



# FORENSIC SCIENCE IN INVESTIGATION

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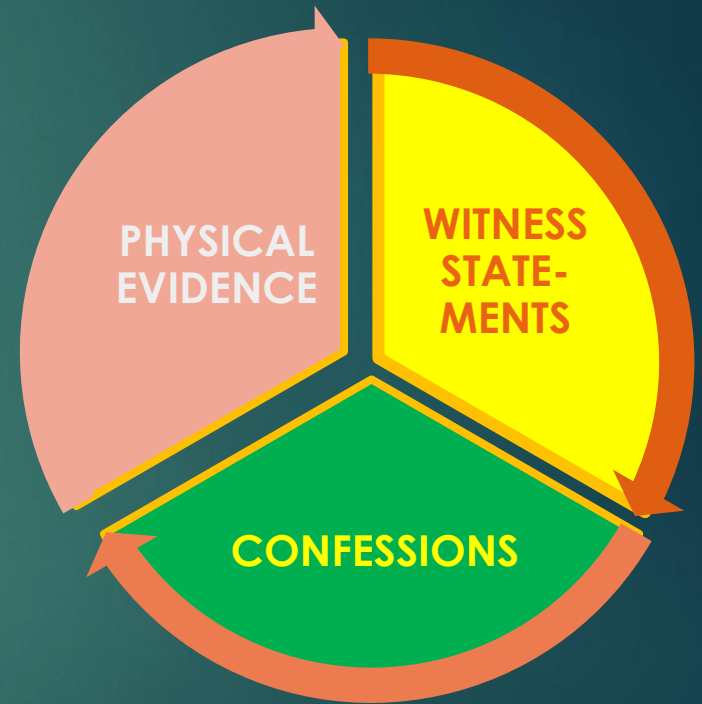
# INTRODUCTION

- The word *forensic* comes from the Latin word *forēnsis*, meaning "before the forum". Now synonymous to LEGAL/LAW.
- So, ***Forensic Science*** is literally a 'legal science' or simply put application of scientific methods for legal reasons. In a broad sense, is the application of scientific methods (verifiable) to the prevention, detection and prosecution of crimes.
- The FSL is a multidisciplinary section of the Department of Investigation of the Nigeria Police Force with various units that are involved in forensic workload

# METHODS OF CRIME RESOLUTION 1

## TESTIMONIALS

- Confession of a suspect – Very valuable but are not reliable and subject to legal difficulties in terms of Police procedural requirements and admissibility in court.
- Statements - Provided by a victim or witness can be very subjective depending on the person viewing the crime and the physical conditions of the scene

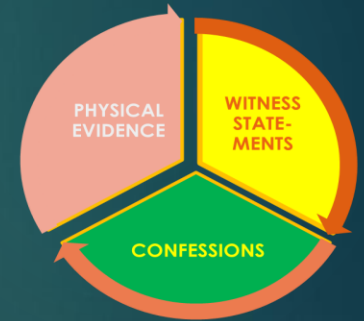


# METHODS OF CRIME RESOLUTION 2

## PHYSICAL/REAL/MATERIAL EVIDENCE

Physical evidence – Usually inanimate and simply described as anything from small evidences to large immovable material

- Impartial
- But verifiable scientific method need to be used
- Chain of custody needs to be maintained
- Freedom from contamination is adhered to
- A “silent witness” – can’t be cross examined
- ‘Locards Principle’ – ‘Every contact leaves a trace’, in essence means a perpetrator of a crime will bring something into the crime scene and leave with something from it, and that both can be used as forensic evidence.

