The Case of Pat Smith

Things to do before you start the activity

Mug Books

◆You will need to create your own fingerprints for each suspect using th Suspect pages provided.

Who dun it.

◆Cut up the clues and put in envelopes. You will need one envelope for each group of 3-4 people.

Ink Chromatograph

◆You will need paper towels that will allow the water to "flow" through the ink lines. I used those brown paper towels. If you can't find any give me a holler.

◆Cut up enough "blank" strips to give each group 3 strips**.**

◆You need to create the "credit card slip". Take a paper towel and "sign" approximately 1 inch from the bottom.

◆Cut the signature part of the towel into enough strips to give each group 1 strip.

◆Be sure to know which pen created the credit card signature. I mark each pen somehow before I start the activity. (i.e., blue dot on one, tape around another, etc.)

Fingerprints

◆You will need to create a page with the criminal, Helen DeRanged's, fingerprint on it. I took one print from each hand.

Part I: The Suspects

Materials:

❒ Envelopes w/ clues

❒ Mug Books for each participant

Procedure:

1. Break into groups of 3 or 4
2. Hand out 1 envelope per group
3. Explain that they are detectives on this case. From the clues in the envelopes, they must determine: Crime, Criminal (who did it), Motive (why they did it), Opportunity (what chance did they have to do it.)
4. Instruct youth that they can organize the clues any way they choose.
5. Start Activity
6. Have each group report Crime; Criminal; Motive; Opportunity.
7. Usually a couple of suspects will surface. Discuss why their suspects were selected and why all groups didn't agree. Ask how they decided what was an important fact and what wasn't. Give an example of an unimportant fact.
8. Pass out a Mug Book to each student. Provide time to look at the "suspect"selected. Ask if anyone has second thoughts. Talk about appearances and how they affect our choices.
9. Talk about direct and circumstantial evidence.

Circumstantial/Indirect evidence: evidence providing only a basis for inference about the fact in dispute.

Direct Evidence: evidence (usually the testimony of a witness) directly related to the fact in dispute.

Inferences are deductions or conclusions which, with reason and common sense, are drawn from facts which have been established by evidence in the case.

The evidence in our crime at this point is circumstantial.

Part II: Ink Chromatograph

Chromatograph: Technique which separates the individual components of mixtures using absorption through paper. Different inks produce different chromatographs because the paper towel absorbs some substances more easily than others.

Materials:

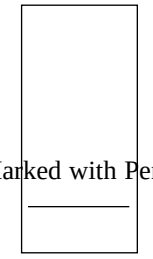
- ❒ 3 pens
- ❒ Cut up samples of credit card signature
- ❒ Enough strips of paper towel for 3 for each group
- ❒ 3 cups for water
- ❒ Extra paper towels
- ❒ Scissors

Procedure

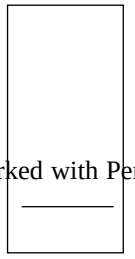
1. Explain to the students that we know that the crime is credit card theft. They have the charge slip signed by the criminal to aid in the investigation. The next evidence to look at is Direct Evidence.

Direct evidence is evidence that directly proves a fact, without an inference or presumption.

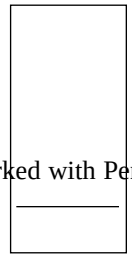
2. Ask the students to review the circumstantial evidence (actions and whereabouts of suspect).
3. Using the same groups, have each group select three strips of paper.
4. Have the students mark (approximately 1 inch from the bottom) one of the pieces of paper with one of the pens, the second with a different pen, the third with the last pen. Be sure to tell the students to mark down which pen draws which line.



Marked with Pen 1



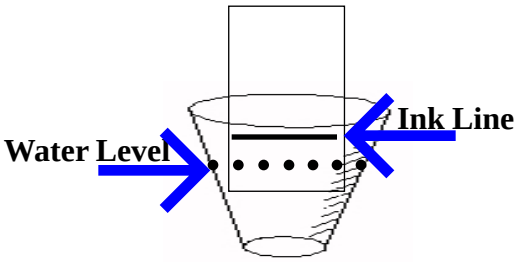
Marked with Pen 2



Marked with Pen 3

You will need to be able to identify which pen produced which chromatograph.

