The Principles and Thought Processes of Crime Scene Investigation

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Training Module Workbook

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Subject Matter Expert

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Mr. Barksdale has an Associate of Arts degree from Dodge City Community College, a Bachelor of Science in Criminal Justice from the University of Nebraska at Omaha, and a Master of Arts degree in Political Science from the University of Nebraska at Lincoln. Larry has also successfully completed additional coursework in chemistry, biology and mathematics from Southeast Community College in Lincoln, Nebraska. He also completed an additional year of graduate study in criminal justice at Sam Houston University in Huntsville, Texas.

Larry is certified by the International Association for Identification as a Crime Scene Analyst. He is also a certified Professional Law Enforcement instructor in Nebraska. Larry is currently an Adjunct Professor of Practice Forensic Science at the University of Nebraska at Lincoln. He was an adjunct instructor for 9 years in the Forensic Science Program at Wesleyan University in Nebraska. Larry has been a guest lecturer for courses at Lagos State University, Nigeria as well at numerous other colleges and schools.

Mr. Barksdale is on the editorial review committee for The Forensic Examiner. He is a member of the TALE committee of the Institute for Linguistic Evidence. Larry is a past president of the International Association of Auto Theft Investigation and the Nebraska Chapter of the International Association for Identification.

Disclaimer

The information presented in this training module is not designed to supersede any agency's policies or procedures. It is important to always follow all agency specific policies and procedures when investigating a crime scene. Applicable local, state and federal laws must also be adhered to.

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Course Objectives

By the end of this course, one is expected to:

- understand the theory, goals, and key components of crime scene investigation
- recognize the importance of using agency specific procedures in conjunction with local, state and federal laws to investigate a crime scene
- receive information/resources about education, training, ethics and safety
- appreciate the importance of crime scene integrity and be able to maintain it in the field
- understand the general duties expected of key personnel at a crime scene
- recognize the importance documentation plays in crime scene investigation and define the various types of documentation utilized
- understand how critical thinking, investigative paradigms and event analysis can be applied to crime scene investigation and recognize the benefits these processes provide
- recognize the importance of being open-minded, using your instincts and experience, digging beyond the obvious, and considering all possibilities when investigating a crime scene

Agenda

- Goals and Theories of Crime Scene Investigation
- Training and Certification
- Safety and Ethics
- Legal Measures and Court Testimony
- Maintaining Crime Scene Integrity
- Crime Scene Management and Personnel
- Crime Scene Documentation
- Crime Scene Processing
- Investigative Tools for Collecting the Dots
    - Critical Thinking
    - Investigative Paradigms
    - Event Analysis

GOALS AND THEORIES OF CRIME SCENE INVESTIGATION

Section Objectives

Upon completion of this section, one is expected to:

- understand what a crime scene entails
- be familiar with various types of crime scenes
- recognize the main goal of a crime scene investigation
- understand the general role of a crime scene investigator
- be familiar with the Cause and Effect Theory
- understand the "CSI Effect" and its impact on law enforcement

The Crime Scene

- Physical location where a crime took place
- Where most of the physical evidence associated with the event will be found
- Factors that can affect the crime scene
  - Weather
  - Biohazards
  - Crowds
  - Accessibility
- Scene types
  - Indoor/Outdoor
  - Simple/Complex
  - Primary/Secondary

Simple Crime Scene Example

Introduction

In this case, a school was broken into by unknown individuals. The school was vandalized, and a computer was stolen. Investigators need to determine what is missing and what has been damaged.

Broken Window

A broken window tells investigators where the perpetrators went. This area was photographed, and glass was collected as trace evidence.

Shoe Print
A shoe print on white paper was detected, photographed and collected since it is possible that it was left by one of the perpetrators.

Missing Property
A computer was missing from one of the desks.

Complex Crime Scene Example

Introduction
This is an example of a complex crime scene in which a fast food restaurant was robbed and two employees were shot. In cases like these, investigators need to make complex decisions about how to go about detecting and collecting evidence.

Blood
Numerous heavy bloodstains were visible as a result of the victims' wounds. The suspects also tracked the blood throughout the restaurant as they moved around.

