

Unit 1: Introduction to Forensic Science

'TEASER' ACTIVITY: How much do you already know about FORENSIC SCIENCE ?

One of the reasons that so many people are interested in Forensic Science is the extensive coverage of this topic by the media.... in fact, it is likely that you may already have some knowledge in this subject area! Let's find out what you know by completing the following activity. Read each statement & then underline the correct response(s). This activity is called a 'teaser' because it briefly touches upon various concepts that you will explore later on in this course.

- | | | |
|-----|--|--|
| 1. | The role of the forensic scientist in a criminal investigation: | Collects evidence
Analyzes evidence |
| 2. | The number of basic fingerprint patterns that exist in humans: | three
five |
| 3. | The most common type of fingerprint pattern: | simple whorl
plain loop |
| 4. | The most common type of body fluid left behind by a sexual assault suspect: | semen
blood |
| 5. | The number of blood types that exist in humans: | eight
ten |
| 6. | The legal blood alcohol limit (in Canada): | 80 mg%
50 mg% |
| 7. | Can a person be charged with a criminal offense if s/he refuses a demand for breath samples? | Yes
No |
| 8. | A polygraph test targets this part of your nervous system: | parasympathetic
sympathetic |
| 9. | If you want to become a police officer in Canada you must pass an extensive polygraph test: | Yes
No |
| 10. | If you want to determine who wrote an unknown criminal document, look at the letters: O, L and C. | Yes
No |
| 11. | Number of chromosomes in a normal human body cell: | 46
47 |
| 12. | A major publicized criminal investigation that used trial DNA evidence: | OJ Simpson
David Milgaard |
| 13. | Only three inmates managed to escape this prison in it's 30-year history: | Kingston
Alcatraz |
| 14. | One of the most famous kidnappings in history (1932) involved this man's son: | Charles Lindbergh
Frank Sinatra |
| 15. | This gangster was was thought to be involved in 1000 murders, but was simply arrested for tax evasion: | Al Capone
Antonio Soprano |
| 16. | As a dead body decays it swells and smells due to the release of this substance: | carbon dioxide
methane |

- | | | |
|-----|--|---|
| 17. | A buried corpse is well preserved in this environment and thus may last nearly forever: | icy ground
peat bog |
| 18. | Under these conditions skeletonization of the body occurs the fastest: | warm, humid climate
rainy, cold climate |
| 19. | A dead body will mummify to durable parchment if it is found in this: | sea water
dry sand |
| 20. | When a body is disposed of in this way it is seldom found by investigators: | buried underground
thrown into body of water |
| 21. | When a corpse is wrapped in these it preserves the soft tissue & thus makes identification easier: | bed sheets
garbage bags |
| 22. | Brains of criminals, as compared to normal brains have been found to be: | smaller
larger
identical |
| 23. | These type of dead bodies will burn fastest when lit on fire: | obese
lean & muscular |
| 24. | If a corpse contains this it will cause an explosion if set on fire: | silicone implants
heart pacemaker |
| 25. | These often help investigators identify the remains of a burnt body: | surgical clips
dental posts |



WHAT IS FORENSIC SCIENCE ?

Forensic science is 'young' science as it's successful implementation by criminal investigators has only occurred within the past 100 years. Forensic science is also unique because it encompasses all three of the scientific disciplines that are discussed in high school: biology, chemistry and physics.

The Oxford Canadian Dictionary defines forensic science as "the application of biochemical and other scientific techniques to investigate crime." After a crime has occurred criminal investigators may use scientific techniques or forensic science experts to help them identify or interpret physical evidence from the crime scene.

Physical evidence from a crime scene comes in many different forms. For example: fingerprints, hair, blood, saliva, semen, bullet casings... etc. Now it's your turn - try to come up with more types of physical evidence and be prepared to share these with your class: _____

According to the Crime Lab Director of the Los Angeles County Sheriff's Department, Barry Fisher, finding and interpreting physical evidence from a crime scene is crucial as it can...

- > prove that a crime has been committed.
- > establish the identity of the suspects.
- > exonerate the innocent.
- > corroborate the victim's testimony.
- > lead to a confession from suspect.
- > be more reliable than eyewitness evidence.
- > be expected by judges and juries.

Therefore, physical evidence is important to the Forensic Scientist as it is used to interpret and draw important conclusions about the events within a criminal case.



INDIVIDUALIZATION & IDENTIFICATION of Physical Evidence

Some types of physical evidence may come from a specific person, place or thing, however most physical evidence may only be associated to a certain class or group.

Individualization of physical evidence:

Is **UNIQUE**; it can be directly linked to a specific person and/or source. (ie: *fingerprints, DNA, tool marks, bullets, dental impressions*)

Identification of physical evidence:

Shares a **COMMON** source; can be grouped into a class of items having similar properties. (ie: *clothing, shoe prints, blood type*)

-
1. If only one type of evidence was found at a crime scene, what would be more useful to investigators & prosecutors: individualized physical evidence or identified physical evidence? Justify your choice.
 2. If the only evidence that police can find at a crime scene is identified physical evidence, should the investigation continue? Explain your thoughts.
 3. With regards to physical evidence, what important role does the forensic scientist play in an investigation?

