



# FINGERPRINTING



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# What are Fingerprints?



- ❖ The impression of a fingertip on any surface.

# Basic Fingerprint Principles

- ❖ All fingerprints are unique to individuals.
  - In the 90 years since fingerprinting was generally introduced, out of the millions of sets of prints that have been taken, no two individuals have been found to have the same fingerprints.
- ❖ A fingerprint will remain unchanged during an individual's lifetime
  - The ridges on the grasping surfaces of hands and on the soles of feet are present at birth and remain unchanged for life except for size as growth occurs.
- ❖ Fingerprints have general ridge patterns that permit them to be systematically classified
  - Arch
  - Loop
  - Whirl

# Arch



# Loop



# Whorl



# At the Crime Scene

- ❖ There are 3 different types of prints found at a crime scene.
  - Visible Fingerprints
  - Plastic Fingerprints
  - Latent Fingerprints



CRIME SCENE DO NOT CROSS




# Latent Fingerprints

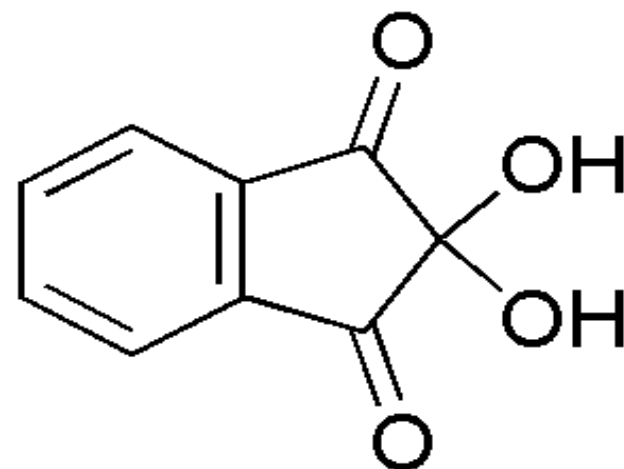
- ❖ Goal: To develop latent fingerprints using two different techniques and match them to someone in the class using the fingerprint sheets we each created.



# How are we able to develop Latent Fingerprints?

- **Main Idea: Latent fingerprints are made up of chemicals that come from the pores in our fingers and are left on virtually everything we touch.**
    - **Primary component: ordinary sweat which is mostly water and dries fairly quickly.**
    - **Other components such as amino acids are solid and can remain on a surface for a much longer period of time.**
- 

# Ninhydrin

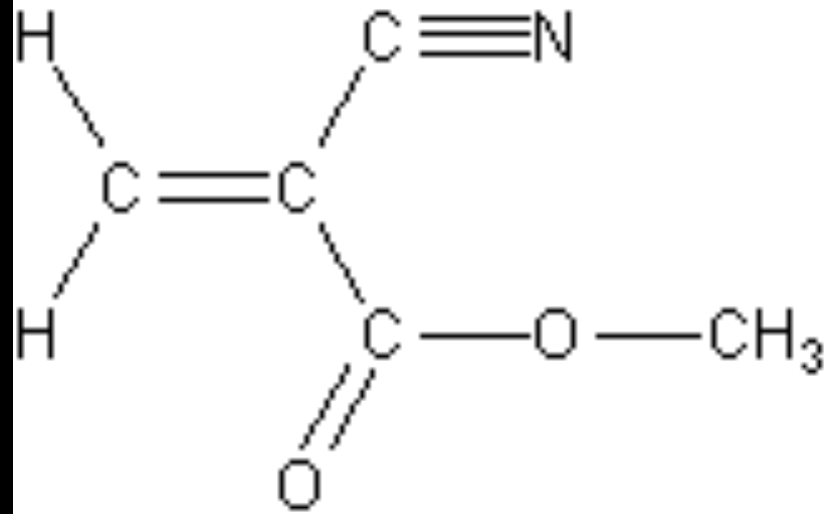


- Ninhydrin reacts with amino acids commonly found in latent print residue to form a purple compound, yielding latent prints visible in shades of purple.
- Under a fume hood, we applied a ninhydrin solution to a latent fingerprint that was on a piece of paper by way of “painting” and allowed it to dry.
- This process yielded a purple fingerprint which can be photographed for future use.

# Ninhydrin Fingerprint



# Cyanoacrylate



- Cyanoacrylate (super glue) reacts with the traces of amino acids, fatty acids, and proteins in the latent fingerprint and the moisture in the air to produce a visible, sticky white material that forms along the ridges of the fingerprint.


# Cyanoacrylate Fingerprints







# Matching Fingerprints

- How do fingerprint specialists determine whether a set of prints is a match?
    1. Identify the pattern of the fingerprint.
      - Is it an arch, a loop, or a whorl?
    2. Identify the different characteristics of the fingerprint.
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# Characteristics of Fingerprints

- Typica are unique lines
  - Ridge ends
  - Bifurcations
- Minutiae are the details in a fingerprint
  - Eyes/Islands
  - Creases
- To make an identification, one must find similar characteristic details between fingerprints. The number of different details needed to make a match varies by country.

Bifurcation

Short Break

Island

The core of the fingerprint pattern

The delta is where the ridges divide

Ridge ending





# Results

- We were successful in finding out whose fingerprints were on the spoon as well as the latent print we developed with ninhydrin.

## In real life...

- When he was received at Leavenworth, Will West denied previous imprisonment there, but the record clerk ran the Bertillon instruments over him anyway. Sure enough, when the clerk referred to the formula derived from West's Bertillon measurements, he located the file of one William West, whose measurements were practically identical and whose photograph appeared to be that of the new prisoner.
- But Will West was not being coy about a previous visit to Leavenworth. When the clerk turned over William West's record card he found it was that of a man already in the Penitentiary, serving a life sentence for murder. Subsequently the fingerprints of Will West and William West were impressed and compared. The patterns bore no resemblance.

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