6. Have one student get 3 cups of water for their group.
7. Explain: Dip the very end of the paper towel strips in the water.



Do not submerge the ink line in the water.
The water will flow up the paper towel and through the ink and create a pattern unique to that pen. Demonstrate and allow time for students to get a chromatograph for each of their 3 samples.

8. Now give each group one of the CREDIT CARD samples. Have the students repeat the same process using the water and the sample.

9. Compare the print from the CREDIT CARD SAMPLE to the 3 samples form the 3 pens.
10. Ask which pen was used to sign the credit card slip?

Part III: Fingerprinting Activity

Materials: (you could also use ink pads for this instead of the lead pencils.)

- ❒ Enough Fingerprint Cards for each student.
- ❒ Tape dispensers, 1" tape (1 dispenser for each group)
- ❒ Extra tape
- ❒ Pencils
- ❒ Pencil sharpener
- ❒ Paper
- ❒ Magnifying glass (1 for each student)
- ❒ Fingerprint Pattern Types Student Handout (1 for each student)
- ❒ Scissors
- ❒ Paper with Helen DeRanged's fingerprint on it. I used two prints, one from each hand. (1 for each student)

Tell the students: *"Before the pens were handled by other people, I lifted fingerprints off each pen. We will look at the fingerprint lifted from the pen and compare it to the finger prints in the Mug Book. Before we do that however, we will be taking our own finger prints and try to figure out what our "Fingerprint Formula" is."*
Fingerprint Formula: is the list of print classifications for one hand, from thumb to pinkie. A formula might look like this: l-a-a-w-l; loop, arch, arch, whorl, loop.
(Note: the chromtagraphy activity eliminated the other two pens from consideration. Fingerprints from those pens don't need to be considered.)

Procedure

1. Pass out to each group:
   - ▲ Fingerprint form
   - ▲ Tape dispenser
   - ▲ Pencils/Paper

Introduction:
What are fingerprints? *Impressions left by friction ridge skin.*
Friction ridge skin: *is the skin that covers the tips of the fingers, the palms of the hand, the toes and soles of the feet. It is ridged to reduce slippage.*
Latent Fingerprints: The sweat glands in the skin of your finger tips produce a water based oil solution that coats the ridges of your print. These ridges retain a portion of this solution such that when the finger makes contact with a surface, a residue is left behind which is a facsimile of your print (i.e., latent print).

Fingerprint patterns are divided into three main groups consisting of: Arches, Loops and Whorls. Approximately five percent of all fingerprints are Arches, 30% are Whorls and 65% are Loops.
Note: This activity is based in part on one from *"A Crime, A Clue and Biotechnology"* out of Iowa State University Extension. It contained a note which suggests that you can call your local law enforcement official(s) and ask them for a crime kit which contains all the equipment you need for fingerprinting.

2. Explain: We are going to take our own fingerprints. Fingerprints are a form of Direct Evidence.
3 Have the students brainstorm other ways of identifying people (i.e., DNA, Eyewitness, etc. Are some more reliable than others? Why.
4. Demonstrate: Rub the lead pencil on the paper and make a really big darkspot.

5. Rub the "pad" of your finger above the first knuckle. Cover from side to side and as far up as possible.

6. Take a piece of tape and put it over the "pad" of each finger, pull off and place in the correct box on the Fingerprinting Card.

7. Use one of the students and demonstrate the first finger.

8. Handout the Student Handout: Fingerprint Pattern Types and magnifying glasses. Have the students figure out which type they are. You can have the students exchange fingerprints and see if they come up with the same formula.

9. Discuss why some people might see different patterns. How could this affect using fingerprints in a criminal trial? Can you think of a way to avoid individual interpretations in looking at fingerprints? (EX: There are now machines that take digital pictures of fingerprints instead of ink and a computer does the analysis. Have experts looking at the prints.) What are some ways that fingerprints might be used other than for a trial? (EX: Having your kids fingerprinted. To identify a body. For identification on documents, etc.)

