

FOLLOWING THE TRAIL OF
EVIDENCE
FORENSIC KIT



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A large, light gray fingerprint graphic is centered on the page, serving as a background for the main title.

FINGERPRINT ANALYSIS

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FINGERPRINTS IN FORENSIC SCIENCE

WHAT IS FRICTION RIDGE SKIN?

Friction ridge skin consists of raised ridges and depressed furrows on the fingers, the palms of the hands, the toes, and the soles of the feet. It allows you to hold and grasp objects.

Friction ridge skin looks like lines on your fingers, palms, toes, and feet.



WHY ARE FINGERPRINTS USED IN FORENSIC SCIENCE?

Fingerprints are made of friction ridge skin and friction ridge skin is permanent and unique. This allows fingerprints (and also palm prints and footprints) to be used in criminal investigations to make identifications.

- **PERMANENCE:** friction ridges remain unchanged throughout the life of an individual
- **UNIQUE:** fingerprints are unique; no two areas of friction ridge skin are the same, not even on identical twins
- Each fingerprint of every person is different.

UNIQUENESS + PERMANENCE = IDENTIFICATION

FINGERPRINT PATTERNS:

There are 3 basic fingerprint pattern types.

- **LOOPS:** 65% of fingerprint patterns
- **ARCHES:** 5% of fingerprint patterns
- **WHORLS:** 30% of fingerprint patterns



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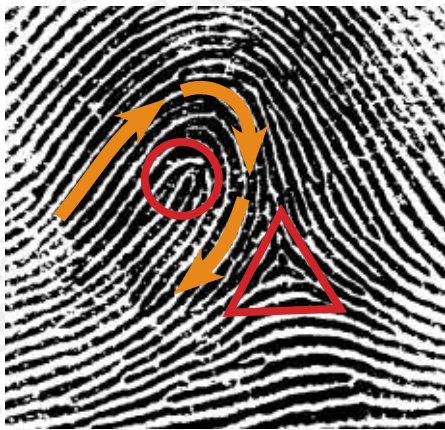


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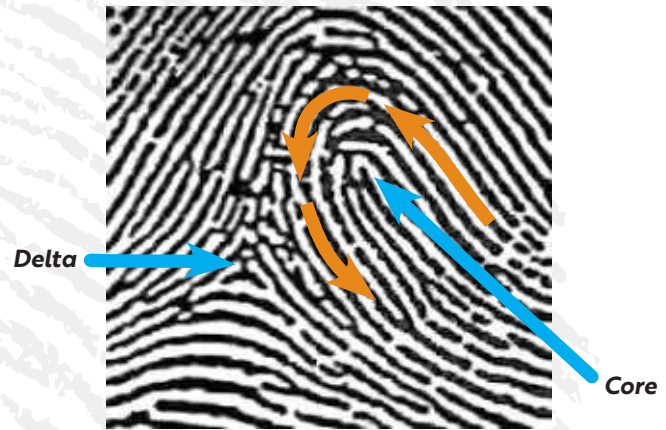
LOOP PATTERNS:

- Ridges enter on one side, recurve, and exit on the same side (—)
- Have 1 core (center of recurve)  and 1 delta (triangle shape) .
- Left loops: ridges enter on the left, recurve, and exit on the left
- Right loops: ridges enter on the right, recurve, and exit on the right

Left Loop



Right Loop



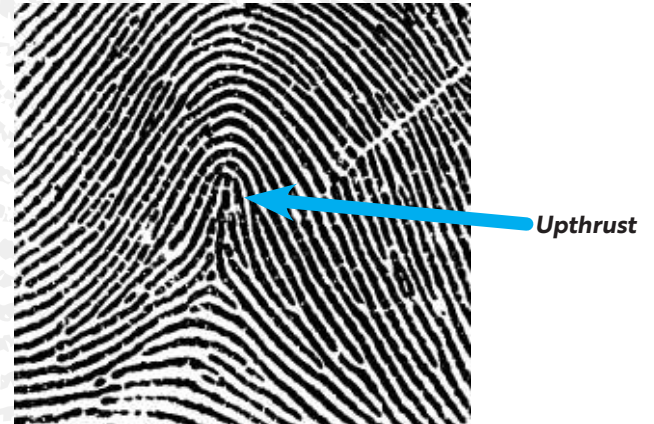
ARCH PATTERNS:

- Ridges run from one side to the other making no backward turn or recurve
- Ridges create a wave-like pattern
- Have 0 cores and 0 deltas.
- Plain arches: look like a wave; easy flow
- Tented arches: have a significant upthrust; appear to form tents

Plain Arch



Tented Arch



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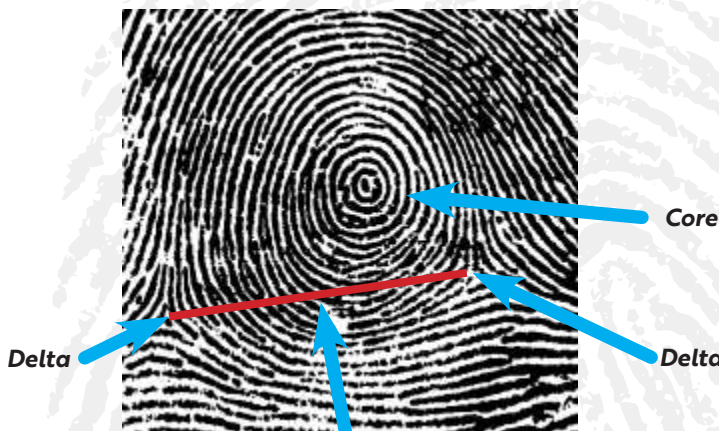


