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
_____: Drug Enforcement Agency
_____: Alcohol, Tobacco, and Firearms
_____: United States Postal Service

U.S. Fish and Wildlife Service
Department of Homeland Security
Department of the Treasury

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:

Unit 1: History of Forensic Science and Scientists Timeline

700 AD:	Chinese used fingerprints to establish identity of documents and clay sculptures.
1000:	Roman courts determined that bloody palm prints were used to frame a man in his brother's murder.
1149:	King Richard of England introduced the idea of the coroner to investigate questionable deaths.
1248:	A murder in China was solved when flies were attracted to invisible blood residue on the sword of a man in the community.
1514:	Earliest known use of blood spatter evidence.
1598:	Fidelus was first to practice forensic medicine in Italy.
1668:	Analysis of blowfly infestation of rotting meat allows Francesco Redi to refute the hypothesis of "spontaneous generation" of maggots
1670:	Anton Van Leeuwenhoek constructed the first high-powered microscope.
1776:	Paul Revere identified the body of General Joseph Warren based on the false teeth he had made for him.
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.
1810:	First recorded use of questioned document analysis involving chemical test for a particular dye
1814:	
1816:	A farm laborer is convicted of murder based upon impression evidence
1840:	Forensic toxicology is first used to convict Marie Lafarge, by use of the March test (detects arsenic compounds), of poisoning her husband.
1856:	Herschel uses thumbprints on documents to identify workers

1859: Gustav Kirchhoff and Robert Bunsen developed the science of spectroscopy.

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

1864: Crime scene photography developed.

1879: Alphonse Bertillon developed a system to identify people using particular body measurements.

Extra info:

1887:

1896: Edward Henry developed the first classification system for fingerprint identification.

1889: Alexandre Lacassagne publishes a text on matching bullets to individual gun barrels

1892:

1893:

1900/1901: Karl Landsteiner identified human blood groups.

1903:

1904: Edmond Locard formulated his famous principle, “Every contact leaves a trace.”

Extra Info:

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

1910: Albert Osborne publishes *Questioned Documents*

1915:

1920's: *Palaeontologist Gerasimov develops a method to reconstruct facial appearances from skulls*

1922: Francis Aston developed the mass spectrometer.

1929:

1932: The FBI crime laboratory is created

1940:

1953:

1959: James Watson and Francis Crick discovered the DNA double helix.

1972: The Forensic Anthropology Center (aka "The Body Farm") is started at the University of Tennessee.

1975: Federal Rules of Evidence are enacted

1977: AFIS developed by the FBI; fully automated in 1996.

1984: Jeffreys developed and used the first DNA tests to be applied to a criminal case.

1986: The polymerase chain reaction (PCR) is developed to replicate DNA for forensics

1992: DNA short tandem repeats (STR) are used in forensic DNA analysis

1998: FBI index of DNA profiles is formed, CODIS (combined DNA Index System)