a few seconds, the 'stain' will disappear. The pH of the ink solution is 10-11, but after exposure to air will drop to 5-6. The damp spot will eventually dry. A white residue may be visible on dark fabrics. The residue will rinse out in the wash.*
6. *If you brush over the spot with a cotton ball that has been dampened in ammonia the color will return. Similarly, the color will vanish more quickly if you apply a cotton ball dampened with vinegar or if you blow on the spot to improve air circulation.*
7. *Leftover ink may be stored in a sealed container. All of the materials may be safely poured down the drain.*

***Disappearing Ink Safety***

* *Never spray disappearing ink into a person's face. Particularly avoid getting the solution in the eyes.*
* *Preparing/handling the sodium hydroxide (lye) solution requires adult supervision, as the base is caustic. In case of skin contact, immediately rinse well with water*

(<http://chemistry.about.com/od/demonstrationsexperiments/ss/disappearink.htm>)

**Table Activity #1 Learning about indicators**

Bromothymol blue and Red Cabbage Extract contain Indicators. Indicators are chemicals that change color based on the pH (how much acid) is in solution.

Supplies: pH strips, Neutral Litmus paper, Bromothymol blue and Red Cabbage Extract, Well-plates, safety goggles, splints, paper towels, piece of white paper

* 1. Put on Safety goggles.
	2. Take 1 wooden splint and break into 4 equal sized pieces. Tear 3 pieces of litmus paper in half and 3 pieces of the yellow-orange pH paper in half.
	3. Place plastic well-plate on piece of white paper.
	4. Quickly put 10 drops of Bromothymol blue solution into well-plate reservoir marked 1.
	5. Immediately record the color of the solution. Measure the pH with a pH strip after it has been dipped into the solution, and write down the color of Neutral litmus paper after it has been dipped into the solution. Place all used testing strips on the same piece of white paper that the well-plate is on.

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Color pH strip # Neutral litmus paper color

* 1. Using a clean piece of splint, add several crystals of Citric Acid to the solution in Reservoir 1. You may gently stir the solution. Record color change and test immediately with pH strip and litmus paper.

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Color pH strip # Neutral litmus paper color

* 1. Using a clean piece of splint, add several crystals of Sodium bicarbonate to the solution in Reservoir 1. You may gently stir the solution. Record color change and test immediately with pH strip and litmus paper.

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Color pH strip # Neutral litmus paper color

* 1. Quickly put 10 drops of Red Cabbage Extract solution into well-plate Reservoir 3.
	2. Record the color of the solution and test immediately with pH strip and litmus paper.

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* 1. Using a clean piece of splint, add several crystals of Sodium bicarbonate to the solution in Reservoir 3. You may gently stir the solution. Record color and test immediately with pH strip and litmus paper.

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Color pH strip # Neutral litmus paper color

* 1. Rinse well-plate into Waste bottle provided. Throw used paper, used splints and test strips into the trash can.
	2. Wash hands with baby wipes.

**Table Activity #2 Color changing Markers-Making Periodic Table tiles on Notecards**

Supplies: Notecards, color changing markers, 1 M NaOH (Sodium hydroxide), Q-tips

* 1. Locate the element key at the top of the Periodic table.
	2. Draw a replica of your favorite element on the BLANK side of a notecard (put your name on the side with the lines.) using color changing markers.
	3. Use the white marker to make lines on your drawing to change the color.
	4. And/or, dip a Q-tip into the 1 M NaOH solution and see how it affects

Why is the color change happening? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Table Activity #3 UV light Effects on Matter**

Supplies: UV lamps, secret messages on notecards, Nail polish on notecards, glow-in-the dark samples, flowers, bananas, tonic water, fluorescent marker samples, uv active bubbles, cardboard boxes spray painted black

**A Fluorescence-** is the emission of light by a substance that has absorbed light or other [electromagnetic radiation](http://en.wikipedia.org/wiki/Electromagnetic_radiation)…It is a form of [luminescence](http://en.wikipedia.org/wiki/Luminescence). In most cases, the emitted light has a longer wavelength, and therefore lower energy, than the absorbed radiation…The most striking examples of fluorescence occur when the absorbed radiation is in the [ultraviolet](http://en.wikipedia.org/wiki/Ultraviolet) region of the [spectrum](http://en.wikipedia.org/wiki/Spectrum), and thus invisible to the human eye, and the emitted light is in the visible region.

