

Lovejoy High School
Forensics

Unit 3 Guide: Fingerprinting

Learning Goals:

- Trace the history of fingerprinting.
- Describe the anatomy of a fingerprint and its impact on forensic science.
- Explain how finger prints are taken from suspects.
- Analyze and describe the major fingerprint patterns and subclasses.
- Distinguish between and be able to compare and contrast visible, plastic, and latent prints.
- Support AFIS and its implications for today's forensic science.
- Compare and contrast lifting prints from porous and nonporous surfaces as well as be able to demonstrate it.
- Evaluate all methods of lifting fingerprints from a crime scene.
- Demonstrate lifting prints from multiple surfaces from a mock crime scene.



Key terms: fingerprints, whorl, loop, arch, delta, core, visible prints, plastic prints, latent prints, AFIS, porous, nonporous, microns, dactyloscopy, anthropometry, ninhydrin, bifurcations

Reading for Understanding: Chapter 4

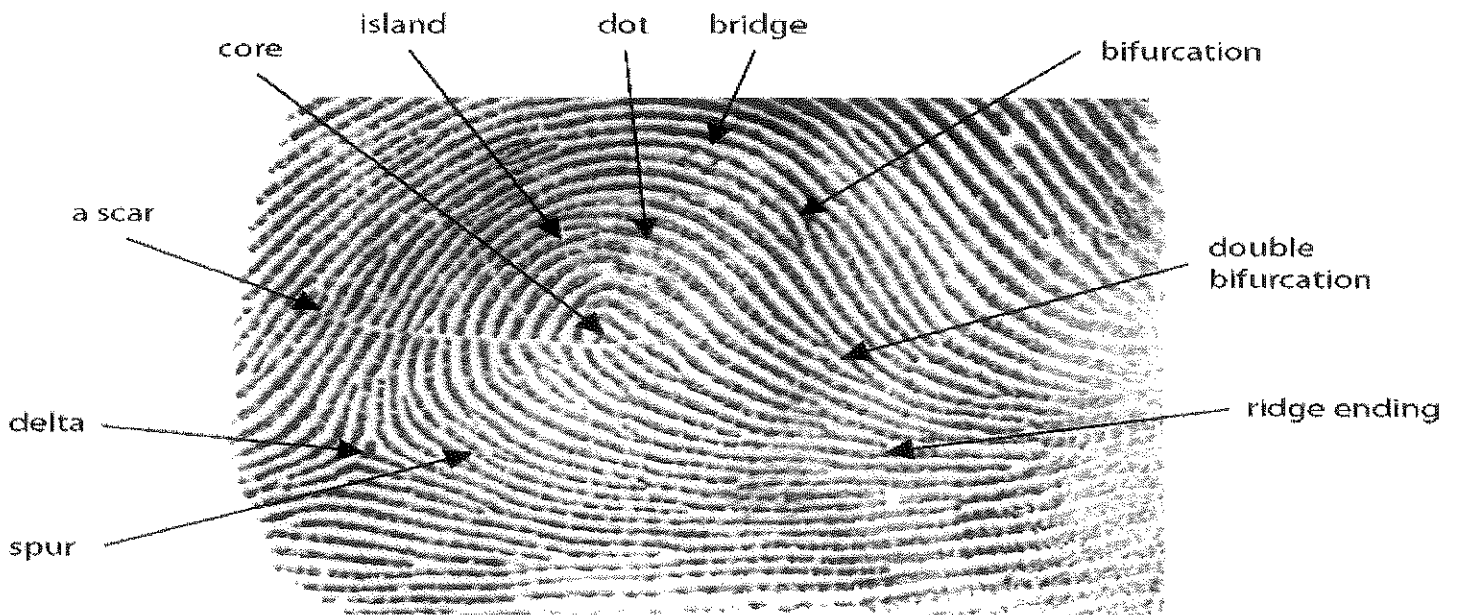
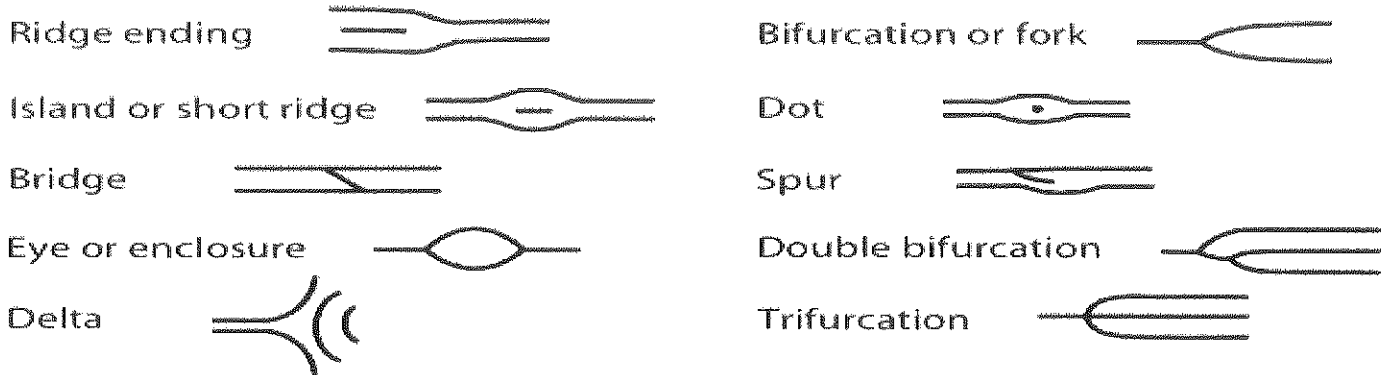


