

# EVIDENCE AND INVESTIGATION



# CRIME SCENE BASICS

- Crime: When someone does something against the law.
- Suspects/persons of interest: People thought to be involved in the crime
- Motive: The reason someone committed the crime
- Opportunity: When did the suspect have a chance to commit the crime. Do they have an alibi?
- Alibi: A story that places a suspect at another location during the crime. They usually have proof like receipts or a witness.
- Evidence: What clues are left behind? Trace or physical evidence? Finger prints, tire tracks, foot prints, fabric/fibers, soil, handwritten note, hairs, DNA, or eyewitnesses?

GUEST SPEAKER

# OBSERVATION, INFERENCE, HYPOTHESIS

Video: [http://www.youtube.com/watch?v=YpcX\\_zxkbBc](http://www.youtube.com/watch?v=YpcX_zxkbBc)  
<https://www.brainpop.com/science/scientificinquiry/scientificmethod/>

- **OBSERVATION**: Noticing or describing an event/object/situation around you. You have to be detailed and very specific when describing what you see.
- **INFERENCE**: A logical interpretation based on something that is already known.
- **HYPOTHESIS**: An explanation for a set of events that can be tested. Can be proven or DISPROVEN. Usually an “If .....then.....” Statement.

## EXAMPLE:

- OBSERVATION: DEAD POTTED PLANT, LIMP LEAVES
- INFERENCE: THE PLANT WAS OVER WATERED
- HYPOTHESIS: IF I water my plant everyday THEN it will grow thick and lush.





# SHOE/FOOT PRINTS

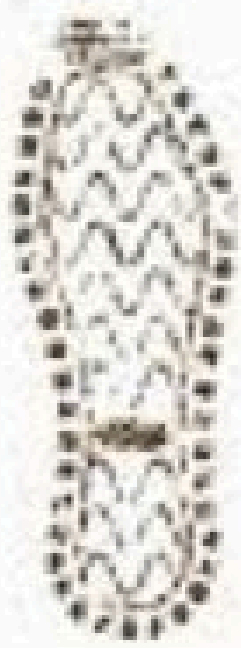
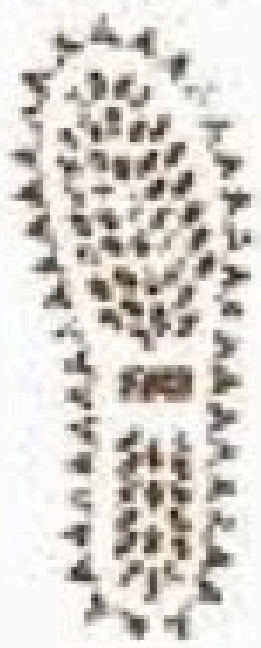
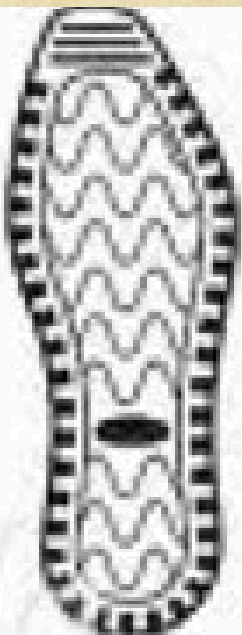
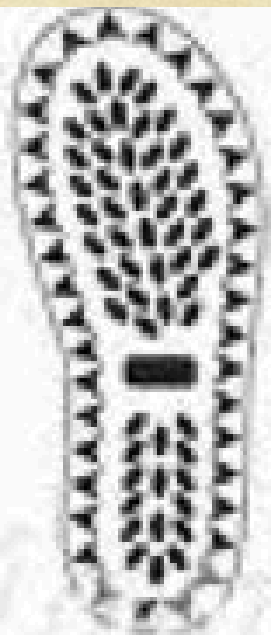
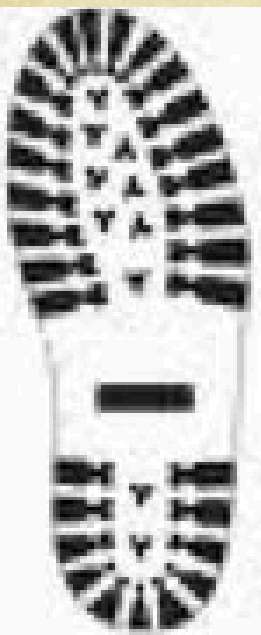
- What to look for: Tread, Size, Style, Direction, Walking/Running
- Parts of a shoe print made while running should be deeper than a print made while walking. The walking print should be clearer and more uniform.
- Depending on the running style of the suspect, there may be only deep toe marks from pushing off or deep heel marks from landing.
- The length of stride increases with speed. The farther apart successive prints are, the greater the speed.
- You will discover that shoe prints can be categorized in a number of ways, heels, visible treads, no treads, wide treads, narrow treads, size of the shoe print, pointed toe, rounded toe, etc.

