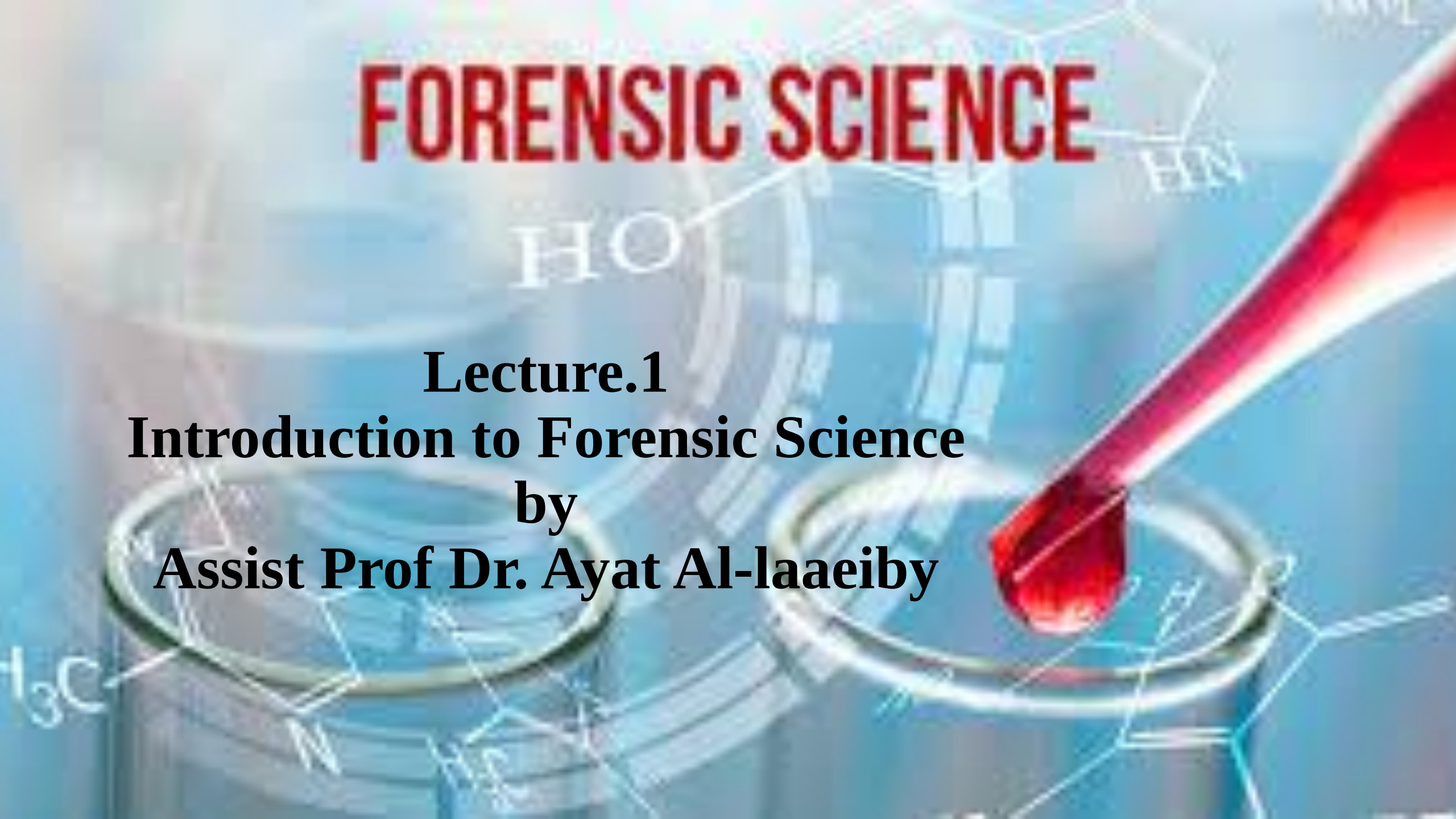

Lecture.1
Introduction to Forensic Science

by
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What is the meaning of forensic science?

- **Forensic science** is the use of scientific methods to investigate crimes and help the court find the truth.
- Forensic science is the application of various scientific disciplines—such as chemistry, biology, physics, and engineering—to legal matters, primarily in the criminal justice system.
- **Forensic Criminology** is one of the branches of the forensic science, which helps to understand criminal behavior and their minds.
- Criminalistics is a branch of forensic science that is involved in the collection, analysis, and interpretation of physical evidence produced by criminal activity.