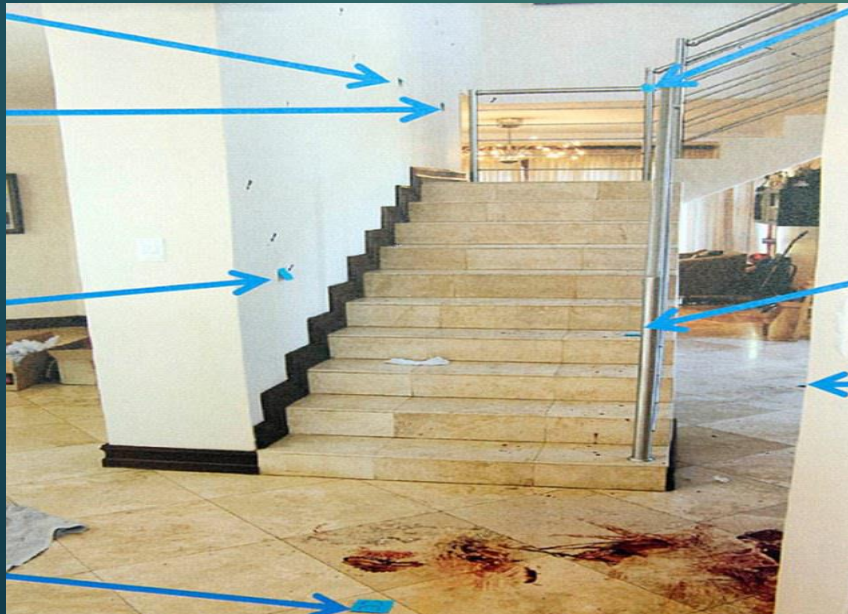


# CRIME SCENE MANAGEMENT

- Crime scene - site or location where a crime has occurred
- Management of a crime scene is the process of ensuring an orderly, accurate and effective collection and preservation of physical evidence in order to reconstruct the crime, link subject to scene and establish cause.
- Highlights include;
  - ❑ Safety is paramount
  - ❑ Identify, Isolate & secure the scene
  - ❑ Organisation of personnel & equipment
  - ❑ Decide method of search
  - ❑ Determine entry and exit points
  - ❑ Chain of Custody



# CRIME SCENES



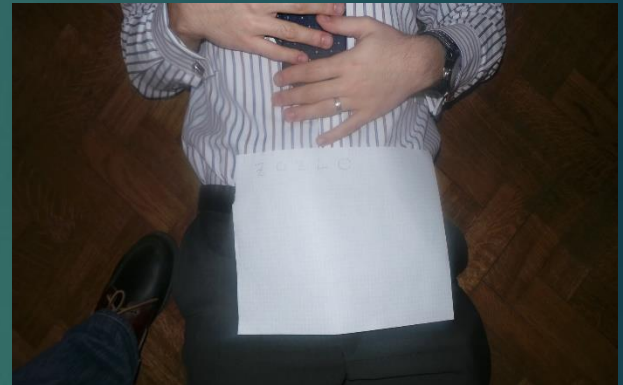
# THE FSL UNITS



- PHOTOGRAPHY/VIDEO
- DNA/SEROLOGY
- FINGERPRINTS
- DISPUTED DOCUMENT EXAMINATION
- TOXICOLOGY/CHEMISTRY
- BALLISTICS
- MEDICINE/PATHOLOGY

# PHOTOGRAPHY AND VIDEO UNIT

- Forensic imaging/crime scene imaging
- Accurate reproduction of a crime or accident scene using photography to aid investigation or evidence in court
- Photography of this kind involves choosing appropriate camera, lighting, lenses, angles etc.
- Scales are usually required to give a fair knowledge of size





# DNA/SEROLOGY UNIT

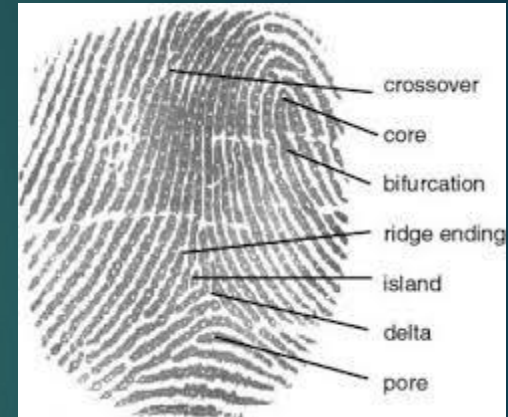
- Serology – From serum (the clear fluid after blood clots)
- Mostly the scientific analysis of blood and other bodily fluids e.g. semen
- DNA – molecules inside a cell (in nucleus/chromosome or mitochondrion)
- Order of arrangements carries genetic information, similar to how the order of letters form a word/sentences/page/book
- Unique to an individual (not identical twins), so can be linked to a subject with fair certainty
- Steps include extraction, quantification, genotyping, matching (known DNA) and interpretation of results



	Group A	Group B	Group AB
blood type			
antibodies in Plasma			No
antigens in Blood	A antigen	B antigen	A and B antigens