ACTIVITY: Comparing footprints between 2-4 people who were walking or running using paint, and roll paper



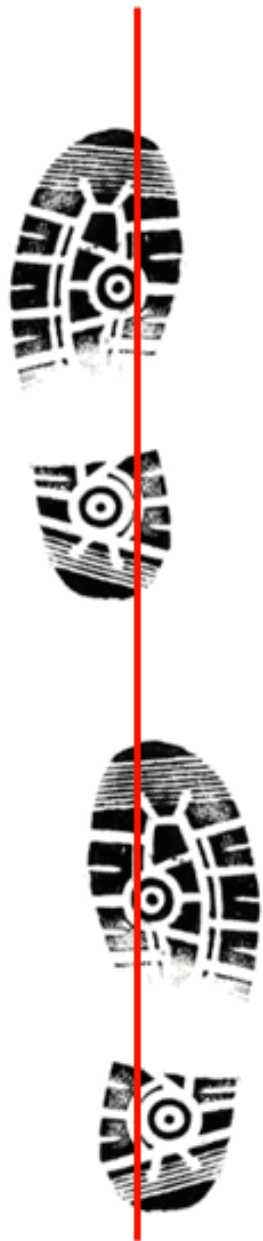








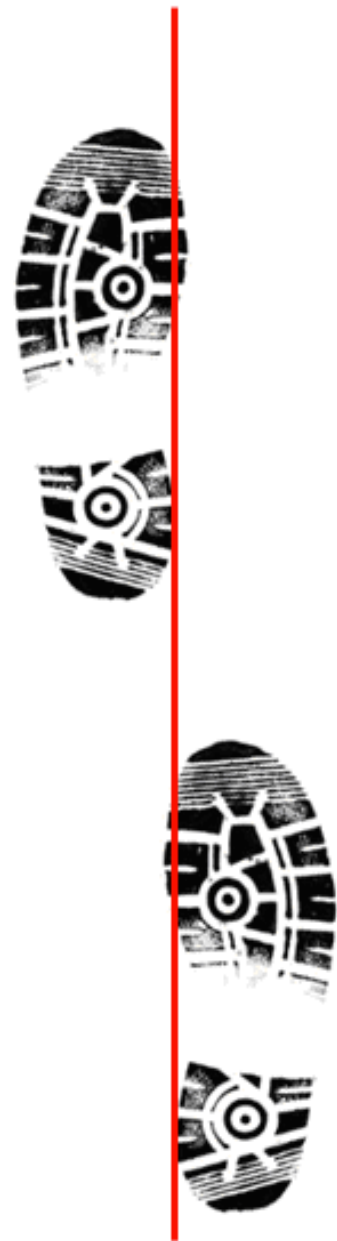
Normal



Leg crossover



Too wide?

