

Evidence and Investigation Study Guide

1. Recognize evidence of recent human activity and animal activity in a natural outdoor setting.
2. Observe a set of footprints, and infer the direction and speed of travel.
3. Recognize that evidence found at the scene of an activity may have **unique characteristics** that allow an investigator **to make inferences** about the participants and the **nature of the activity**:
 - a. Fingerprints
 - b. Footprints
 - c. Fabric
 - d. Handwriting
 - e. Ink chromatography
 - f. Tire prints
 - g. Soil
4. Give examples of how specific evidence may be used (eg. Match fingerprints to ones in a database, burn/soak fabric in chemicals, compare handwriting samples etc)
5. Investigate evidence and link it to a possible source by:
 - **Classifying footprints** – size, pattern, depth, distance between, wear, weight, height, type of shoe (hiking, high heel, runner etc)
 - **Classify tire prints** – tread pattern, areas worn down, depth etc
 - **Classify soil samples** – color, texture, odour, size, mixture of materials etc
 - **Analyzing the ink** – chromatography, different colors present in black ink etc
 - **Analyzing handwriting** – slant/straight, space between letters and words, handwriting/printing, dotted 'i's, crossed 't's, letters connected, loops etc
 - **Comparing samples of fabric** – color, texture, pattern, reaction to flame, reaction to chemicals etc
 - **Classifying fingerprints** – loop, whorl, arch, composite, ridge ending, delta, island, lake bifurcation (fork), matching 2 or more fingerprints etc

Thursday, November 14th

Evidence and Investigation

How do police and investigators solve crimes?

- **Observations** are information gathered through our senses (see, smell, touch, taste, hear)
- **Inferences** are a conclusion about something based on an observation.
 - Example: Jim observed that there was a broken window in the classroom. The glass was on the inside of the classroom. Jim inferred that the window was broken from the outside of the classroom.
- **Classify** means to arrange things in groups according to similar qualities.
- **Evidence** is any bit of information, physical markings or objects that give people a reason to believe something.
- Common types of evidence are
 - Fingerprints - Materials and fibers
 - Tire tracks - Animal tracks
 - Soil Samples - Shoeprints and/or footprints
 - Handwriting Samples - Witness Identification

Monday, November 18th

Shoe Characteristics

Size

- Says size on bottom of shoe
- Use ruler or tape measure
- Width of the shoe

Direction

- Pressure/depth of print
- Heel or toe
- Walking sideways footprints side by side
- Freshest footprints
- Dragging feet - look at smudge

Speed/Gait

- Walking: footprints close together
- Running: footprints are further apart (note tall people have longer strides)
- Running in mud/snow, kick up remnants behind them
- Sprinting: only see toe part, no heel

Tread Pattern

- Brands have unique patterns
- Certain brands can only be bought in certain stores
- Different "grips" or depth of treads (high heel shoe = no grip, hiking boots = lots of grip)

Fingerprints

Fingerprints are marks left by tiny ridges of your finger tip. These markings are left by dust or other particles on the oil of your skin.

There are 4 main types of fingerprints:

The arch fingerprint goes from one side of the finger to the other.



The whorl fingerprint has a central circle area with ridges circling around it. The whorl ridges do not go from one side to the other.



The loop fingerprint begins at one side of the finger, loops around and the ridge ends at the same side of the finger that it began



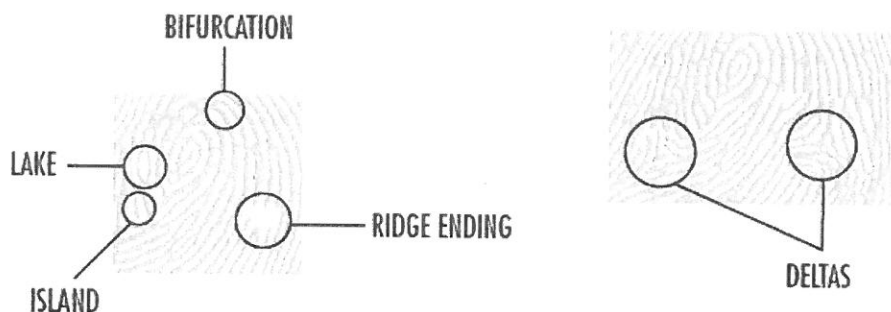
The composite fingerprint is a combination of the whorl, arch or loop together on the finger.



