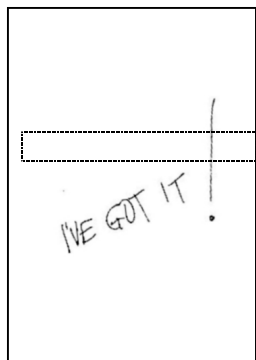


Clue 3 Ink Samples



Introduction

Ink chromatography is a technique that can be used to identify or compare inks. The result of the test is like a 'fingerprint' for the ink. Comparing these fingerprints can identify the type of pen that made the mark under investigation. Forensic scientists can identify a pen from a tiny amount of ink – the dot on an 'i' is plenty! This technique has been used to catch thousands of criminals attempting to commit forgery and fraud.



Section of crime scene note sent to lab

The trick is to allow a solvent to be drawn up through the ink by capillary action. You may have seen this happen when water travels up, against gravity, into a paper towel. As a solvent passes through the ink, some of it dissolves. Different sized molecules in the ink travel through the tiny spaces in the paper at different speeds, so they spread out. After a few minutes, you will have a 'fingerprint' of the ink.

You have been sent a section of the crime scene note containing part of the exclamation mark.

You have also received a sample of ink from each suspect's pen. The pens were seized at the time of questioning and used to make a similar mark on white paper. You will use surgical spirit as the solvent in this test. You will produce a 'fingerprint' for the ink found on the note at the crime scene, and for each of the suspects' pens. You can then compare your results to determine which suspect(s) might have written the note.



Safety notes

Surgical spirit is a flammable liquid. Make sure you understand the safety guidelines before you begin this test. Your laboratory safety policy may require the Laboratory Supervisor (eg. your teacher) to add the solvent to your apparatus.

Remember that you only have a small section of the note to use for your tests – mistakes can be costly! Use a small strip from the sample to ensure that you can repeat the test if necessary. The ink on the strip must not be submerged in the surgical spirit. The solvent will be drawn up into the paper by 'capillary action' and pass through the ink.



Pens seized

Suspect	Pen
S Club	Corvina
Ms Dynamite	Papermate
Blazin' Squad	Papermate
James Beattie	Bic
Zach Shaw	Bic



Equipment

Each group will need:

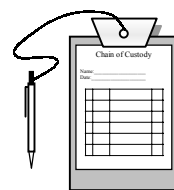
Beaker or plastic cup	10–15 ml Surgical spirit
Pencils	Eyedropper
Pair of scissors (clean!)	Paper towels to clean spills
Sticky tape	



Procedure

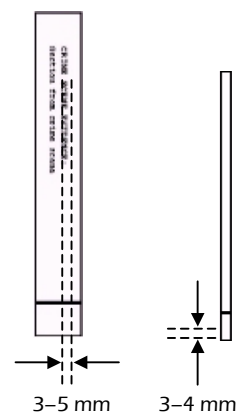
Before you begin, review your Forensic Laboratory Code of Practice and ensure that each group member is aware of his or her responsibilities (refer to the Job Descriptions Wall Chart if necessary).

- 1 Evidence Officer only:** Collect the evidence from the central store and record all details of the transaction on the Chain of Custody form.



- 2 Grease and markings could affect your results.**
 - USE CLEAN SCISSORS AND CUT CAREFULLY.
 - You can use a sharp pencil to lightly mark a cutting guide first.

Carefully cut a narrow strip of paper about 3–5 mm wide, containing a section of the black ink line from the section of the handwritten note. Trim the strip so that there is about 3–4 mm of white paper below the line.

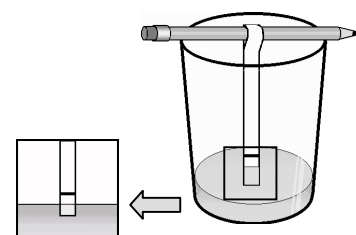


- 3 BEFORE ADDING SOLVENT:** Fold the strip over a pencil and secure with at the top with sticky tape. The strip should *almost* touch the bottom of the beaker, but not quite. Make sure it hangs in the centre of the beaker and does not touch sides.