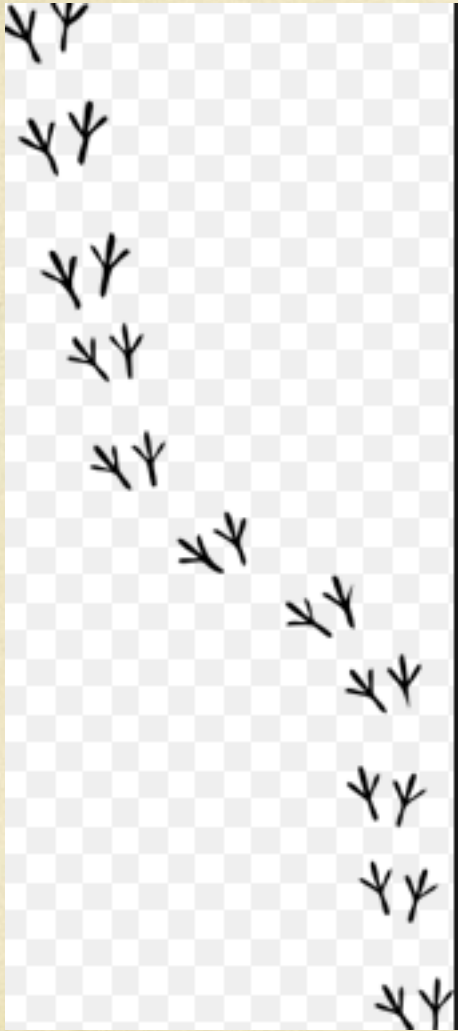


# ANIMAL AND TIRE TRACKS

When looking at animal tracks you should consider the following:

- Were these items left in the area recently?
- Have they been here for awhile? How can you tell?
- Who or what made the prints? BEAR OR BIRD?
- How fast was the subject moving?
- What direction was the subject going?
- Is there evidence of more than one animal being in the area?  
Did they interact?

