

Station #2: Titian Red, Cerulean Blue, Chinese Purple

Every period of artists produced their own distinctive techniques and style, but also their own materials, especially paints. In this exercise you will perform a simple test called chromatography to identify the kind of pen used on a ransom note.

This is how chromatography works. The pen ink dissolves in the solvent, and is carried up the paper strip by capillary action (the same force that causes paper towels to absorb water). At a specific height on the strip the components of the ink stop moving up and form a color pattern distinctive to that ink.

Aim: Students will

- Build a vocabulary list
- Be able to carry out the steps of chromatography
- Use skills of observation and analysis
- Describe chromatography.

Materials:

5 black pens of different brands

Alcohol

Water

Beakers

Paper towels

Scissors

Scotch tape

Pencil

Ink sample cut from the ransom note

Protocols:

- 1.) Form your lab groups.

- 2.) Each group will run two tests, one where the inks are dissolved in water, the second in alcohol.
- 3.) Assign the following roles:
 - Materials collector
 - Paper towel cutter
 - Ink spot maker
 - Apparatus assembler
 - Recorder.
- 4.) Cut 10 strips of paper towel that can be taped to a pencil and hung inside the beaker with about 1 and $\frac{1}{2}$ inches above the bottom. The strip should be about 1 inch wide.
- 5.) Label the strips twice, 1 through 5. Make a table listing the number and the brand name of pen next to it.
- 6.) For each brand of pen, make a dot on the strip with the corresponding number. The dot should be about 1 inch from the end of the strip.
- 7.) Cut enough of an ink sample from the ransom note to make a strip similar to the brand name pen strips.
- 8.) Make a mark on the beaker to the level where the bottom of the paper towel strip is located. Remove the pencil with the strip and add water to the marked level. Replace the strip so that the TIP OF THE PAPER ONLY is in the water, NOT THE DOT. If you wet the dot, you have ruined the test.
- 9.) Let the water be absorbed, run up the paper through the dot, and stop.
- 10.) Repeat for all pens and the ransom note.

- 11.) Observe the results. Which brand pen makes a color pattern that is the same as the ransom note?
- 12.) Record your results.
- 13.) If you had the suspect's pen , how would the pattern of that pen match the ransom note results?
- 14.) Repeat the whole experiment, using alcohol as the solvent.

Lipstick, automotive paint and yes, those beautiful paints used in Renaissance masterpieces are analyzed in a similar way.