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Online Instructor's Manual with Test Bank

for

Criminalistics
An Introduction to Forensic Science

13th Edition

Richard Saferstein, Ph. D.

Forensic Science Consultant, Mt. Laurel, New Jersey

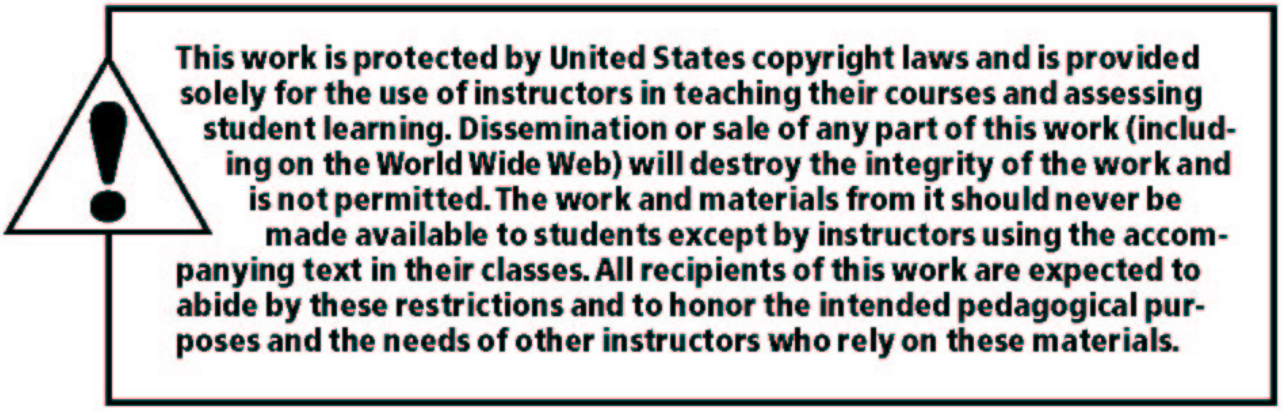
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To the Instructor

Each chapter of the instructor's manual to accompany the 13th edition of Criminalistics includes the following support materials for instructors:

- Chapter overview of the main topics presented in the text
- Learning objectives from the main text
- Lecture outline with teaching notes
- Additional assignments and class activities
    - Demonstrations and lecture-starters
    - Questions (and answers)
    - Answers to Virtual Lab Activities (Chapter 16)
- Suggested answers to end-of-chapter assignments in the main text, namely the Review Questions, Inside the Science, Application and Critical Thinking, and Case Analysis

Students should become familiar with the organization and capabilities of their state and local forensic laboratories. Usually this can be accomplished through brochures and pamphlets that are prepared by these facilities. The instructor may want to arrange a class tour of one of these laboratories, or perhaps engage the cooperation of a forensic laboratory in order to prepare a PowerPoint presentation showing pertinent sections of the installation.

Students should be encouraged to become familiar with Reddy's Forensic Home Page and Zeno's Forensic Site. These pages contain detailed listings of Web pages relevant to forensic science. Students should also be encouraged to explore the Police Officer's Internet Directory. This directory encompasses many of the Web pages relevant to the criminal justice field and of interest to police officers.

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Syllabi

COURSE SYLLABUS

Course Number/Name: CRJ370 INTRO TO CRIMINALISTICS/FORENSIC SCIENCE

Course Description: This is an introductory course to criminalistics which explores the history and scope of forensic science. Criminalistics is the application of science to those criminal and civil laws that are enforced by police agencies in a criminal justice system. The scope of this course includes discovery at a crime scene, the most important location of evidence; physical evidence; analytical techniques for organic and inorganic materials; forensic toxicology; firearms, ammunition, unique tool marks, and various impressions (e.g., shoe prints, fabric properties, and bloodstains).

Course Objectives: Upon completion of this course, students should be able to:

1. Explain the goal of physical evidence in the criminal justice system.
2. Specify what the field of criminalistics encompasses.
3. Identify the capabilities of crime laboratories with regard to the examination and analysis of various types of physical evidence.
4. Understand the limitations of crime laboratories with regard to various types of physical evidence.
5. Distinguish criminalistics from the other areas of forensic science.
6. Recognize the inter-relationships between criminalistics and criminal investigation.

Required Texts: Criminalistics: An Introduction to Forensic Science. 13th Edition. Saferstein. 2021. Prentice Hall.

Recommended Texts & Readings: **Library Resources**: The college online database LIRN is available on campus or off-site to students and faculty. This resource tool provides current scholarly articles and information in all academic subject areas. Visit the library for more information. Computers are available in the college library as well as other references and periodicals.

Instructional Methods: Lecture, class discussion, and video and audio supplements.

General Course Policies:

1. Students will abide by the college honor code.
2. Students are expected to arrive promptly for class.
3. Class attendance is essential to academic success. Lack of regular attendance may result in probation or suspension.

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4. All students, faculty, and staff are required to conform to acceptable standards of academic integrity. Cheating will not be tolerated. If the instructor has reason to believe that any student is giving or receiving unauthorized assistance during an examination, the materials will be removed from the involved parties. Each student will receive a grade of 0 on the examination, and each student may be subject to disciplinary action (see College Catalog). Plagiarism is a form of cheating. Crediting and citing authors or sources will avoid plagiarism.

Grading Criteria: Students must receive a minimum of 70% or better in all general education and program core courses. Please see the Academic Catalog for general graduation requirements.

Letter Grade	Grading Scale	Letter Grade	Grading Scale
A	94-100	C	74-76
A–	90-93	C–	70-73
B+	87-89	D+	67-69
B	84-86	D	64-66
B–	80-83	D–	60-63
C+	77-79	F	0-59

Evaluation Methods:

Tests/Quizzes…….	60%
Assignments ……..	20%
Paper/Project……..	10%
Attendance/Participation……	10%
TOTAL…….……..	100%

Course Outline: The course outline may be changed at any time at the discretion of the instructor.

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COURSE OUTLINE – 10 Weeks		
WEEK	**TOPIC**	**ASSIGNMENT**
Week 1	▪ Chapter 1: Introduction ▪ Chapter 2: The Crime Scene	
Week 2	▪ Chapter 3: Physical Evidence ▪ Chapter 4: Crime-Scene Reconstruction: Bloodstain Pattern Analysis	
Week 3	▪ Chapter 5: Death Investigation ▪ Chapter 6: Fingerprints	
Week 4	▪ Chapter 7: Forensic Biometrics ▪ Chapter 8: The Microscope	
Week 5	▪ Chapter 9: Firearms, Tool Marks, and Other Impressions ▪ Chapter 10: Matter, Light, and Glass Examination	
Week 6	▪ Chapter 11: Hairs and Fibers ▪ Chapter 12: Drugs	
Week 7	▪ Chapter 13: Forensic Toxicology ▪ Chapter 14: Metals, Paint, and Soil	
Week 8	▪ Chapter 15: Forensic Serology ▪ Chapter 16: DNA: The Indispensable Forensic Science Tool	
Week 9	▪ Chapter 17: Forensic Aspects of Fire and Explosion Investigation ▪ Chapter 18: Document Examination	
Week 10	▪ Chapter 19: Computer Forensics ▪ Chapter 20: Mobile Device Forensics	

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COURSE OUTLINE – 16 Weeks		
WEEK	**TOPIC**	**ASSIGNMENT**
Week 1	▪ Chapter 1: Introduction ▪ Chapter 2: The Crime Scene	
Week 2	▪ Chapter 3: Physical Evidence	
Week 3	▪ Chapter 4: Crime-Scene Reconstruction: Bloodstain Pattern Analysis ▪ Chapter 5: Death Investigation	
Week 4	▪ Chapter 6: Fingerprints	
Week 5	▪ Chapter 7: Forensic Biometrics	
Week 6	▪ Chapter 8: The Microscope	
Week 7	▪ Chapter 9: Firearms, Tool Marks and Other Impressions	
Week 8	▪ Chapter 10: Matter, Light, and Glass Examination	
Week 9	▪ Chapter 11: Hairs and Fibers	
Week 10	▪ Chapter 12: Drugs ▪ Chapter 13: Forensic Toxicology	
Week 11	▪ Chapter 14: Metals, Paint, and Soil	
Week 12	▪ Chapter 15: Serology	
Week 13	▪ Chapter 16: DNA: The Indispensable Forensic Science Tool	
Week 14	▪ Chapter 17: Forensic Aspects of Fire and Explosion Investigation	
Week 15	▪ Chapter 18: Document Examination	
Week 16	▪ Chapter 19: Computer Forensics ▪ Chapter 20: Mobile Device Forensics	

