

Introduction to Forensic Science

Forensic Science: The application of scientific knowledge and methodology to legal problems and criminal investigations

Types of Science used in Forensics:

- Chemistry
- Biology
- Firearms
- Document Examination
- Photography
- Toxicology and Drug Analysis
- Technology
- Fingerprints

Forensic Scientist Job Description:

- Process and document crime scenes
- Collect and preserve evidence
- Analyze and compare evidence in laboratory
- Reconstruction of data (form the “best theory” of events in the case)
- Testify as an expert witness
- Scientific research
- Training others in forensic science

Types of Forensics

- Computer Forensics: Computers for fraud and the pursuit of other crimes has increased to dramatic proportions. Specialists deal with computer crime. Computer crime is not only about fraud. Computer crimes also deal with pornography, child sex abuse and the sale of black market goods online.
- Forensic Accounting: A forensic accountant will seek to trace any financial discrepancies within a company's accounts and use so-called 'paper trails' or 'audit trail'
- Forensic Archaeology: Archaeology and anthropology are the study of historic human remains and the objects, buildings and other artifacts associated with them.
- Forensic Dentistry: Forensic Dentistry is the area of forensic medicine concerned with the examination of teeth, especially in the cases of victims who cannot be identified.
- Forensic Entomology: Entomology is the study of insects. Forensic entomologists use insects to provide more information about crimes.
- Forensic Graphology: Forensic Graphology is the study of handwriting especially that found in ransom notes, poison pen letters or blackmail demands.
- Forensic Medicine: If a body is found in a field with no visible signs of injury forensic medicine seeks to answer the questions; how did the body get there, how did the person die.
- Forensic Pathology: Forensic pathology involves discovering the cause of death, especially in cases where it is sudden or the police suspect that it has not occurred by natural causes.
- Forensic Psychology: Forensic psychology is the forensic study of the mind and the ways in which the mind works, especially in the instances of violent crime.
- Forensic Toxicology: Forensic toxicology deals with the investigation of toxic substances, environmental chemicals or poisonous products. If you have ever been asked to take a drug test for work or you know someone who has, then you are already familiar with one of the applications of forensic toxicology. The toxicology part refers to the methods used to study these substances. Forensic toxicology is actually a bit of a mix of many other scientific disciplines such as chemistry, pathology and biochemistry. It also shares ties with some of the environmental sciences.

Degree Requirements:

- B.S. in science (preferred to be in biology, chemistry or forensic science)
- Some schools specialize in a forensic science B.S. degree (ex. John Jay College of Criminal Justice)

Skills Needed:

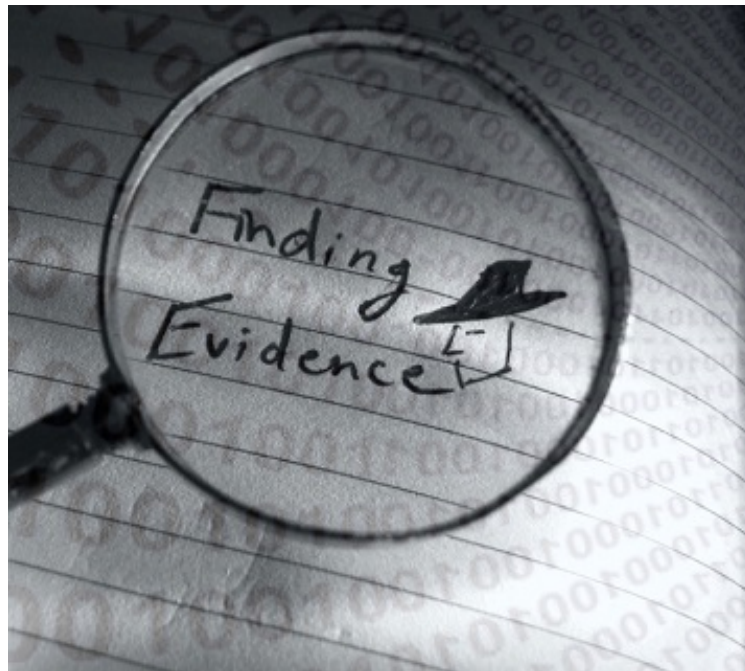
- Good observation skills – use 5 senses
- Analytical skills – ability to identify problem, organize info, draw conclusions
- Deductive reasoning – using logical steps to draw a conclusion based on facts or evidence

Are Forensic Scientists part of the police department?

- Varies by County and State (some lab are independent labs some are part of the police department)
- The forensics lab must be accredited to hold up in court

Four Major Federal Crime Laboratories:

- **FBI** Federal Bureau of Investigation, largest crime lab in the world
- **DEA** Drug Enforcement Administration, analyzes drugs seized
- **ATF** Bureau of Alcohol Tobacco and Firearms, analyzes alcoholic beverages, weapons, explosives
- **USPIS** U.S. Postal Inspection Service, crimes involving the postal service



Perception

How are observations made? We use our senses: Sight, Taste, Hearing, Smell, Touch. But these observations can be flawed! Given the unreliable nature of eyewitness testimony, summarize the importance of forensic evidence rather than eyewitness accounts in criminal proceedings on your conclusion sheet.

