

CSI at home

Learn about the tests, check your skills then use them to identify who stole the precious elephant from the collection

CSI at home

there are 4 stages to this activity, you can do some or all of them, it is up to you.

- Stage 1: Learn how the tests work and try some of them for yourself
- Stage 2: Test your observational skills to make sure you are ready
- Stage 3: Use your skills to investigate all of the evidence and decide who the mastermind elephant thief is.....
- Stage 4: check if you got it right.

The crime: 'Help, my elephant is missing'....

This is a phrase that haunts inspector Hugo to this day

You see, inspector Hugo was supposed to be watching the precious elephant collection of Dame Pathis when he had been sitting in the garden enjoying a book while only watching the outdoor collection of elephants.

A loud noise distracted him, and he moved to investigate, when he returned to the garden, he noticed something was not quite right. Things had moved, he took a photo so that it could be compared to photos from the security video – one that was taken before the camera stopped working.....

I am sure you have guessed it – one of the elephants from the inside collection had gone missing. It was likely the culprit escaped via the garden and that is why some of those things had moved too. Thankfully, nothing was taken from the garden.

Can you help inspector Hugo to find the culprit?

The suspects

- **Timmy** – the gardener who had been in the garden the day before and was aware of the collection
- **Tommy** – Timmy's twin brother who had helped Timmy tidy up the garden the day before
- **Tammy** – the window cleaner who had cleaned the windows for the exhibition that morning
- **Tabatha** – who was in charge of setting out the collection and a real elephant enthusiast
- **Tristan**- the florist who had brought floral displays for the grand opening of the exhibition

The evidence

Evidence was collected from the crime scene and from each of the suspects, these included:

- Garden photographs taken before and after the crime
- Photographs of the collection before and after the crime
- Handwriting samples
- Fingerprints
- Hair samples – allowing DNA analysis
- Shoeprints – to compare to the footprint found in the garden

WHAT ARE FINGERPRINTS?

- Fingerprints are little ridges on your fingers and thumb in patterns of loops and spirals
- The texture of fingerprints helps us grip and hold things which would be hard if our fingers were smooth.
- Fingerprint patterns are inherited but are never exactly identical – even the fingerprints of identical twins vary very slightly.

**The study of fingerprint identification is called
DACTYLOSCOPY**

How and when are fingerprints formed?

- Fingerprints are formed before you are born
- Fingerprints form as the layers of your skin are moved around as a baby develops
- Fingerprints don't change as you get older, the pattern stay the same
- Identical twins have different fingerprints
- The police have records of a huge number of fingerprints

Different types of fingerprints

Fingerprints can be described as having patterns of:

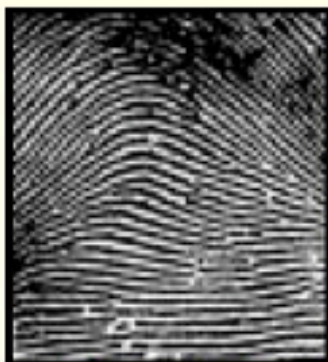
LOOPS (60% of people have these)

ARCHES (5% of people have these)

WHORLS (35% of people have these)

These are further broken down into eight basic patterns which are still used today in crime investigation by forensic scientists.

