

Ink Chromatography:

Chromatography is a method for separating liquids mixed in solution based on their relative solubilities. This is used often to separate various ink pigments specifically in pens, markers, etc. All you need is a porous paper and various solvents to try to separate the pigments used to make the ink in the writing utensil.

Procedure:

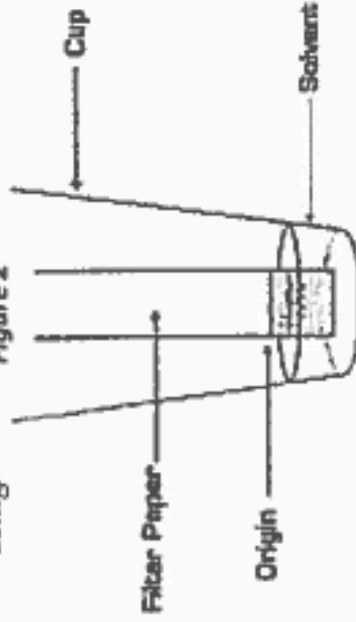
1. Obtain a piece of the partial ransom note from the center table. Cut the piece of the note into three sections, each containing a sample of the ink. Label the back of each piece "Sample D" IN PENCIL
2. Obtain chromatography paper, a Dixie® cup, the evidence pens, dH₂O, 30 mL of isopropyl alcohol, a pencil, a pencil, and a ruler.
3. Cut your chromatography paper into strips just long enough to go 1" over the top over your Dixie® cup. On each piece of your filter paper, draw a line in pencil 2cm from the bottom of the paper; this is your point of origin (see figure 1).

4. Use your pencil to label the back of each piece of filter paper with the letter of the sample pen ink & solvent you will be testing on that paper. Also indicate which solvent you will be testing. For Example: Sample A/water or Sample B/alcohol. Note: all samples will be tested in BOTH solvents!

5. Label your chromatography chambers (Dixie® cups) with the solvent used inside (ie: water or alcohol)

6. Pour a small amount of solvent in the appropriate chamber. You need only enough solvent to cover the bottom of the containers you are using
7. Wet a small area of the ransom note (Sample D) with the first solvent and use the stirring rod to blot the ink on the origin of the filter paper. Place the end of the strip in the solvent chamber. Make sure the line of origin is above the solvent. You can either use a paper clip or tape to hold the paper in place. (See figure 2). You should be able to fit all samples in each chamber at once.

Figure 2



8. Watch as the solvent travels up the paper. The solvent front or wetness, will travel up the paper. Remove the paper from the chamber before the solvent front runs off the top edge (2-3cm from top). Place the chromatogram (chromatography paper with separated ink) on a paper towel to dry.

9. Record your observations on the student data sheet. *To calculate Rf values - Divide the*

distance each band traveled by the distance the solvent front traveled(see figure 3). Record on your data sheet for each color band/ marker/solvent.

10. Pour all left over solvents down the sink and throw away chambers. Staple chromatograms to your data sheet (once they are DRY)

Figure 1

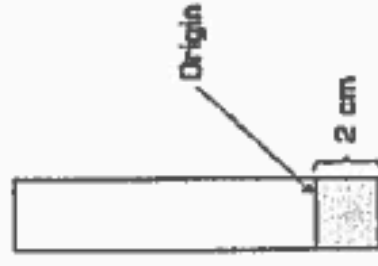
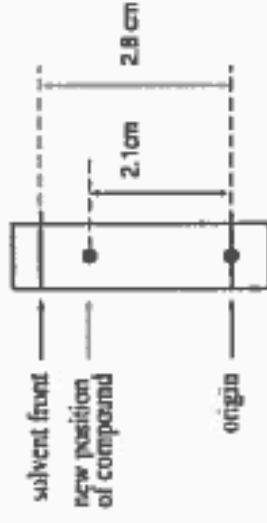


Figure 3

$$R_f = \frac{\text{distance traveled by the compound}}{\text{distance traveled by the solvent front}}$$



$$R_f = \frac{2.1}{2.8} = 0.75$$