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Chapter 1

Introduction

CHAPTER OVERVIEW

- Forensic science is the application of science to criminal and civil laws that are enforced by police agencies in a criminal justice system.
- The development of crime laboratories in the United States has been characterized by rapid growth accompanied by a lack of national and regional planning and coordination.
- The technical support provided by crime laboratories can be assigned to five basic services: the physical science unit, the biology unit, the firearms unit, the document unit, and the photography unit.
- Some crime laboratories may offer optional services such as toxicology, fingerprint analysis, voiceprint analysis, crime scene investigation, and polygraph administration.
- A forensic scientist must be skilled in applying the principles and techniques of the physical and natural sciences to the analysis of evidence that may be recovered during a criminal investigation.
- An expert witness evaluates evidence based on specialized training and experience.
- Forensic scientists train law enforcement personnel in the proper recognition, collection, and preservation of physical evidence.
- The *Frye* v. *United States* decision set guidelines for determining the admissibility of scientific evidence into the courtroom. To meet the *Frye* standard, the evidence in question must be "generally accepted" by the scientific community.
- In the case of *Daubert* v. *Merrell Dow Pharmaceuticals, Inc.*, the U.S. Supreme Court ruled that trial judges were responsible for the admissibility and validity of scientific evidence presented in their courts.
- Special forensic science services available to the law enforcement community include forensic psychiatry, forensic odontology, and forensic engineering.

LEARNING OBJECTIVES

1. Distinguish between forensic science and criminalistics.
2. Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.
3. Explain how physical evidence is analyzed and presented in the courtroom by the forensic scientist, and how admissibility of evidence is determined in the courtroom.
4. Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

LECTURE OUTLINE

DEFINITION AND SCOPE OF FORENSIC SCIENCE

HISTORY AND DEVELOPMENT OF FORENSIC SCIENCE

Literary Roots

Important Contributors to Forensic Science

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- **Teaching Note:** Challenge your students to come up with mnemonics or tricks to help remember the important figures in forensic science. For example: Walter **Mc**Mrone was a **Mic**roscopist.

CRIME LABORATORIES

Crime Labs in the United States

International Crime Labs

- **Teaching Note:** Be sure to cover the differences between a state and local forensic laboratory. Students should understand what the local analysts normally do compared to what the state analysts can do.

ORGANIZATION OF A CRIME LABORATORY

The Growth of Crime Laboratories

Future Challenges

Types of Crime Laboratories

Services of the Crime Laboratory

Basic Services Provided by Full-Service Crime Laboratories

Optional Services Provided by Full-Service Crime Laboratories

- **Teaching Note:** Discuss how the crime laboratory is organized and what departments or sections are usually in the lab, including serology, trace evidence, fingerprint examiner, and so forth.

FUNCTIONS OF THE FORENSIC SCIENTIST

Analysis of Physical Evidence

- **Teaching Note:** If you have stories of cases or interesting work you or someone you know has done in the field, share them! Draw your students in by discussing what types of evidence is analyzed.

Providing Expert Testimony

Furnishing Training in the Proper Recognition, Collection, and Preservation of Physical Evidence

OTHER FORENSIC SCIENCE SERVICES

Forensic Psychiatry

Forensic Odontology

Forensic Engineering

Forensic Computer and Digital Analysis

Exploring Forensic Science on the Internet

General Forensics Sites

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LIST OF CHANGES / TRANSITION GUIDE

This chapter has been expanded to cover the discussion of the reliability and controversy surrounding forensic bite mark comparison.

ADDITIONAL ASSIGNMENTS AND CLASS ACTIVITIES

Demonstrations and Lecture-Starters

Deductive Reasoning Exercise: The Deadly Picnic. This exercise challenges students to critically analyze evidence and emphasizes the importance of thorough observation and note taking at the crime scene.

The Facts of the Case

Centerville police discovered the body of a 36-year-old white male (later identified as Gaven Brooks) in a field about twenty miles north of town. Mr. Brooks's body was discovered at 7:30 p.m. on Friday, October 11. He was found lying face-up on a yellow, queen-size sheet. According to autopsy reports, one fatal gunshot to the back of the head ended Mr. Brooks's life. Scientists estimate that death occurred at about 4:20 p.m. As investigators scanned the crime scene, they made the following notes:

- Paper plates filled with partially eaten fried chicken, deviled eggs, potato salad, and chocolate cake were located near Mr. Brooks's body.
- An open bottle of red wine and two partially filled glasses of wine were found next to the yellow sheet.
- A recently smoked cigarette butt was found near the sheet.
- Shoeprints from the road to the field were those of a male, size 10, and a female, size 5. The only shoeprints from the field back to the road were those of a female, size 5.
- Car tracks of the same wheel base and tread pattern as Mr. Brooks's automobile were found at the road. The car was not found at the scene.
- Mr. Brooks's car was found abandoned in an empty parking lot in downtown Centerville.

Investigators believe that a female friend of Mr. Brooks was responsible for his demise. After questioning family and friends, it was discovered that the deceased had frequent social outings with six women who live in or near Centerville. The women's names are Rita, Lauren, Gail, Janice, Elaine, and Peggy. Investigators gathered the following information about the six women:

- Janice works full-time as a caterer.
- Elaine and Gail are schoolteachers.
- Rita's mother says Rita arrived home in her own car at about 5 p.m.
- Peggy and Elaine live together in a two-bedroom apartment in downtown Centerville.
- Gail lives in a nearby town called Jordan.
- Elaine and Janice are very petite women—they wear size 4 jeans.
- Gail and Peggy are smokers.
- Rita's father owns a gun shop.
- Elaine attends a 5-p.m. yoga class in downtown Centerville every Friday afternoon and has not missed a class in two years.
- Peggy is deathly allergic to grapes.
- Lauren works at a chemical supply house.
- Rita lives in a country house about thirty miles west of Centerville.
- Gail is a vegan.
- Rita is a florist.

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- Janice doesn't know how to drive.
- Elaine and Gail hate the color yellow.
- Lauren played center for a semiprofessional basketball team five years ago. She has red hair and is six feet, one inch tall.

Based on the preceding information, students must determine who murdered Mr. Brooks and the general facts of the case.

The Solution

The general facts of the case are that Mr. Brooks and one of the women took his car on a picnic north of Centerville. After dining, Mr. Brooks was killed by his female companion, who then drove back to town and abandoned his car. Based on the evidence, the murderer is Elaine. At least one piece of evidence eliminates every other suspect. Peggy is deathly allergic to grapes, so she would not have drunk the wine. Lauren is obviously a tall woman, so the shoe prints found in the field are too small to be hers. Janice does not know how to drive, so she could not have driven the car back to town by herself. Doubt may fall on Rita, who has no alibi until half an hour after the murder was committed. However, she would not have enough time to drive the twenty miles to Centerville, abandon the car there, then drive an additional thirty miles home and still arrive by 5:00. That leaves Gail and Elaine as possible suspects. Gail might fit the profile because she is a smoker and a cigarette butt was found near the body. However, there is no indication of the sex of the person who smoked the cigarette, so this alone is not sufficient proof. Moreover, Gail is a vegan, so she would not have eaten the chicken or deviled eggs. Elaine has the alibi that she was at a 5:00 aerobics class, but the class is in downtown Centerville, where the car was abandoned. This means that she would have had time to commit the murder and still make the class on time. Because all other suspects have been eliminated, Elaine must be the murderer.