Examples of different types of fingerprints



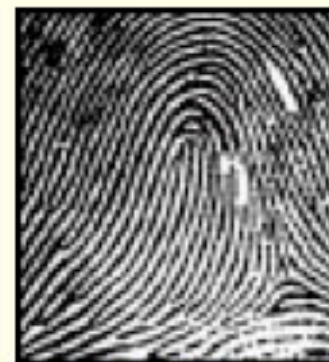
Plain Arch



Tented Arch



Ulnar Loop



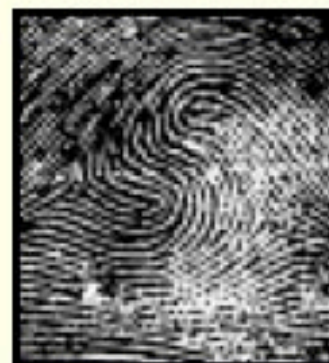
Radial Loop



Plain Whorl



Central Pocket Loop



Double Loop Whorl



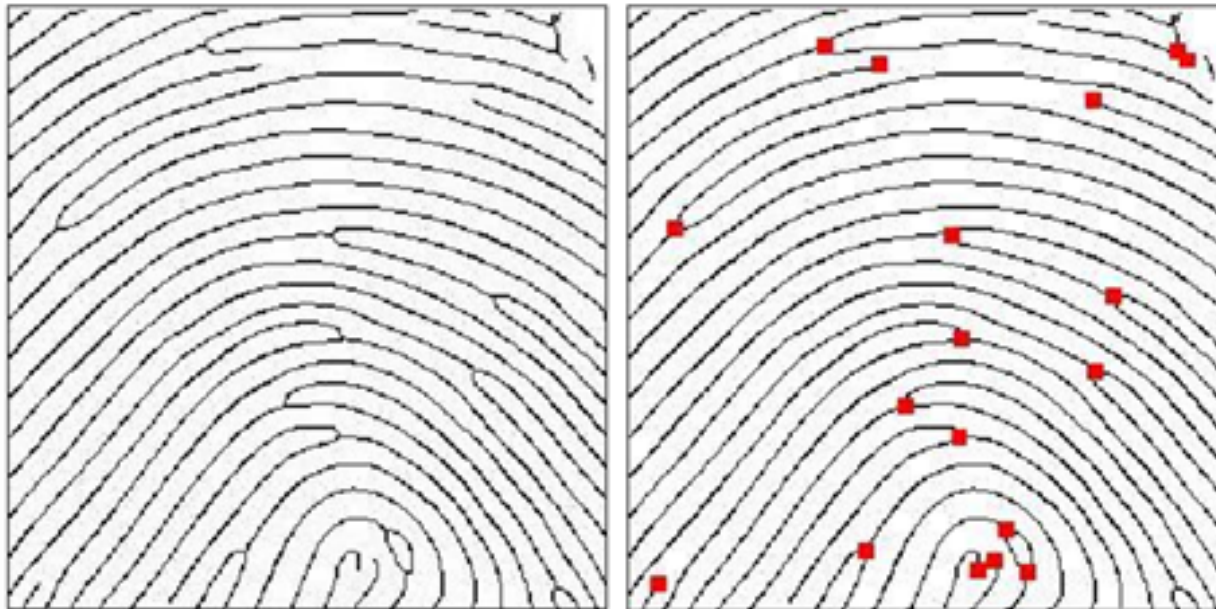
Accidental Whorl

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How to check fingerprints

Many fingerprints are quite similar and difficult to tell apart unless you are an expert, so computers are used to look at many points on each fingerprint to find a 'match'

Each red dot on the picture on the right is where the lines split and could be a place that could be used to compare 2 fingerprints