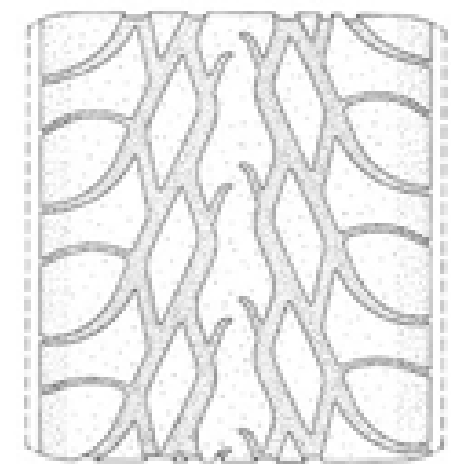
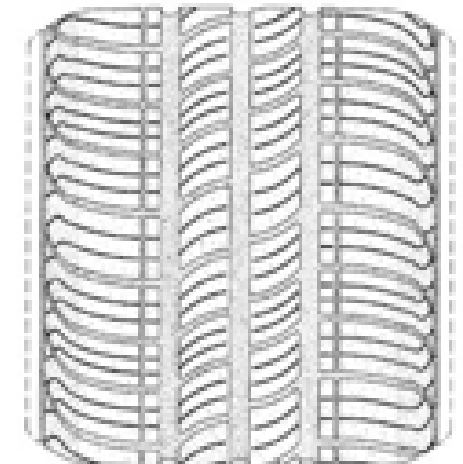
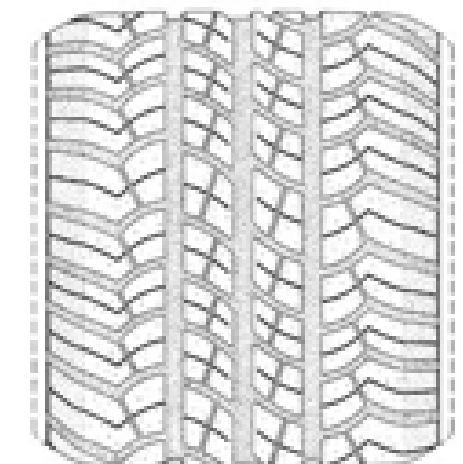
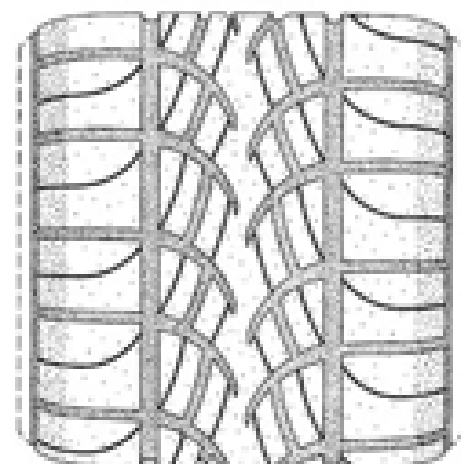
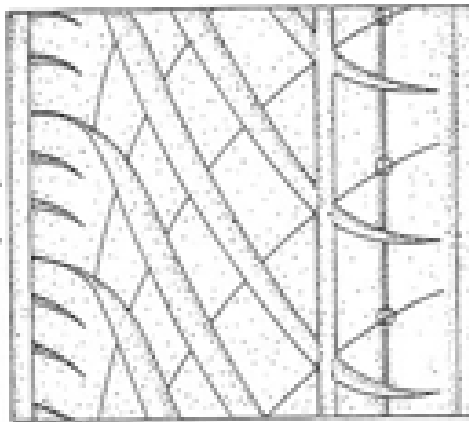
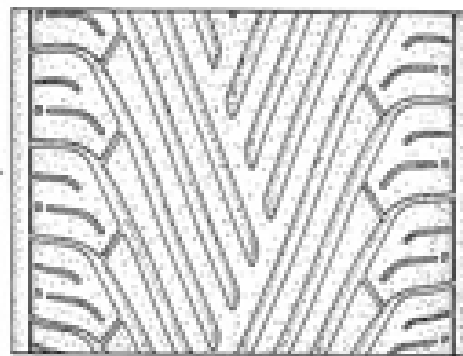
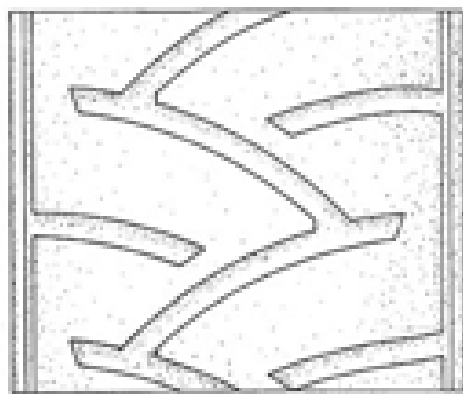
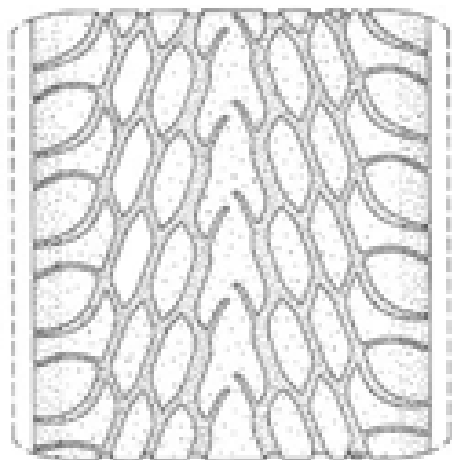
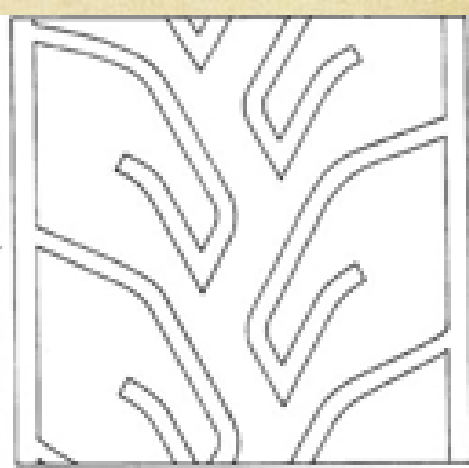
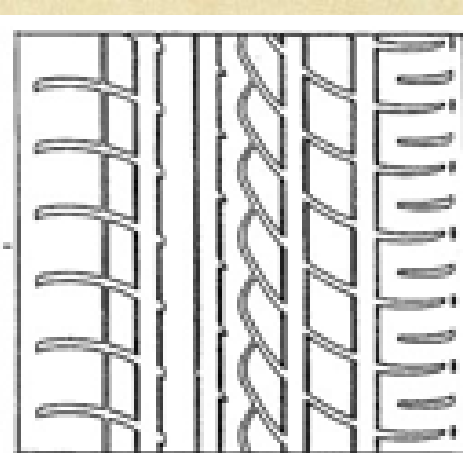
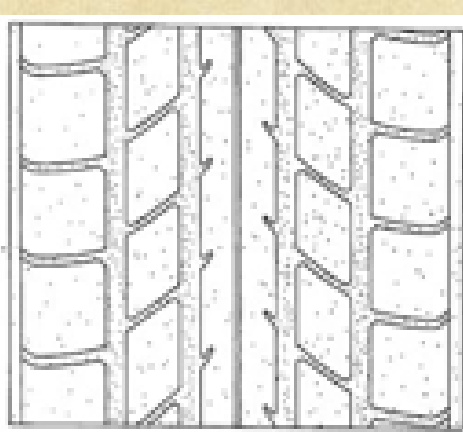
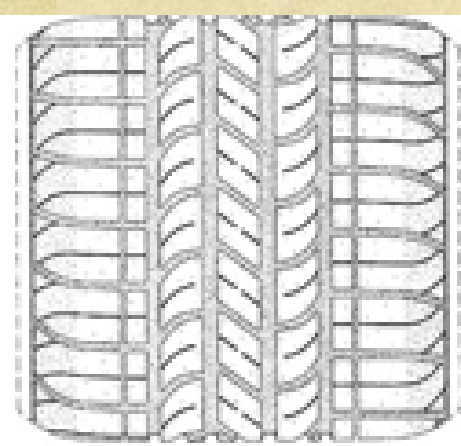