Questions

1. How does the textbook define forensic science?
2. Why is Mathieu Orfila considered "the father of forensic toxicology"?
3. What was Francis Galton's principal contribution to forensic science?
4. How did Calvin Goddard advance the science of firearms examination?
5. What is Locard's exchange principle?
6. What major advance in forensic science did the state of California undertake in 1972?
7. How does the British system of forensic laboratories differ from that of the United States?
8. How has the emergence of the "fee-for-service" system affected the practice of forensic science in Great Britain?
9. List three reasons for the unparalleled growth of crime laboratories in the United States since the 1960s.
10. Describe how the structure of the U.S. federal government has affected the organization of crime labs in the United States.
11. List three main reasons for the wide variation in total services offered by crime labs in different communities.

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12. Describe the basic duties of the physical science unit in a crime lab and give three examples of the type of work performed by a physical science unit.
13. In addition to the physical science unit, what four units typically are found in full-service crime labs? List at least one function performed by each of these units.
14. List two optional units found in most crime labs and give at least one example of the type of work done by each.
15. List the main functions of the forensic scientist.
16. What important principle was established in the case of *Frye* v. *United States*?
17. How did the court's ruling in the case of *Daubert* v. *Merrell Dow Pharmaceuticals, Inc.* affect the admissibility of scientific evidence in federal courts?
18. How does the testimony of an expert witness differ from the testimony of a lay witness?
19. List two ways in which a forensic odontologist can assist in criminal investigations.

Answers to Questions

1. Forensic science is the application of science to criminal and civil laws that are enforced by police agencies in a criminal justice system.
2. Orfila published the first scientific treatise on the detection of poisons and their effects on animals.
3. Galton undertook the first definitive study of fingerprints and developed a methodology of classifying them for filing.
4. Goddard was the first to use a comparison microscope to analyze bullets to determine whether they were fired from the same gun.
5. Locard's exchange principle states that whenever two objects come into contact with one another, there is exchange of materials between them. When this happens during the commission of a crime, the cross-transfer of evidence can connect the suspect to his or her victim.
6. In 1972 California began creating an integrated network of state-operated forensic laboratories consisting of regional and satellite facilities.
7. In contrast to the American system of independent government laboratories, Britain and Wales have privatized their forensic science services.
8. The fee-for-service concept has encouraged the creation of a number of private laboratories that make their services available to police and defense alike.
9. First, Supreme Court decisions in the 1960s required police to place greater emphasis on securing scientifically evaluated evidence and all but eliminated confessions as a routine investigative tool. Second, the dramatic increase in U.S. crime rates led to a greater need for scientific examination of criminal evidence. Third, the advent of DNA profiling led to a need for crime labs to expand their staffs and modernize their facilities to meet the demands of DNA technology.
10. The federal system of government emphasizes the importance of retaining local control over important matters such as criminal prosecution. This has led to the growth of many local and state crime laboratories and precluded the creation of a national system. In addition, the federal government has no single law enforcement or investigative agency that has unlimited jurisdiction throughout the country.

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11. Three main reasons for the wide variation in total services offered by crime labs are variations in local laws, different capabilities and functions of the organization to which a laboratory is attached, and budgetary and staffing limitations.

12. The physical science unit applies principles and techniques of chemistry, physics, and geology to the identification and comparison of crime scene evidence. Three examples of the type of work performed by the physical science unit are drug identification, soil and mineral analysis, and examination of trace physical evidence.

13. The biology unit performs DNA profiling of dried bloodstains and other biological material, compares hairs and fibers, and identifies and compares botanical materials such as wood and plants. The firearms unit examines firearms and ammunition of all types, examines garments and other objects in order to detect firearms discharge residues, and examines crime scene evidence to approximate the distance from a target at which a weapon was fired. The document examination unit studies questioned documents to ascertain their authenticity and/or source; analyzes paper and ink; and examines indented writings, obliterations, erasures, and burned or charred documents. The photography unit examines and records physical evidence, uses specialized photographic techniques to make invisible information visible to the naked eye, and helps prepare photographic exhibits for courtroom presentation.

14. The toxicology unit examines body fluids and organs to determine the presence or absence of drugs and poisons, determines the alcoholic consumption of individuals, trains operators in the use of field instruments, and maintains and services such instruments. The latent fingerprint unit processes and examines evidence for latent fingerprints. The polygraph unit administers and interprets the results of polygraph tests. The voiceprint analysis unit analyzes sound recordings to connect voiceprints to particular criminal suspects. The crime scene investigation unit dispatches specially trained personnel to the crime scene to collect and preserve physical evidence that will later be processed at the crime laboratory.

15. The main functions of the forensic scientist include analyzing physical evidence; providing expert testimony; and furnishing training in the proper recognition, collection, and preservation of physical evidence.

16. *Frye* v. *United States* established the principle that questioned procedures, techniques, or principles must be "generally accepted" by a meaningful segment of the relevant scientific community before they are admissible as evidence at trial.

17. In *Daubert* v. *Merrell Dow Pharmaceuticals, Inc.*, the Supreme Court asserted that "general acceptance" is not an absolute prerequisite to the admissibility of scientific evidence under the Federal Rules of Evidence. According to the Court, the Rules of Evidence assign to the trial judge the task of ensuring that an expert's testimony rests on a reliable foundation and is relevant to the task at hand.

18. A lay witness must give testimony on events or observations that arise from personal knowledge. This testimony must be factual and, with few exceptions, cannot contain the personal opinions of the witness. By contrast, the expert witness evaluates evidence that the court lacks the expertise to do, and thus must express his or her personal opinion as to the significance of the findings. The views expressed are accepted only as representing the expert's opinion and may later be accepted or ignored in jury deliberations.

19. Forensic odontologists can use dental records such as X-rays, dental casts, and a photograph of a person's smile to compare a set of dental remains and a suspected victim. A forensic odontologist can also compare bite marks left on a victim to the tooth structure of suspects.

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SUGGESTED ANSWERS TO END-OF-CHAPTER ASSIGNMENTS

Review Questions

1. Forensic science
2. Sherlock Holmes
3. Anthropometry
4. Francis Henry Galton
5. Leone Lattes
6. Walter McCrone
7. Albert Osborn
8. Hans Gross
9. Edmond Locard
10. Edmond Locard
11. Los Angeles
12. California
13. Regional
14. Drug
15. The Federal Bureau of Investigation; the Drug Enforcement Administration; the Bureau of Alcohol, Tobacco, Firearms, and Explosives; the U.S. Postal Service
16. Federal, state, county, municipal
17. Trace evidence
18. Biology
19. Firearms
20. Toxicology
21. Crime scene investigation
22. *Frye v. United States*
23. *Daubert v. Merrell Dow Pharmaceuticals, Inc.*
24. True
25. *Coppolino v. State*
26. Expert witness
27. True
28. False
29. Training
30. True
31. Melendez-Diaz

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Application and Critical Thinking

1. There are a range of possible answers to this question. Under the British fee-for-service model, government budgets might limit the number and type of laboratory tests police and prosecutors may request. On the other hand, if they must pay fees for crime lab services, police and prosecutors may be more careful about the types of evidence they submit. The fact that the U.S. model allows investigators to submit a theoretically unlimited amount of evidence for examination means that it might encourage police to spend more time and resources than are necessary to investigate a case. Under a fee-for-service model, police must be more efficient in their investigations. However, this can be a drawback in cases in which initial tests prove inconclusive and more extensive methods of examination are needed.
2. The note would be examined by the document examination unit; the revolver would be examined by both the firearms unit and the latent fingerprint unit; the traces of skin and blood would be examined by the biology unit.
3. Again, this question could have several answers, which might include greater expertise in crime scene investigation, using the skills of experts in several areas of criminalistics, and reducing the workload on patrol officers.
4. On appeal, the defense raised the question of whether a new test that has not been generally accepted by the scientific community is admissible as evidence in court. The court rejected the appeal, arguing that "general acceptance," as stated in *Frye v. United States,* is not an absolute prerequisite to the admissibility of scientific evidence.
5. C, A, G, E, B, F, D
6. A=Toxicology, B-Drugs, C=Biology, D=Computer and Digital, E=Biology, F=Criminalistics, G=Anthropology, H=Document Examination, I=Computer and Digital, J=Toxicology, K=Fingerprint, L=Criminalistics, M=Firearms.

