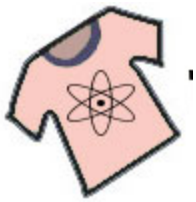
**LAB: T-Shirt Chromatography**

**Students: Please read the following information given below, and then come to class on your lab day with the following already prepared in your notebooks:**



1) Date, 2) Partner, 3) Title, 4) Purpose, 5) Materials, 6) Safety,
7) Diagram, 8) Procedures/Observations, and
9) Data Table (collect data in your notebooks)

**The last page needs to be printed out. This page will be turned in. Data for this lab should be collected in your notebooks and later, rewritten in the Data and Calculations section. The data, calculations, and questions will be due one week after performing the lab in class (your next lab class).**

## YOU WILL ALSO BE REQUIRED TO WEAR YOUR T-SHIRT IN CLASS WHEN WE CELEBRATE MOLE DAY.

**For this lab, it is very important to keep the room well ventilated. The windows and doors must stay open and the exhaust fan must remain on. Please do not wear your most expensive clothes, as the marker may bleed on to your clothes and/or skin. Aprons and goggles are definitely required!**

Chromatography is a procedure during which a mixture of substances is allowed to dissolve in a **suitable solvent** (what makes a solvent suitable?) which carries it through a porous material such as filter paper, paper towel, or a cotton fabric. Each substance is carried at a specific rate, which allows each one to be separated into rings or bands. When a mark is made on the fabric of a T-shirt with an **indelible** (what does indelible mean?) marker, and a solvent is slowly added drop-by-drop to that point with a pipette, it spreads out in all directions creating concentric bands of various colors.

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Obtain a new white T-shirt. Wash and dry it to remove the sizing. You may also use an older article of clothing, washed many times. Be sure it is at least part cotton. **WRITE YOUR NAME ON THE INSIDE TAG OF THE T-SHIRT.** Use a container such as a baking pan, pie plate, or tray to place inside the T-shirt. Stretch the T-shirt over the container so that the fabric is taut . Stretch a rubber band around the extra fabric to keep the T-shirt taut**.** If you do not have a rubber band, you may twist the shirt until it is taut and hold it with one hand while you decorate it with the other. **Make sure the side of the shirt you are going to decorate does not touch any other part of the shirt. The marker dye can bleed through the fabric!**

Use the "permanent" markers to make a pattern of spots somewhere on the stretched fabric. You may also draw on the T-shirt using lines instead of dots—but there must be some area where you have used dots. Refer to the "dotted" area on your T-shirt. Use a pipet to draw up some tap water. Place the tip of the pipet in the direct center of one of the dots. Gradually squeeze the pipet bulb to deliver a few drops of water onto the fabric. As the water soaks in, observe any changes and enter your observations in your lab notebook. Then repeat the same procedure, this time using some isopropyl alcohol solvent instead of water. Record your observations in your lab notebook. Try dropping the alcohol on different areas of your pattern and record your observations in your lab notebook. When the stretched area has been sufficiently decorated, allow 1-2 minutes for partial drying. Then remove the rubber band, and if desired, decorate another area of the shirt. Try a variety of patterns, shapes, and sizes.

****Be especially careful not to allow the front and the back of the T-shirt to touch, as the dye could bleed through the fabric!** Hang the T-shirt up to dry**.
**The room must stay well ventilated!**

**Make sure these procedures are written somewhere in your data table. Observations should be made and recorded for each of these procedures.**

## Water dripped on center of colored dot

## Alcohol dripped on center of colored dot

## Alcohol dripped on one side of colored dot

## Alcohol dripped on the colored line

CP CHEMISTRY MR. CANOVA

Name_____ Date_____

Period_____ Lab Group #_____

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**Questions:** Answer in complete sentences and properly cite references used. Be sure to attach a data table of your observations made on your t-shirt.

1) Which part of your design came out the best? Why?

2) Draw the structural diagrams for water and isopropyl alcohol. Label the bond polarities on each molecule and indicate if the molecule is polar or non-polar..

3) Based on your observations, do you think the molecules in the permanent markers are dipoles or non- dipoles? Explain.

4) Are "permanent" markers really permanent? Explain.

5) Crayola has a line of markers that are referred to as "washable." Predict the polarity of the solvent(s) used in these markers and explain your reasoning.

6) Explain how this lab activity relates to the statement "Like dissolves like."