When looking at tire tracks students should consider:

- Are all tires the same?
- Is a tire from one manufacturer the same as a tire from another manufacturer?
- Do all vehicles have the same tires?
- Do trucks use the same tires as cars?
- Do minivans have the same tires as cars and trucks?

Samples of tires from the same manufacturer will be similar because they are made on the same machine; or tire treads from different vehicles will be different because different vehicles have tires from different manufacturers, etc.







# FINGER PRINTS

ARCHES: Have lines that start on one side of the finger and end on the other side of the finger. Kind of like hills or mountains.

LOOPS: Have lines that start on one side and then loop back to end on the same side of the finger.

WHORLS: They form circles and the lines do not appear to enter or exit either side of the finger.

COMPOSITES: A combination of all three or none of the three.

Activity: Classify your finger prints using graphite, clear tape, and white paper.

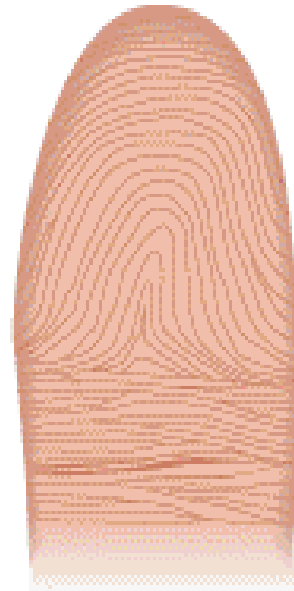
*There are three main types of prints.*



**Whorl**



**Loop**



**Arch**

When the police identify fingerprints, the first thing they do is look at the pattern of the print i.e., loop, whorl, arch or composite. Once they have a matching pattern type, they look for unique features of a print to help them match a suspect to the fingerprints found at the scene of a crime. In order for the print to be considered “a match” they must have a number of ridge characteristics in common. The following are four ridge characteristics they look for in a fingerprint.

- Bifurcation (fork)
- Ridge Endings
- Island
- Lake/dot

<https://www.youtube.com/watch?v=FM8NE4VVYGk>

<http://handlines.blogspot.ca/2005/09/do-you-have-unusual-fingerprints.html>



**LOOP**

**LOOP**

**65% of all  
fingerprints**

Loops have lines entering at one side of the finger pad and leaving on the same side.