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Chapter 2

The Crime Scene

CHAPTER OVERVIEW

- Physical evidence includes any and all objects that can establish that a crime has been committed or can link crime and victim or victim and perpetrator.
- Forensic science begins at the crime scene, where investigators must recognize and properly preserve evidence for laboratory examination.
- The first officer to arrive must secure the crime scene.
- Investigators record the crime scene by using photographs, sketches, and notes, and make a preliminary examination of the scene as it was left by the perpetrator.
- The search pattern selected at a crime scene depends on the size and location of the scene and the number of collectors participating in the search.
- Many items of evidence may be detected only through examination at the crime laboratory. For this reason, it is important to collect possible carriers of trace evidence, such as clothing, vacuum sweepings, and fingernail scrapings, in addition to more discernible items.
- Each item of physical evidence collected at a crime scene must be placed in a separate appropriate container to prevent damage through contact or cross-contamination.
- Investigators must maintain the chain of custody, which is a record for denoting the location of the evidence.
- Proper standard/reference samples, such as hairs, blood, and fibers, must be collected at the crime scene and from appropriate subjects for comparison purposes in the laboratory.
- The removal of any evidence from a person or from the scene of a crime must be done in accordance with appropriate search and seizure protocols.

LEARNING OBJECTIVES

1. Describe the various measures taken while securing, recording, and searching the crime scene.
2. Describe proper techniques for packaging common types of physical evidence.
3. Understand the concept of chain of custody.
4. Relate what steps are typically required to maintain appropriate health and safety standards at the crime scene.
5. Understand the implications of relevant U.S. Supreme Court decisions in conducting a crime scene investigation.

LECTURE OUTLINE

PROCESSING THE CRIME SCENE

Securing and Isolating the Crime Scene

Recording the Crime Scene

- **Teaching Note:** Be sure to cover the importance of protecting the crime scene from the very beginning. Too many critical things can be disturbed or destroyed if people are walking through the scene. Discuss how to control the scene and document who goes in and out.

Conducting a Systematic Search for Evidence

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COLLECTING AND PACKAGING PHYSICAL EVIDENCE

- **Teaching Note:** Stress the importance of packaging evidence at a crime scene correctly. If cross-contamination, loss, transfer, or destruction of evidence occurs at the scene, then no amount of skill by a laboratory examiner can fix the compromised evidence.

MAINTAINING THE CHAIN OF CUSTODY

- **Teaching Note:** In explaining the chain of custody, elaborate on the responsibility that comes with having crime-scene evidence in one's possession.

Obtaining Standard/Reference Samples

Submitting Evidence to the Laboratory

ENSURING CRIME-SCENE SAFETY

LEGAL CONSIDERATIONS AT THE CRIME SCENE

- **Teaching Note:** Emphasize the legal consideration of proper evidence-handling. Bring up famous evidence mishap cases, like the O.J. Simpson and the Jon Benet Ramsey cases.

ADDITIONAL ASSIGNMENTS AND CLASS ACTIVITIES

Demonstrations and Lecture-Starters

Mock Crime Scene.

A mock crime scene can be set up in a classroom. Students are encouraged to become familiar with proper packaging and handling of common types of physical evidence. Emphasize preparation and use of the druggist fold. All pertinent information should be recorded in a notebook. Sketches may be made of the crime scene. A crime scene sketch kit, which includes an excellent instructional manual on sketching, is available from Sirchie Finger Print Laboratories, 100 Hunter Place, Youngsville, NC 27596.

Crime Scene Sketch.

Materials:

Graph paper

Notepad

Rulers

Tape measure/meter sticks

Mock crime scene

Procedure:

You have been introduced to the appropriate steps to process a crime scene. An important part of this process is surveying the scene and taking diligent notes of it. You must also create a sketch of the scene. With a partner or small group, you must create a sketch of the scene presented to you and keep notes of what evidence you find. In your sketch you must provide an accurate

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depiction of the entire scene with dimension measurements, as well as location measurements for all pieces of physical evidence.

Follow-Up Questions:

1. Why is it important to take diligent notes when processing the crime scene?
2. What is the chain of custody?
3. Why do we sketch the crime scene as well as take photographs of it?

Questions

1. How does the textbook define physical evidence?
2. What is the first critical step in crime scene investigation? Why is this step so important?
3. List the three methods of crime scene recording.
4. What is the most important prerequisite for photographing a crime scene? Why is this so critical?
5. What is a rough sketch and what information must it accurately reflect?
6. What information must be included in any notes taken at the crime scene?
7. Besides the crime scene itself, what locations must investigators search?
8. What items from deceased victims must be collected and sent to a forensic laboratory?
9. What is the main objective in collecting and packaging physical evidence?
10. What is the best way to maintain the integrity of evidence that is collected and submitted to the crime laboratory?
11. Why is it important to package items of physical evidence in separate containers?
12. Why should ordinary mailing envelopes not be used for packaging physical evidence?
13. Describe a druggist fold and explain why it is a superior way to package small amounts of trace evidence.
14. Why should bloodstained evidence not be stored in airtight containers? What is the best way to store such evidence?
15. Define *chain of custody* and explain why maintaining a proper chain of custody is important. What are the possible consequences of failing to maintain a proper chain of custody?
16. What is a standard/reference sample and why is it important to the criminalist?
17. What is a substrate control and why is it important?
18. Why is it important to include a brief description of the case history on an evidence submission form?
19. What two diseases have sensitized the law enforcement community to the potential health hazards that can exist at crime scenes? Name three basic types of protective clothing that investigators use to guard against contamination by infectious materials at a crime scene.
20. List four situations in which a warrantless search may be justified.

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Answers to Questions

1. Physical evidence is any object that can establish that a crime has been committed, or can link a crime and its victim or a crime and its perpetrator.
2. The first critical step in crime scene investigation is securing and isolating the crime scene. It is critical because anyone who enters a crime scene potentially could destroy physical evidence important to the investigation.
3. The three methods of crime scene recording are photography, sketches, and notes.
4. The most important prerequisite for photographing a crime scene is for the scene to be in an unaltered condition. If objects at the scene have been removed, added, or changed positions, the photographs may not be admissible as evidence at a trial, and their intended value will be lost.
5. A rough sketch is a draft representation of all essential information and measurements at a crime scene. A rough sketch must accurately depict the dimensions of the crime scene, as well as all recovered items of physical evidence and their exact locations.
6. Crime scene notes must include a detailed written description of the scene with the location of items of physical evidence recovered. They must also identify the time at which an item of physical evidence was discovered, by whom, how and by whom it was packaged and marked, and the disposition of the item after it was collected.
7. The areas searched must include all probable points of entry and exit used by the criminal(s).
8. The following items must be sent to the forensic laboratory: the victim's clothing, fingernail scrapings, head and pubic hairs, blood, any bullets recovered from the body, hand swabs (from shooting victims), and vaginal/anal/oral swabs (in sex-related crimes).
9. The main objective in collecting and packaging physical evidence is to prevent any change in the evidence between the time it is removed from the crime scene and the time it is received by the crime laboratory.
10. The integrity of evidence is best maintained when the item is kept in its original condition as found at the crime site.
11. Packaging evidence separately prevents damage through contact and cross-contamination.
12. Ordinary mailing envelopes should not be used as evidence containers because powders and fine particles will leak out of their corners.
13. A druggist fold consists of folding one end of a piece of paper over one-third, then folding the other end (one-third) over that, and repeating the process from the other two sides. After the paper is folded in this manner, the outside two edges are tucked into each other. A druggist fold produces a closed container that keeps the specimen from falling out.
14. Bloodstained materials should not be stored in airtight containers because the accumulation of moisture in such containers may encourage the growth of mold, which can destroy the evidential value of blood. In these instances, butcher paper, manila envelopes, and paper bags are recommended packaging materials.
15. The chain of custody is a list of all people who came into possession of an item of evidence. Maintaining a proper chain of custody is the best guarantee that the evidence will withstand inquiries of what happened to it from the time of its finding to its presentation in court. Failure to substantiate the evidence's chain of custody may lead to serious questions regarding the authenticity and integrity of the evidence and examinations of it.