10. Tell the students: *"Now that we have had some experience in looking for the different features of our own fingerprints, lets get back to our investigation in the case of Pat Smith. We will now have the opportunity to compare the fingerprint from the pen we have identified as the one used to sign the credit card slip with those of our suspects. I have two fingerprints taken from that pen. "*

11. Pass out the suspect's fingerprint and have the students compare these prints to the suspects in the Mug Book.

Q. WHO IS THE CRIMINAL?

A. Helen DeRanged

Clues for Who dun it - Part I: The Suspects.

On Saturday at around 5:00 p.m. Pat Smith turned into the Texaco Food & Fuel.

Pat Smith quickly went to the bathroom to clean up after spilling coffee on herself.

At 5:15 p.m. Pat Smith came out of the bathroom.

Pat Smith bought gas.

When Pat Smith reaches in her car for her purse, she realizes that someone has stolen her billfold with her credit card in it.

Pat Smith pays for her gas with cash she found in her pocket.

Pat Smith is a teacher.

Pat Smith is on her way to a wedding and is running late.

At 5:05 the Go-Go Gas Pumper Truck arrives and parks next to one of the pumps near Pat Smith's car.

The station attendant, Tony, comes out to help the pumper truck fill the gas station's underground gas tanks.

At 5:00 p.m. Helen buys a lottery ticket inside the Food & Fuel. She says, "I better win because I'm out of money."

Helen spent Saturday at the nearby casino.

Helen has a gambling problem.

Helen lives in the nearby town.

At 5:00 p.m. Franklin goes to his car at the end of his working day at the Torro company as the Human Resource Director.

Franklin's car is parked at the edge of the Torro company parking lot next to the Food & Fuel.

Franklin walks to the Food & Fuel to buy a rose for his wife.

Franklin was recently passed over for promotion.

Franklin had promised to buy his wife a diamond anniversary band after his promotion.

While walking to the Food & Fuel, Franklin passes Pat Smith's car.

4:45 p.m. Lynch pulls into the Texaco Food & Fuel on a motorcycle.

A motor cycle gang arrives at the Texaco Food & Fuel with Lynch.

Lynch's motorcycle stops working.

Garage mechanic says motorcycle will take a few hours to fix and cost $380.00.

Lynch hops on the back of a fellow cyclist's bike at 5:09 p.m..

The motorcycle gang drives to the next town for dinner.

At 5:11 p.m. Sam's softball team pulls into the gas station in a van and parks next to Pat Smith's car.

At 5:12p.m. Tony hears someone in the van say "Sam, I dare you."

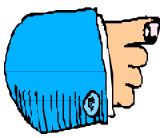
4:45 p.m. student in an old rusted car pulls into Food & Fuel and buys $5.00 worth of gas.

Larry had Pat Smith as a teacher several years ago.

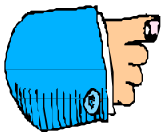
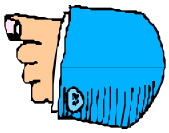
Larry received her only "D" in Pat Smith's science class.

At 6:30 p.m., $500 is charged on Pat Smith's credit card in a nearby town.