Next, make a mark on the side of the beaker just below the height of the ink line on the strip.

Using an eyedropper, carefully add solvent to the level you marked.

DO NOT ALLOW THE INK LINE TO BE SUBMERGED IN THE SOLVENT.



The ink line **MUST** be above the solvent level! The solvent will be drawn up to the ink by capillary action

- 4** Observe carefully as the solvent rises and passes through the ink line.

Record your observations including the order in which they occur.



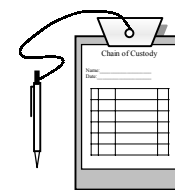
- 5** After five minutes, remove the strip from the solvent. Allow to dry for a few minutes, then store the strip in your exercise book or another secure place.

You can put a strip of clear sticky tape over the strip to preserve the result.



Preserve your results under sticky tape

- 7** Return the remaining evidence to the Evidence Store and ensure you complete the Chain of Custody form.



- 8** Return equipment, wash out beakers and clean workbenches.



Discussion and conclusions

In the group discussion, discuss the outcomes of the analysis of all the suspects' samples. Remember that you are building a case and that you should not jump to conclusions until you have examined all the evidence.

Some questions to consider:

Are the ink chromatograms significantly different for different pens?

Did your analysis implicate any of the suspects in the crime? If so, who?

Is there any other possible explanation for your results?

Clue 4 Fabric Samples



Introduction

In this investigation, you will use the most valuable tool in all detective work – careful observation. You will examine the crime scene fibre and compare it to fibres you pluck from fabric samples from the suspects' clothing.

During investigations at the crime scene, investigators discovered a white fibre near where the guitar was last seen. All the members of BUSTED were wearing black clothes for their performance on the day, so it is unlikely that it came from them. At the time of apprehension, items of clothing worn by the suspects from which the fibre could have come were seized. Investigators were careful to seize any clothing that could yield a white fibre. Items of clothing which did not contain white were not seized.

List of fabric samples seized

Suspect	Source of Fabric	Description
S Club	Jacket	Pink denim
Ms Dynamite	Jeans	Stripe denim
Blazin' Squad	Shirt	Grey stretch denim
James Beattie	Jeans	White linen / cotton blend
Zach Shaw	Jeans	Khaki denim



Equipment

Each group will need:

Tweezers (at least one pair)

Scissors

Magnifying glass

Black or dark paper

Sticky tape

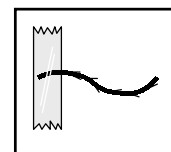


Procedure

Before you begin, review your Forensic Laboratory Code of Practice and ensure that each group member is aware of his or her responsibilities (refer to the Job Descriptions Wall Chart if necessary).

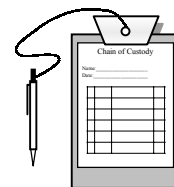
NOTE:

The first Evidence Officer (or teacher) to sign out the crime scene fibre should use sticky tape to fasten the fibre to a piece of dark paper as illustrated. Ensure the sheet is appropriately labelled to avoid loss or confusion between samples.



The crime scene fibre sample can be rotated between groups by the Evidence Officers so that everyone has the chance to compare it to fibres plucked from their suspect's sample.

- 1** Evidence Officer only: Collect the evidence from the central store and record all details of the transaction on the Chain of Custody form.



- 2** Examine the fabric sample using the magnifying glass, recording any visible characteristics, including the weave and colour.



- 3** Use the tweezers to carefully remove a single fibre from the piece of fabric – you may need to make a small incision with scissors first. Observe and note carefully how easily the fibre pulls away from the fabric.



- 4** Examine the fibre carefully and note any distinguishing features. Fasten the suspect's sample fibre to a sheet of paper and label it appropriately. Record your observations using diagrams if appropriate.

- 6** Return the evidence and equipment, and ensure the transactions are recorded on the chain of custody form.



Discussion and conclusions

In the group discussion, discuss the observations made by all the groups. Did your analysis implicate any of the suspects in the crime? If so, who and how? How unique is the crime scene fibre? Is it from a common type of material? What is the likelihood of a similar fibre from another source turning up at the crime scene?