Aims of studying forensic science?

- The aims of studying forensic science are to apply scientific principles to legal matters, providing objective analysis of evidence from crime scenes and other legal contexts.

What are the difference between Forensic Science and Forensic criminology ?

- Forensic science focuses on physical evidence (DNA, fingerprints, ballistics, etc.).
- Forensic criminology emphasizes behavioral, psychological, and social aspects of crime.
- Forensic science is not a branch of law enforcement, and forensic scientists are not law enforcement officers. Despite how they are portrayed on television, forensic scientists do not interrogate and arrest suspects and do not usually investigate crime scenes.

The main duties of a forensic scientist are

- To analyze physical evidence, interpret the results and testify in a court of law.
- Forensic science plays a role in criminal and civil law.
- Forensic scientists help determine cause of death, identify perpetrators of crimes, identify bodily remains, track the electronic transfer of money, investigate internet fraud and identity theft, and reconstruct vehicular accidents.

What a significant difference between clinical and forensic specimens?

- Clinical specimens: Collected from patients to diagnose, monitor, or treat diseases and improve health outcomes (e.g., blood, urine, tissue samples for medical testing).

Forensic specimens: Collected to investigate crimes, identify individuals, or provide evidence in legal cases (e.g., bloodstains, hair, semen, or tissue collected from a crime scene or autopsy).

History of forensic science

- 44 bce (Before Common Era): Roman physician Antistius performed the autopsy on the body of Roman politician Julius Caesar.
- 3000 bce: Egyptian started the practice of removal of the examination of internal organs after the death.
- First century ce (Common Era): Roman orator and jurist Quintilian used basic forensics to acquit an innocent at the thirteenth century.
- Thirteenth century The first literature to determine cause of death is Xi Yuan Li by Song Ci.
- 1773 Carl Wilhelm Scheele developed a chemical test to detect the presence of Arsenic in a dead body

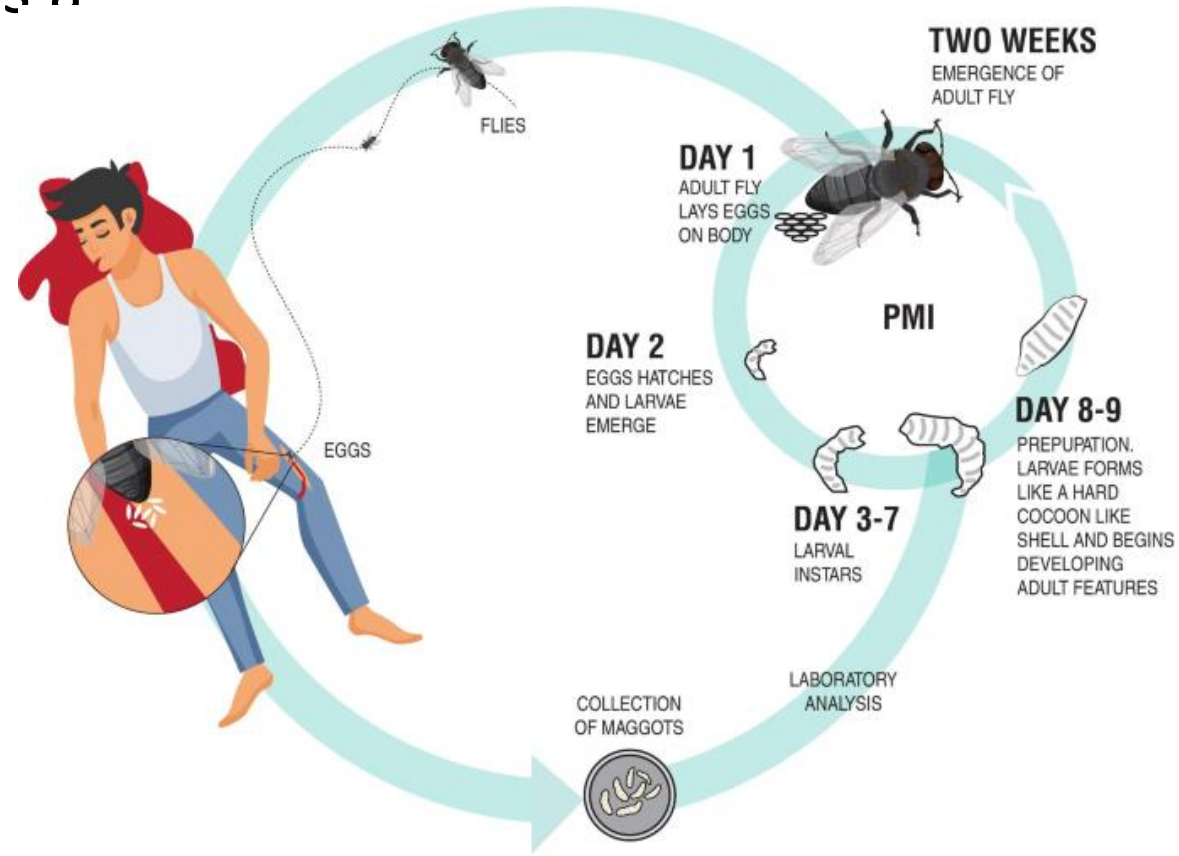
- 1775 Paul Revere an amateur dentist identified the dead body of American revolutionist Dr. Joseph Warren using his dental work.
- 1835 Henry Goddard connected a bullet to a murder weapon as a physical analysis.
- 1836 James Marsh developed arsenic detection process called Marsh test.
- Karl Landsteiner was awarded with Nobel Prize for the discovery of blood grouping.
- 1984 DNA fingerprinting was developed by Alec Jeffrey.
- 1984 FBI launched a computer analysis response team.

