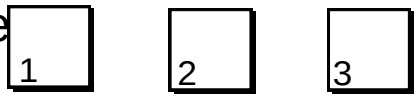
Magic Inks

Procedure:

1. Always wear safety goggles.

2. Take out three sheets of paper and use a pencil to label them 1, 2 and 3.



3.
   - Use Magic Ink #1 to paint your initials on paper 1.
   - Use Magic Ink #2 to paint your initials on paper 2.
   - Use a Magic Pen to write your initials on paper 3.
   - Let the papers dry.

     After they dry, can you see your initials on any of the papers?

4.
   - Paint Developer #1 over your initials on paper 1.
   - Paint Developer #2 over your initials on paper 2.
   - Use a Developer Pen to write over your initials on paper 3.

     What happened to each of the magic inks?

5. When paper 1 is dry, paint Vanishing Solution on it.
   (Note: the vanishing solution only works on Magic Ink #1)

   What happens to the magic ink?

6. Put the paper in the "Used Paper" tub, then wash your hands in the sink.

What makes the magic writing become visible?

A Closer Look:

Each of the magic inks is invisible on dry paper. When a chemical in the developer solution reacts with the ink, the magic ink changes color and becomes visible. Each ink and developer uses a different chemical reaction.

Magic Ink #1 is a solution of sodium hydroxide (NaOH), a base. Developer #1 is a solution of phenolphthalein, which is colorless in acid but turns bright pink in a base. The phenolphthalein should turn your initials pink. The hydrochloric acid (HCl) in the Vanishing Solution turns the phenolphthalein and your initials colorless again.

Magic Ink #2 is a colorless solution of potassium thiocyanate (KSCN). Developer #2 is a pale yellow solution of iron chloride ($FeCl_3$). When these two chemicals react, the red iron thiocyanate ion ($Fe(SCN)_2^{2+}$) is one of the products.

The chemical composition of the inks in the Magic Pens is a trade secret, but it is probably similar to Magic Ink #1.