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16. A standard/reference sample is physical evidence whose origin is known, such as blood or hair from a suspect, which can be compared to crime-scene evidence. Standard/reference samples are important because they allow the criminalist to connect evidence found at the scene of a crime to the suspect and/or victim.
17. A substrate control consists of uncontaminated surface material close to an area where physical evidence has been deposited. A substrate control ensures that the surface on which a sample has been deposited does not interfere with the interpretation of laboratory tests.
18. Providing a case history allows the examiner to analyze specimens in a logical sequence and make the proper comparisons, and it also facilitates the search for trace quantities of evidence.
19. The spread of AIDS and hepatitis B have sensitized the law enforcement community to the potential health hazards that can exist at crime scenes. Three basic types of protective clothing recommended for investigators are latex gloves, shoe covers, and liquid-repellent coveralls.
20. A warrantless search may be justified in the following situations: (1) the existence of emergency circumstances; (2) the need to prevent the immediate loss or destruction of evidence; (3) a search of a person and property within the immediate control of the person, provided it is made incident to a lawful arrest; and (4) a search made by consent of the parties involved.

SUGGESTED ANSWERS TO END-OF-CHAPTER ASSIGNMENTS

Review Questions

1. Physical evidence
2. False
3. False
4. Excluded
5. True
6. First responding officer
7. Medical assistance
8. False
9. Log
10. True
11. Photography; sketching; notes
12. True
13. First responding officer
14. False
15. Notes
16. False
17. Unaltered
18. Close-up

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19. False
20. Single lens reflex
21. Pixels
22. True
23. Overview; close-up
24. False
25. Standard operating procedures
26. Videotaping
27. Final sketch
28. Computer-aided design
29. Rough
30. Systematic
31. Physical evidence
32. False
33. False
34. Carriers
35. Is not
36. Separate
37. False
38. Is not
39. Air-dried
40. False
41. Chain of custody
42. Standard/reference
43. Unwarranted
44. Arson or fire

Application and Critical Thinking

1. While waiting for backup, you should summon medical assistance for the victim, take a statement from the victim, detain any suspects at the scene, establish the boundaries of the crime scene, and ensure no unauthorized personnel enter the crime scene.
2. a) Grid or line search
   b) Quadrant (zone) search
   c) Spiral or line search
3. Officer Walter made a mistake by opening the window and airing out the house. He should have kept the window closed until an investigation team arrived. From the lack of blood or evidence of a struggle, he concluded that the murder occurred someplace else, and that the room containing the body was a secondary scene.

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4. Officer Guajardo should not have removed the scrap of cloth until the photographer had arrived and taken a picture of the evidence. He also should have put on latex gloves or used forceps or another tool to remove the scrap of cloth. Finally, he should have placed the cloth in a paper bag or other container where air could circulate, rather than in a sealed plastic bag where moisture could accumulate and cause mold to grow on the cloth.
5. Officer Gurney should have recorded his initials on the original seal and the date on which the evidence was sealed. The forensic scientist should have opened the package in a different place, not broken the old seal. The forensic scientist also should not have discarded the old seal.
6. The crime scene sketch does not contain dimensions of walls and objects or reference measurements for labeled objects. The sketch does show some case information, but it should be condensed in a title block.

Case Analysis

1. first challenge investigators faced was destruction of evidence. Mexican authorities autopsied the bodies twice before the corpses had been inspected, which likely destroyed potentially helpful evidence. Authorities also prevented forensic scientists from examining the corpses until the bodies had decomposed significantly. Mexican police removed all of the obvious evidence from the residence where the victims were held before allowing the FBI forensic team to enter the scene. Mexican authorities later seized a license plate found hidden at the scene and would not allow FBI agents to examine it or to conduct any further searches of the property. In addition, Mexican authorities destroyed much of the evidence that had been collected from the crime scene for "health reasons." The second main challenge was contamination of crime scenes linked to the murders. The location where the bodies were discovered was not sealed by police, thus allowing both police officers and onlookers to contaminate the scene. Also, the residence at 881 Lope De Vega—where the victims were believed to have been killed—was cleaned and painted before forensics experts had a chance to examine it. In addition, Mexican federal police officers had been living in the residence since shortly after the time of the murders, further contaminating the scene.
2. Investigators collected reference samples of carpeting from the victims' bodies, as well as bits of the victims' clothing and the sheets in which the bodies were buried. The carpet samples matched samples taken from the residence at 881 Lope De Vega, where investigators suspected the victims were killed. The samples of burial sheet matched pillowcases found at the residence, and bits of clothing matching that worn by the victims were also found at the residence. In addition, hair and blood samples matching those of the victims were found in the residence at 881 Lope De Vega.
3. Investigators found that soil samples from the victims' bodies did not match the soil from the area where the bodies were found. They also found no significant bodily fluids in the area where the bodies were found. This evidence suggested that the bodies originally had been buried elsewhere and later transported to the location where they were found. Investigators later compared soil samples from the victims' bodies to samples taken from a park where the bodies of two Americans killed by drug traffickers had been discovered. Soil samples from the bodies of Camarena and Zavala exactly matched the soil found at the location where the Americans' bodies were found.

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Test Bank

Chapter 1

Introduction

Chapter 1 Multiple Choice

1) Forensic science is the application of science to:
   A) Crime scene reconstruction.
   B) Civil laws.
   C) Criminal laws.
   D) Both criminal and civil laws.
   Answer: D
   Page Ref: 03
   Objective: Distinguish between forensic science and criminalistics.
   Level: Basic

2) The fictional character of Sherlock Holmes was created by:
   A) Dalton.
   B) Doyle.
   C) Darwin.
   D) Denton.
   Answer: B
   Page Ref: 05
   Objective: Distinguish between forensic science and criminalistics.
   Level: Intermediate

3) Who is known as the "father of forensic toxicology"?
   A) Orfila
   B) Locard
   C) Osborn
   D) Lattes
   Answer: A
   Page Ref: 05
   Objective: Distinguish between forensic science and criminalistics.
   Level: Intermediate

4) Who developed the system known as anthropometry?
   A) Bertillon
   B) Goddard
   C) Gross
   D) Galton
   Answer: A

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Page Ref: 05

Objective: Distinguish between forensic science and criminalistics.

Level: Intermediate

5) Who undertook the first definitive study of fingerprints as a method of personal identification?

A) Gross

B) Lattes

C) Goddard

D) Galton

Answer: D

Page Ref: 07

Objective: Distinguish between forensic science and criminalistics.

Level: Intermediate

6) Who devised a technique for determining the blood group of a dried bloodstain, which he applied to criminal investigations?

A) Lattes

B) Gross

C) Locard

D) Bertillon

Answer: A

Page Ref: 07

Objective: Distinguish between forensic science and criminalistics.

Level: Intermediate

7) Who established the comparison microscope as the indispensable tool of the modern firearms examiner?

A) Goddard

B) Lattes

C) Gross

D) Osborn

Answer: A

Page Ref: 07

Objective: Distinguish between forensic science and criminalistics.

Level: Intermediate

8) Who wrote the first treatise describing the application of science to the field of criminal investigation?

A) Locard

B) Osborn

C) Lattes

D) Gross

Answer: D

Page Ref: 07

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Objective: Distinguish between forensic science and criminalistics.
Level: Intermediate

9) Who established the first workable crime laboratory?

A) Galton
B) Bertillon
C) Locard
D) Osborn

Answer: C
Page Ref: 07
Objective: Distinguish between forensic science and criminalistics.
Level: Intermediate

10) The exchange of evidence principle was theorized by:

A) Gross.
B) Locard.
C) Galton.
D) Osborn.

Answer: B
Page Ref: 08
Objective: Distinguish between forensic science and criminalistics.
Level: Basic

11) The oldest forensic laboratory in the United States is that of the:

A) N.Y.C. Police Department.
B) FBI.
C) Los Angeles Police Department.
D) Secret Service.

Answer: C
Page Ref: 08
Objective: Distinguish between forensic science and criminalistics.
Level: Intermediate

12) Which of the following can be rightfully cited as an explanation for the rapid growth of crime labs during the last 40 years?

A) Supreme Court decisions in the 1960s
B) Staggering increase in crime rates in the United States
C) Advent of DNA profiling
D) All of the above

Answer: D
Page Ref: 9-10
Objective: Distinguish between forensic science and criminalistics.
Level: Basic

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13) Which entity maintains the largest crime laboratory in the world?