Investigate: *examine your own fingerprints*

What you will need

- A felt tip or marker pen
- A balloon
- A wipe to clean your finger

What to do

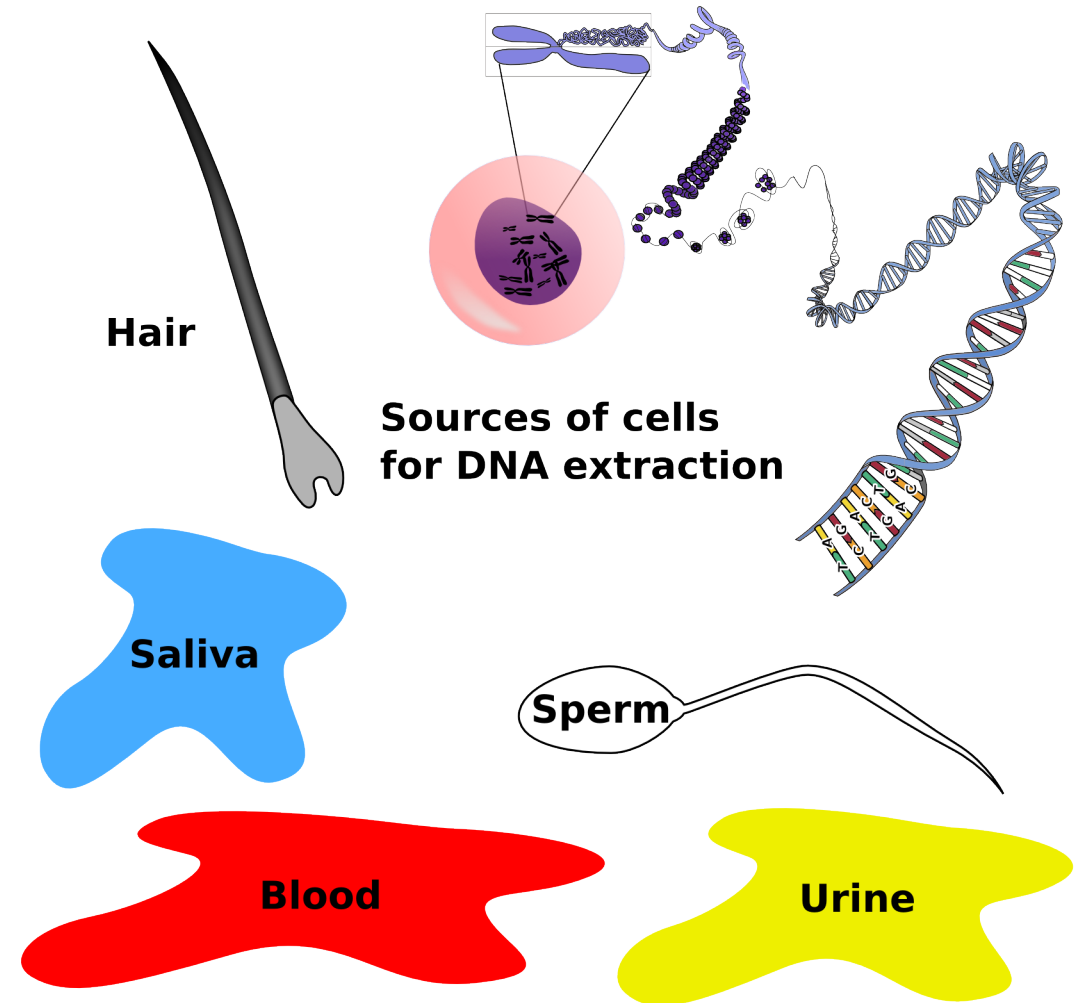
- Colour your thumb with the pen
- Roll your thumb gently once on the balloon
- Wait for the ink to dry
- Blow up the balloon and tie it so the air does not escape
- Examine your fingerprint

Where can you find DNA at a crime scene?

There are many different biological samples that can be left behind at a crime scene that may have trace levels of DNA in it.

DNA is found in the part of our cells called the nucleus

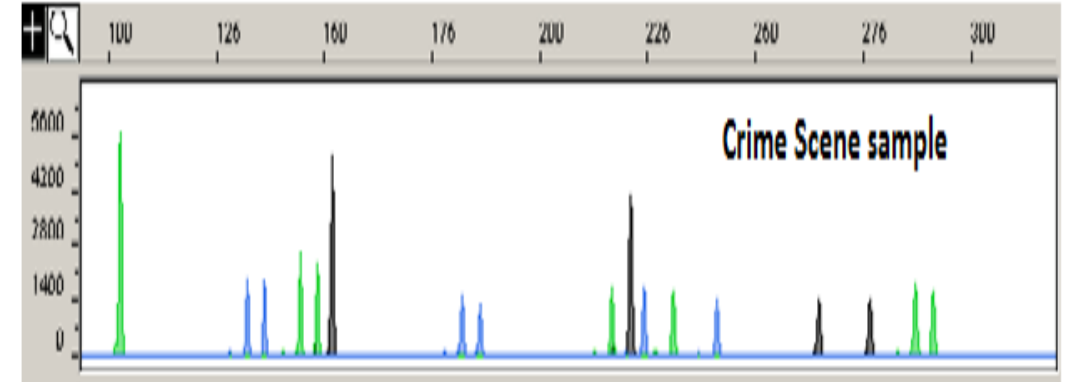
- Hair
- Blood
- Skin cells
- Under fingernails