Important Branches of Forensic Science

- Forensic Entomology

is a branch of applied entomology that uses insects and other arthropods as a basis for legal evidence.

used to determine the postmortem interval (time since death) and movement of a corpse, provide evidence of crime scene location or foul play, and potentially aid in determining the cause of death.



- **Forensic Pathology** is the branch of medicine concerned with the investigation of sudden and unnatural deaths. Forensic pathologists determine the cause and manner of death to provide answers for families, protect public health, and inform the criminal justice system.

Forensic Toxicology applies toxicology principles to aid in legal and medical investigations by analyzing biological samples for the presence and quantity of toxins, drugs, and other substances.

- **Example: Death Investigations:**
- Examining post-mortem samples (like the liver, vitreous humor, or gastric contents) to find the presence of lethal poisons (such as carbon monoxide or cyanide) or excessive amounts of drugs.

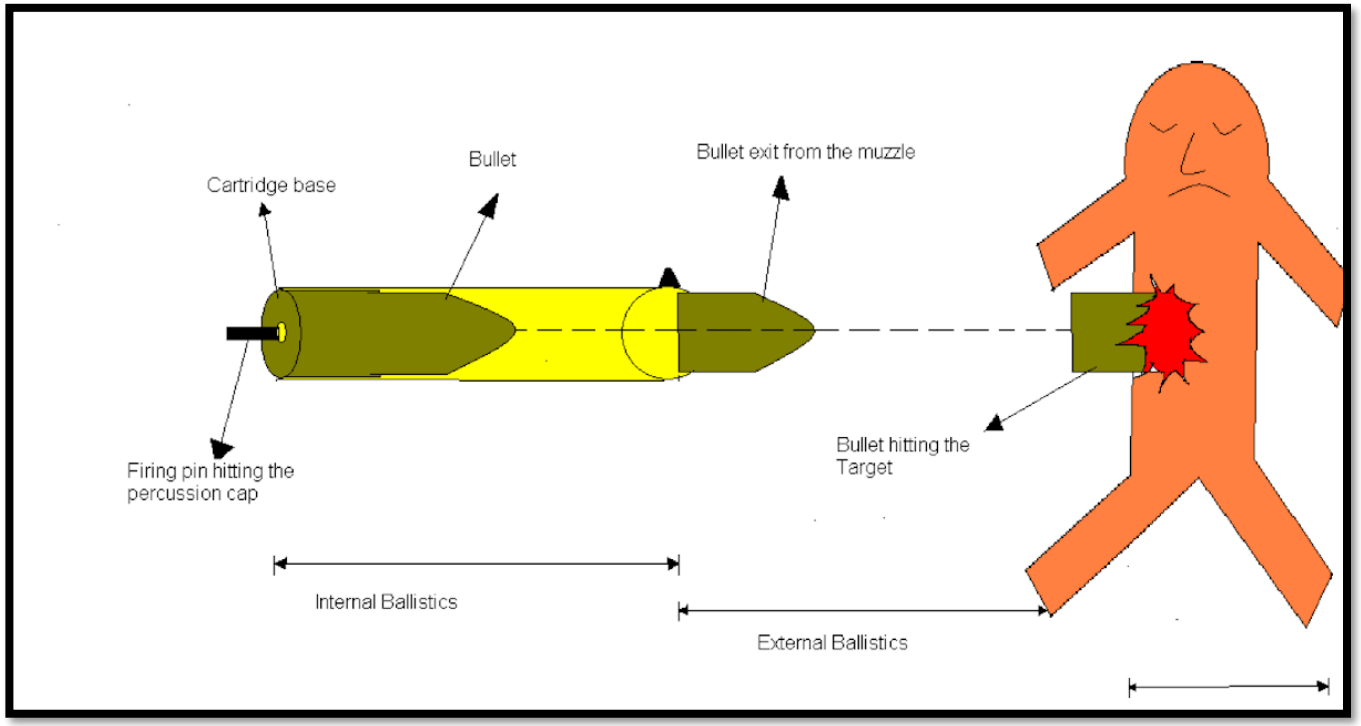
- **Forensic Anthropometry**

is a series of systematized measuring techniques that express quantitatively the dimensions of the human body and skeleton.

- Examples of forensic anthropology work include recovering and analyzing skeletal remains to establish a biological profile (age, sex, stature, ancestry), identifying the cause and manner of trauma to bones (such as sharp force, blunt force, or projectile trauma)

- **Forensic Ballistics**

is the science of firearms identification through ammunition fired from them.



- **Fingerprint Forensics**