A) FBI

B) Royal Canadian Mounted Police

C) Scotland Yard

D) ATF

Answer: A

Page Ref: 10

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Basic

14) Which would NOT be included in the work of the biology unit of a crime lab?

A) Blood typing

B) Comparison of hairs

C) DNA profiling

D) Fingerprint analysis

Answer: D

Page Ref: 12

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Basic

15) Which unit is responsible for the examination of body fluids and organs for the presence of drugs and poisons?

A) Toxicology unit

B) Physical science unit

C) Evidence collection unit

D) Biology unit

Answer: A

Page Ref: 13

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Basic

16) The concept of "general acceptance" of scientific evidence relates to the:

A) First Amendment.

B) Exclusionary rule.

C) Frye standard.

D) Miranda warnings.

Answer: C

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Objective: Explain how physical evidence is analyzed and presented in the courtroom by the forensic scientist, and how admissibility of evidence is determined in the courtroom.

Level: Intermediate

17) In the case of *Daubert v. Merrell Dow Pharmaceutical, Inc.*, the U.S. Supreme Court advocated that a "gatekeeper" determine the admissibility and reliability of scientific evidence. This gatekeeper is the:

A) Expert witness.

B) Prosecutor.

C) Jury.

D) Trial judge.

Answer: D

Page Ref: 17

Objective: Explain how physical evidence is analyzed and presented in the courtroom by the forensic scientist, and how admissibility of evidence is determined in the courtroom.

Level: Intermediate

18) Which of the following is NOT true? An expert witness must be able to demonstrate:

A) Skill in a trade or profession that is of interest to the court.

B) Significant experience in a relevant field.

C) A formal degree in forensic science.

D) Education in his/her area of expertise.

Answer: C

Page Ref: 18

Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Intermediate

19) The final evaluator of forensic evidence is the:

A) Police.

B) Jury.

C) Accused.

D) Prosecutor.

Answer: B

Page Ref: 20

Objective: Explain how physical evidence is analyzed and presented in the courtroom by the forensic scientist, and how admissibility of evidence is determined in the courtroom.

Level: Basic

20) What is the LEAST important consideration in the gathering of evidence at a crime scene?

A) Adequate preservation of samples

B) Competent collection of materials

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C) Guilt of the suspect(s)

D) Proper recognition of the evidence

Answer: C

Page Ref: 21

Objective: Explain how physical evidence is analyzed and presented in the courtroom by the forensic scientist, and how admissibility of evidence is determined in the courtroom.

Level: Intermediate

21) Bite marks would be LEAST likely to be found in cases involving:

A) Murder.

B) Child abuse.

C) Arson.

D) Sexual abuse.

Answer: C

Page Ref: 22

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Basic

22) Forensic odontology refers to the study of:

A) Drugs.

B) Pollen.

C) Teeth.

D) Bones.

Answer: C

Page Ref: 22

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Basic

23) Which of the following services are typically provided to law enforcement by crime laboratories?

A) Pathology

B) Criminalistics

C) Odontology

D) Psychology

Answer: B

Page Ref: 12

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Basic

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24) The case of *Coppolino v. State* highlights issues dealing with:

A) Search and seizure.

B) The admissibility of the polygraph.

C) The evidential value of confessions.

D) The acceptability of new scientific tests.

Answer: D

Page Ref: 18

Objective: Explain how physical evidence is analyzed and presented in the courtroom by the forensic scientist, and how admissibility of evidence is determined in the courtroom.

Level: Intermediate

25) The scientific method requires that scientific evidence be validated by:

A) Formulating pertinent questions.

B) Formulating hypotheticals.

C) Performing experiments.

D) All of the above

Answer: D

Page Ref: 16

Objective: Distinguish between forensic science and criminalistics.

Level: Basic

26) The eleven sections of The American Academy of Forensic Science include all of the following EXCEPT:

A) General.

B) Arson/Explosives.

C) Jurisprudence.

D) Criminalistics.

Answer: B

Page Ref: 03

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

27) The tendency of the public to believe that every crime scene will yield forensic evidence and their unrealistic expectations that a prosecutor's case should always be bolstered and supported by forensic evidence is known as:

A) Jurisprudence.

B) Locard's Principle.

C) The Scientific Method.

D) The CSI Effect.

Answer: D

Page Ref: 04

Objective: Distinguish between forensic science and criminalistics.

Level: Intermediate

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28) What is the most significant problem facing the forensic DNA community?

A) Contamination of DNA samples by evidence collectors

B) Backlog of unanalyzed DNA samples

C) Lack of recent advancements in DNA technology

D) Absence of computerized DNA databases

Answer: B

Page Ref: 10

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

29) Which unit applies principles and techniques of chemistry, physics, and geology to the identification and comparison of crime scene evidence?

A) Forensic geology

B) Physical science

C) Toxicology

D) Biology

Answer: B

Page Ref: 12

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

30) Which specialized area of forensic science examines the relationship between human behavior and legal proceedings?

A) Forensic jury selection

B) Jurisprudence

C) Forensic psychiatry

D) Forensic odontology

Answer: C

Page Ref: 22

Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Intermediate

31) A crime scene which involved the collapse of a structure would be analyzed by specialists in the area of:

A) Forensic computer and digital analysis.

B) Forensic error analysis.

C) Criminalistics.

D) Forensic engineering.

Answer: D

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Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Intermediate

32) What factor(s) do(es) the court usually take into consideration as sufficient grounds for qualification as an expert witness?

A) Experience

B) Training

C) Education

D) All of the above

Answer: D

Page Ref: 18

Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Basic

33) Specially trained personnel called _____ are employed by some crime laboratories on 24-hour call to retrieve evidence and have all the proper tools and supplies for proper collection and packaging of evidence at their disposal.

A) Evidence officers

B) Forensic detectives

C) Evidence technicians

D) Forensic pathologists

Answer: C

Page Ref: 21

Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Intermediate

34) In *Kumho Tire Co., Ltd. v. Carmichael*, the U.S. Supreme Court ruled that the "gatekeeping" role of a trial judge:

A) Was restricted to scientific testimony.

B) Applied only to cases involving capital crimes.

C) Was subject to appeal by a higher court.

D) Applied to all expert testimony.

Answer: D

Page Ref: 18

Objective: Explain how physical evidence is analyzed and presented in the courtroom by the forensic scientist, and how admissibility of evidence is determined in the courtroom.

Level: Intermediate

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35) Which judicial case set forth the most current guidelines for determining the admissibility of scientific examinations in the federal courts?

A) *Frye v. United States*

B) *Daubert v. Merrell Dow Pharmaceuticals*

C) *Coppolino v. State of Florida*

D) *Kumho Tire Co., Ltd. v. Carmichael*

Answer: B

Page Ref: 17

Objective: Explain how physical evidence is analyzed and presented in the courtroom by the forensic scientist, and how admissibility of evidence is determined in the courtroom.

Level: Intermediate

36) The dramatization of forensic science on television has led to a phenomenon known as the:

A) NCIS effect.

B) NYPD effect.

C) CSI effect.

D) LAPD effect.

Answer: C

Page Ref: 04

Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Basic

37) The necessity for the forensic scientist to appear in court comes from the U.S. Supreme Court case?

A) *Melendez-Diaz v. Massachusetts*

B) *Crawford v. Washington*

C) *Coppolino v. State*

D) *Frye v. United States*

Answer: A

Page Ref: 20

Objective: Explain how physical evidence is analyzed and presented in the courtroom by the forensic scientist, and how admissibility of evidence is determined in the courtroom.

Level: Basic

38) The lay witness provides testimony that relies on:

A) Scientific education.

B) Personal opinions.

C) Personal knowledge.

D) Scientific experience.

Answer: C

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Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Intermediate

Chapter 1 True/False

1) One of the earliest crime laboratories was founded by Albert Osborn.

A) True

B) False

Answer: B

Page Ref: 08

Objective: Distinguish between forensic science and criminalistics.

Level: Intermediate

2) The case of *Frye v. United States* deals with the legal issue of general acceptance of scientific principles.