Unit 3: Fingerprints Outline

Definition:

Fundamental Principles of Fingerprints

Ridge Characteristics Minutiae



Comparison

Arches-No Deltas or Cores



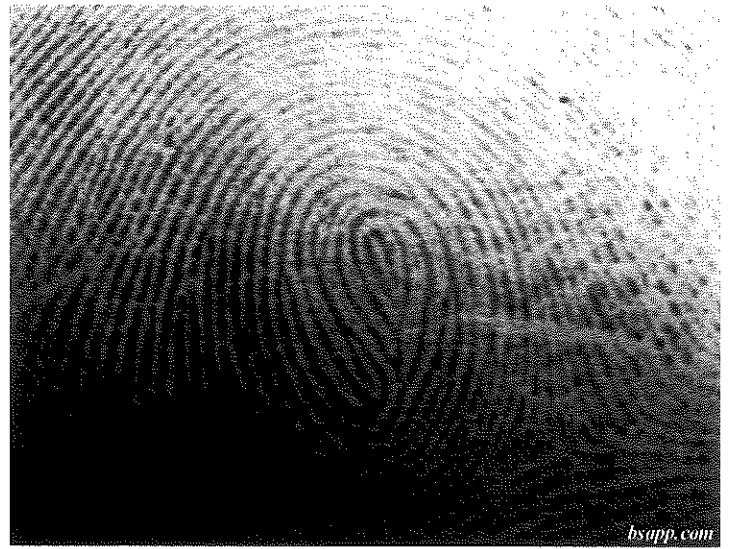
Print from the right hand



Print from the right hand



Whorls - One or more cores and At least two deltas



Fingerprints Dusting, Lifting and Developing—Outline

I

II.

III.

IV. Dusting Appropriate Surface:

V. Iodine Fuming

Steps for Iodine Fuming

VI. Ninhydrin

Steps for Ninhydrin

VII. Silver Nitrate & UV Light

Steps for Silver Nitrate:

VIII. Other Methods:

The Key to reading prints is not to find each and every characteristic in the prints, but to get the trend of the patterns. Most prints found at a crime scene are partial prints which rarely contain all deltas and cores. It is for this reason that we must learn how to look at the trend of the lines as a whole rather than individual lines.

The following is a guide on how to recognize different types of prints. It is not meant to be taken for or in place of the definitions. Its only use is to young forensic scientist get a better feel for reading prints.

1st-Note a few characteristics that give away certain types of prints

Double loops-always have an "S" shape some where in the print



Plain whorls and central pocket loops-are the only prints that contain a circle or spiral within the print



Plain



Central pocket loop

Loops-always have some lines that come in one side, turn around and go out the same side



Arches-all the lines come in one side of the print and exit out the other

Note: There has been no mention of cores or deltas, these attributes can be attained by looking at the trend of the lines, not individual characteristics.

2nd-Procedure for identifying prints

Ask yourself these questions and in this order:

Are there any "S" shapes?

[If yes then print is a **double loop**]

Do I see circles?

[If yes then the print is either a **plain whorl** (symmetrical) or a **central pocket loop** (not symmetrical)]

Plain Whorl (symmetrical)



Central Pocket Loop (not symmetrical)



If there are no S shapes or circles we must have an arch or loop (easy prints to identify)

Are there any lines that turn around and go back to the side they came from?

[If yes it is a **loop**]

[If no it is an **arch**]

*Remember to differentiate between **ulnar** and **radial** loops, and **plain** and **tented** arches.

Ulnar loops open toward the pinky

Radial loops open toward the thumb



[assuming the prints above are from a right hand]

Plain arches are flat



Tented arches are steep



Name: _____ Period: _____

Fingerprinting Yourself

After determining and reading about the different types of fingerprint patterns, your first job is to fingerprint yourself using an ink pad or markers. You will print each finger on both hands and analyze the patterns you see.

To fingerprint yourself:

1. Place the side of your finger on the ink pad and roll it from one side to the other without dragging your finger in the ink. If you are using washable markers instead, color lightly your fingertip from side to side. Make sure that the ink is only on the ridges of the print and not completely covering your finger!
2. After applying the ink, place one side of your finger in the proper box and then **SOFTLY** roll your finger from side to side leaving a clean and crisp print.
3. After you have completed this with all fingers and have washed your hands, take a look at each print and identify the patterns that you see there.
4. Compare your fingerprints to those other students around you.