In this case, the bloodstain patterns were analyzed. Samples were taken and sent for DNA testing. The victims' and suspects' footwear were compared against those found in blood.

Investigators needed to be very careful not to step in the blood or move the various items scattered on the floor.

Hat
A hat (top middle of image) was found on the floor that was collected for potential hair, fiber and DNA evidence.

Bullet Holes
Since more than one shot was fired in this case, there were several bullet holes. Investigators needed to gather evidence to determine trajectory of each shot, try to recover the bullets, and try to link each trajectory with the suspect's position.

A shooting incident reconstruction needed to be performed and the results needed to be linked with information from other evidence (i.e., bloodstain pattern, DNA, trace, victim statements, etc.).

Outdoor Crime Scene Example

Introduction

Presented here is an example of an outdoor crime scene in which a lethal shooting took place. In this case, a perimeter needed to be determined and security along the perimeter needed to be established. Since this crime occurred outdoors, a shield was put up to block the victim's body from the public view. Also, wet and snowy conditions further complicated this investigation.

Blood

Blood was found on the brick wall. The bloodstains were documented and collected for DNA testing.

Tire Impressions

Investigators found tire tracks that were photographed and compared against the suspect's vehicle. However, it started to rain and the impressions were washed away before the impression could be cast.

Shoe Prints

Shoe prints were also detected and photographed, but also washed away by the rain before they could be cast.

Shoe prints from EMT personnel and others with access to the crime scene were collected to perform comparisons as well.

Personal Property

A ring was found at the scene and was collected and submitted for DNA testing.

Example Primary and Secondary Crime Scene

Introduction

Presented here is an example case in which a primary and secondary crime scene needed to be investigated. A homicide took place inside a semi-tractor trailer rig (primary scene) and then the perpetrator buried the victim in a ditch along a dirt road (secondary scene) 20 miles away.

Blood- Primary Scene

A lot of blood was found inside the truck. White powder had been sprinkled over the area in an attempt to soak up the blood. Samples were collected and submitted for DNA testing.

When the suspect was found, he had bloody clothing in his possession. Through DNA analysis, it was determined that the victim was the source of the blood.

Trace- Primary Scene

The exhaust of the truck was damaged. Investigators collected botanical evidence (leaves, twigs, and spores) from the exhaust.

The investigators swabbed the steering wheel and gear shift for DNA. The seats and other interior surfaces were processed for hairs, fibers and other trace evidence.

Fracture Evidence – Primary Scene

The switches from the dash of the semi-truck were removed. They were later recovered in the pick-up of the suspect. The fractures were consistent between the stubs left in the dash of the semi-truck and the broken off pieces found in the suspect's car.

Personal Property – Primary Scene

The suspect stole the victim's billfold, which was recovered when the suspect was found.

Damages – Primary Scene
Several air vents were removed from the semi-truck, which were later found in the suspect's possession.

Trace- Secondary Scene
At the burial site, investigators collected botanical and soil samples.

Victim's Body- Secondary Scene
The body was excavated. Before sent to the morgue for an autopsy, photographs were taken of the fingerprints in an effort to identify the victim. Entomological evidence, such as maggots, were used to determine that the time of death was 8 days from the day of discovery.

Tire Impressions- Secondary Scene
Tire track impressions were found along the dirt road. They were photographed and cast for comparisons.

Crime Scene Investigation

- *"…the systematic process of documenting, collecting, preserving, and interpreting physical evidence associated with a alleged crime scene in an effort to determine the truth relating to the event in question."* (Dutelle)
- Investigators must attempt to legally gather as much information that will lead to an acceptable theory of what took place
- Goal is to make an association between **people**, **places**, and **things**
- Sources of information
  - Witnesses
  - Informants
  - Victim(s)
  - Suspect(s)
  - Physical evidence
  - Intelligence information

Cause and Effect Theory

- Cause and Effect Relationship Theory (Noon)
  - One thing or event occurred causing another thing or event to then happen
  - Information obtained from people and things form the basis of determining the cause of the effect
- Cause and Effect Theory as it relates to criminal investigations
  - Effect of the crime is caused by an event or chain of events
  - Investigators collect information from people and things to determine the events that took place to cause the crime
- Caution
  - It is possible to connect events identified as cause with those identified as effect without logical sufficiency due to bias (Noon)

