

# Unit 1: Introduction to Forensic Science Notes – Definitions and Background

## What is forensic science?

- \_\_\_\_\_  
–
- Includes the business of providing \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ information to all levels of decision makers in our criminal justice system
- The word *forensic* is derived from the Latin \_\_\_\_\_ meaning forum, a public place where, in Roman times, senators and others debated, performed, and held judicial proceedings.

## Criminalistics vs. Criminology *Criminalistics:*

\_\_\_\_\_

\_\_\_\_\_

*Criminology:*

\_\_\_\_\_

\_\_\_\_\_

## Crime Lab Services

*Crime labs can be government-run at the \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, or they can be private consulting businesses. Most Lab Services:*

Physical science unit

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

Biology unit

- Firearms and ballistics unit
- Document examination unit
- Photography unit

*The most common types of evidence examined are:*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Optional Services:

Toxicology unit  
Latent fingerprint unit  
Polygraph unit

Voiceprint analysis unit  
Evidence collection unit  
Engineering

**Specialty Services**

Forensic \_\_\_\_\_  
Forensic \_\_\_\_\_  
Forensic \_\_\_\_\_  
Forensic \_\_\_\_\_  
Forensic \_\_\_\_\_  
Forensic \_\_\_\_\_

Cybertechnology Geology  
Environmental science  
Polynology  
Polygraphy  
Voiceprint analysis

**Federal Crime Labs**

\_\_\_\_\_ : Federal Bureau of Investigation \_\_\_\_\_ : U.S. Fish and Wildlife Service  
Drug Enforcement Agency Department of Homeland Security  
\_\_\_\_\_ : Alcohol, Tobacco, and Firearms Department of the Treasury  
\_\_\_\_\_ : United States Postal Service

**Crime Scene Responders**

\_\_\_\_\_  
\_\_\_\_\_

Team members:

First police officer on the scene  
Medics (if necessary) Investigators

Medical examiner or representative (if  
necessary)  
Photographer and/or field evidence  
technician

Lab experts:

pathologist DNA  
expert  
forensic odontologist forensic  
psychologist firearm examiner  
document and handwriting  
experts

serologist  
\_\_\_\_\_  
forensic anthropologist  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Scientific Method (as it pertains to criminalistics)**

1. \_\_\_\_\_  
\_\_\_\_\_
2. Consider a hypothesis or possible \_\_\_\_\_.
3. Examine, test, and then analyze the evidence.
4. Determine the \_\_\_\_\_.
5. Formulate a \_\_\_\_\_ of  
the significance of the evidence.

## **Types of Law**

Constitutional: supreme document and final authority on laws

Statutory law: \_\_\_\_\_

Common law or case law: body of law made up of judicial opinions or precedents

Civil law: \_\_\_\_\_

Criminal law: \_\_\_\_\_

Equity law: remedial or preventive (restraining orders)

Administrative law: rules or laws established by agencies such as IRS, SSA, military

## **Bill of Rights: gives individuals the right**

*Summarize 5 rights that you think are very important:*

1.

2.

3.

4.

5.

## **Miranda Rights**

*Summarize the Miranda Rights:*

## **Types of Crimes** Infraction:

\_\_\_\_\_

Misdemeanor:

\_\_\_\_\_

Felony:

\_\_\_\_\_

## **Federal Rules of Evidence**

- In order for scientific evidence to be admitted in a court of law, it must be:

*Probative:* \_\_\_\_\_

*Material:* \_\_\_\_\_

### **The Frye Standard: 1923 case 'Frye v. US'**

Scientific evidence is allowed into the courtroom if it is generally accepted by the \_\_\_\_\_.

The *Frye* standard does not offer any guidance on \_\_\_\_\_.

The evidence is presented in the trial and the \_\_\_\_\_ decides if it can be used.

### **The Daubert Ruling: 1993 case 'Daubert v. Dow'**

The \_\_\_\_\_ decides if the evidence can be entered into trial.

Admissibility is determined by:

- Whether the theory or technique can be \_\_\_\_\_
- Whether the science has been offered for \_\_\_\_\_
- Whether the rate of error is acceptable
- Whether the method at issue enjoys widespread \_\_\_\_\_
- Whether the theory or technique follows \_\_\_\_\_

### **The Expert Witness**

The expert witness presents scientific evidence in court.

He/She will:

- Establish credibility through \_\_\_\_\_, background experience.
- \_\_\_\_\_.
- Render an \_\_\_\_\_ about the evidence.
- The judge may \_\_\_\_\_ the opinion's significance.

### **Facets of Guilt**

To prove a case, the "MMO" must be established; it must be shown that the suspect had:

Motive—

\_\_\_\_\_

Means—

\_\_\_\_\_

Opportunity—

\_\_\_\_\_

### **Introduction to forensic science: Observations**

Observation is a \_\_\_\_\_ of Forensic Investigators

Observation: everything we \_\_\_\_\_

The brain selects what information \_\_\_\_\_.