How and why do we test DNA?

- Only a tiny amount of DNA is needed
- Scientists can make many copies of DNA in the lab
- Specific regions of DNA are looked at, regions that are known to be different between people
- 10+ regions are examined

- Image of Sequence



- You will need this information to investigate evidence from the crime scene.

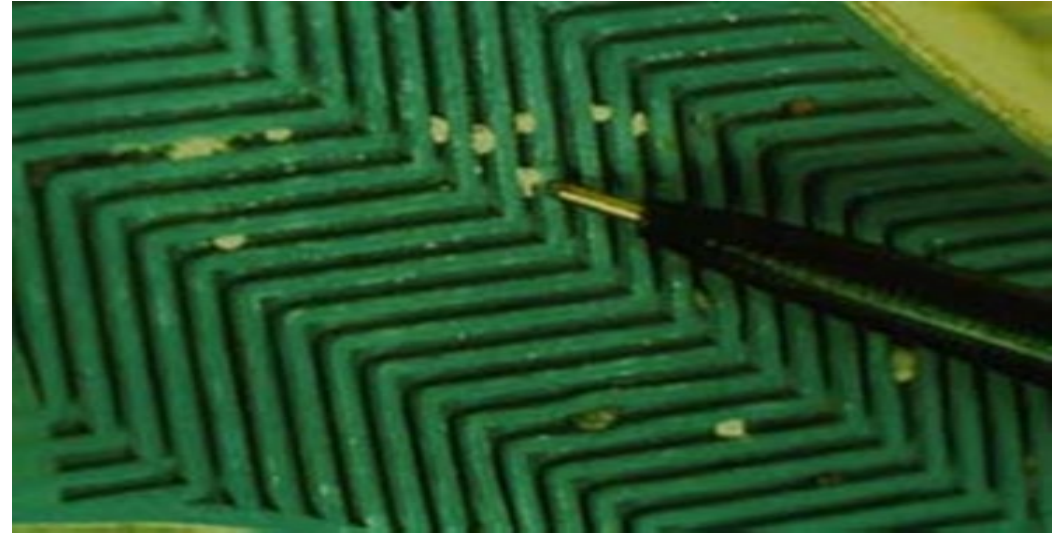
Using footprints from a crime scene

- Have a look at the bottom of your shoes – the sole.
- They may have **patterns** on them.
- Have a look at the pattern on some other shoes in your house, notice that they will probably be different and would cause a different pattern in e.g mud or sand
- The way we walk can **wear down** the sole of the shoes in different ways
- An older pair of shoes may be worn more on one side than the other – this again will cause a different pattern in mud – one that could be traced back to you.
- Lastly your weight will indicate **how deep** the footprint would be in mud or sand again identifying you from your shoes and how you walk.