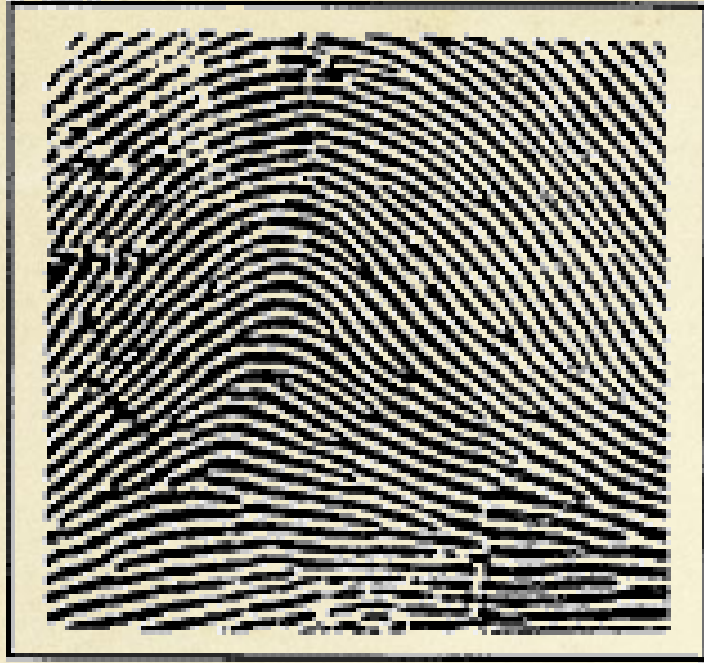


WHORL

## WHORLS

30% of all  
fingerprints

Whorls have lines entering at the side of the finger pad and spiraling inward ending at the center.



ARCHES

## ARCHES

5% of all  
fingerprints

Arches have lines entering on one side of the finger pad and leaving on the opposite side.

# FABRIC FORENSICS

When looking at fabrics what should you consider?:

- What tests can be performed to discover what distinguishes one fabric from another?
- Will it wrinkle?
- What color is it?
- Does the dye come out in water? In other solvents?
- What does the weave look like?
- How does it feel?
- Will it stretch?
- Does it absorb or repel water?
- What happens when it burns?
- What does one thread look like?



- Do all fabrics respond to flame in the same manner?
- Does the fabric burn?
- Does the fabric melt?
- Is there an odor?
- Is there smoke or flame?
- Does it scorch?
- Does it ignite immediately?
- Is there a residue?
- What does it look like?

Man-made fibers are more likely to melt and give off noxious fumes than natural fibers. Natural fibers are more likely to scorch and burn. Wool will smell of burnt proteins (hair).

# CHROMATOGRAPHY and HANDWRITING ANALYSIS

Chromatography: Separation of a mixture into its component substances by a moving solvent front. As different components move at a rate, they separate.

- ACTIVITY: LAB testing different ink

## Alphabet Analysis

Some of the indicators used in comparing handwriting samples are:

- Spacing and slant of the letters
- Spacing and size of the words
- Pressure on the page
- Formation of the loops, dots, and crossing of letters.
- How letters are joined
- Etc.