Right Hand

Thumb	Index	Middle	Ring	Little

Left Hand

Thumb	Index	Middle	Ring	Little

Questions:

1. What was the pattern you found most in your prints?
2. Were all your prints from each finger identical?
3. Are your fingerprints like anyone else's around you? Do you share the same patterns?
4. What was the most common pattern among other students in your class?
5. Using your own fingerprints, calculate your Henry Classification number and show the chart below.

	Right Hand					Left Hand				
	Thumb	Index	Middle	Ring	Little	Thumb	Index	Middle	Ring	Little
Digit #	1	2	3	4	5	6	7	8	9	10
Point Value	16		8		4		2		1	
Sum of X (even)										
Sum of Y (odd)										
x/y										

6. Compare your Henry Classifications number to those within the class - explain similarities and differences.

7. Using the attached pictures, identify each print (ie: accidental whorl) in the table below:

Print	Classification	Print	Classification
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A		J	
B		K	
C		L	
D		M	
E		N	
F		O	
G		P	
H		Q	
I		R	

8. Using the crime scene prints, Match the print (#1-24) with its enlarged print (letters A - R). Some prints may have multiple matches and some may have none. Compile your answers in the table below:

Crime Scene Print	Enlarged Print	Crime Scene Print	Enlarged Print
1		13	
2		14	
3		15	
4		16	
5		17	
6		18	
7		19	
8		20	
9		21	
10		22	
11		23	
12		24	

Lifting Fingerprints

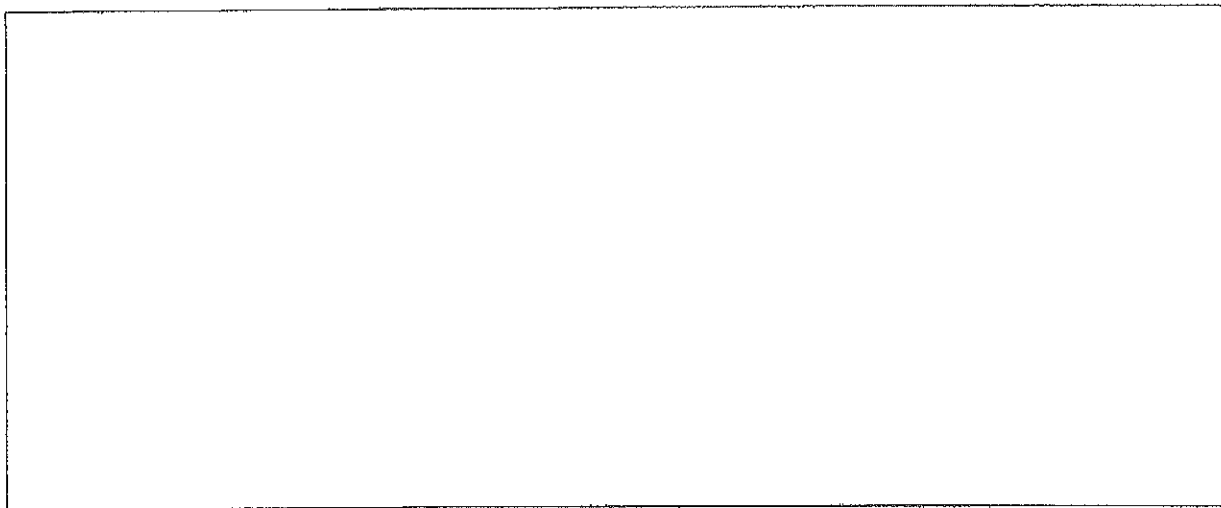
After you have identified your own prints, you will now practice lifting prints from objects. This is a difficult thing to do and may take multiple tries to get a good print. Make sure that you limit how much you hold the object you are trying to print so that you don't get smears or

smudging. The simplest and most frequently used method of lifting fingerprints is to dust it with black powder.

To lift fingerprints:

1. Get a clean beaker and only handle it by the bottom and the rim of the beaker - DO NOT touch the sides until you are ready!
2. Have you and your partner press your fingers around the outside of the beaker firmly without dragging your fingers across the surface.
3. Dip the small brush into the black powder and LIGHTLY AND GENTLY dust the first print that you see.
4. Place a piece of clear tape over the fingerprint and rub the back of the tape. Carefully lift the tape off the beaker and place the tape in the designated space below.
5. Once the tape is placed below - identify it as your print or your partner's print - write your identification next to the print below.
6. Each of you should lift at least 4 separate prints and identify them.
7. Clean the beaker, have another person from another group touch the glass and leave their prints behind without you watching. Now lift the prints they made on the beaker (this will be more difficult because you don't know where the prints are located).
8. After you have finished, wash the beaker (inside and outside) with soap and water and place it back where you found it making sure not to touch the sides of the beaker!

Place your tape lifts here!



Questions:

1. What difficulties did you have in trying to lift prints?
2. Were you able to easily identify each print as yours or your partner's? Why or why not?