

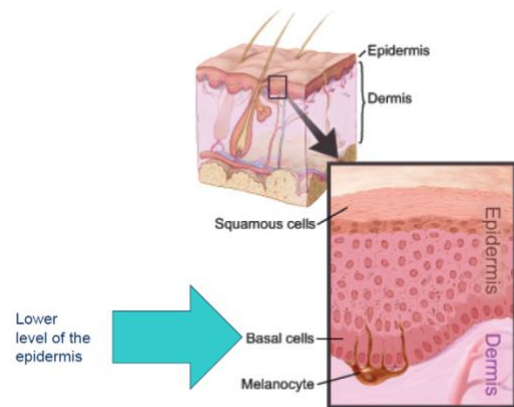
# FINGERPRINT ANALYSIS

## WHAT ARE FINGERPRINTS?

- All fingers, toes, feet, and palms are covered in small ridges. These ridges are arranged in connected units called *dermal*, or \_\_\_\_\_, *ridges*.
- These ridges help us get or keep our \_\_\_\_\_ on objects.
- Natural \_\_\_\_\_ plus dirt on these surfaces leave behind an impression (a print) on those objects with which we come in contact.

## LOCATION OF FINGERPRINTS

- An animal's external tissue (skin) consists of an inner dermis and an outer epidermis
- The creation of fingerprints occurs in a special layer (the \_\_\_\_\_ layer) in the epidermis where new skin cells are produced.



## FORMATION OF FINGERPRINTS

Fingerprints begin forming approximately at the start of the \_\_\_\_\_ week of pregnancy.

- It is believed that no two mammals have the same fingerprints because everyone's \_\_\_\_\_ in-utero is different
- Because the basal layer grows faster than the others, it \_\_\_\_\_, forming intricate shapes.

## PRINCIPLES OF FINGERPRINTS

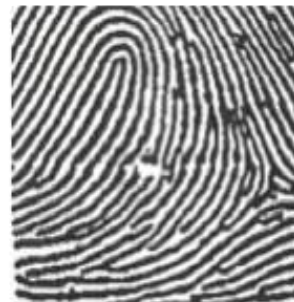
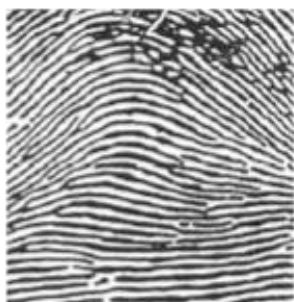
First Principle: A fingerprint is an \_\_\_\_\_ characteristic; no two fingers have yet been found to possess identical ridge characteristics

Second Principle: A fingerprint will remain \_\_\_\_\_ during an individual's lifetime

Third Principle: Fingerprints have general \_\_\_\_\_ that permit them to be systematically classified

## CHARACTERISTICS OF FINGERPRINTS

There are 3 general fingerprint distinctions:



\_\_\_\_\_

About 5% of the population

\_\_\_\_\_

About 30% of the population

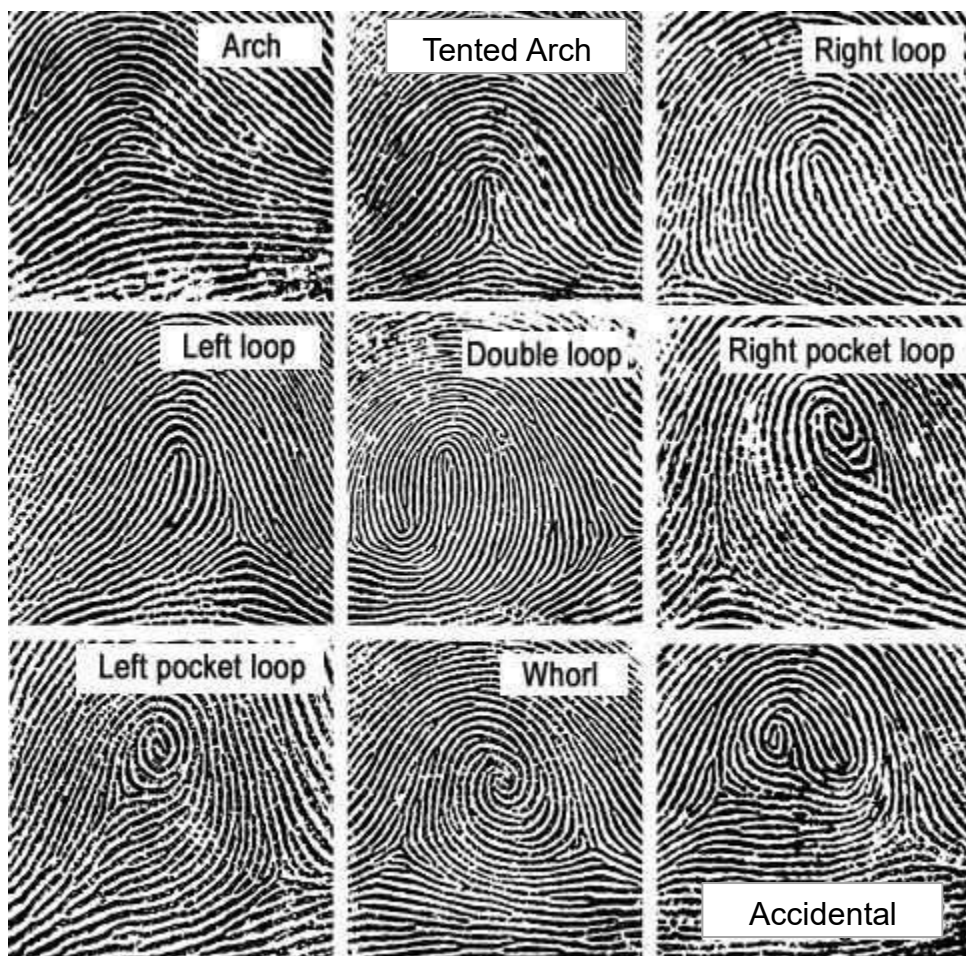
\_\_\_\_\_

About 65% of the population

Basic patterns can be further divided:

- Arch patterns can be plain (4%) or tented (1%).
- Loop patterns can be radial or ulnar
- Whorl patterns can be central pocket (2%), double loop (4%), or accidental (0.01%).

Even twins have unique fingerprints due to small differences (called minutiae) in the ridge patterns.



## FINGERPRINT MINUTIAE PATTERNS

The individuality of any fingerprint is based not only upon the general shape or pattern it forms, but more importantly upon its ridge structure and specific characteristics. The recognition of these ridges, their relative number, and the approximate location of them, on the observed print, are special characteristics that make the fingerprint a specific identifying characteristics of each individual. There are at least \_\_\_\_\_ individual ridge characteristics on the average fingerprint. If between \_\_\_\_\_ to \_\_\_\_\_ specific points of reference for any two corresponding fingerprints identically compare, a match is assumed.

Forensic Examiners look for:

- Core (the center of a whorl or loop)
- Delta (triangular regions near a loop)
- Ridge Count
  - o Counting from the core to the edge of the delta
  - o Distinguishes one fingerprint from another



