

Paper Chromatography Extra Credit

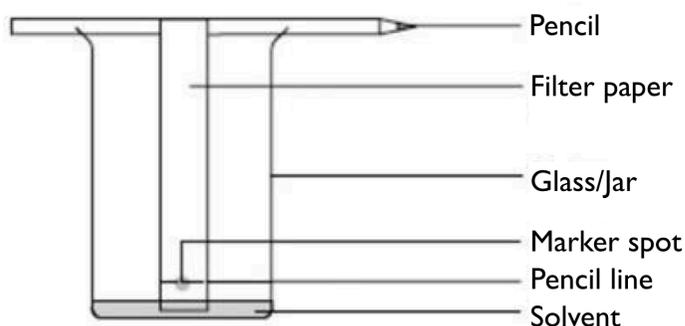
Name:

Class:

Details (be sure to read this): You may work with a partner or own your own. If you choose to work with a partner, you will need to hang 2 strips in each solvent so that each partner has a set of chromatogram strips to analyze. Each partner will then do their own data collection, calculations, and conclusions.

Materials:

- White basket coffee filters - these come in large quantities - consider sharing!
- Clear glass cup or jar - shallow enough that filter papers can reach the bottom
- Pencil
- 3 paperclips or tape
- Non-permanent black marker
 - Not dry erase (white board)
- Scissors
- Solvents (enough to create a 1/2 inch pool in the cup or jar):
 - water
 - isopropyl alcohol (~90% rubbing alcohol)
 - acetone (nail polish remover)



Procedure:

1. Gather 3 coffee filters. From each filter paper cut a 1/2 inch wide strip as long as possible. The strips should be long enough to touch the bottom of the glass/jar.
2. Flatten the coffee filter strips as much as possible.
3. Using a pencil, draw a line 1/2 inch from one end of each of the filter strips.
4. Using your black marker, put a small dot in the middle of the line that you drew on each filter strip (see image). Allow the dot to dry. Place another dot in the EXACT SAME SPOT. Allow the dot to dry again.
5. Fill the glass/jar with 1/2 inch of your first solvent.
6. Suspend a filter paper in the solvent, ensuring that the solvent-level is below the line and the dot on the filter paper (see image).
7. Place the pencil across the glass/jar. Attach the filter paper to the pencil using a paperclip or tape so that the filter paper remains in place in the solvent.
8. Allow the solvent to move up the filter paper until it climbs ~80% of the paper.
9. Remove the filter paper from the solvent and IMMEDIATELY USE A PENCIL to draw the solvent front (a line indicating the highest point that the solvent reached).
10. Dispose of your solution
 - water = pour it down the drain
 - isopropyl alcohol = pour it down the drain
 - acetone = allow it to evaporate
11. While allowing the strip to dry, repeat steps 5-10 for each of the solvents.
12. On each paper, mark the center of each colored region with a pencil. This creates a chromatogram for that solvent.