Point of Caution (Garrison)

- Humans have an innate desire to understand "why" a crime occurred
- Problems with determining motive
  - Human behavior is unpredictable
  - Question can't always be answered
  - Often falls outside the definition of science
- Crime scene investigators should only gather and interpret the information from people and things to learn the physical events that took place

Crime Scene Investigator

- *"The investigator, to realize his maximum goal, must understand what physical evidence is; how to collect and preserve it; how to obtain from it the information it carries; and how to interpret the information so obtained."* (Kirk)
- Must consider at all times
  - ethics
  - safety
  - crime scene and evidence integrity
- May be required to testify in court to actions taken and/or evidence collected

CSI Effect

- Crime dramas give the public a distorted perspective of crime scene investigation, physical evidence and forensic science
- Effects on law enforcement
  - Investigators are held to higher and sometimes unrealistic expectations
  - More physical evidence is being collected and submitted for laboratory testing
  - Criminals leave less obvious evidence behind

Information based on a journal article by Evan Durnal

TRAINING AND CERTIFICATION

Section Objectives

Upon completion of this section, one is expected to:

- be aware of the guidelines for crime scene investigation published by the National Institution of Justice
- be aware of various resources in regard to training, education, publication and online forums
- understand the purpose and benefits of certification and be familiar with the types of certification available

Training & Education

- NIJ published guidelines
  - Crime Scene Investigation: A Guide for Law Enforcement
- Training and education resources
  - College and University programs (Crime Scene Investigator Network)
  - https://www.theiai.org/ The International Association for Identification
  - http://www.neiai.org/. Nebraska Chapter of The International Association for Identification.
  - NIJ Sponsored Training Courses
  - https://www.aafs.org/. The American Academy of Forensic Sciences.
- Skill and education that may be required
  - a college degree
  - education in natural sciences
  - training in logic and reasoning
  - physical ability standards

Publications & Forums

- Publications
  - Crime & Clues
  - Forensic Science Communications (FBI)
  - Forensic Magazine
  - Evidence Technology Magazine
  - Journal of Forensic Identification. Published by International Association for Identification.
  - Journal of Forensic Science. Published by American Academy of Forensic Sciences.
- Forums
  - International Crime Scene Investigation Association Members Forum
  - Reddy's Forensic Page. http://www.forensicpage.com/.
  - Crime Scene Investigator Network. https://www.crime-scene-investigator.net/.
  - National Forensic Science Technology Center FACEBOOK. https://www.facebook.com/nfstc/.
  - National Forensic Science Technology Center Home. https://www.nfstc.org/?fbclid=IwAR1KHpKd-O5yML7uSknZhFc67KAhETbZYwDz7wuQI7T8FKGzOcqgoemaGjc.
  - Onin. http://www.onin.com/fp/index.htm.
  - Association for Crime Scene Reconstruction FACEBOOK. https://www.facebook.com/associationforcrimescenereconstruction/.

Certification

- Provides evidence that an individual meets specific standards
  - Education
  - Training
  - Experience
  - Continuing Education
- May strengthen court testimony
- Offered by International Association for Identification (IAI)
  - Certified Crime Scene Investigator
  - Certified Crime Scene Analyst
  - Certified Crime Scene Reconstructionist
  - Certified Senior Crime Scene Analyst
  - Certified Bloodstain Pattern Analyst
  - Many other certifications

SAFETY & ETHICS

Upon completion of this section, one is expected to:

- become familiar with safety related resources available
- understand the importance of practicing ethical behavior and following all applicable Codes of Conduct
- recognize the difference between negligence and dishonesty
  be aware of resources discussing ethics in law enforcement

Safety

- Follow agency specific safety policies and procedures
- Comply with OSHA Safety and Health Standards and local health regulations
- Be aware of all Material Safety Data Sheets (MSDS) that apply to any crime investigation chemicals/products
- Wear personal protective equipment (PPE) to prevent exposure to hazardous materials and contamination
- Refer to https://www.fbi.gov/file-repository/handbook-of-forensic-services-pdf.pdf/view (Crime Scene Safety), https://www.osha.gov/OshDoc/data_BloodborneFacts/bbfact01.pdf.