Central pocket loop whorl













Double loop whorl

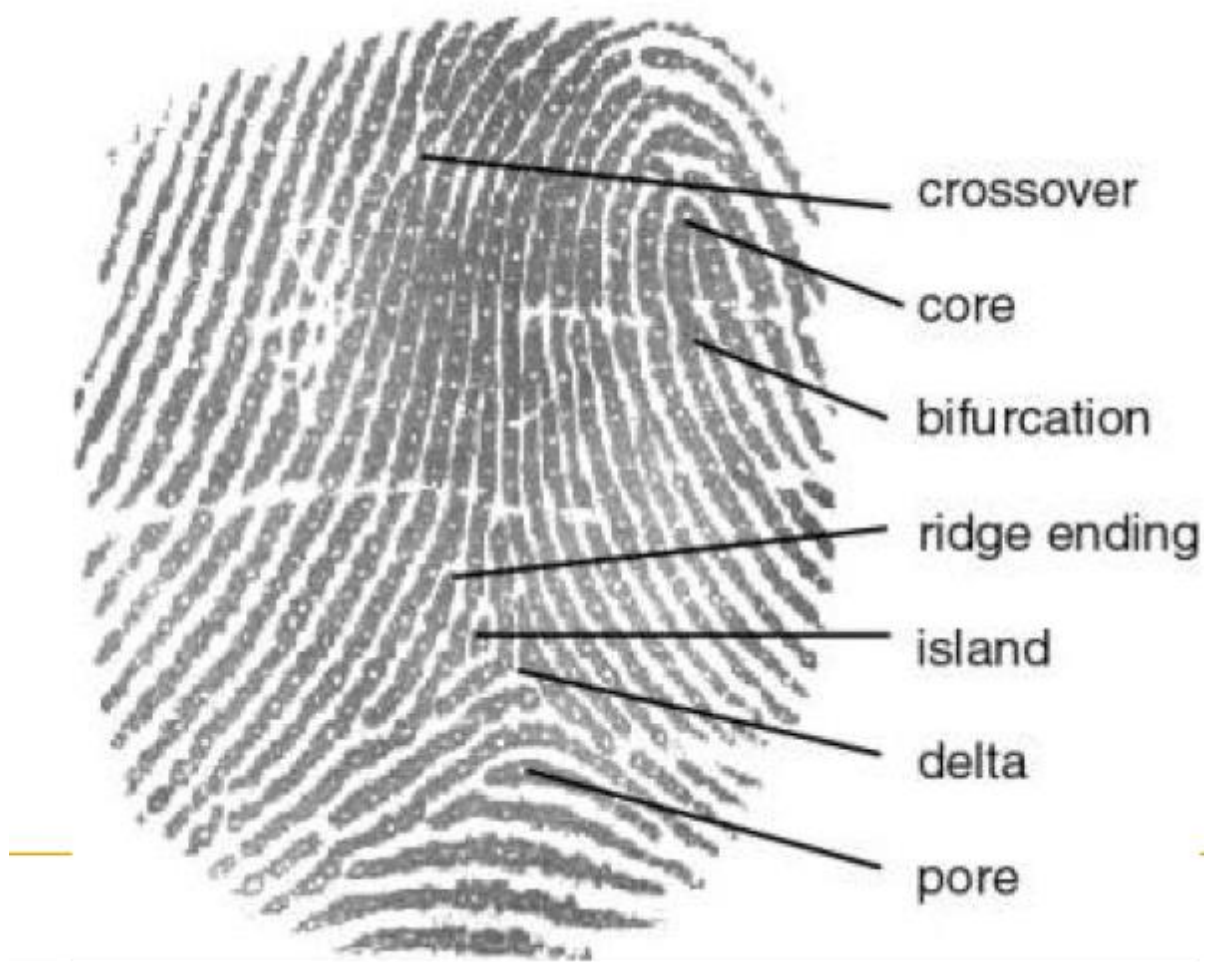


Accidental whorl



# Minutiae Patterns

	Visual Appearance			
1. Ending Ridge	1.		6. Spur (hook)	6. 
2. Fork	2.		7. Eye	7. 
3. Island Ridge	3.		8. Double Bifurcation	8. 
4. Dot	4.		9. Delta	9. 
5. Bridge	5.		10. Trifurcation	10. 



## Developing Latent Prints

Latent prints are fingerprints that are \_\_\_\_\_ to the naked eye

- Come from \_\_\_\_\_ from glands in human skin
- Need to be “\_\_\_\_\_” for them to become visible

There are several methods to develop latent prints; each depends on the situation and what is available.

### 1) Dusting Powders

- can be magnetic or regular
- adhere to \_\_\_\_\_ & \_\_\_\_\_ deposits
- best on \_\_\_\_\_ surfaces

Examples: glass, tile, painted wood, plastic, magazine covers, metal, rubber

### 2) Ninhydrin

- reacts with \_\_\_\_\_ to produce a \_\_\_\_\_ color
- best on \_\_\_\_\_ surfaces

Examples: wood, cardboard

### 3) Cyanoacrylate

- common name is \_\_\_\_\_
  - \_\_\_\_\_ from chemicals react with fingerprint to form a hard, whitish deposit
  - best on \_\_\_\_\_ surfaces
- Examples: glass, tile, painted wood, plastic, magazine covers, metal, rubber
- reacts with \_\_\_\_\_ from latent residue
  - using \_\_\_\_\_ speeds up the reaction

### 4) Other Methods

- Iodine Fuming
  - iodine solid sublimates to the \_\_\_\_\_ phase
  - when fingerprints are formed they are a \_\_\_\_\_ color
- Leucocrystal Violet
  - used to develop prints on \_\_\_\_\_
- Amido Black
- Titanium Dioxide
  - a white powder for lifting prints on \_\_\_\_\_ surfaces

## Preserving Fingerprints

- Be sure to photograph at the scene
- Bring object back if \_\_\_\_\_ enough
- \_\_\_\_\_ the prints if large objects (door, car, wall, etc)