Ridge Characteristics

Within a fingerprint, there are characteristics that help investigators match up fingerprints. These are ridge characteristics. These might include:

Ridge	Characteristics
Bifurcation (Fork)	1 ridge splits to form 2 ridges and then rejoin one ridge again, forming a shape like a lake.
Lake	A ridge in the shape of a circle/oval
Ridge Ending	A ridge ends.
Island	A very short ridge in the print pattern is not connected to any other ridge, much like an island floating by itself.



Fingerprints can be lifted off surfaces using powders, brushes and tape.

Smooth surfaces are easier to lift prints off than rough surfaces. Some surfaces are not good for lifting prints off of.

- Good surfaces: glass, mirrors, smooth plastic, smooth metal
- Bad surfaces: bricks, materials, wood











Fingerprints can only be matched if they have a suspect to compare samples to or if the suspect has fingerprints in a database.

Name: _____

Master #9

Date: _____

Pencil Print

	Thumb	Index	Middle	Ring	Pinkie
Left Hand Print					
Type of Print	loops.	loop	Composite	loop	loop
Right Hand Print					
Type of Print	whorl	loop	loop	loop	loop

Total number of finger prints you have of each pattern:

arch loop whorl composite

Fabric characteristics

Texture:

- Rough, smooth, soft , fuzzy etc

Colour:

- All colours of threads , single color etc

Weave pattern:

- Tight or loose weave
- Under and over (alternating) , double under/double over
- Single under, double over (and vice versa) etc

Flame test:

- Burns up , melts , turns to ash. Smells good/bad when burned.
Changes color, texture

Moisture:

- Absorbs moisture , water beads, water slides off of fabric

Thursday, December 05, 2013

Soil Characteristics

L.F. What are the different characteristics of soils?

Odor: Another word for smell.

- Stinks , smells good (aroma) , moist fresh

Shape

- Rectangular , circular , clumpy

Texture

- Rough , moist/dry , smooth , gritty , rocky/sharp

Colour

- Brown , reddish , grey , golden etc

Size

- Large , medium , small , granular , particles

Heterogeneous Mixture

- Made up of more than one substance
- Ex. Dirt, leaves, twigs, soil/sand, gravel, salt

Tire Characteristics

Wednesday, December 11, 2013

Tread Pattern

- Crossed , angled , triangles etc

Width of tire Track

- Narrow , wide

Width Between Tires

- Large gap, narrow gap

Depth of Tracks

- Deep , shallow

Monday, December 16, 2013

Eyewitness Information

- Useful tool to help analyze a crime scene
- Not highly reliable because the same scene may look different to all people depending on their:
 - o Position
 - o Line of sight
 - o Familiarity of the area
- Factors that affect a person's memory are:
 - o Age
 - o Race
 - o Use of drugs
 - o Trauma
 - o Time of day
 - o Influenced by other witnesses/investigators
- However, they are still commonly used to identify suspects

Ink Chromatography

- Chromatography is a method for analyzing mixtures by separating them into the chemicals from which they are made.
- It can be used to separate mixtures like ink, blood, gasoline, and lipstick.
- In ink chromatography, you are separating the coloured pigments that make up the colour of the pen
- Even though a pen will only write in one colour, the ink is actually made from a mixture of different coloured pigments.

To perform ink chromatography, you put a small dot of ink to be separated at one end of a strip of paper. This end of the paper strip is then placed in a solvent. The solvent moves up the paper strip; and, as it travels upward it dissolves the mixture of chemicals and pulls them up the paper. The chemicals that dissolve best in the solvent will move up the paper strip further than chemicals that do not dissolve as well. What is produced from this method is a **chromatogram**.

Forensic scientists are able to use ink chromatography to solve crimes by matching documents or stains found at a crime scene to the marker or pen that belongs to a suspect. Forensic scientists analyze the unknown ink and compare it to writing utensils collected from possible suspects.

Handwriting Characteristics

Monday 6th 2014

Handwriting/print

- Is the writing printed, handwritten, or a mix of both

Size of print

- Are the letters and words large, average, small

Slant

- Are the words slanted to the right or left (indicates right/left hand)

Spaces Between words/Letters

- Is there gaps between words or are they squished together
- Is there large gaps between letters or are they squished together

Specific letters - l, l, t, y, g, a

- Are there certain characteristics of these letters? Loops dots?

iii l l t t t y y y g g a a a

Capitals/lowercase

- Is it all written in capitals or lowercase letters

Graphology: The study of the letter shape in handwriting.