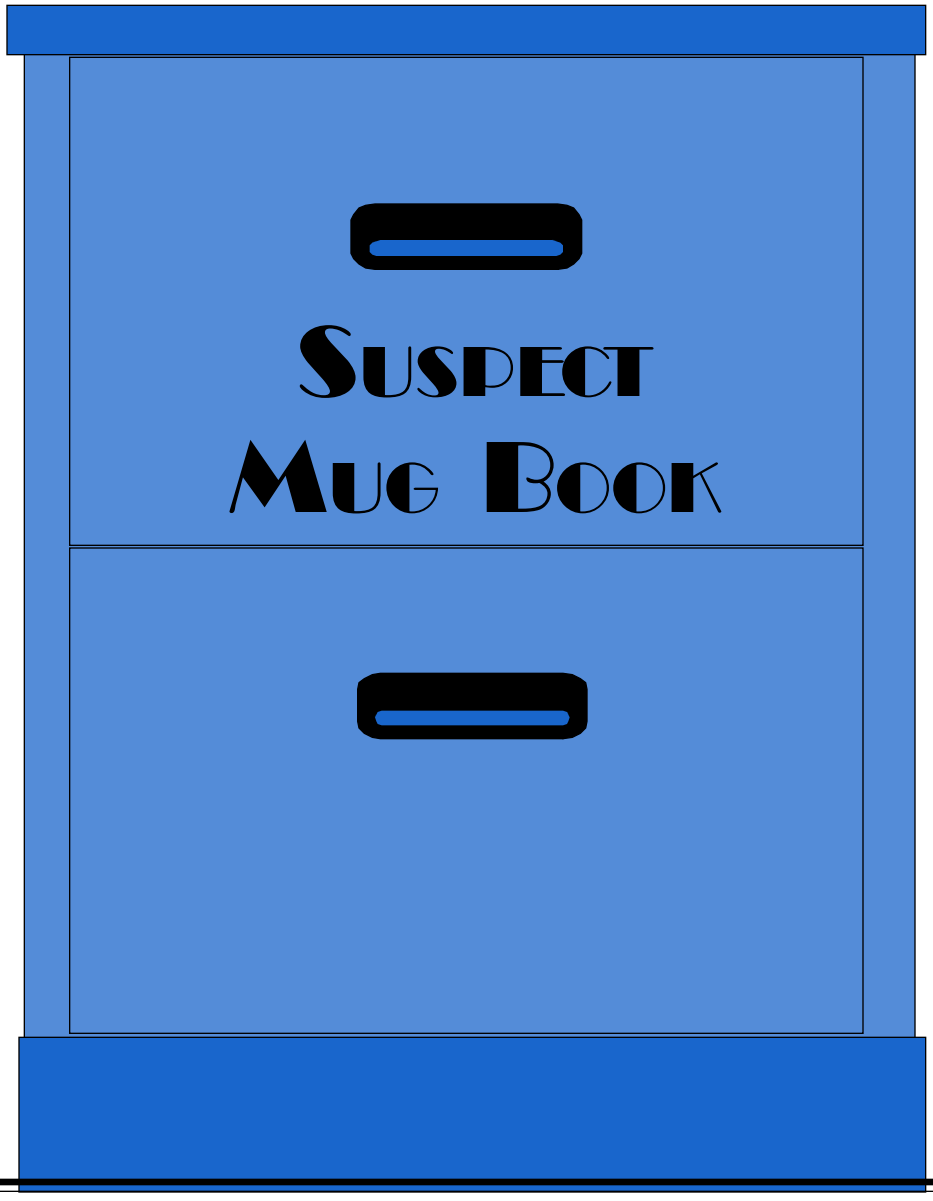
FINGERPRINT CARDS

Right Hand 	Thumb	First Finger	Second Finger	Third Finger	Fourth Finger
Formula					
Left Hand 	**Thumb**	**First Finger**	**Second Finger**	**Third Finger**	**Fourth Finger**
Formula					