Body language: Some indicators to look for:

- Watch the eyes
- Look for fidgeting
- Look for covering the mouth or touching the face
- Observe for a dry mouth
- Pay attention to gestures
- Crossing arms or legs
- Body pointed away from you or avoiding eye contact

The Modern polygraph was invented by James Larson in 1921. Polygraph's work by attempting to detect unconscious changes in the body such as increased heart rate, blood pressure, breathing rate and changes in skin such as sweating. The admissibility of polygraph results in court is on a case by case basis. Voice detectors were invented in the 1970's to detect changes in stress of the voice.



Crime Procedures

1. Investigation:
 - a. Crime scene documented and searched for evidence
 - b. Information is gathered for prosecutor
 - c. Determine if there is enough evidence for probable cause
 - i. Probable Cause – reason for making a search
2. Arrest Warrant Issued
 - a. No warrant needed if an officer was present
 - b. 95% of all arrests occur without a warrant.
3. During Arrest
 - a. Suspect is read Miranda rights
 - b. Suspect is “booked”- fingerprinted and photographed
 - c. Suspect is presumed innocent
4. Within 72 hours:
 - a. Non Jury Hearing
 - b. Prosecution presents case
 - c. Accused can cross examine and provide favorable evidence
5. Judge:
 - a. Assures defendant has a lawyer and understands the charge
 - b. If it is a Misdemeanor, the court may accept a plea
 - c. For Felonies the judge sets preliminary hearing to decide if there is probable cause if the defendant pleads:
 - i. Guilty: Sentencing date
 - ii. Not Guilty: Trial date



The Burden of Proof

- The burden of proof is on the prosecution
- 50% of persons arrested are convicted
- 25% of those arrested are sentenced to 1 or more years in prison
- 90% of cases are plea bargained

The Legal System

- Civil Law- Deals with the relationships between individuals
Ex. Contracts, marriage, divorce, wills property
- Criminal Law – Deals with offenses against an individual
 - Misdemeanor:
minor crime theft
minor assault & battery
Small amounts of drugs
 - Felony:
Rape
Murder
Armed robbery
Serious assaults
Dealing drugs
Fraud
Auto theft
Forgery

The “Bill of Rights”

The “Bill of Rights” gives individuals the right to:

- presumed innocence until proven guilty.
- not to be searched unreasonably.
- not to be arrested without probable cause.
- “reasonable” search and seizure of personal property.
- refuse self-incrimination.
- fair questioning by police.
- protection from physical harm throughout the justice process.
- to an attorney.
- trial by jury.
- be made aware of charges.
- cross-examine prosecution witnesses.
- not be tried again for the same crime.
- guard against cruel and unusual punishment.
- due process.
- speedy trial.
- excessive bail and fines.
- equal treatment regardless of race, gender, religion, country of origin and other personal attributes.



Miranda Rights

Your “Miranda Rights” are named after a U.S. Supreme court case *Miranda v. Arizona* S384 US 436 (1966). The police must advise suspects of their “Miranda Rights” - their right to remain silent, their right to an attorney, and the right to an appointed attorney if they are unable to afford counsel - prior to conducting a custodial interrogation. If a suspect is not in police custody (i.e., “under arrest”), the police do not have to warn him of his rights.

Miranda v. Arizona: In 1963, Ernesto Miranda, a 23 year old mentally challenged man was arrested for stealing \$8.00 from a bank in Phoenix, Arizona. After 2 hours of questioning, not only did he confess to stealing the money, but he confessed to the kidnapping and rape of an 18 year old woman 11 days earlier. He was never told that he did not have to speak or that he was allowed to have a lawyer present.

Outcome of the Case: At the trial, Miranda’s lawyer tried to get the confession thrown out, but it was denied. In 1966, the case went to the Supreme Court. The Supreme Court ruled that Miranda’s confession was inadmissible and could not be used as evidence because he was not advised of his rights.

The 4th Amendment

The fourth is an amendment to the United States Constitution and part of the Bill of Rights. It prohibits unreasonable searches and seizures and requires any warrant to be judicially sanctioned and supported by probable cause.

Types of Searches:

- looking around a house or apartment
- looking into an automobile
- wire taps
- taking blood/saliva
- looking through binoculars or telescopes
- x-rays
- looking through pockets and hand bags
- dog sniffing

Legal Warrantless Searches:

- Searches after an arrest
- Consent searches
- Plain view
- Stop and frisk
- Hot pursuit
- Automobile
- Inventory
- Border and airport searches
- Exigent circumstances

The 4th Amendment

The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.