Safety Questions

Route of Exposure	Description
Inhalation	
Skin Contact	
Ingestion	
Injection	

List the engineering and work practices effective in preventing exposure to bloodborne pathogens.

_____

_____

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_____

Ethics

- A system of moral principles that govern the conduct of a person or members of a profession
- When violated by an individual, the effects are detrimental
  - Evidence may be deemed inadmissible in court
  - All scenes processed by that individual might be brought into question
  - The entire agency may face suspicion of misconduct
  - Decrease in morale and productivity
  - Community's sense of safety decreases

Points to Consider in Ethics

- Follow the link for a sample of important ethical cases: https://www.txcourts.gov/All_Archived_Documents/ccaInformation/tcjiu/pdf/Peerwani-2.pdf.
- Ethical issues are widespread across forensic science. https://ejfs.springeropen.com/articles/10.1186/s41935-017-0010-1.
- Ethics relate to other issues. https://www.forensic-pathways.com/confirmation-bias-ethics-and-mistakes-in-forensics/.

Describe an ethical situation from your personal experience. _____

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Negligence versus Dishonesty

Negligence

- Errors or misconduct that are absent of harmful intent or fraud
- Examples:
  - Not maintaining continuing education, or keeping abreast of current issues
  - Losing, accidental switching or incorrect labeling of evidence items
  - Misinterpretation of test results due to insufficient knowledge
  - Insufficient reporting of discovery and collection of evidence

Dishonesty

- Deliberate misconduct with the intent to provide false information or results
- Examples:
  - Manipulation of documentation or chemical test results
  - Falsifying data to support the desired outcome
  - Intentionally not following protocols
  - Exaggerating results in reports or in court testimony
  - Misrepresentation of qualifications

Ethics Question

Which of the following behaviors would NOT be considered ethical?

- Reporting a missing item of evidence
- Accidentally breaking an object at the crime scene without documenting and reporting it
- Disarming a firearm before photographing it in its original state and location
- Refusing to interpret results of an unfamiliar test in court

Code of Ethics and Conduct

- A written document containing ethical rules
- Most law enforcement agencies and professional organizations have a Code of Ethics and/or Conduct that must be followed
- Violation of these codes is grounds for dismissal from the agency or organization
- Example Codes of Ethics and Conduct:
  - American Academy of Forensic Science: https://ebrary.net/88930/education/american_academy_forensic_sciences.
  - American Board of Criminalistics: https://www.criminalistics.com/.
  - International Association for Identification: https://theiai.org/docs/code_of_ethics.pdf.

Center for Law Enforcement Ethics

- Established in 1992 by the Institute for Law Enforcement Administration (ILEA)
- Focuses on ethical issues associated with law enforcement
- Goals:
  - "examine the ethics of professional obligations in law enforcement"
  - "explore strategies that enhance the ethical climate in policing"
  - "establish programs that will provide ethical decision-making tools"
- Services
  - Annual conference
  - Training courses offered
  - Ethics Roll Call seasonal publication

Articles on Ethics

- *Managing for Ethics: A Mandate for Administrators* by Timothy J. O'Malley
- https://www.thefreelibrary.com/Organizational+ethics+through+effective+leadership.-a0196055258. by Brandon V. Zuidema and H. Wayne Duff, Jr.
- Forensic Science: Solutions and Problems. https://innocenceproject.org/forensic-science-problems-and-solutions/.

