

# Forensic Fingerprinting

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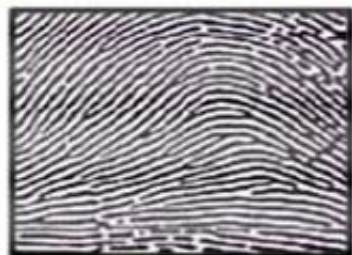
# What is a fingerprint?

- An impression or mark made on a surface by a person's fingertip, especially as used for identifying individuals from the unique pattern of whorls and lines.
- Fingerprints are made of an arrangement of ridges, called friction ridges. Each ridge contains pores, which are attached to sweat glands under the skin.
- You leave fingerprints on glasses, tables and just about anything else you touch because of this sweat.

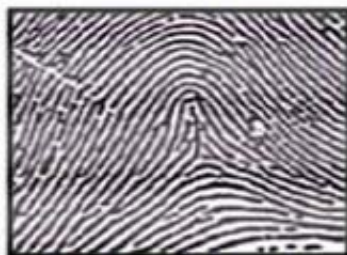


## Arches

Ridges enter on one side & exit on the other side.



Plain Arch



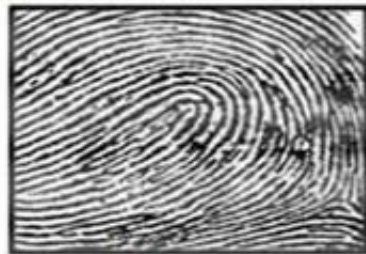
Tented Arch

## Loops

Ridges enter on one side & exit on the same side



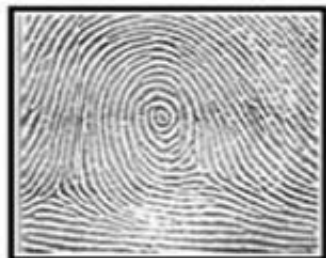
L - Radial Loop  
R - Ulnar Loop



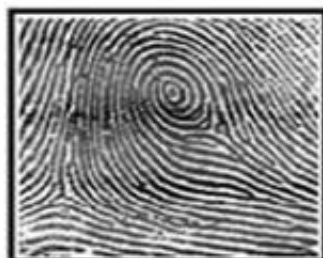
L - Ulnar Loop  
R - Radial Loop

## Whorls

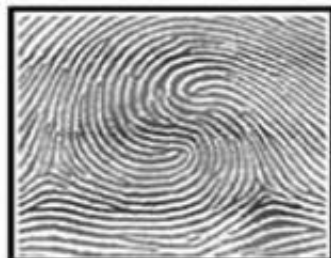
Consists of circles, more than one loop,  
or a mixture of pattern types



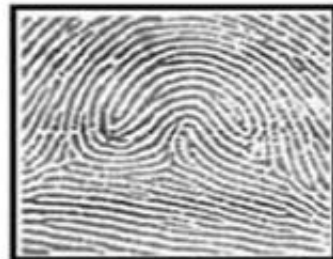
Plain  
Whorl



Central  
Pocket  
Whorl



Double  
Loop  
Whorl



Accidental  
Whorl

# Fingerprint Uses

- One of the most important uses for fingerprints is to help investigators link one crime scene to another involving the same person. Fingerprint identification also helps investigators track a criminal's record, their previous arrests, and convictions.
- This aids in sentencing, probation, parole, and pardoning decisions. Fingerprints are also used to prevent forged signatures, identify accident victims, verify job applicants, and provide personalized access to everything from ATMs to computer networks.



# Introduction



According to criminal investigators, fingerprints follow

## **Three Fundamental Principles:**

1. A fingerprint is an individual characteristic; no two people have been found with the exact same fingerprint pattern.
2. A fingerprint pattern will remain unchanged for the life of an individual; however, the print itself may change due to permanent scars and skin diseases.
3. Fingerprints have general characteristic ridge patterns that allow them to be systematically identified.

# Hypothesis



- I believe my fingerprints will be more similar to my mother's than my grandmother's because 50% of my DNA comes from my mother and 25% from my grandmother.
- I am going to be looking for the percentage of loops, whorls and arches.