Fluorescence has many practical applications, including [mineralogy](http://en.wikipedia.org/wiki/Mineralogy), [gemology](http://en.wikipedia.org/wiki/Gemology), chemical sensors ([fluorescence spectroscopy](http://en.wikipedia.org/wiki/Fluorescence_spectroscopy)), [fluorescent labelling](http://en.wikipedia.org/wiki/Fluorescent_labelling), [dyes](http://en.wikipedia.org/wiki/Dye), biological detectors, and, most commonly, [fluorescent lamps](http://en.wikipedia.org/wiki/Fluorescent_lamp). (source: <http://en.wikipedia.org/wiki/Fluorescence>)

**B Phosphorescence** is a specific type of [photoluminescence](http://en.wikipedia.org/wiki/Photoluminescence) related to [fluorescence](http://en.wikipedia.org/wiki/Fluorescence). Unlike fluorescence, a phosphorescent material does not immediately re-emit the radiation it absorbs. The slower time scales of the re-emission are associated with "[forbidden](http://en.wikipedia.org/wiki/Forbidden_mechanism)" [energy state](http://en.wikipedia.org/wiki/Energy_level) transitions in [quantum mechanics](http://en.wikipedia.org/wiki/Quantum_mechanics). As these transitions occur very slowly in certain materials, absorbed radiation may be re-emitted at a lower intensity for up to several hours after the original excitation.

Commonly seen examples of phosphorescent materials are the glow-in-the-dark toys, paint, and clock dials that glow for some time after being charged with a bright light such as in any normal reading or room light. Typically the glowing then slowly fades out within minutes (or up to a few hours) in a dark room. (source: <http://en.wikipedia.org/wiki/Phosphorescence>)

Test various items provided with flashlight and/or UV lamp. Record the results.

Item tested Device used and observations Fluorescent or Phosphorescent?

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**NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. NCW Oct. 17th 10-1 at the Environmental Learning Center, Lake County
2. You Be the Chemist Challenge ([www.chemed.org](http://www.chemed.org)) program
	1. Quizzes on each chapter for Extra Credit
	2. Preliminary exam in Jan./Feb.
	3. Challenge at KSUA in March
3. Periodic Table Activity in classroom
4. Color each group of the Periodic Table a particular color (lightly with crayons or colored pencils as to not cover up the information).
5. Carefully cut out the groups and glue to the Periodic Table.
6. Learn the names of the various groups of the Periodic Table.

**Intro Activity: WHY? Does disappearing ink fade when put onto cloth/paper?**

Add several drops of Disappearing Ink to scrap cloth/scrap paper

Explain WHAT? is happening! \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explain WHY? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Breathe on the ink spot…how does that affect the persistence? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Table Activity #1 Learning about indicators**

Bromothymol blue and Red Cabbage Extract contain Indicators. Indicators are chemicals that change color based on the pH (how much acid) is in solution.

Supplies: pH strips, Neutral Litmus paper, Bromothymol blue and Red Cabbage Extract, Well-plates, safety goggles, citric acid, sodium bicarbonate, wooden splints, white paper.

* 1. Take 1 wooden splint and break into 4 equal sized pieces. Tear 3 pieces of litmus paper in half and 3 pieces of the yellow-orange pH paper in half.
	2. Place plastic well-plate on piece of white paper.
	3. Quickly put 10 drops of Bromothymol blue solution into well-plate reservoir marked 1.
	4. Immediately record the color of the solution. Measure the pH with a pH strip after it has been dipped into the solution, and write down the color of Neutral litmus paper after it has been dipped into the solution. Place all used testing strips on the same piece of white paper that the well-plate is on.

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Color pH strip # Neutral litmus paper color

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Color pH strip # Neutral litmus paper color

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Color pH strip # Neutral litmus paper color

* 1. Quickly put 10 drops of Red Cabbage Extract solution into well-plate Reservoir 3.
	2. Record the color of the solution and test immediately with pH strip and litmus paper.

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Notecards, color changing markers

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Why is the color change happening? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Supplies: UV lamps, secret messages on notecards, Nail polish on notecards, glow-in-the dark samples, flowers, bananas, tonic water, fluorescent marker samples, uv active bubbles, cardboard boxes spray painted black

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Item tested Device used and observations Fluorescent or Phosphorescent?

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