LEGAL MEASURES AND COURT TESTIMONY

Section Objectives

Upon completion of this section, one is expected to:

- understand the need to obtain consent before searching a scene and seizing evidence
- inquire about local policies in regard to Miranda warnings, elimination samples and dying declarations
- understand the crime scene investigator's responsibility as a trial witness
- become familiar with the types of information one must be prepared to discuss when testifying in court

Search and Seizure

- Voluntary or court consent is required before entering and searching a crime scene and seizing evidence
- Critical to ensure evidence is admissible in court
- Voluntary consent
  - Obtained from any party responsible for premise or property
  - Person must understand the scope of the search
- Court consent
  - Issued by judge
  - Requires submission of affidavit
  - Search warrant is issued
  - Caylee Anthon search warrant. https://www.scribd.com/doc/21832236/Casey-Anthony-Search-Warrant.

Miranda

- Most jurisdictions require reading Miranda warning to anyone in custody before questioning
- Generally, statements may be taken from witnesses and victims not in custody without reading Miranda warning
- Miranda warning example: Search the internet for an example.
- List Miranda warning criteria. _____
  _____

Collecting Exemplar Samples

- Known samples to be compared against evidentiary samples are referred to as exemplar samples.
- Refer to local policies and procedures for consent requirements.
- Provide DNA sample consent form.

Dying Declarations

- Last chance to obtain statement from dying victim, suspect and/or witness
- Often only admissible if the individual is told and understands that there is no possibility for his/her survival
- Must refer to local policies and procedures.

MAINTAINING CRIME SCENE INTEGRITY

Section Objectives

Upon completion of this section, one is expected to:

- Understand the purpose and importance of crime scene and evidence integrity
- be familiar with the different types of contamination that can occur
- learn specific actions to prevent contamination, destruction and alteration of evidence and apply them in the field

Integrity of Crime Scene and Evidence

- Must be established and maintained to present evidence in court
- Numerous measures must be taken to prevent the destruction, alteration and contamination of the crime scene and evidence
- Begins with securing and documenting the crime scene
- Within the boundaries of a crime scene, individuals should NOT:
  - Smoke
  - Chew tobacco
  - Eat or drink
  - Spit
  - Use the telephone or bathroom
  - Move any items including weapons (unless necessary for the safety and well-being of persons at the scene)
  - Adjust the thermostat or open windows or doors
  - Touch anything unnecessarily
  - Reposition moved items
  - Litter

Contamination

- Adventitious transfer of information/material from one location to another
  - People to evidence
  - Environment to evidence
  - Evidence to evidence (cross-contamination)
- Ramifications of evidence contamination
  - Time and resources spent working on false leads
  - Destruction of evidence
- If not properly documented
  - Credibility of investigators is questioned
  - Threatens court admissibility of evidence

Contamination Control

- Define and follow established entry/exit routes at the scene
- Collect elimination samples from individuals with access to the scene
- Designate secure area for trash and equipment
- Use personal protective equipment (i.e., gloves, masks, etc.)
- Clean/sanitize or dispose of tools/equipment and personal protective equipment between evidence collections and/or scenes
- Use single-use equipment when performing direct collection of biological evidence
- Tie hair back or wear cap/hat
- Do NOT touch face or mouth
- Do NOT cough, sneeze or talk over evidence
- Handle and package each evidence item separately

See "Crime Scene Contamination Issues" by Baldwin and May: https://www.crime-scene-investigator.net/crime-scene-contamination-issues.html.

Contamination Question

Type of Contamination	**Most Likely Event to Cause It**
Self-contamination	
Environmental	
Cross Contamination	

Golden Rules

Keep in mind at all times when processing a crime scene…

- NEVER touch anything until it has been thoroughly documented
- Once an item is touched, that individual must take responsibility for that item

CRIME SCENE MANAGEMENT AND PERSONNEL

Section Objectives

Upon completion of this section, one is expected to:

- understand the chain of command at a crime scene
- recognize the complexity of managing a crime scene
- be aware of various types of crime scene responders and the general role of each
- understand the main stages of a crime scene investigation
- be familiar the actions that must be performed during the initial response
- be aware of the duties expected of the investigator in charge

Who's In Charge?