# Methods

## How to take a fingerprint

1. Press finger on fingerprint pad.
2. Press finger on paper.

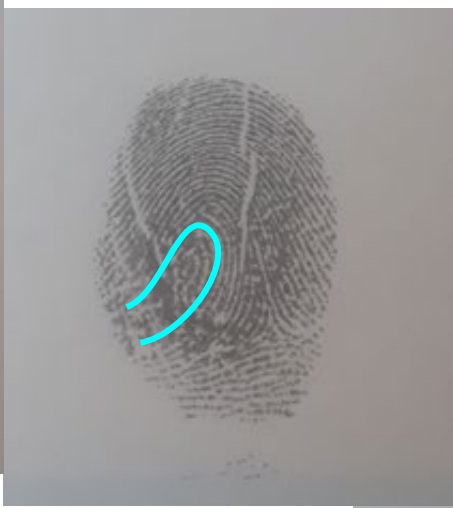
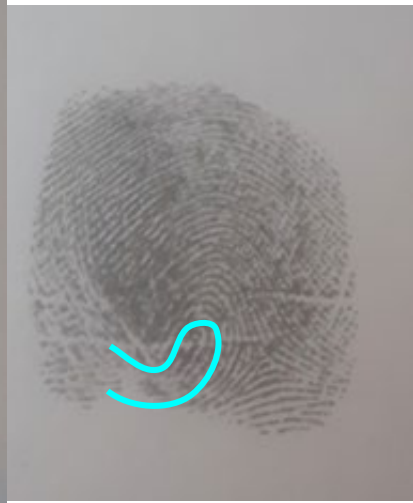
## How to measure fingerprint difference

1. Count the number of loops, whorls and arches.
2. Look at the placement. (Thumb, pointer, etc.)

Mother

Left Hand

Pointer  
arch



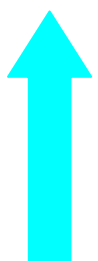
Ring  
loop



Thumb  
arch



Middle  
loop



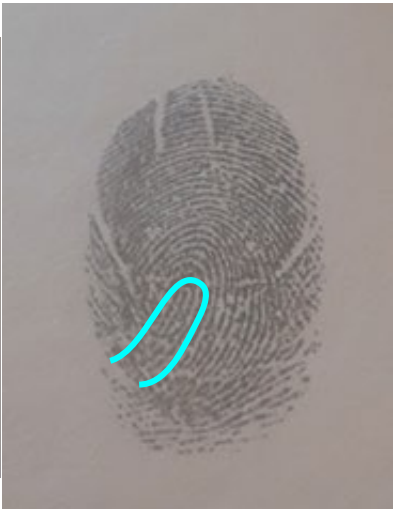
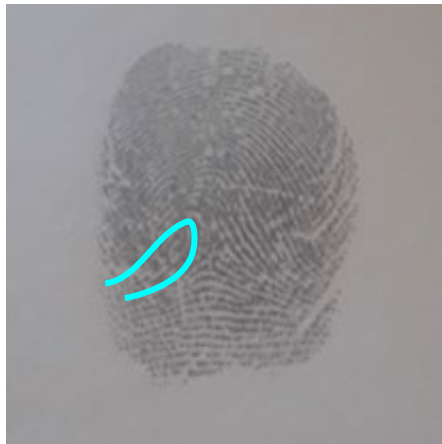
Pinkie  
loop



Grandmother

Left Hand

Pointer  
loop



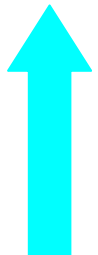
Ring  
loop



Thumb  
loop



Middle  
loop



Pinkie  
loop



Daughter (me)

Left Hand

Pointer  
loop



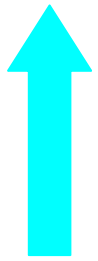
Ring  
loop



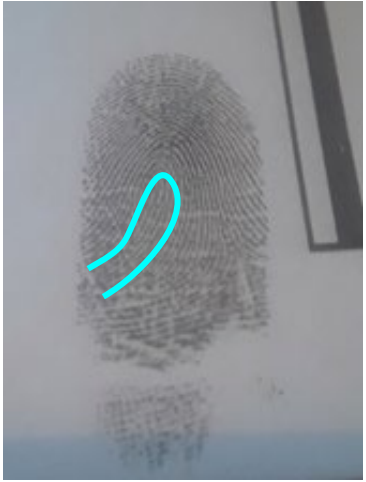
Thumb  
arch



Middle  
loop



Pinkie  
loop



# Conclusion

- Based on my fingerprint results my hypothesis was wrong.
- My fingerprints were more similar to my grandmother's. My fingerprints were mostly loops like my grandmother's.
- I learned that DNA doesn't affect fingerprints.

# References

*T. Trimpe, ScienceSpot 2006*

<https://sciencespot.net/Media/FrnsScience/fingerprint101.ppt>