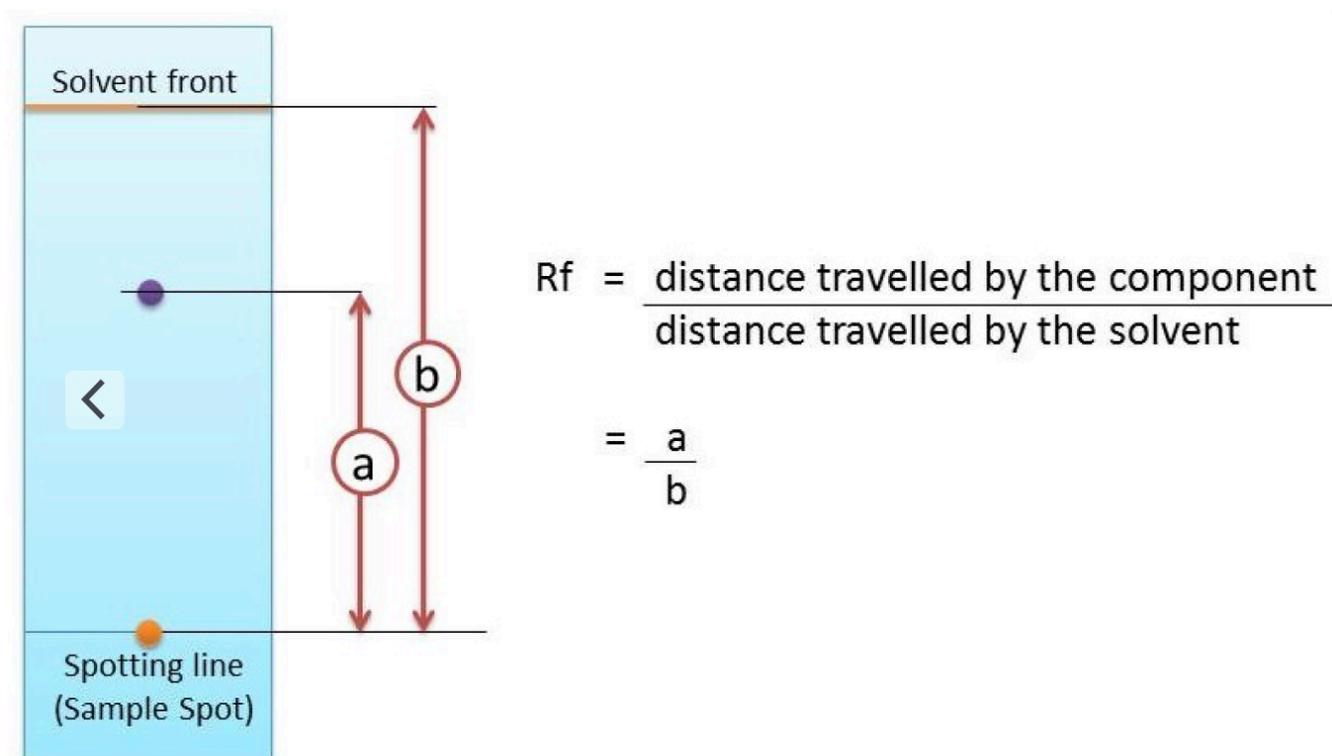
On the following pages, you will collect your data and complete your calculations.

Data:

- Tape your chromatogram for the specified solvent on the data sheet.
- Record data for each colored region on the chromatogram.

Calculations:

- For each chromatogram, calculate the Rf value for each colored region.
- See below:



Calculating the Retention Factor Value

continue on to the next page

SOLVENT = WATER

Tape chromatogram here:



Data:

	Color	Distance (with units)
Solvent front	xxxxxxxxxxxx	
Spot A		
Spot B		
Spot C		
Spot D		
Spot E		

Calculations:

Rf values for each dot (be organized and neat)

SOLVENT = ISOPROPYL ALCOHOL

Tape chromatogram here:



Data:

	Color	Distance (with units)
Solvent front	xxxxxxxxxxxx	
Spot A		
Spot B		
Spot C		
Spot D		
Spot E		

Calculations:

Rf values for each dot (be organized and neat)

SOLVENT = ACETONE

Tape chromatogram here:



Data:

	Color	Distance (with units)
Solvent front	xxxxxxxxxxxx	
Spot A		
Spot B		
Spot C		
Spot D		
Spot E		

Calculations:

Rf values for each dot (be organized and neat)

Conclusions

Your responses to the questions will be typed and stapled to your completed lab report. If you worked in a group, you will write your response individually. To answer these questions you will need to carry out additional research building on your understand of molecular polarity and IMFs.

1. In paper chromatography, what is a mobile phase? What in this lab filled that role?
2. In paper chromatography, what is a stationary phase? What in this lab filled that role?
3. Why does the the solvent move up the filter paper?
4. How does the solvent's movement up the filter paper create separation of the ink? In your answer to this question, discuss the relative polarities and IMFs between the ink, the solvent, and the paper.
5. What color of ink had the highest R_f value? What does that tell you about the molecules in that particular dye color?