A) True

B) False Answer: A

Page Ref: 16

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

3) The administration of a polygraph examination does not normally lie within the expertise of the forensic scientist.

A) True

B) False

Answer: A

Page Ref: 13

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

4) The effectiveness of an expert's testimony does not usually depend on the educational background of the expert.

A) True

B) False

Answer: B

Page Ref: 18

Objective: Distinguish between forensic science and criminalistics.

Level: Basic

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5) Forensic science is the application of science to criminal laws only.

A) True

B) False

Answer: B

Page Ref: 03

Objective: Distinguish between forensic science and criminalistics.

Level: Basic

6) Locard's exchange principle states that whenever two objects come into contact with one another, there is an exchange of materials between them.

A) True

B) False

Answer: A

Page Ref: 08

Objective: Distinguish between forensic science and criminalistics.

Level: Basic

7) In 1972, New York began creating an integrated network of state-operated forensic laboratories consisting of regional and satellite facilities.

A) True

B) False

Answer: B

Page Ref: 08

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

8) The increase in U.S. crime rates since the 1960s did not have any effect on the growth of crime laboratories.

A) True

B) False

Answer: B

Page Ref: 10

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Basic

9) The federal government has no single law enforcement or investigative agency that has unlimited jurisdiction throughout the country.

A) True

B) False

Answer: A

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Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

10) Differences in local laws have no effect on the variation of total services offered by crime labs in different communities.

A) True

B) False

Answer: B

Page Ref: 11

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Basic

11) The physical science unit would perform soil and mineral analysis.

A) True

B) False

Answer: A

Page Ref: 12

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

12) The comparison of hairs and fibers would be performed in the biology unit.

A) True

B) False

Answer: A

Page Ref: 12

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

13) Examining garments and other objects in order to detect firearms discharge residues would be performed in the biology unit.

A) True

B) False

Answer: B

Page Ref: 12

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

14) Providing expert testimony is not one of the main functions of a forensic scientist.

A) True

B) False

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Answer: B

Page Ref: 14

Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Basic

15) *Frye v. United States* established the "general acceptance" rule.

A) True

B) False

Answer: A

Page Ref: 16

Objective: Explain how physical evidence is analyzed and presented in the courtroom by the forensic scientist, and how admissibility of evidence is determined in the courtroom.

Level: Intermediate

16) An expert witness gives testimony on events or observations that arise from personal knowledge.

A) True

B) False

Answer: B

Page Ref: 19

Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Intermediate

17) A lay witness's testimony cannot usually contain the personal opinions of the witness.

A) True

B) False

Answer: A

Page Ref: 19

Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Intermediate

18) Forensic anthropologists can use dental records such as X-rays, dental casts, and a photograph of a person's smile to compare a set of dental remains and a suspected victim.

A) True

B) False

Answer: B

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Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Intermediate

19) The physical science unit is responsible for examining burned or charred documents.

A) True

B) False

Answer: B

Page Ref: 12

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

20) The toxicology unit determines the amount of alcoholic consumption of individuals.

A) True

B) False

Answer: A

Page Ref: 13

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

21) Karl Landsteiner and Leone Lattes are associated with the area of blood typing.

A) True

B) False

Answer: A

Page Ref: 07

Objective: Distinguish between forensic science and criminalistics.

Level: Basic

22) Dr. Walter C. McCrone made significant contributions to forensic science using the microscope.

A) True

B) False

Answer: A

Page Ref: 07

Objective: Distinguish between forensic science and criminalistics.

Level: Basic

23) The increase in crime rates in the U.S. has led to an increase in the number of crime laboratories.

A) True

B) False

Answer: A

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Page Ref: 10

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

24) All illicit drug seizures must be sent to a forensic laboratory for confirmatory analysis.

A) True

B) False

Answer: A

Page Ref: 10

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

25) It is the responsibility of the forensic investigator to determine innocence or guilt.

A) True

B) False

Answer: B

Page Ref: 20

Objective: Distinguish between forensic science and criminalistics.

Level: Intermediate

26) The Bureau of Alcohol, Tobacco, Firearms and Explosives is a state-run agency.

A) True

B) False

Answer: B

Page Ref: 10

Objective: Distinguish between forensic science and criminalistics.

Level: Intermediate

27) Forensic odontologists look at bones to identify victims.

A) True

B) False

Answer: B

Page Ref: 22

Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Intermediate

28) The American Academy of Forensic Sciences is the largest forensic science organization in the world.

A) True

B) False

Answer: A

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Page Ref: 03

Objective: Distinguish between forensic science and criminalistics.

Level: Intermediate

29) Sir Arthur Conan Doyle's Sherlock Holmes had a large influence on popularizing scientific crime-detection methods.

A) True

B) False

Answer: A

Page Ref: 05

Objective: Distinguish between forensic science and criminalistics.

Level: Basic

30) The United States has no national system of forensic laboratories.

A) True

B) False

Answer: B

Page Ref: 10

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

31) The firearms unit may also analyze tool marks.

A) True

B) False

Answer: A

Page Ref: 12

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Basic

32) Physical evidence is subject to bias.

A) True

B) False

Answer: B

Page Ref: 14

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Basic

33) One major problem in forensic DNA laboratories is the backlog of unanalyzed DNA samples.

A) True

B) False

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Answer: A

Page Ref: 10

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

34) Regional laboratories have decreased the accessibility of many local law enforcement agencies to a crime laboratory.

A) True

B) False

Answer: B

Page Ref: 11

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

35) A voiceprint transforms a visual graphic display into speech.

A) True

B) False

Answer: B

Page Ref: 13

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

36) The five basic services a crime lab can provide are the physical science unit, the biology unit, the firearms unit, the document examination unit, and the photography unit.

A) True

B) False

Answer: A

Page Ref: 12-13

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

Chapter 1 Fill in the Blank

1) The "father of forensic toxicology" is considered to be _____.

Answer: Orfila

Page Ref: 05

Objective: Distinguish between forensic science and criminalistics.

Level: Intermediate

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2) _____ undertook the first definitive study of fingerprints and developed a methodology of classifying them for filing.

Answer: Galton

Page Ref: 07

Objective: Distinguish between forensic science and criminalistics.

Level: Intermediate

3) _____ was the first to use a comparison microscope to analyze bullets to determine whether they were fired from the same gun.

Answer: Goddard

Page Ref: 07

Objective: Distinguish between forensic science and criminalistics.

Level: Difficult

4) The fee-for-service concept has encouraged the creation of a number of _____ laboratories.

Answer: Private

Page Ref: 9

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Difficult

5) The _____ unit performs DNA profiling of dried bloodstains and other body fluids.

Answer: Biology

Page Ref: 12

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Basic

6) The _____ unit examines body fluids and organs to determine the presence or absence of drugs and poisons.

Answer: Toxicology

Page Ref: 13

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Basic

7) The _____ case assigned the trial judge the task of ensuring that an expert's testimony rests on a reliable foundation and is relevant to the task at hand.

Answer: *Daubert*

Page Ref: 17-18

Objective: Explain how physical evidence is analyzed and presented in the courtroom by the forensic scientist, and how admissibility of evidence is determined in the courtroom.

Level: Difficult

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8) The _____ witness evaluates evidence that the court lacks the expertise to do.

Answer: Expert

Page Ref: 18

Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Intermediate

9) A _____ witness must give testimony on events or observations that arise from personal knowledge.

Answer: Lay

Page Ref: 19

Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Intermediate

10) A forensic _____ can compare bite marks left on a victim to the tooth structure of suspects.

Answer: Odontologist

Page Ref: 22

Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Basic

11) The _____ unit helps prepare photographic exhibits for courtroom presentation.

Answer: Photography

Page Ref: 12

Objective: Describe the services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Basic

12) Forensic science is the application of science to the _____.

Answer: Law

Page Ref: 03

Objective: Distinguish between forensic science and criminalistics.

Level: Basic

13) Fingerprinting replaced _____ as a method of personal identification.

Answer: Anthropometry

Page Ref: 07

Objective: Distinguish between forensic science and criminalistics.

Level: Intermediate

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14) The _____ analysis unit analyzes telephoned threats and audio-recorded messages.

