



# Color Writing Analyzing Fuel to Keep Jets Flying High



Dayton, OH (Wright-Patterson Air Force Base)—  
Scientists can use chromatography (“color-writing”) to analyze unknown solutions and determine their components. A scientist describes how separating the dye colors in felt-tip markers is analogous with separating hydrocarbon compounds in jet fuels. The lab is able to make more efficient jet fuels through research using chromatography.

*“Dye makers use chromatography to separate the different dye pigments in colors.”*

**Milissa Lawson, research chemist**

## Framework

Middle School

## Standards

- NSES - B.i.1 ➤ A substance has characteristic properties.
- STL - 3.E ➤ Developments may be applied from one setting to another.
- STL - 9.H ➤ Testing and evaluating are used.
- STL - 10.H ➤ Problems are solved through experimentation.

## Content Illustrated

- A chromatography test of water-soluble markers using a coffee filter is demonstrated.



## Content



### Physical Science

- Chromatography is used to separate and identify the components of a solution.
- The dye used in water-soluble markers are compositions of several pigments that separate out when put in solution with water.

### Technology

- Gas chromatographs analyze a solution in the gas phase flowing through a column. For example, jet fuels are first converted into the gas phase for chromatography analysis. Different components of the fuel release into the column at differing times depending on their attraction to the column walls.

### Math

- Using the x,y-axis, a simple graph can represent the compounds going through the chromatography column for analysis.

## Guiding Questions

*To think about as you watch:*

- How can you separate the different ingredients of a mixture?

## Suggested Activities

- Have students research pigmentation in leaves and fruits.

## Keywords

chromatography  
chromatograph  
component  
compound  
dye  
gas phase  
inert gas  
pigment  
solution

- *Color Writing* can be found online at [www.ndep.us/Color-Writing](http://www.ndep.us/Color-Writing). Visit [www.ndep.us/LabTV](http://www.ndep.us/LabTV) for a list of process skills modeled in webisodes.