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Agenda

Presentation in 3 parts

1. Overview of Forensic Science and how it is being taught in the high school
2. Forensic Anthropology
3. Forensic Odontology
Outcomes

Part 1

Participants will:

- Define forensic science and the role of the forensic scientist
- Name various services provided by crime labs.
- Review an overview of the syllabus for a forensic science class in Montgomery County
- Observe student artifacts
Forensic Science - is the application of various sciences to those criminal and civil laws that are enforced by police agencies in a criminal justice system.
Role of the Forensic Scientist

- Analyze physical evidence and to provide expert witness testimony

- Know the laws that decide admissibility of scientific evidence

- Cannot give 100% correct answer, only an opinion based on reasonable scientific certainty based on training and experience
Early Forensic Scientists

Albert S. Osborn
- Developed fundamental principles of document examination
- Responsible for acceptance of documents as scientific evidence

Hans Gross
- First work to describe application of scientific disciplines to criminal investigation

Edmund Locard
- Locard’s Exchange Principle: trace evidence is transferred when people come in contact
Early Forensic Scientists

Francis Galton
• Formed the basis of today’s fingerprint identification

Leone Lattes
• Recognized that blood can be grouped and devised procedure for determining blood type

Calvin Goddard
• Established the comparison microscope as the tool for firearms comparison
Mathieu Orfila
- First paper on detection of poisons
- Father of toxicology

Alphonse Bertillon
- First system of personal identification
- Established *anthropometry*
- Father of criminal identification
More than 300 public crime labs in the U.S.

Why are there so many?

- Supreme Court decisions in 1960’s placed greater emphasis on scientifically evaluated evidence

- In 1923 the oldest crime lab was established – do you know where?
Some of the Provided Crime Laboratory Services

- Audio, Video, & Image Analysis
- Chemistry
- Combined DNA Index System
- Computer Analysis and Response
Services continued...

- DNA Analysis
- Evidence Response
- Explosives
- Firearms & Toolmarks
Services continued...

- Hazardous Materials Response
- Investigative and Prosecutive Graphics
- Photography
Services continued...

- Research
- Ridge Pattern experts / Latent prints
- Impressions
Services continued...

- Questioned documents
- Dan Rather

Dan Rather documents
Services Continued.

- **Structural Design**

- **Trace Evidence**

Scale models of Unabomber’s cabin used during trial
Overlap is common

Bloody shoeprints left on brick floor
So what is forensic science class all about?
In Forensic Science, students apply cross-disciplinary scientific knowledge and techniques to investigate crime scenes, evaluate various types of evidence, solve scenario-based “crimes,” while exploring career opportunities.
Society’s trend has made the scientist, an active participant in the crime laboratory, a useful part of the criminal justice system.

Students are exposed to analysis involving human remains, glass and soils, trace evidence, firearms and tool marks, documents, and entomological specimens. Cutting-edge biotechnological techniques are also explored.

Writing and verbal communication skills are essential tools with which students both analyze and present their findings.
4 Main Categories

- Forensic Science and the Law
- Biological Science
- Chemical Science
- Physical Science


**Semester 1**

1. **Forensic Science and the Law**
   - *Introduction to Forensic Science*
   - *Evidence Analysis*
   - *Law*
   - *Crime Scene*
   - Careers in Forensic Science
   - Mass Fatalities

2. **Biological Science - Is it human?**
   - *Anthropology*
   - *DNA*
   - *Hair*
   - Serology and Blood Patterns
   - *Time of Death*
     - a. Entomology
     - b. Pathology
   - Odontology
Human Hair

- Mongloid
- Negroid
- Caucasian
Human Hair

- Mongloid
- Negroid
- Caucasian
3. Chemical Science

* Fiber
* Glass, Soil, Paint
* Fire
* Explosives
* Toxicology

4. Physical Science

* Criminal Profiling
* Fingerprint
* Firearms/Ballistics
* Internet
* Questioned Documents
* Tool marks and Impressions
Nylon Carpet

Different cross-sectional patterns can be patented
concentric fractures from secondary bullets terminate at fractures from first bullet

radial cracks from first bullet
With scientific knowledge, and critical thinking skills acquired through forensic science; students are poised to pursue further studies in biology, chemistry, physics, anatomy, anthropology, law, and medicine.
Enduring Understandings

Forensic Science is the application of various sciences to those criminal and civil laws that are enforced by police agencies in a criminal justice system.
Forensic evidence is evaluated using controlled scientific techniques.

Various court cases throughout the years have set guidelines created specifically designed to set parameters around the type of evidence and how it is collected, processed, tested and presented in a court of law.
Forensic scientists come from many different fields of specialization.

| Anthropologists | Odontologists | Ridge pattern specialists |
| Entomologists   | Footware/Toolmark | X-Ray specialists   |
| Toxicologists  | Pathologists   | Hair/Fiber          |
| Serologists    | Biology        | Glass and Paint    |
| Soil/Glass/Paint | Questioned Documents | Geologists    |
| Photographers  | Computer specialists | Explosives |
Forensic science begins at the crime scene.

- First Responder - Securing the scene
- Scene documentation – Crime scene sketches, photography
- Collection of evidence - Chain of Custody begins
TV

- Court TV
  - Forensic Files
  - Body of Evidence
  - Cold Case Files
Problems with CSI

- Interrogation of witnesses done by police officers
- Lab turn around time is much longer
- Jobs in a crime lab are divided into different disciplines... not done by one person.
- Other issues...
- Photographing Evidence
- Contamination
- Using the same machine for various tests
Opportunities

http://www.aafsf.org

Check out the site – lots of great information!
Student Artifacts
Let's get jazzed
It is all about you, the active learner
The game is afoot..
Impressions
Steph Lee

Worn Tread
Cut
Worn-out Letters
Is it human?
Bite Marks
Odontology
Digital Bite Mark Analysis
“Adobe Photoshop”
Tool Marks
DNA Recovery
On–Line Activities
Blood and Blood Spatter
Simulated Blood
Firearms
Arson
Short Mystery Solving

Profiling
Forensic Toxicology

Toxicology is the science of harmful effects of substances on living organisms.

Forensic toxicology is a specialty area of analytical chemistry.
BALLISTICS

THE STUDY OF PROJECTILE MOTION

THE STUDY CONCERNED WITH DETERMINING WHETHER A BULLET OR CARTRIDGE WAS FIRED BY A PARTICULAR WEAPON.

THE ANATOMY OF A HANDGUN
Observation Skill Skits
“No one person is smarter than the team”
Reading with a Purpose: Harris Pic List

- Father of Forensics; Colin Evans
  ISBN # 0-425-210073

- The Casebook of Forensic Detection; Colin Evans

- Sherlock Holmes; Sir Author Conan Doyle