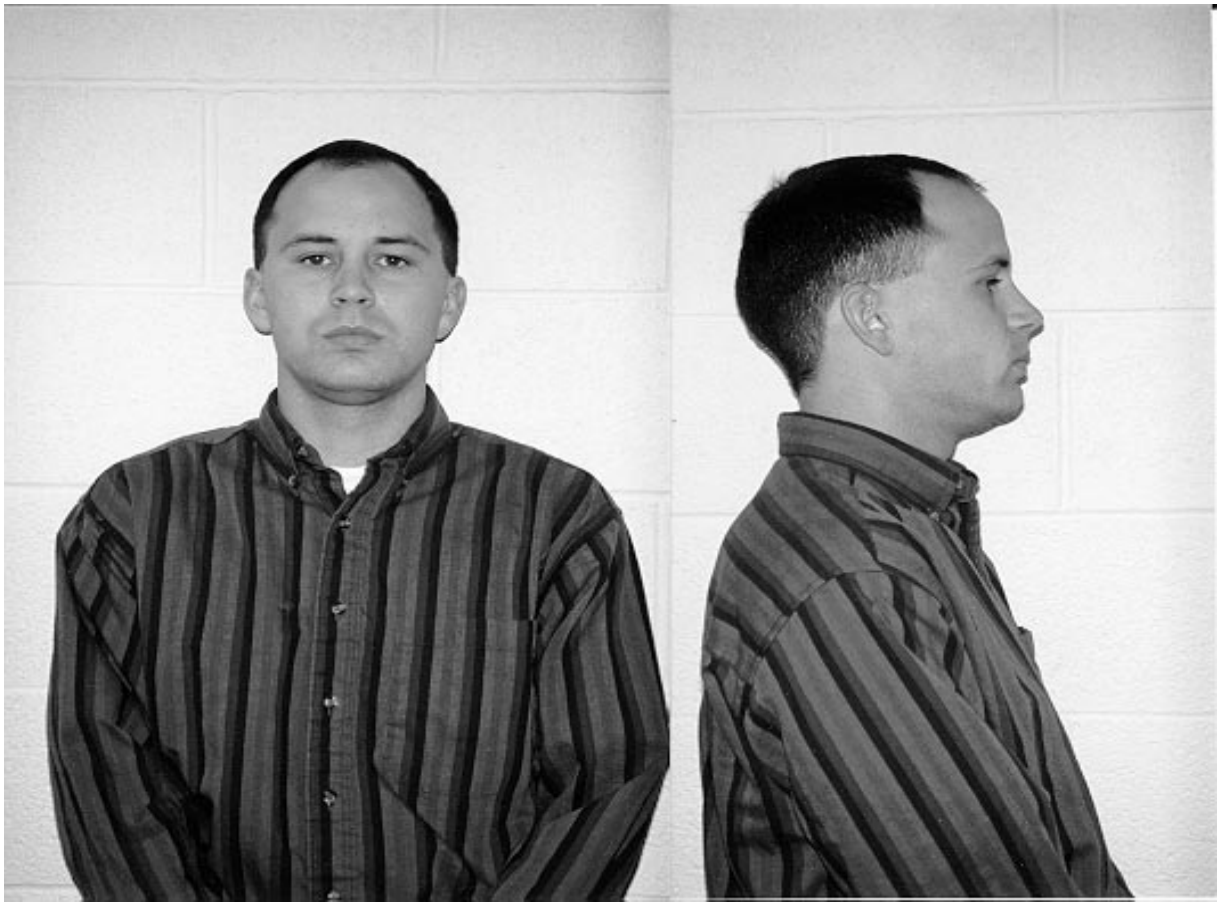
FINGERPRINT CARDS

Right Hand 	Thumb	First Finger	Second Finger	Third Finger	Fourth Finger
Formula					
Left Hand 	**Thumb**	**First Finger**	**Second Finger**	**Third Finger**	**Fourth Finger**
Formula					

