# FORENSIC SCIENCE: FINAL EXAM REVIEW

There will be ~100 multiple choice. As mentioned at the start of the year, this exam is NOT open note. However, it will cover basic understanding of the material. If you can successfully answer the questions below, you should be fine for the exam.

The following topics are covered:

Intro to Forensic Science and History
Laws in Forensic Science
Observation
Explosives
The Crime Scene
Physical Evidence
Forensic Pathology
Forensic Entomology
Forensic Anthropology
Impressions
Arson
Ballistics*

*assuming that we complete Ballistics before the end of the semester.

## Unit 1: Intro to FS and History, Law

1. What is Forensic Science?
2. Criminalistics vs. Criminology
3. Know the contributions of each to the history of Forensic Science:
    a. Calvin Goddard
    b. Francis Galton
    c. Mathieu Orfila
    d. Alphonse Bertillon
    e. Sherlock Holmes and Sir Arthur Conan Doyle
    f. Locard
    g. Karl Landsteiner
    h. Sir Alex Jeffrys
    i. Leone Lattes
    j. Yi Yu Ji
4. Why did anthropometry fail? What was it replaced with?
5. How and why is the scientific method used in Forensic Science?
6. Know how to apply Locard's Exchange Principle
7. What is the CSI effect?
8. What types of evidence do the crime labs at the DEA, ATF, USPS, FBI examine? Do they specialize?
9. Know the responsibilities (types of evidence they study) of the different Forensic units: Physical Science, Biology,Firearms, Questioned Document, Photography, Toxicology, Latent Fingerprint, Polygraph Unit, Voice Print, CSI, Forensic psychiatry, odontology, entomology, pathology, engineering, anthropology and computer/digital analysis.

## Laws

10. What is the constitution?
11. What is the difference between civil and criminal laws?
12. What are administrative, equity, statutory, and common laws?
13. What is double jeopardy?

14. What happened in *Miranda v Arizona* and what was the impact on Forensic Science? What amendments were involved?
15. Why do Forensic Scientists even need to know about laws?
16. What is the difference between a felony and misdemeanor?
17. What is an arraignment?
18. What are the facets of guilt? (MMO)
19. What is an expert witness? How do they different from a lay witness?
20. What does it mean when something is probative? Material?
21. How did the Frye Standard affect admissibility of evidence?
22. How did the Daubert Ruling affect admissibility of evidence?
23. How did the *Kumo Tire v Carmichael* affect admissibility of evidence?
24. How did the *Copollino v State* affect admissibility of evidence?
25. What are the three elements needed in order for something to be ruled a crime (and thus, something that is prosecutable?)
26. Who is the prosecutor/prosecution? Who is the defendant/defense?

## Observation

27. What is observation?
28. What is an inference?
29. What is a lay witness? What can affect what they remember?
30. Are lay witnesses accurate? Why?
31. What is the Innocence Project?
32. What is the Cross Race Effect?
33. How does face recognition work? Make sure you understand what the numbers mean from the facial recognition lab.

## Unit 2: Crime Scene Investigation

34. What are the difference between circumstantial, demonstrative, direct, physical evidence?
35. What are (be able to recognize examples) transient, pattern, conditional, transfer, associative evidence?
36. How is evidence classified by nature?
37. What is the difference between individual and class evidence? (for EVERY type of evidence we've covered)
38. Know how to use the product rule. What is its purpose?
39. Why does class evidence have any value?
40. Know the 7 Ss (recording the scene of a crime: note taking, photos (what to photo and how), sketches: what to include, etc) and what happens at each stage.
41. Responsibilities of the first officer on the scene
42. When can you search without a warrant?

## Physical Evidence

43. physical evidence vs eyewitness testimony
44. chain of custody – what is it and why is it necessary
45. Proper collection techniques including personal protective gear, forceps, and packaging for specific types of evidence (bindle, paper vs plastic, arson, biological samples, etc.)
46. Experimental controls: positive and negative controls, substrate controls, known standards, etc.

