Name: _____Class: ____ Date: _____

Marker Chromatography

Learner Outcomes:

- Distinguish amongst pure substances, mixtures and solutions, using common examples
- Investigate and identify factors that affect solubility and the rate of dissolving a solute in a solvent (e.g., identify the effect of particle size).

Key Terms:

Solution	Homogeneous mixture	Chromatography
Pure substance	Solubility	Solvent

Background Information: For some fluids, a paper chromatography test can be used to determine if they are pure substances or solutions. A piece of filter paper is placed partly in a solution. If the fluid is a pure substance it will move up the strip of paper to one level. If the fluid is a solution, it will move up the paper to different levels.

Research Question: Is the black ink in a marker a pure substance or a solution?

Hypothesis:

Materials:

Chromatography paper	Permanent black marker	Water
Water soluble markers	250 mL beaker	Paper towels

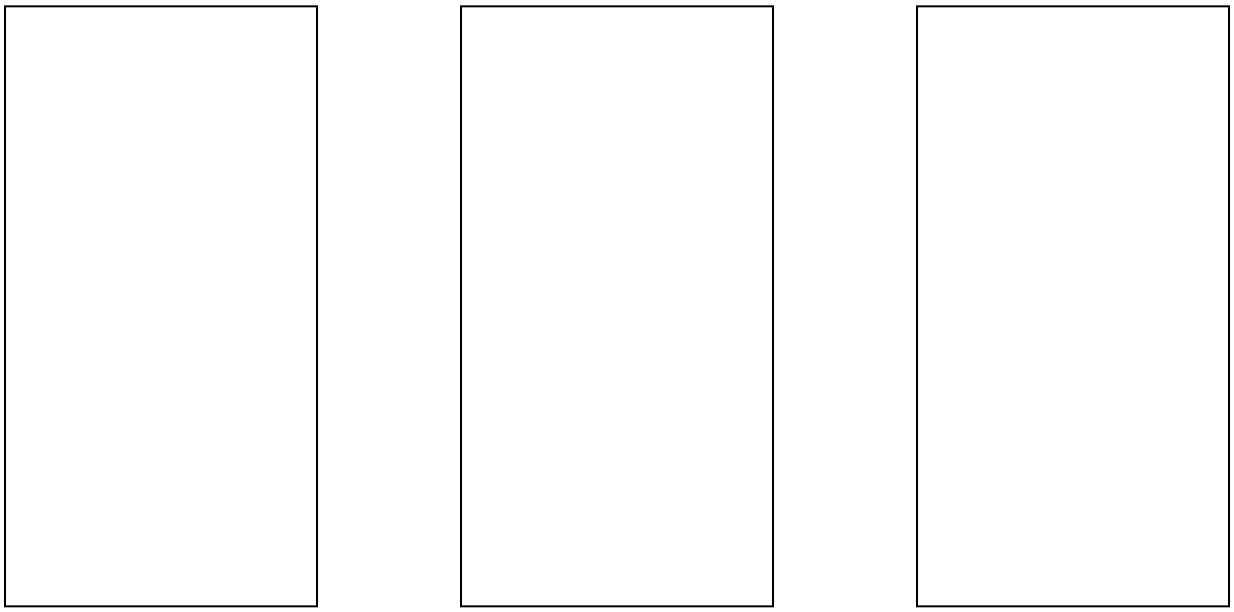
Procedure:

1. Collect 3 pieces of chromatography paper and **using a pencil**, draw a horizontal line 1 cm from the pointed end.
2. Along the pencil line, draw a line with the permanant marker on one piece, a line with one colored non-permanent marker on another piece and a line with another colored non-permanent marker on the last piece.
3. Attach the chromatography paper to a pencil so that it can hang in your beaker.
4. Pour water into the beaker to a depth of 0.5 cm - **you do not want the ink to touch the water**
5. Hang your chromatograms so that their points are just touching the water and allow the water to move up as it soaks into the paper.

6. When the water is almost at the top of the papers, take them out, place them on a paper towel and allow to dry.
7. Attach the dried chromatograms to your lab sheet.

Observations:

Permanent marker _____ _____



Analysis:

1. Is the ink in the markers considered a solid or a liquid? How do you know?

2. What happened to the ink as the water moved up the chromatography paper? Why?

3. Would you consider ink to be a pure substance or a mixture? Explain your answer

4. Which of your ink samples was made of the greatest number of differently sized molecules? Explain how you can determine this?

5. Explain how paper chromatography determines whether you have a pure substance or a mixture?

6. What happened to the non-permanent marker? Why?

Conclusion: Explain your answer the research question in a short paragraph.

Extension:

1. What other household substances could you test using paper chromatography?

2. Research at least 2 other solvents you could use in this experiment, and when it would be appropriate to use them. What are the advantages and disadvantages to using solvents other than water?

3. Investigate how chromatography might be used in a forensic analysis.