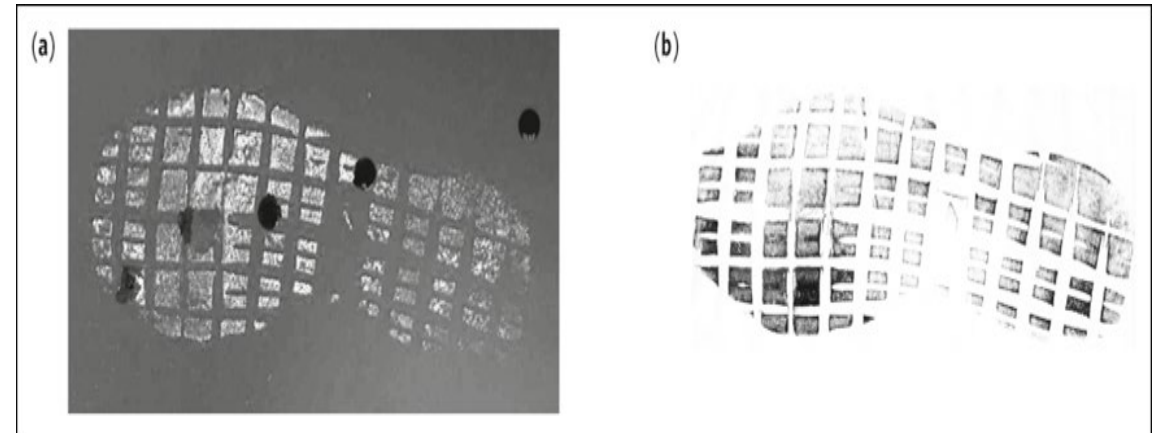
Investigate: examine the footprints from your own shoes

Footprints & Trace evidence

- Trace evidence is very small amounts of material
- It can provide a link between a suspect, victim and/or crime scene
- Locard's Exchange Principle – every contact leaves a trace



- (a) a crime scene print and
(b) a test print taken from a suspect shoe – can you see matching patterns?





Handwriting: Everyone writes differently

This can help identify a suspect but would not be used on its own as someone could disguise their writing. Have a look at the handwriting on the left below and the word innocent on the right – try to match the writing.

- *I am a suspect but I am innocent*
- I am a Suspect but I am innocent
- I am a suspect but I am innocent
- *I am a suspect but I am innocent*
- *Innocent*
- *innocent*
- *innocent*
- *innocent*

Investigate: You and others in your home do this exercise -can you identify who wrote each one?



Investigate the crime scene

Nearly there – you have looked at the techniques now we need to make sure you are observant. Look at the two images below and decide which elephant has been removed.



Did you notice that this elephant was missing? Well done if you did 😊



- Now examine the evidence to find out who stole this elephant
- The next images are from the garden where the thief fled the crime scene.
- 5 Items were moved around or removed, write down what was moved or taken away



The escape route taken by the criminal.

The picture on the left was taken before the crime, the one on the right after the crime. Can you list 5 things that have been moved or changed?