Answer: Voiceprint

Page Ref: 13

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Basic

15) Collecting evidence from a cell phone is an example of forensic _____ and digital analysis.

Answer: Computer

Page Ref: 23

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

16) The document examination unit studies the handwriting and _____ on questioned documents to ascertain authenticity and/or source.

Answer: Typewriting

Page Ref: 12

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Basic

17) _____ was the first to use a comparison microscope to analyze bullets to determine whether they were fired from the same gun.

Answer: Goddard

Page Ref: 07

Objective: Distinguish between forensic science and criminalistics.

Level: Difficult

Chapter 1 Matching

Match the word in Column 1 to its definition in Column 2. Each answer can only be used once.

A) When two objects come into contact with each other, a cross-transfer of materials occurs

B) Application of science to the law

C) A process that uses strict guidelines to ensure careful and systematic collection, organization, and analysis of information

D) An individual whom the court determines to possess a particular skill or knowledge in a trade or profession that is not expected of the average layperson and that will aid a court in determining the truth of a matter at trial

E) Public belief that every crime scene will yield forensic evidence

F) A systematic procedure that involved taking a series of body measurements as a means of distinguishing one individual from another

G) Lie detector

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H) Describes the services of a crime laboratory

I) Visual graphic display of speech

J) Specialized area in which the relationship between human behavior and legal proceedings is examined

1) Expert witness

Page Ref: 18

Level: Basic

2) Locard's exchange principle

Page Ref: 8

Level: Basic

3) Scientific Method

Page Ref: 16

Level: Basic

4) Forensic science

Page Ref: 3

Level: Basic

5) Anthropometry

Page Ref: 4

Level: Basic

6) Voiceprint

Page Ref: 13

Level: Basic

7) Polygraph

Page Ref: 13

Level: Basic

8) Criminalistics

Page Ref: 4

Level: Basic

9) CSI Effect

Page Ref: 4

Level: Basic

10) Forensic psychiatry

Page Ref: 22

Level: Basic

Answers: 1) D 2) A 3) C 4) B 5) F 6) G 7) I 8) H 9) E 10) J

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Chapter 1 Essay

1) List the underlying reasons for the rapid growth of crime laboratories in the United States since the late 1960s.

Answer:

- The increasing volume of physical evidence recovered from crime scenes as a result of rising crime rates
- The need to perform chemical analyses on drugs, coupled with a significant increase in illicit drug seizures
- Supreme Court decisions have enhanced the rights of the defendant. Decisions, such as those ensuring a defendant's right to counsel and the right to remain silent, have encouraged police agencies to place a greater reliance on scientific investigative techniques.
- A more recent impetus leading to the growth and maturation of crime laboratories has been the advent of DNA profiling. Since the early 1990s, this technology has progressed to the point at which traces of blood, semen, stains, hair, and saliva residues left behind on stamps, cups, bite marks, and so on, have made possible the individualization or near-individualization of biological evidence. To meet the demands of DNA technology, crime labs have expanded staff, and, in many cases, modernized their physical laboratories.
- Advances in scientific technology have provided forensic scientists with many new skills and techniques to extract meaningful information from physical evidence.

Page Ref: 9-10

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

2) List the advantages of incorporating an evidence collection unit into the organizational structure of the crime laboratory.

Answer (should include points such as):

- Evidence technicians under the continuous direction of the crime laboratory are more likely to have received thorough training in the gathering of evidence at the crime site than have detectives.
- Evidence technicians who are continuously exposed to the problems and techniques of the forensic scientist are better prepared to adopt new procedures or modify existing procedures to improve evidence collection.
- Evidence technicians working out of the forensic laboratory will have at their disposal all the proper tools and supplies for proper collection and packaging of evidence for future scientific examination.

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Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

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3) List the three basic functions of a forensic scientist.

Answer:

- Provides analysis of physical evidence
- Provides expert testimony
- Furnishes training in recognizing, collecting, and preserving physical evidence at crime scenes

Page Ref: 14-21

Objective: Distinguish between forensic science and criminalistics.

Level: Basic

4) Discuss the major outcomes of the trials Frye v. United States and Daubert v. Merrell Dow Pharmaceuticals.

Answer (should include points such as):

- **In *Frye v. United States*,** the court ruled that in order for expert testimony to be admitted at trial, a questioned procedure, technique, or principle must be "generally accepted" by a meaningful segment of the relevant scientific community.
- **In *Daubert v. Merrell Dow Pharmaceuticals*,** the U.S. Supreme Court charged the trial judge with ensuring that an expert's testimony rests on a reliable foundation and is relevant to the case.

Page Ref: 16-18

Objective: Explain how physical evidence is analyzed and presented in the courtroom by the forensic scientist, and how admissibility of evidence is determined in the courtroom.

Level: Difficult

5) What is the main difference between the testimony given by an expert witness and that given by a lay witness?

Answer: **The ordinary or lay witness** must give testimony that does not contain the personal opinions of the witness. **The expert witness** may express his or her personal opinion as to the significance of specific findings.

Page Ref: 18-19

Objective: Explain the role and responsibilities of the expert witness and what specialized forensic services, aside from the crime laboratory, are generally available to law enforcement personnel.

Level: Intermediate

Chapter 1 Critical Thinking

1) Describe the evidence to be collected and the specialists or crime laboratory units that would be needed to properly analyze the following crime scene and answer the given questions.

On Monday, September 26, 2011, a small airplane believed to be transporting members of a Mexican drug cartel and a shipment of drugs and firearms of unknown type or size recorded a short "mayday" call at 8:05 A.M. before crashing into a farmhouse in Laredo, TX. Local police report that the abandoned farmhouse is frequented by homeless individuals, and there may have been several inside at the time of impact. Upon impact, the airplane's nearly full gas tank caused a fire that incinerated those within the plane and those within the farmhouse.

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The investigators need to deduce the following:

a. How the airplane malfunctioned to cause the crash
b. Who was on the airplane and in the farmhouse
c. The contents of the airplane's cargo

Answer (should include points such as):

All evidence should be collected by the crime scene unit or trained personnel.

a. All available portions of the airplane should be collected and analyzed by a forensic engineer to acquire information about potential causes of the crash. The mayday signal should be recorded and analyzed by the voiceprint analysis unit to acquire information about potential causes of the crash. Samples of gasoline should be collected and analyzed by the physical science unit to acquire information about potential causes of the crash.
b. Any discovered remains should be collected and analyzed by a forensic odontologist to acquire information about the identity of the victims. Tissue from discovered remains should be collected and analyzed by the biology unit for blood type or DNA to acquire information about the identity of the victims.
c. All available portions of the cargo materials should be collected. Potential drug evidence should be analyzed by the physical science unit to acquire information about the contents of the airplane's cargo. Potential firearms evidence should be analyzed by the firearms unit to acquire information about the contents of the airplane's cargo.

Page Ref: 3-23

Objective: Describe the organization and services of a typical comprehensive crime laboratory in the criminal justice system.

Level: Intermediate

2) For each of the early forensic science methods listed below, denote the more recent technology or discipline which has taken its place for use in forensic science inquiry.

a. Identification via anthropometry
b. Firearms bullet and cartridge analysis via unassisted vision
c. Identification via blood typing
d. Poison identification via stomach content analysis
e. Collections and analysis of evidence via untrained police officers

Answer:

a. Fingerprinting
b. Comparison microscope
c. DNA
d. Toxicology
e. Crime scene unit/evidence technicians and crime laboratories

Page Ref: 3-23

Objective: Distinguish between forensic science and criminalistics.

Level: Basic

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3) Explain the reasons why it is important to consider the relevance of scientific evidence before allowing it to be introduced into a criminal case.

Answer (should include points such as):

It is important to consider the relevance of scientific evidence before allowing it to be introduced into a criminal case because physical evidence is accorded great weight during jury deliberations. In addition, failure to take proper safeguards when determining the relevance of evidence may unfairly prejudice a case against the accused. This is in direct conflict with the prosecution's need to be objective and present information in an objective manner at trial.

Page Ref: 3-23

Objective: Explain how physical evidence is analyzed and presented in the courtroom by the forensic scientist, and how admissibility of evidence is determined in the courtroom.

Level: Basic

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