Bleeding Mixtures

A Lesson on Chromatography

Forensic Science School Year 2021-2022

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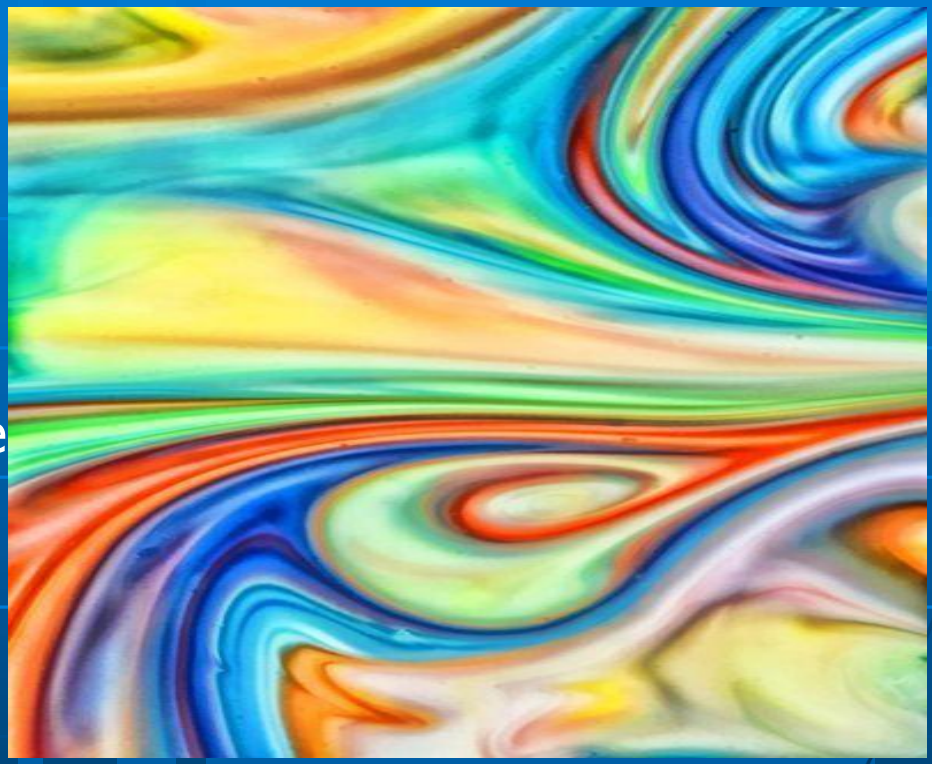
Introduction

- At crime scenes, investigators often find unknown materials that need to be identified.
- If the unknown material is a mixture, an investigator may want to know one of two things about it:
  - 1. What are the ingredients of the mixture?
  - 2. Is the mixture found at the scene the same as a known mixture?

What Is A Mixture?

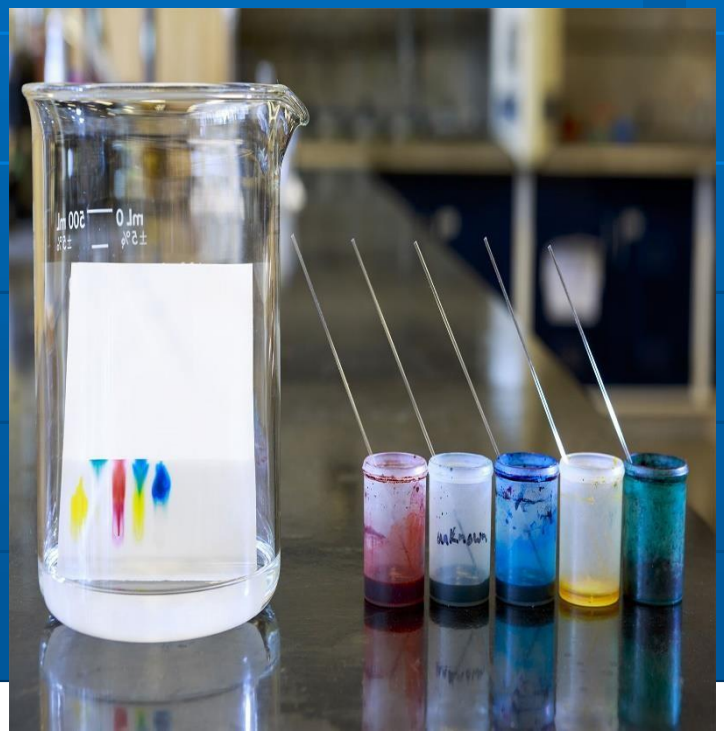
- ✓ A collection of two or more



close together.

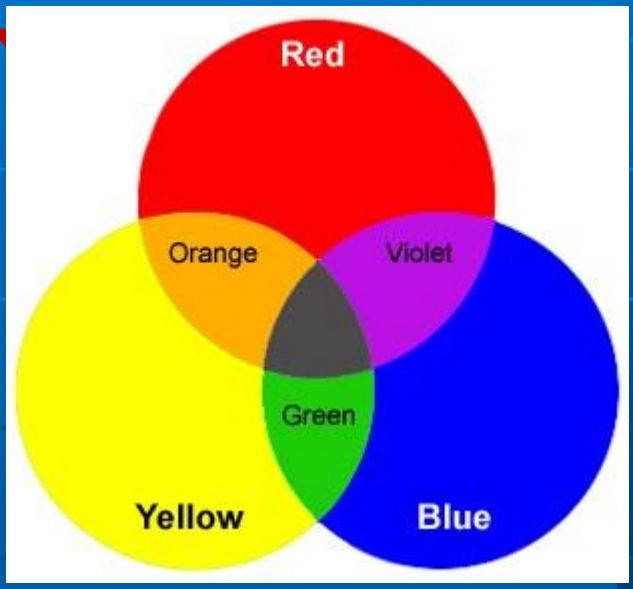
- For Example
- Soda or Pop (Potatoes or Tomatoes) is a mixture of sugar, artificial colors, caffeine, and flavors.
- Other mixtures include:
  - Drugs
  - Cosmetics
  - Fuels
  - Dyes

Chromatography



- ✓ Chromatography is an ancient method of separating parts of a mixture.
- ✓ The word Chromatography really means, "Color Writing".
- ✓ The inks in modern pens are made of a mixture of dyes.
- ✓ These inks show a variety of colors when a solvent, such as water passes through them.

Colors in Chror



- ✓ Different types of water-soluble ink pens vary in their composition.
- ✓ Two different brands of pens will give two dissimilar chromatograms.
- ✓ Therefore, if ink samples are taken from separate locations on a document that was written with one pen, all samples should produce the same chromatograph.

Connection To

Forensics

- By using chromatograph, **Forensic Scientists** can determine whether a document contains two or more different inks.
- One drawback of using ink chromatography in Forensic Science is that it destroys the evidence.
- The document under investigation must have areas cut from it so the ink can be analyzed.

In Summary

- ✓ If an entire document has been written with the same ink pen, then test applied to different portions of the document should produce the same results.
- ✓ If the chromatogram produced are the same, the **Forensic Scientist** can assume the inks are the same.
  - ✓ Diverse solvents can be used in **ink chromatography**. For inks that are water soluble, water is the solvent of choice.
  - ✓ For inks that are not soluble in water, methanol, ammonium hydroxide, ethanol, acetone or hydrochloric acid can all be used as solvents.

Thanks

Questions or Comments?