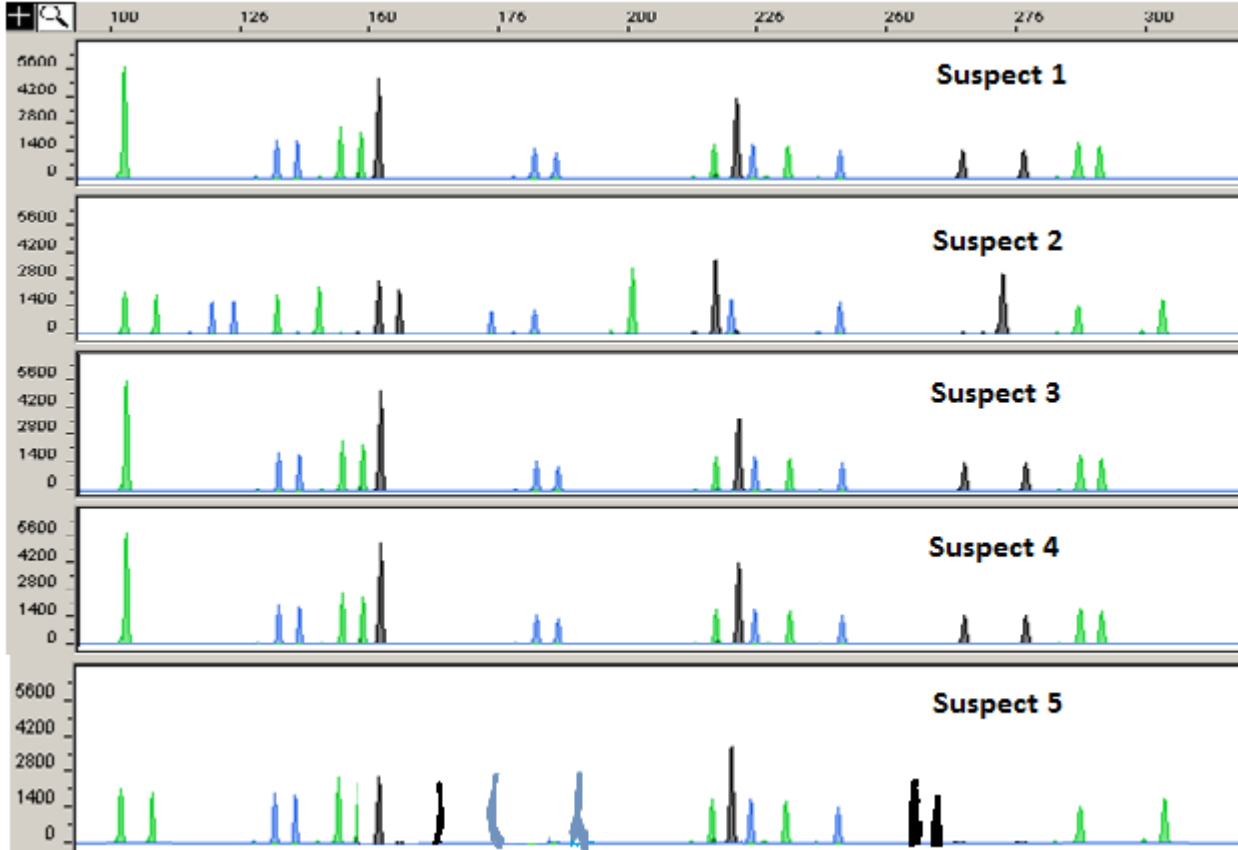
Before



After



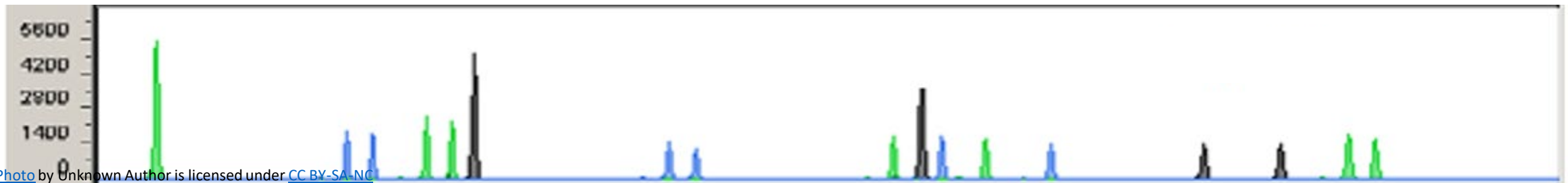
DNA Evidence - Spot the differences



1. Are all the samples from the suspects different?

2. Match the crime scene DNA to the suspect DNA

Crime Scene Sample





Handwriting evidence: match the writing

The bookmark found in the book had the following threat written on it – can you find the culprit before more elephants are stolen. Remember handwriting can be disguised so you need more evidence than this

Message on the bookmark

I will be back for more

Handwriting of suspects

Timmy: *I will be back for more*

Tommy: *I will be back for more*

Tammy: *I will be back for more*

Tabitha: *I will be back for more*

Tristan: *I will be back for more*



Fingerprint Evidence: compare the fingerprints to see who left their fingerprint at the crime scene?



