# Practice Tips:
# Crime Busters

**PAPER CHROMATOGRAPHY:** **Practice with your teacher or at home with a parent.**

Chromatography is a way to separate materials from a mixture. The ink in a black pen is a good example of a mixture that can be separated this way. Although they look like one color to our eyes, most black inks are comprised of pigments of many different colors like purple and blue! By making a chromatogram, you can see the differences between different brands of black ink pens by separating their various pigments.

The Crime Busters event includes paper chromatography as one part of the competition. This is a useful part to practice in advance!

Materials: Your team will receive the following at our DeKalb Olympiad:

- 1 piece of filter paper (already cut into a rectangular shape)
- 1 set of pens (same color, different brands)
- 1 plastic beaker
- 1 pencil or Popsicle stick
- 1 small plastic cup

Set-Up:

1. Along the bottom edge of your filter paper, use each different pen to draw a small square about a quarter of an inch ***above*** the bottom edge. Leave a small gap between each square to keep your ink samples separate.

   Keep in mind that you only receive ***one piece*** of filter paper, so you still need to fit each pen's sample square on that same piece – don't spread them too far apart!. Did you label your squares somehow? You need to know which pen made each square later.

2. Fold the upper end of your rectangular filter paper over a pencil or Popsicle stick so that the stick extends across the top of your cup and holds the filter paper in place. The bottom edge of the paper should be ***about 1 cm above*** the bottom of the cup.

3. Place the filter paper in the empty cup and estimate how much water should go in. (The water should touch the bottom edge but not your sample squares.)
4. Remove the filter and add the appropriate amount of water.

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M. Dowling 03-07-2019
O. Poole 03-27-2014

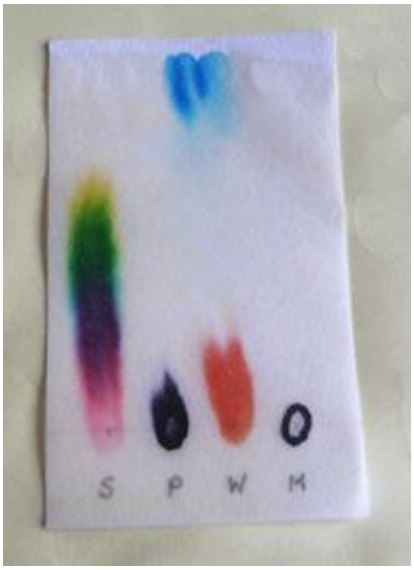
Questions? Please contact Fernbank Science Center:
Michael Dowling / 678-874-7158 / Michael_Dowling@DekalbSchoolsGA.org

Testing:

1. Slowly lower the filter paper into the water and let the pencil or stick rest on the top edge of the cup. The solvent should start moving up the paper and the pigments of the ink will also move.
2. Look carefully at the pigments produced. Sometimes there are faint hints of yellow or pink that cannot be seen from far away.
3. Also consider the distance the pigments traveled up the filter paper. Chemicals that dissolve best will move farther up the paper.

Making Observations:

1. The photo to the right shows how a typical chromatogram turns out. (The top fold that kept it on the stick is folded under, so you cannot see it here.)
2. Note that not all ink is water soluble, so some samples may not move at all. (See **M** in the photograph.)
3. Colors may look slightly different before and after the filter paper dries.




**USEFUL WORDS TO KNOW:** **Here is some representative vocabulary.**

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| Solvent | Diffuse | Pigment | Chromatography | Filter |
| Soluble | Dissolve | Ink | Chromatogram | Separate |