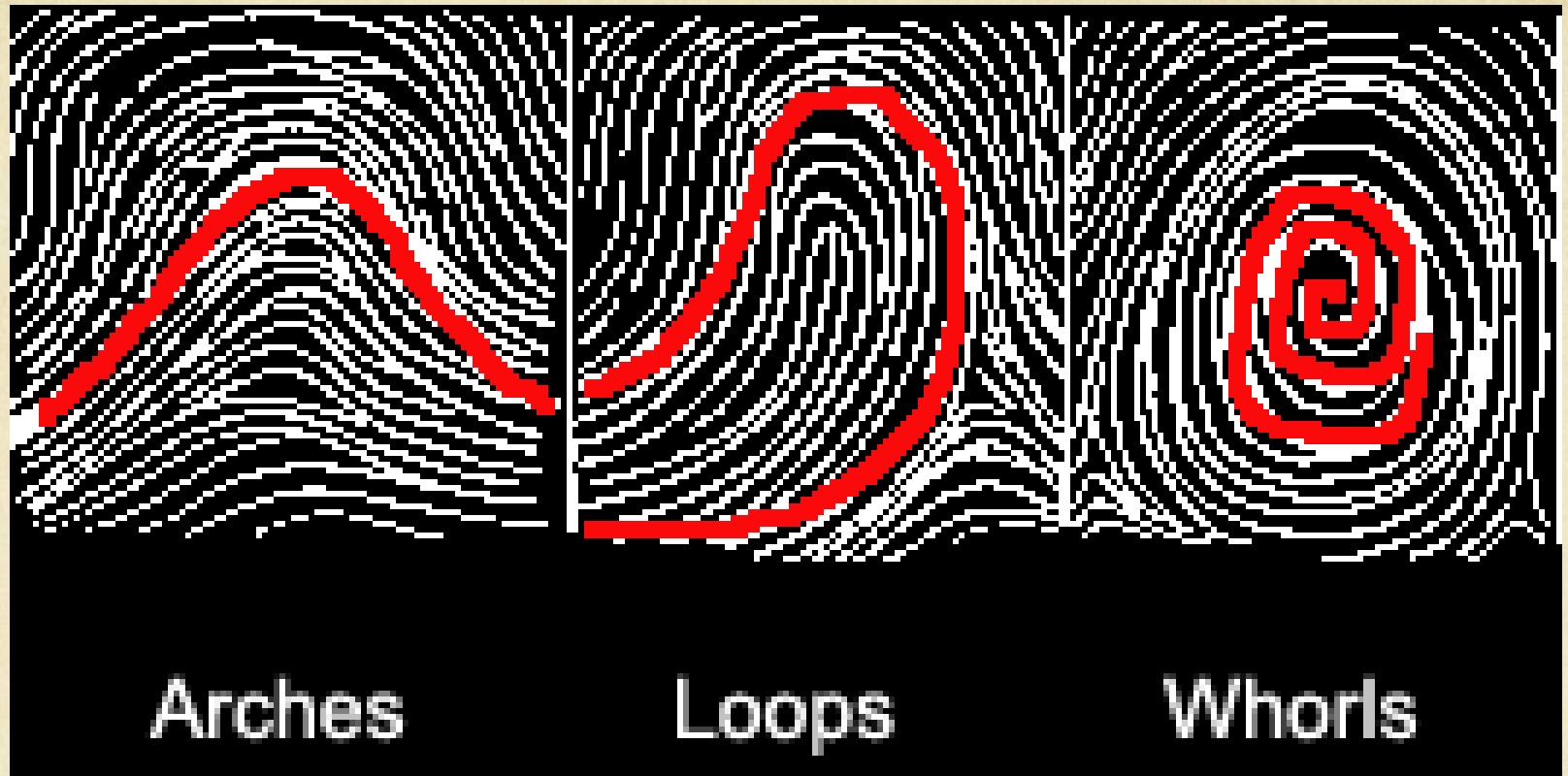
ACTIVITY: Comparing crime scene letters/notes

- Possible tests:
- Stretch
- Colourfastness (how well does it hold its colour?)
- Absorbency
- Wrinkling
- Thread
- Flammability

After a crime has been committed, a cloth piece caught on a window, nail, birdcage, etc., can be compared to clothing worn by suspects on the night in question, taking care to match torn edges and fiber types.

Police may find hair or fibers at the scene of a crime or on a suspect's clothing. They examine the fibers in the lab to determine whether there is a match.

Activity: Fabric testing



Notice the difference between the three...



