Evidence in the Assassination of JFK

- On November 22, 1963, President John F. Kennedy was shot and killed by Lee Harvey Oswald while traveling in a presidential motorcade in Dallas, Texas.
- Since the assassination of JFK in 1963, questions have lingered as to whether Lee Harvey Oswald acted alone or as part of a conspiracy.
- They government body appointed to investigate the crime was called the Warren Commission.
- They determined that Lee Harvey Oswald acted alone.
- To arrive at this conclusion, the Warren Commission reconstructed the crime.
- The president was struck by two bullets.
- The first bullet hit the president in the back, exited the front of his throat, and went on to strike Texas Governor John Connally, who was sitting in front of JFK.
- A second bullet, this time to the head, was the fatal wound for the president.
- In a nearby building, a 6.5 mm military rifle was discovered with Oswald's palm print on it, along with three spent 6.5 mm cartridge cases.
- Oswald was an employee of the building, had been seen there that morning, and was also seen there a few minutes after the assassination took place.
- Critics of the Oswald acting alone theory believe the evidence suggests Oswald could not have done it alone.
- Eyewitness accounts and forensic data interpreted by some experts suggest that a second shooter fired at the president from a “grassy knoll” in front of his car.
- They also argue that one bullet could not have passed through President Kennedy and lodged in Governor Connally without being severely mutilated—the bullet was slightly flattened with no deformity and minimal weight lost.
- Forensic experts performed neutron activation analysis on the bullets to determine the trace elements present in them.
- The bullets responsible for the death of JFK and the injuries to Governor Connally are consistent with the casings discovered with Oswald's gun.
- Forensic evidence generally supports the findings of the Warren commission.
- The findings, however, cannot be verified with absolute 100% certainty, so the questions about JFK's assassination will continue to linger.

Atoms and Isotopes

- To understand metal analysis, you must understand the basic structure of the atom.
- Atoms consist of 3 subatomic particles: protons, electrons, and neutrons.
- An atom has a nucleus that is composed of protons and neutrons with the much smaller electrons orbiting around the outside.
- Different elements have different numbers of subatomic particles.
- For example, Hydrogen has 1 proton, no neutrons, and 1 electron.
- Helium has 2 protons, 2 neutrons, and 2 electrons.
- Elements are defined by their atomic number—the number of protons in their nucleus.
- The atoms of an element will always have the same number of protons—otherwise it would no longer be that element!
- However, atoms of an element can have different numbers of neutrons.
- This is called an isotope.
- Most elements have two or more isotopes.
- Some isotopes are radioactive, meaning they will decompose over time by emitting high energy subatomic particles.
- Radioactivity is the name given to this emission of high energy subatomic particles.
- When an atom is bombarded with neutrons, it will catch some of those neutrons and form new isotopes.
- When it catches enough neutrons, it will become radioactive and begin emitting energy as it decays.
- Neutron bombardment is the very basic idea behind nuclear reactors!
Forensic Analysis of Metals

- Trace elements are those elements that are present in materials in very, very, VERY small amounts.
- Forensic scientists can determine the trace elements in metals by bombarding it with neutrons and measuring the radiation that occurs.
- This is known as neutron activation analysis.
- Neutron activation analysis allows the forensic scientist to determine amounts of trace elements as small as 1 billionth of a gram!
- Knowing the trace elements present in various metal samples makes it much easier to compare them.
- Neutron activation analysis can also be used to determine trace elements found in drugs, paint, soil, gunpowder residue, and even hair!

Forensic Examination of Paint

- Paint is one of the most prevalent types of physical evidence received by the crime lab.
- This is because paint covers everything!
- Paint is most frequently encountered in burglary or hit-and-run cases.
- Criminalists compare paint to establish common origin.
- They can also determine the color, make, and model of a car by examining paint chips.
- The microscope is the primary tool used in the comparison of paint specimens.
- Properties considered in paint analysis include:
  - Color
  - Surface texture
  - Color layer sequence
- When collecting, paint evidence, great care must be taken.
- Paint chips must be kept intact whenever possible.
- Paint chips can be picked up with tweezers and packaged in a druggist fold or a plastic vial.
- If paint is smeared on something, it is best to package the entire item and send it off to the lab.
- Standard/reference samples should ALWAYS be collected!

Forensic Analysis of Soil

- For forensic purposes, soil is any disintegrated surface material, natural OR artificial, that lies on or near the earth's surface.
- Soil evidence is unique in that it can contain many other types of physical evidence: glass, paint chips, asphalt, brick fragments, cinders, etc.
- Soil adhering to a suspect's clothing, shoes, or automobile can be used to link them to the scene of the crime.
- Soil, like most physical evidence, is analyzed for comparison.
- Soil can be compared simply by appearance.
- Since soil appears different when wet, all soil samples should be dried prior to being compared.
- Using a microscope allows comparison of the different materials in the soil such as plant and animal materials, rocks, and minerals.
- The value of soil evidence depends on variation at the crime scene.
- If, for example, soil at the crime scene is indistinguishable from soil found for miles around the crime scene, soil evidence will not be very useful.
- When a crime scene location has a unique composition of soil, soil evidence becomes much more valuable.
- When collecting soil evidence, standard/reference samples must be collected from various locations throughout the crime scene.
- A tablespoon or two of soil is enough to conduct an analysis on.
- The sample should be collected from the surface layer, and stored in vials.
- Soil adhering to an item like a shoe or a tool should not be removed.
- Instead, the entire object should be packaged and sent to the crime lab.
Chapter 11 Notes Review

1. Which of the following conclusions can be drawn from the forensic analysis of the bullets recovered after the assassination of JFK?
   A. The analysis absolutely verified the findings of the Warren Commission.
   B. The analysis cast doubt on the findings of the Warren Commission.
   C. The analysis generally supported the findings of the Warren Commission.
   D. The analysis absolutely disproved the findings of the Warren Commission.

2. The electrical charge of a proton is
   A. 0
   B. -1
   C. -2
   D. +1

3. One of the most common types of paint analyzed in the crime lab is
   A. paint from a firearm
   B. paint from furniture
   C. paint from automobiles
   D. fingernail paint

4. True or False: Trace elements are important for the criminalist because they provide markers that may establish the source of a material or at least provide additional points for comparison.
   A. True
   B. False

5. True or False: When soil is found on a suspect’s garment or shoes, the investigator should remove the soil by gently scraping it into an airtight container.
   A. True
   B. False

6. True or False: Paint is one of the most prevalent types of evidence received by the crime lab.
   A. True
   B. False