## Unit 3: Death: Pathology, Entomology and Anthropology

47. What is death?
48. livor mortis –including time line and how it's used to show foul play
49. rigor mortis – including time line and why it disappears
50. algor mortis – including time line and calculation
51. How are stomach contents used to determine time of death? - know time line
52. PMI: define and how to determine age by maggots. How are they used to determine foul play?
53. Forensic anthropology – what is it. When is it used?
54. How to tell age with a skeleton – what other information can you get from bones? Know how to use the tables to determine height.
55. 5 manners of death (Remember SHAUN the sheep)
56. Cause of death
57. Mechanisms of death
58. what influences the rate of a cooling dead body
59. autopsy
60. Stages of death – know basics of what happens in each stage.

## Unit 4: Fingerprints and other Impressions:

61. Categories of prints (latent, patent, plastic)
62. What are impressions? What are the different types of impressions?
63. What unit is responsible for examining the following evidence…fabric impressions? Tire impressions? Lip prints? Dental impressions? Foot prints?
64. What makes a fingerprint? Why do we leave prints behind?
65. What are ridges/valleys? Minutiae?
66. Be able to identify a print and classify its shape (central pocket whorl, tented arch, etc)
67. What about a fingerprint is class? Individual?
68. What are the techniques for isolating patent and plastic fingerprints?
69. What are the techniques for isolating latent fingerprints? What do they interact with within the print?
70. Why are fingerprints unique to everyone?
71. What is ELD? Briefly describe how a forensic scientists would use this technique.
72. What is the first step to collecting a foot (or any) visible print?
73. Briefly describe how a forensic scientists collects: a bloody footprint, a tire print in snow, a dusty impression on a granite floor.
74. What relationship exists between shoe size, foot length, and height?
75. What information can forensic scientists obtain from a shoe print? Why are they often overlooked?
76. What class evidence can you get from shoe prints? What can individualize a shoe print?
77. When comparing evidence, what information do you need?
78. What database do you need to look for shoe prints?
79. Know how to predict someone's height from their shoe size.
80. What is the difference between a suspect tire and an elimination tire?
81. What class evidence can you get from tire prints? What can individualize a tire print?
82. What is cheiloscopy?
83. What are the basic lip patterns?
84. Are lip prints individual or class evidence?
85. How can TLC be used when examining a lip print?
86. What information can you obtain from a bite mark?
87. How can bite marks be individualized?

88. Why do bite marks on either extreme (i.e. just bruising on one end and lacerated skin on the other) provide low forensic value?

## Unit 5: Arson, Explosives, Ballistics

89. What is fire?
90. Describe the various burn indicators (color of flame, color of smoke, chimney effect, V-pattern, burn pattern, heat shadow, glass)
91. What is a point of origin? How is determined?
92. Define accelerant, fire triangle (and each component), substrate control, ignition device, plant
93. How do fire investigators differentiate between accident and arson?
94. How is arson evidence packaged?
95. How are the following techniques used in arson investigations: gas chromatography, infrared spectrophotometry, ultraviolet fluorescence
96. How does an explosion differ from a fire?
97. Define: shock wave, low explosive, high explosive, primary explosive, secondary explosive.
98. How are the following techniques used in explosion investigations: Greiss reagents, TLC, infrared spectrophotometer, gas chromatography/mass spectroscopy
99. What are the difference between fission and fusion nuclear weapons?
100. What causes a bullet to be propelled by a gun?
101. What are the components of a cartridge?
102. What is rifling? How is a rifling pattern used to identify a gun? How is it detected? Is it class or individual evidence? Define grooves and lands.
103. What are the different types of long guns and handguns? How do you tell them apart?
104. What is caliber? Trajectory?
105. Describe fire pin impressions, breechblock marks, ejector marks. Are they individual or class characteristics?
106. What databases are available to ballistics investigators?
107. Describe the difference between entrance and exit wounds.
108. What tests are used to look for gunshot residue?
109. Describe packaging of ballistic evidence.