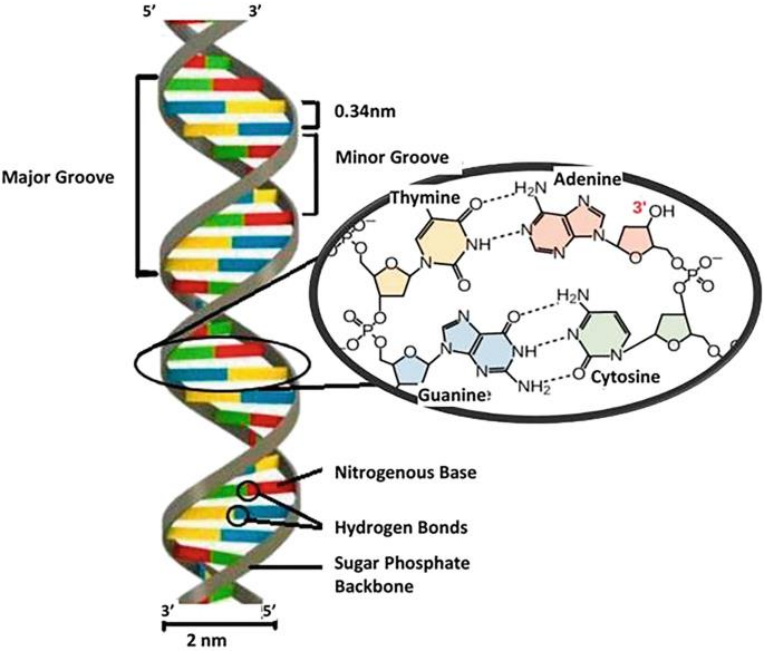
 is the scientific analysis and comparison of fingerprints to identify individuals.

- **Digital Forensics**

Digital forensics is the process through which skilled investigators identify, preserve, analyze, document, and present material found on digital or electronic devices, such as computers and smartphones.

- **Forensic Odontology**
- forensic dentistry, is the application of dental knowledge to legal issues, primarily for the identification of human remains, analysis of bite marks, and evaluation of dental injuries.

- **Forensic Serology**
- is the scientific discipline that studies and identifies biological fluids and tissues found at crime scenes, such as blood, semen, and saliva, to help link suspects, victims, and crime scenes.



Forensic DNA Profiling

Using DNA in forensic science is known as Forensic DNA Analysis, which is a subfield of Forensic Biology. This technique involves extracting and analyzing DNA from biological samples like blood, hair, and saliva found at a crime scene to identify individuals and link them to a criminal event.

Important terms

- **Autopsy**= a post-mortem examination to discover the cause of death or the extent of disease.
- **Testify**= give evidence as a witness in a law court.
- **Arsenic=** is a naturally occurring chemical element found in the earth's crust, distributed in soil, water, and air.
- **Postmortem**= an examination of a dead body to determine the cause of death.
- **A heart attack**= is a serious medical emergency in which the supply of blood to the heart is suddenly blocked, usually by a blood clot.
- **Autopsy** (post-mortem examination)
- **Ballistics** (study of firearms)