MINILAB **20 pts** **Name** _____
Paper Chromatography **Lab Partner** _____
Date _____ **Period** _____

Paper Chromatography to Separate Dyes

Introduction: Though we may not be aware of it, most substances are actually mixtures of several compounds or elements. In this experiment, you will use a technique called paper chromatography to separate the mixture of dyes present in marker ink. This technique uses solubility differences to separate the dyes. All the dyes dissolve in the solvent (the liquid which does the dissolving), but some dyes are more soluble than others. This allows for a separation as the solvent moves up the paper.

Purpose: To separate the dyes present in different marker ink colors by using paper chromatography.

Procedure:

1) Get two 10-cm filter paper strips. Draw a line across each strip about 1.5 cm from the end with pencil.
2) Obtain 4 markers: one black marker A, one black marker C"#" (record the number of the marker C used), one green marker and one brown marker. Put two dots on each strip (evenly spaced along the pencil mark). Label the marker letter below the dots (in pencil!).
3) Add enough water to two 100 ml beakers so that the bottoms are just barely covered (~5 mL each).
4) Carefully hang both strips from a ring, one per beaker, so that they reach the water. The pencil line should be towards bottom, but the marker dots should not touch the water. (If a marker dot does go into the liquid, you will have to restart. Either remove some liquid or draw your dots higher up.)
5) Watch and wait as your dyes separate. When the water line (the *solvent front*) almost reaches the end of the filter paper, you may remove your filter paper (This could take as long as 15 minutes). Your dyes should be cleanly separated.
6) Using pencil, draw a line across the top marking where your solvent front reached.
7) Draw each strip—**carefully specifying colors and showing relative distances traveled (not length of streak)**. Attach the original strips or a color image of the strips to the upper left of this page.

Observations: Draw what your strips look like below. [10 pts]

Strip 1:

Strip 2:

Post Lab Questions:

1) The black color from **marker A** split into different colored dyes. Rank these colored dyes according to the distances they traveled from the start (not their length!), shortest to longest distance. [2 pts]

shortest ●——————————————● longest

2) In order for the dyes to travel up the paper, they must be soluble in the water (the solvent). Rank each colored dye from **marker A,** from least soluble to most soluble. [2 pts]

least soluble ●——————————————● most soluble

3) Why was it necessary to use pencil (not pen!) when marking the filter paper? [1 pt]

PART II: Pain Reliever Activity (No lab work necessary).

There are many different brands of pain relievers out on the market today. Often a brand will contain more than one active ingredient. In the chart below, the composition of some common pain relievers are listed. (Challenge question: Do you know the brand names that correspond to the listed ingredients?)

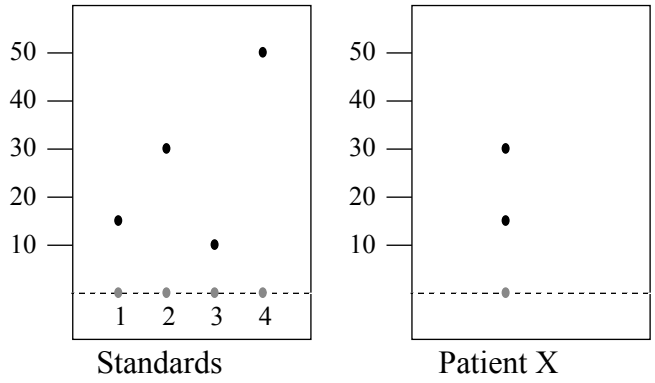
Brand	Active Ingredient(s)	Composition per Tablet
Brand A	Aspirin	325.0 mg
Brand B	Aspirin	453.6 mg
	Caffeine	22.7 mg
Brand C	Acetaminophen	325.0 mg
Brand D	Aspirin	324.0 mg
	Salicylamide	30.0 mg
	Caffeine	65.0 mg

Frequently, a chemist is called up to identify unknown drugs in a patient's blood. In this activity, you will be given the necessary data needed to determine what brand of pain reliever was taken by "Patient X."

Here's the story:
Patient X was brought into the emergency ward of a hospital. The patient had been in an excited state in the ambulance and lapsed into a coma shortly before arriving at the hospital. The ambulance driver tells you that Patient X had taken a pain reliever in order to relieve a headache three hours before lapsing into the coma.

You are the chemist who must determine which pain reliever, if any, is present in the patient's blood sample. Look at the following chromatographs. Each ingredient is a pure substance that has a unique "marker" or distance that it travels on the chromatography paper. The first chromatograph below shows the standards (where the chemical is known) so you can tell how far each chemical in the key will travel. The second shows the substance(s) in Patient X's blood sample. Study the chromatographs, think about your answers to the questions on the front of the lab, and answer the questions below.

Key
1) Aspirin
2) Caffeine
3) Acetaminophen
4) Salicylamide



1) [1 pt] Which active ingredient was least soluble in the solvent? _____
2) [1 pt] Which active ingredient was the most soluble in the solvent? _____
3) [1 pt] Which active ingredient(s) was/were found in Patient X's blood? _____

_____

4) [2 pts] Which brand of drug did patient X take? (A, B, C or D) _____
Explain your choice (CER!):