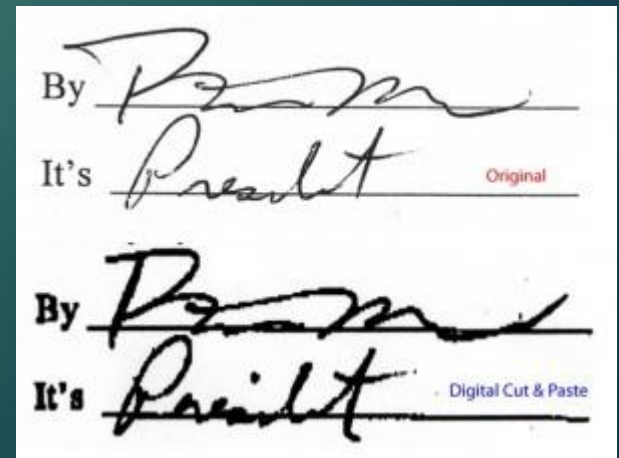
# FINGERPRINT (AFIS) UNIT

- Fingerprints are unique (not even same in an individual's fingers or identical twins) but examination is fairly subjective
- Fingerprint is an impression made by friction ridges of the finger
- Main aim is to match a latent fingerprints to database of fingerprints or that of the suspects
- AFIS – Automated Fingerprint Identification System
- Dactyloscopy or Dermatoglyphics - study of fingerprints and its ID



# DISPUTED DOCUMENT EXAMINATION UNIT

- Also Questioned Document Examination (QDE)
- Scientific examinations, comparisons and analyses of documents in order to:
  - ❑ establish genuineness or otherwise of a document
  - ❑ identify or eliminate person(s) as the source of a handwriting,
  - ❑ identify or eliminate the source of typewriting or other impression, marks or relative evidence
- Documents are varied including;
  - ❑ Bank cheques/Currency/stamps/
  - ❑ Indented impressions
  - ❑ Written/mechanically-produced texts



# CHEMISTRY/TOXICOLOGY UNIT

**Toxicology** - Analytical chemistry, pharmacology and clinical chemistry to aid medical or legal investigation of death, poisoning, and drug use/abuse (e.g. in sports, DUI)

- Analyses are done on;
  - ❑ Blood/Bodily fluids/Tissues/organs
- Substances are analysed with;
  - ❑ Spectrophotometry/Mass spectrometry
  - ❑ Gas Chromatography

**Forensic Chemistry** – identification and analysis of natural and manufactured products involved in criminal cases e.g. explosives, gun residues etc

# BALLISTIC UNIT

- Investigation involving use of fire-arms
- Investigations attempt to answer;
  - ❑ Is the weapon a fire-arm
  - ❑ Was it capable of being fired at all?
  - ❑ Was the weapon fired recently?
  - ❑ Was the weapon liable to accidental discharge?
  - ❑ Were the bullets / cartridges recovered from the scene, fired from the weapon submitted for examination?





# FORENSIC MEDICINE/PATHOLOGY

FORENSIC MEDICINE encompasses the following;

- Medical Jurisprudence: Law relating to medical practice - acts, certification, drug prescription, ethics, human rights etc.
- Clinical forensic medicine: Exam (and treatment) of the living patient for the purpose of the law – sexual assaults, non-fatal accidents, industrial diseases, injuries, sanity (psychiatry), poisoning, persons in custody
- Forensic Pathology – Medico-legal autopsies in to determine cause and manner of death, identification of tissues etc

# AUTOPSY

- Medical investigation of death derived from the Greek word *autopsia* "to see for oneself", (*autos* - oneself) and (*opsis* - eye).
- Post-mortem or necropsy – An examination of a corpse to determine the cause and manner of death, and to evaluate any disease or injury that may be present.
- Usually performed by a [pathologist](#) or any medically qualified doctor



# OTHER BRANCHES OF FORENSIC SCIENCE

- ODONTOLOGY
- ANTHROPOLOGY
- ARCHAEOLOGY
- ENTOMOLOGY
- FIRE/ARSON INVESTIGATION
- CCTV ANALYSIS
- PODIATRY
- GAIT ANALYSIS
- SHOE & BARE FOOT PRINT ANALYSIS
- VOICE RECOGNITION



***Thank you***