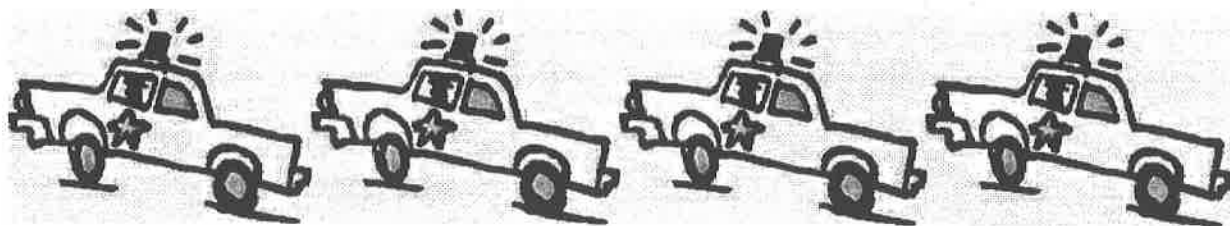
The body of a 22 year-old male murder victim is discovered in his apartment by his landlord. He was found face down on his bed with multiple stab wounds in his chest, head and back. Just above the victim's hand, scrawled in blood on the bedroom wall is the name 'Joe'

4. a) Could this evidence be interpreted as individualized physical evidence, identified physical evidence, or both? Justify your choice.

- b) Do you think a defense lawyer would view this evidence as individualized or simply identified? Explain.

- c) Do you think the prosecutor would view this evidence as individualized or simply identified evidence? Explain.

- d) How do you think a jury member would view this evidence? Individualized or simply identified? Explain your choice.



Comparing Individualization & Identification of Physical Evidence at Various Crime Scenes

Read the following scenarios & state whether the physical evidence would be considered individualized or simply identified. All these scenarios are based on ACTUAL criminal investigations.

Scenario #1: Several red-colored cotton fibers are found upon the ledge of a window that had been broken to gain entry into a home. The home had been burglarized. A suspect wearing a torn red cotton jacket is apprehended nearby. Tests conducted later show that the fibers from the crime scene and the fibers from the suspect's jacket have identical physical properties.

Type of physical evidence = _____

Scenario #2: When the shoes seized from a break-and-enter suspect are examined, a small piece of glass is found embedded in the sole of one of the shoes. After analysis it was determined that the unique piece of glass came directly from the crime scene.

Type of physical evidence = _____

Scenario #3: One night a Hit & Run occurs in which a parked car is struck by another vehicle that lost control at an intersection. The suspect vehicle then fled the scene. Although a license plate number was obtained at the time, it was noted by a witness that the suspect vehicle was a blue half-ton truck. Police officers find the broken half of a 'vanity plate' at the scene, and determine that it does not belong to the victim's car. Several hours after the collision, police officers find a damaged blue truck with a broken 'vanity plate', the remainder of which matched the fragments of plate found at the earlier collision.

Type of physical evidence = _____

Scenario #4: A victim's body surfaces nine months after being dumped in a lake. The body had been tied to cement rocks with a torn up bed sheet. It was determined that the victim was killed by hammer blows to the head. Forensic scientists were asked to determine if a certain hammer caused the unique markings on the skull. During the autopsy it was determined that the victim had been struck with a ballpeen hammer.

Type of physical evidence = _____

Scenario #5: A casing from a 9 mm bullet is found at the scene of a shooting. When this casing was compared to a casing obtained from the suspect's gun, the markings upon both bullet casings matched perfectly.

Type of physical evidence = _____

Scenario #6: A plaster cast of a faint shoe print is taken from the scene of a burglary. It is then compared to the tread of a suspect's shoe. The shoe print found at the scene appears to match the tread of the suspect's right shoe.

Type of physical evidence = _____

Scenario #7: A plaster cast of a faint shoe print is taken from a burglary scene and of a suspect's shoe. The tread of the shoe print found at the scene appears to match the suspect's right shoe. Even the location of a staple stuck in the tread of the suspect's shoe matches the impression in the shoe print plaster.

Type of physical evidence = _____

Scenario #8: The body of a hit-and-run victim was found next to a major highway. A suspect vehicle was located and examined and an impression of a unique watch wristband found on the car's bumper matched the hit-and-run victim's watch wristband.

Type of physical evidence = _____

Scenario #9: A young boy was kidnapped and his parents were sent a stenciled ransom note. The stencil was later found at a suspect's home which matched the stenciled letters on the ransom note.

Type of physical evidence = _____

Scenario #10: A bite mark is found in a chunk of cheese left at a crime scene. When the bite mark was compared to the suspect's teeth it was found to match.

Type of physical evidence = _____

Scenario #11: Duct tape is used to bind a victim's hands. When the ripped end of this tape was compared to the end of a roll of tape found in the suspect's home, it was found to be an exact match.

Type of physical evidence = _____

Scenario #12: A ripped receipt for payment of a monthly bus pass purchased earlier in the month by a murder victim was compared with a piece of the ripped receipt found in the suspect's home. The two pieces matched and thus were originally part of the same ticket.

Type of physical evidence = _____