Investigators must observe, interpret, and report observations clearly at the crime scene and examine evidence in the crime lab \_\_\_\_\_ about its potential importance.

### Perception

- Our perception is \_\_\_\_\_
- Our brains
- fill in information that is \_\_\_\_\_
- \_\_\_\_\_ we already have about our surroundings to new situations
- Understanding these limitations of the brain helps to improve our observation skills

### Eyewitness Accounts

According to The Innocence Project (2008) "Eyewitness misidentification is the single greatest cause of wrongful convictions nationwide, playing a role in more than \_\_\_\_\_ of convictions over-turned through DNA testing."

Still, the criminal justice system profoundly relies on eyewitness identification and testimony for investigating and prosecuting crimes (Wells & Olson, 2003).

### Eyewitness Testimony

- Juries \_\_\_\_\_ by eyewitness identifications.
- Lots of innocent people convicted because of faulty eyewitness accounts.
- Some Issues:
- types of \_\_\_\_\_ asked by investigator
- type of \_\_\_\_\_
- Emotional response \_\_\_\_\_ to a certain point
- (Do you remember where you were when 9/11 happened?)
- \_\_\_\_\_ of questioning after event
- \_\_\_\_\_

### How to be a good observer

1. Make a \_\_\_\_\_  
\_\_\_\_\_
  - At a crime scene, start at one corner and run your eyes slowly over the place looking at everything you see.
2. Consciously decide \_\_\_\_\_

- 
- This prevents the brain from filtering out 'unimportant' information without your awareness.
3. Concentrate first \_\_\_\_\_
- 
- This prevents the brain from interpreting what we see by finding patterns and making connections.
4. Write down \_\_\_\_\_
- Our memories are faulty and physical documentation is important in admitting evidence into court.

**What do forensic scientists do?**

- Find, examine, and evaluate evidence from a crime scene
- Forensic scientists have analytical skills such as the ability to observe a situation, organize it into its component parts, evaluate it, and draw appropriate conclusions.

**Observation Activity Notes:**

## Major Developments in the History of Forensic Science

**1248:** A murder in China was solved when flies were attracted to invisible blood residue on the sword of a man in the community.

**1784:** John Toms was convicted of murder on the basis of the torn edge of a wad of paper in a pistol matching a piece of paper in his pocket.

**1863:** The first presumptive test for blood is developed (hydrogen peroxide)

**1904:** Edmond Locard formulated his famous principle, "Every contact leaves a trace."

**1906:** bite mark evidence is first used in an English Court to convict two burglars using teeth marks found in cheese at the scene

## Scientists

### Mathieu Orfila (1787-1853)

- Spanish born but did work in France
- \_\_\_\_\_
- 1814 published a Treatise on the detection of poisons

### Alphonse Bertillon (1853-1914)

- French Scientist
- \_\_\_\_\_
- Devised the first crime scene kit –still used today

### **Anthropometry**

- The Bertillon system relied on a detailed description and measurement of the subject.
- Eleven measurements were necessary.
- \_\_\_\_\_

### **Will West/William West**

- 1903: Leavenworth Federal Prison.
- Will West was brought to the prison and had his measurements taken
- Match William West
- \_\_\_\_\_

### Francis Galton (1822-1911)

- British Scientist.
- 1892 published the book "*Finger Prints*" which contained the 1st statistical proof supporting the uniqueness of fingerprints.
- \_\_\_\_\_

### **Karl Landsteiner (1868-1943)**

- Austrian who immigrated to the U.S.
- 1901 Discovered human blood could be grouped into different categories (A, B, AB and O).
- 1930 Won Nobel Prize.
- \_\_\_\_\_

### **Hans Gross (1847-1915)**

- Lawyer and Judge in Austria
- 1893 Published the first treatise on applying science to criminal investigation
- \_\_\_\_\_

### **Edmond Locard (1877-1966)**

- 1910 set up the first Forensic Lab in Lyons, France
- Founder and Director of the Institute of Criminalistics @ the University of Lyons
- \_\_\_\_\_

#### **Locard's Exchange Principle**

- When a criminal comes in contact with an object or person, a cross-transfer of evidence occurs
- The criminal either removes something from the crime scene or leaves something behind
- Either way this exchange can link the criminal to the crime scene.
- \_\_\_\_\_

### **Paul Kirk (1902-1970)**

- U.S. scientist that applied biochemistry to forensics
- 1950 Head of the Crime Dept @ U of Cal school of Criminology  
1953 published "*Crime Investigation*", a handbook for lab techniques

### **J. Edgar Hoover (1895-1972)**

- Director of the FBI (1924-1972)
- FBI was established in 1905 by Teddy Roosevelt as the Bureau of Investigation • 1924 National Fingerprint file organized
- 1932 Crime Lab Established
- 1935 National Police Academy formed
- \_\_\_\_\_