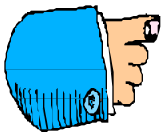
The Case File of Pat Smith

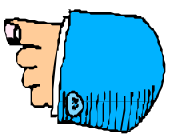


Suspect: Lynch



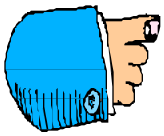
Fingerprints

Right Hand	Thumb	First Finger	Second Finger	Third Finger	Fourth Finger
					

Left Hand	Thumb	First Finger	Second Finger	Third Finger	Fourth Finger
					

Suspect: Larry Letme

Fingerprints

Right Hand	Thumb	First Finger	Second Finger	Third Finger	Fourth Finger
					

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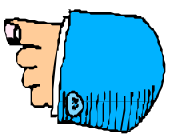
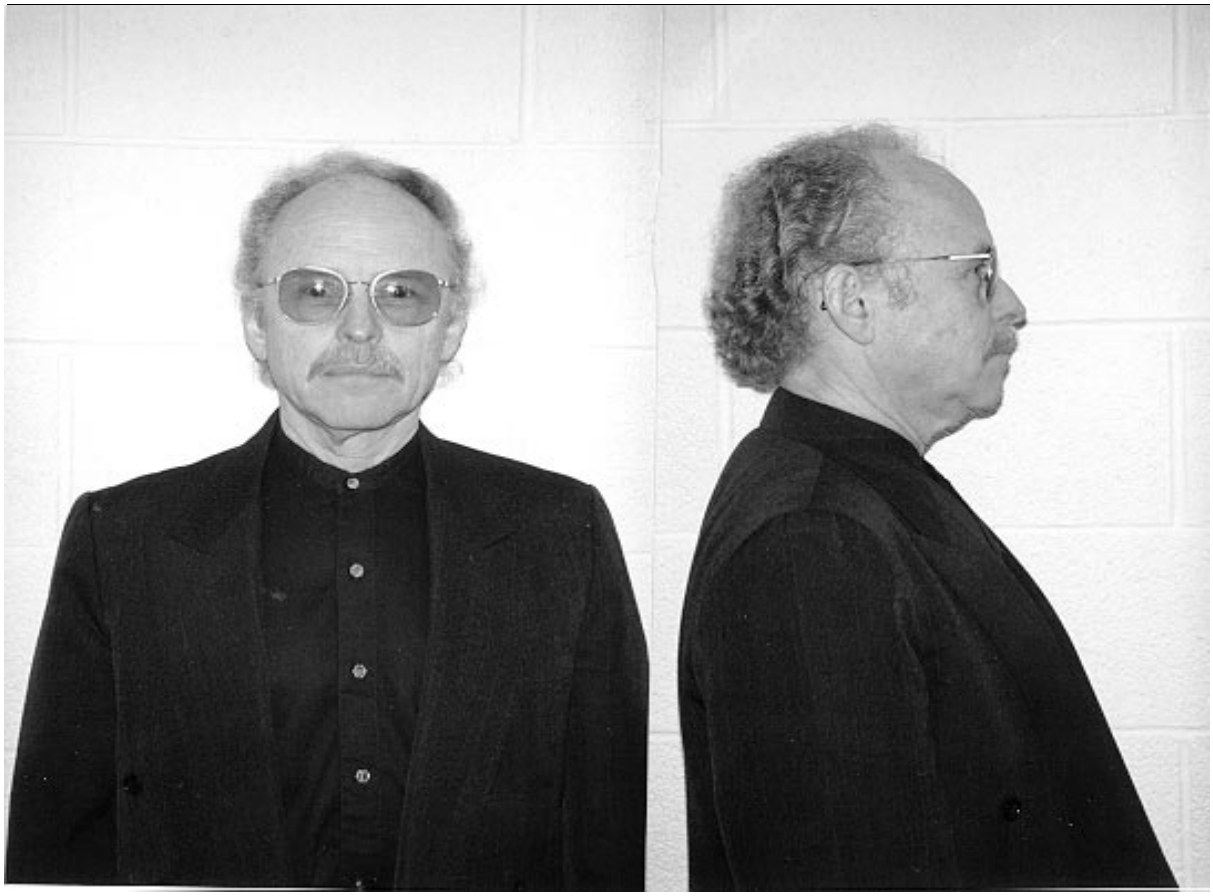
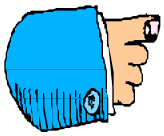
					

Suspect: Franklin Mint, III



Fingerprints

Right Hand	Thumb	First Finger	Second Finger	Third Finger	Fourth Finger
					

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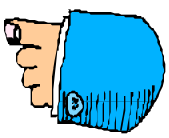
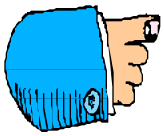
					

Suspect: Tony Tiger

Fingerprints

Right Hand	Thumb	First Finger	Second Finger	Third Finger	Fourth Finger
					

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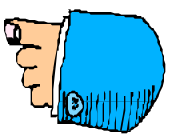
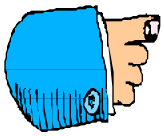
					

Suspect: Sam Iam

Fingerprints

Right Hand	Thumb	First Finger	Second Finger	Third Finger	Fourth Finger
					

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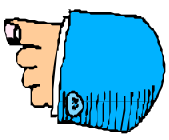
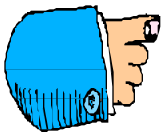
					

Suspect: Helen DeRanged

Fingerprints

Right Hand	Thumb	First Finger	Second Finger	Third Finger	Fourth Finger
					

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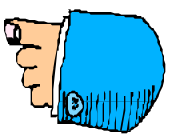
					

Fingerprint Pattern Types

All fingerprint patterns are divided into three classes based on the arrangement of the friction ridge lines which make up the fingerprint: loops, whorls, and arches.