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Timmy



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Tommy



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Tammy



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Tabitha



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Tristan



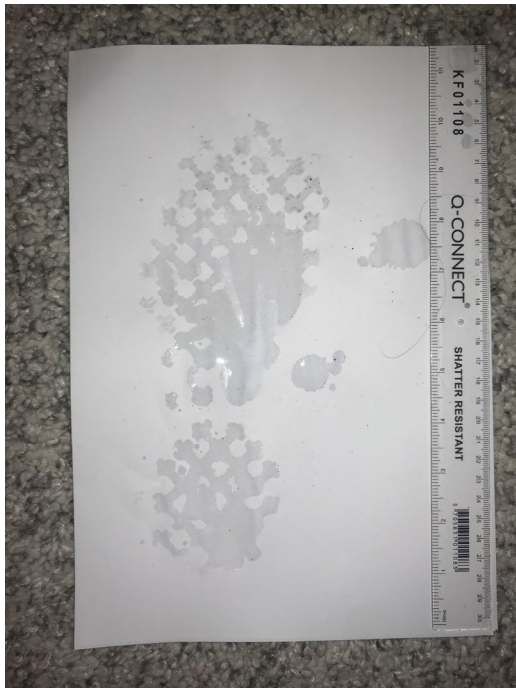
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Crime Scene



Footprint Evidence 1: compare the footprints

Footprint found in the garden



Footprints of the suspects



Tommy



Timmy

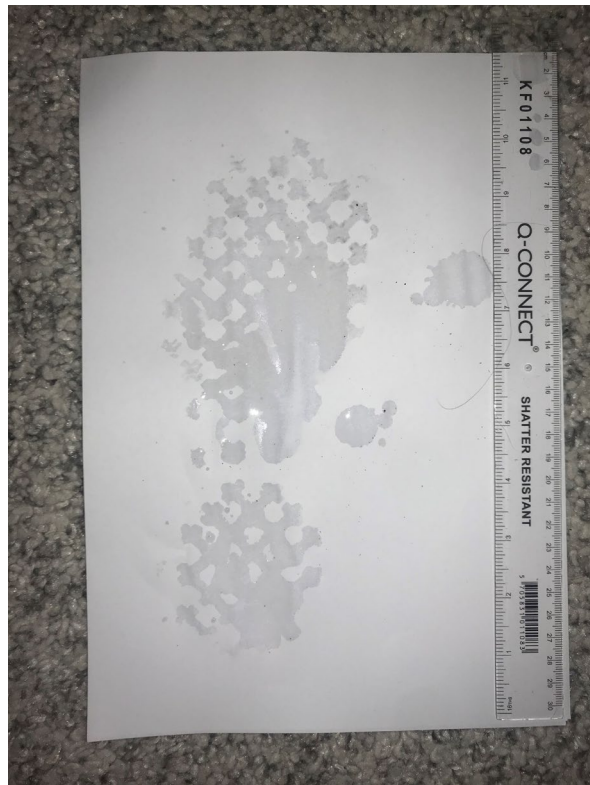


Tammy



Footprint Evidence 2: compare the footprints

Imprint of footprint from in the garden



Footprints of the suspects



Tristan



Tabitha



Evidence Sheet - complete this with your results as you examine all the evidence

Suspect	DNA	Fingerprint	Handwriting	Footprint
Timmy				
Tommy				
Tammy				
Tabitha				
Tristan				

The name of the suspect is _____

Answer sheet 1: Did you notice that this elephant was missing? Well done if you did 😊



Answer sheet 2: moved items at the crime scene



Moved

- The garden shears from the chair to the large elephant
- The small elephant was turned round
- The book was closed in the second picture

Swapped or appeared

- The orange ball was replaced by a white one
- Flowers appeared on the chair

Answer sheet 2: Evidence Sheet

Suspect	DNA	Fingerprint	Handwriting	Footprint
Timmy	Y			Y
Tommy	Y	Y	Y	
Tammy				
Tabitha				
Tristan				

It turns out that on the day of the crime Timmy was wearing the shoes belonging to his brother Tommy.

The name of the suspect is _____Tommy_____