Island

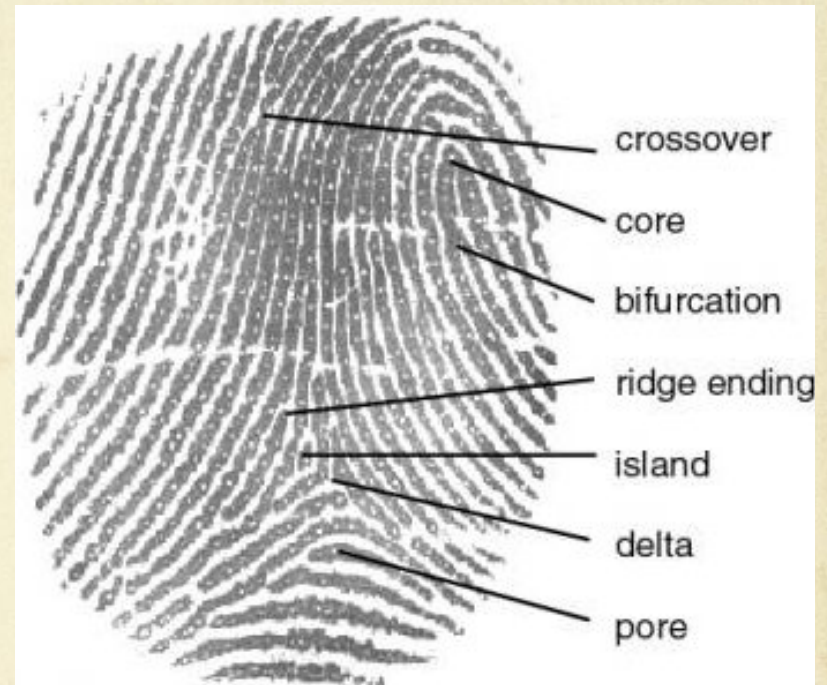
Dot

Ending  
ridge

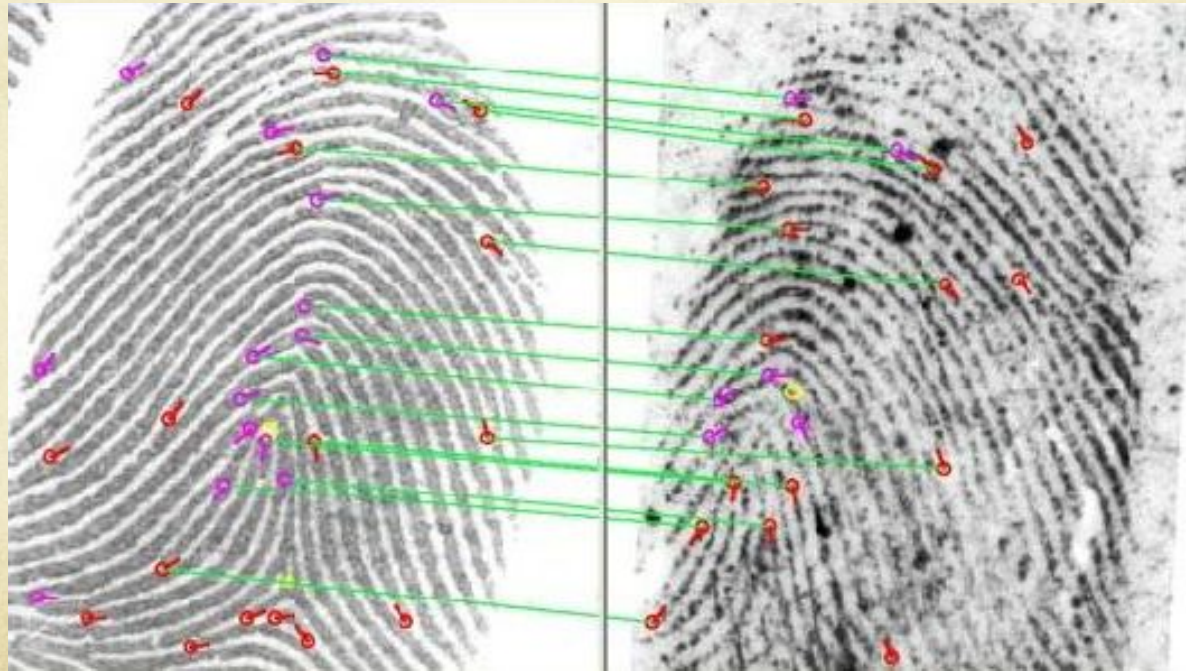
Bifurcation

# *WHAT IS A FINGERPRINT?*

- Fingerprints are unique patterns of ridges on the finger skin.
- Prints are created during the fetal stage and remain the same all life long.
- *Did you know even twins have different prints?*



Law enforcement use computers to look for similarities between specific points on prints.



# SOIL SAMPLES

- What makes one soil sample different from another?
- Color, texture (soft, coarse, smooth, gritty), odor (musty, woody, decay), comprised of different materials (sand, black soil, clay, leaves, etc.), shape and size of particles.
- Other material found in the soil may include insect parts, fur, hair, bones, branches, etc. Another avenue of police investigation might involve the discovery of soil (from a footprint, a knocked-down flower pot, etc) and the comparison of this soil found in the suspect's yards, cars, or homes.