Who Wrote It? Paper Chromatography

Sections

Joey Scouts | Cub Scouts | **Scouts** | **Venturer Scouts** | Rover Scouts

Scouts VICTORIA

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Challenge Areas

COMMUNITY | **CREATIVE** | OUTDOOR | PERSONAL GROWTH

Scout Method Elements

COMMUNITY INVOLVEMENT | **LEARNING BY DOING** | NATURE AND THE OUTDOORS | PROMISE AND LAW | PERSONAL PROGRESSION | **PATROL SYSTEM**

SYMBOLIC FRAMEWORK | **YOUTH LEADING, ADULTS SUPPORTING**

SPICES Growth Areas

CHARACTER | EMOTIONAL | **INTELLECTUAL** | PHYSICAL | SOCIAL | SPIRITUAL

The Adventure

Learn about chromatography and the science of pens to determine who wrote the suspect note

Plan

1. Investigate pen ink. What is it made out of and how do they make the ink the desired colour?
2. Investigate chromatography, what it is and how it works. There are a lot of explanation of chromatography on the internet, but you may like to start here: https://www.explainthatstuff.com/chromatography.html
3. Investigate how chromatography can be used to aid in criminal investigations.
4. Read the safety information and discuss with your leaders or another appropriate adult what safety equipment, precautions, and supervision may be required. Ensure that you have these safety measures in place before starting the 'Do' section.
5. Gather all the equipment that you need to make your fingerprint analysis experience. You will need the following equipment and ingredients: multiple pens of different models, paper - ideally absorbent paper such as paper towel or a napkin, scissors, jars, and methylated spirits.

Do

1. Get a leader or another patrol, which you can then swap with, to assemble a collection of reference notes written with pens of different makes and models, ideally in the same colour ink. Black ink is often more complex in colour combinations so will likely create separations with increased difference. You can have as many reference notes and pens in your set as you want but it should be at least two. There should also be a reference note written with the same pen as the suspect note. Make sure that there is about 1.5 cm of space below the writing on the paper and plenty of room about the writing.
2. Cut out a section of each note for testing. Make sure you know which testing sample came from which reference or suspect sample.
3. Pour about 1 cm of methylated spirits into the bottom of a clear glass or jar.
4. Gently place a testing sample into the jar. Make sure that the bottom of the paper is in the methylated spirits but it is not covering or touching the ink.
5. Wait and watch the methylated spirits travel up the paper. The pen ink should spread out into different colours. Depending on the paper, the methylated spirits may take some time to travel. It may be beneficial to cover the top of the glass or jar with a plate or plastic wrap to trap fumes. Make sure that the methylated spirits does not travel past the top of the paper.
6. Repeat with all the reference samples and the suspect sample.
7. Compare the chromatographic patterns and determine which pen the suspect sample was likely written with.

Review

1. Were you able to correctly match the suspect pen with the corresponding reference pen? Why or why not?
2. If there were multiple reference samples that reacted similarly to the suspect sample, how do you think you could further analyse the note to determine the ink source or author?
3. What did you enjoy most about this activity? What did you learn?
4. Do you think changing the liquid or paper may affect the results?
5. What would you do differently if you did this activity again?

Safety

- Sharps warning: This activity uses scissors. Take care when using and ensure adult supervision for younger youth members.
- Whilst methylated spirits can be purchased from supermarkets and hardware stores, they are poisonous and flammable. Take care when handling, ensure adult supervision and avoid ignition sources. Do not drink. If consumed, seek medical attention. An SDS for methylated spirits can be found here: https://s3-ap-southeast-2.amazonaws.com/wc-prod-pim/Asset_Documents/Diggers%20Methylated%20Spirits%202%20SDS.pdf

Variations

- This challenge card can pair well with other forensic science-based challenge cards such as other challenge cards such as the 'Figuring Out Fingerprints' series and soil pH testing, to create a forensics program or a 'Whodunit' night.
- This challenge card can also pair well with other challenge cards on chemical properties.
- You can expand on this challenge card by experimenting with different liquids such as water or acetone (nail polish remover). Think about the additional safety precautions you will need to take when using these chemicals.
- Depending on the section and challenge area used, this challenge card can also be paired with a police station visit or some other law enforcement related community involvement.