Sixty to sixty-five percent of the population has loop-type fingerprints. Thirty to thirty-five percent have whorls. Only about five percent of the population has arches. These three classes of fingerprint form the basis for all of the ten-finger classification systems used throughout the world.

Loop-type patterns

Loop-type patterns must have one or more ridge lines which enter from one side of the pattern area, recurve, and exit from the same side. If a loop opens toward the little finger, it is called an **ulnar loop**. If a loop opens toward the thumb, it is called a **radial loop**. Below is an example of a loop-type fingerprint.

Fingerprint 1. Loop-type pattern

Arch-type patterns

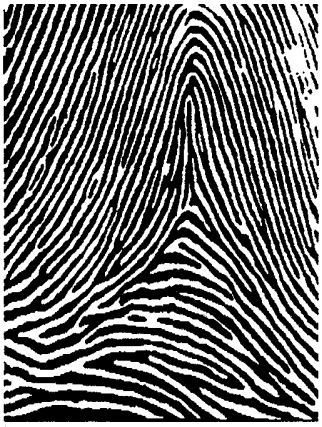
Arch-type patterns generally are divided into two general patterns - plain and tented arches.

The plain arch is the simplest of all fingerprint patterns. It is formed by ridges entering from one side of the print and exiting the opposite side with a gentle rise or wave in the center of the pattern.

Fingerprint 2. Arch-type pattern

The tented arch is similar to the plain arch except that instead of rising smoothly at the center, there is a sharp upthrust or spike in the center ridge lines. There are two tented-arch patterns - the tented arch and the exceptional arch. The tented arch is essentially a loop-type pattern which lacks the center recurving ridge line.

The exceptional arch is an arch-type pattern in which the upthrust ridge lines culminate in an angle of less than 90 degree. The exceptional arch is classified as a tented arch. Arch-type patterns have no type lines, deltas, or cores.



Fingerprint 3. Tented arch-type pattern

Whorl-type patterns

The whorl family of fingerprints is made up of plain whorls and composites.

A plain whorl is a fingerprint pattern which has two sets of type lines and two deltas, one on each side of the pattern area. Between the deltas is a spiraling ridge line which passes its point of origin at least once. This ridge line may be a spiral, an oval, or any variant of a circle. To determine if a whorl is plain or composite, an imaginary line is drawn between the deltas. If one of the spiraling ridges bisects the imaginary line, the whorl is plain. If the ridge does not bisect the imaginary line, the whorl is a composite and either a central pocket loop or lateral pocket loop.

Fingerprint 4. Whorl-type pattern

Composite whorls are whorl fingerprint patterns containing two or more sets of type lines and two or more deltas. As the name implies, composite whorls are made up of two or more fingerprint pattern types. Composite whorls are divided into four distinct pattern types: central pocket loops, lateral pocket loops, twin loops and accidental whorls.

Central pocket loops are loop-type patterns in which some of the ridges tend to form a whorl at the center. An imaginary line drawn between the deltas would not touch a recurving ridge line in the central pocket loop pattern.

Fingerprint 5. Central pocket loops

Lateral pocket loops are loop-type patterns in which two loops are intertwined. One of the loops surrounds the other. The core (the center or inner terminus or recurving ridge line) is on the same side as either of the deltas. The lateral pocket loop has two or more deltas, two sets of type lines, and two cores.

Fingerprint 6. Lateral pocket loops

Twin loops (also called twinned loops) are whorl-type patterns in which two loops are intertwined. One loop surrounds or tends to surround the other. Both loops lie between the deltas which are on each side of the pattern area.

Fingerprint 7. Twin loops

Accidental whorls are whorl-type patterns which are made up of two or more pattern types within a single fingerprint. Accidental whorls have two or more deltas, two or more cores, and two or more sets of type lines.

An accidental whorl is a fingerprint pattern which does not conform to any of the definitions for other pattern types.

Fingerprint 8. Accidental whorl