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WHORL PATTERNS:

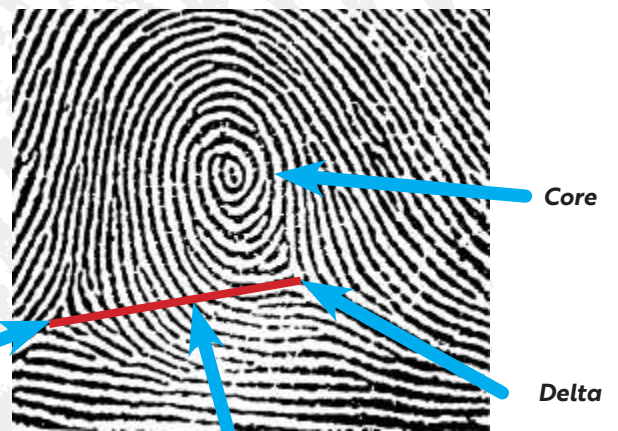
- Form circular or spiral patterns
- Contain 1-2 cores and 2 or more deltas (depending on type of whorl)
- **PLAIN WHORLS:** Concentric circles; 1 core and 2 deltas
 - If you draw a line between both deltas, the line will cross recurving ridges in a plain whorl
- **CENTRAL POCKET LOOP WHORLS:** Ridges make at least 1 complete circle; 1 delta is close to the core; 1 core and 2 deltas
 - If you draw a line between both deltas, the line will not cross a recurving ridge in a central pocket loop whorl
- **DOUBLE LOOP WHORL:** 2 loop formations that make an S shape; 2 deltas and 2 cores
- **ACCIDENTAL WHORLS:** Combination of pattern types; have 2 or more deltas and 2 or more cores (irregular or unusual pattern)

Plain Whorl



Line crosses recurving ridges

Central Pocket Loop Whorl



Line does not cross recurving ridges

Double Loop Whorl



Accidental Whorl



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FINGERPRINT PATTERN EXERCISE

Identify the following pattern types and label the cores and deltas.



1. PATTERN TYPE: _____



2. PATTERN TYPE: _____



3. PATTERN TYPE: _____



4. PATTERN TYPE: _____

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FINGERPRINT PATTERN EXERCISE

Identify the following pattern types and label the cores and deltas.



5. PATTERN TYPE: _____



6. PATTERN TYPE: _____



7. PATTERN TYPE: _____



8. PATTERN TYPE: _____

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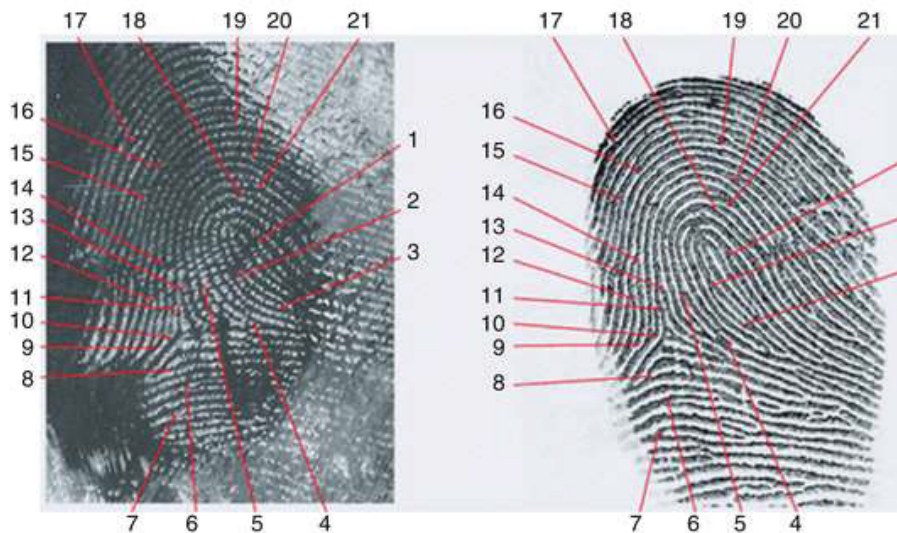
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LEVEL 3 ANALYSIS: RIDGE ATTRIBUTES

- Analyzing locations of pores
- Examining edge shapes and end shapes of ridges
- Identifications can be made at this level with level 1 and 2 detail. Eliminations are also possible.
- You will not be completing this level of analysis in your examinations.

Fingerprint analysis involves comparing an unknown print from a crime scene to a known suspect print and determining if they have the same level 1, 2, and 3 details. If the details are the same and in the same locations, an identification can be made.



Level 1: Both prints are right loops with a single core and delta and a ridge count of 7.

Level 2: 21 Galton features (minutia) have been identified that are consistent between the unknown and known print.

Level 3: Not examined

Conclusion: Identification

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FINGERPRINT COMPARISON EXERCISE

Determine if the unknown print (print from the crime scene) and the known print (suspect print) are from the same source. Make sure to analyze level 1 and 2 detail:

- Identify the pattern type
- Label core(s) and delta(s)
- Conduct a ridge count
- Label Galton features
- Determine if it is an identification or exclusion

* Note – the prints are not to scale

1.



Unknown Print



Known Print

PATTERN TYPE: _____

PATTERN TYPE: _____

2.



Unknown Print



Known Print

PATTERN TYPE: _____

PATTERN TYPE: _____

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3.



Unknown Print



Known Print

PATTERN TYPE: _____

PATTERN TYPE: _____

4.



Unknown Print



Known Print

PATTERN TYPE: _____

PATTERN TYPE: _____