- One individual must take charge of the scene and be held accountable
- Highest rank or designated supervisor has authority to take charge
  - Police Officer → Sergeant → Lieutenant → Captain
- Determination of primary crime scene investigator is based upon jurisdiction and resources
- If multiple agencies are involved, responsibilities may be determined by statute, memorandums of understanding, and/or agreement at the scene
- Chain of command established to pass responsibility for the scene from one person to another
- Unified Command System under the National Incident Management System (NIMS) may take precedence as the Incident Command

Case Example

- Industrial accident on public military base
- Agencies/individuals with an interest:
  - Military
  - Law Enforcement
  - Local Fire and Rescue
  - Private Contractors
  - OSHA
  - EPA
  - Insurance Carrier
  - Civil Attorneys
  - Families of Victims
  - News Media

Crime Scene Management

Four components of crime scene management (Lee et al):

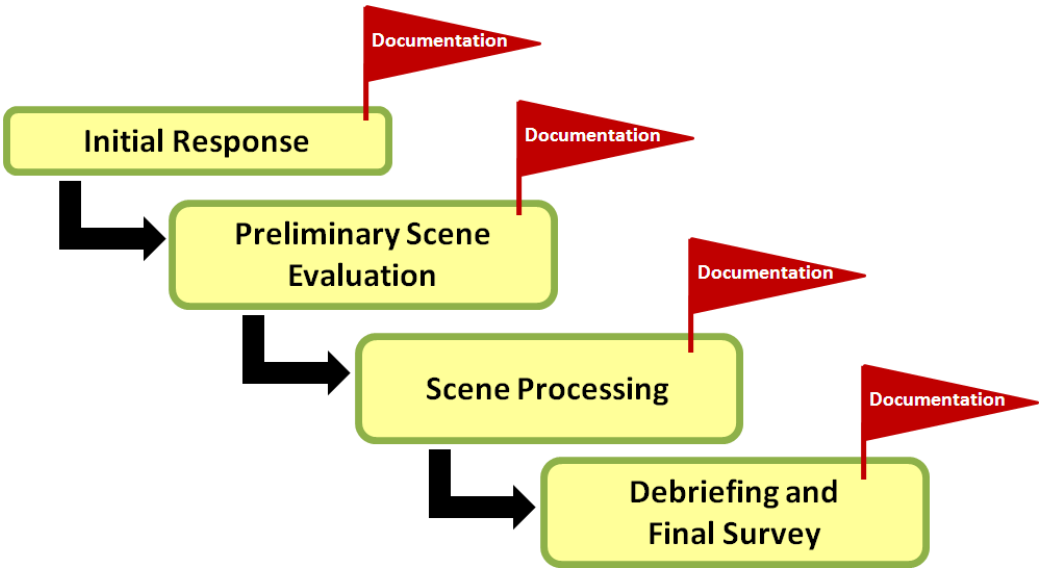
- **Information Management**
  - People
  - Criminal history
  - Physical evidence
- **Manpower Management**
  - Personnel
  - Roles & Responsibilities

- **Technology Management**
  - Equipment
  - Tools
  - Chemicals/Reagents
- **Management of Logistics**
  - Jurisdiction
  - Food and water
  - Parking
  - Storage
  - Media

Crime Scene Responders

Type of Responder	**Enter Brief Description**
First Responder	
Detective	
Crime Scene Investigator	
Crime Scene Supervisor	
Medical Examiner	
Forensic Photographer	
Forensic Expert	

Stages of a Crime Scene Investigation



Crime Scene Investigation: A Guide for Law Enforcement

Initial Response

Component	Enter Brief Description
Safety	
Emergency Care	
Scene Security	
Transfer of Scene	
Documentation	

Investigator in Charge Duties

Component	Enter Brief Description
Scene Assessment	
Walk-Through	
Team Composition	
Debriefing	
Final Survey	
Case File	

CRIME SCENE DOCUMENTATION

Section Objectives

Upon completion of this section, one is expected to:

- appreciate the important role documentation plays in a crime scene investigation
- be aware of the various methods of crime scene documentation
- understand Chain of Custody and its importance
- be aware of various types of crime scene investigation reports

Crime Scene Documentation

Type of Documentation	**Enter Brief Description**
Notes	
Audio Recording	
Photographs	
Video	
Sketches	

Chain of Custody (COC)

- Record documenting the location and possession of physical evidence
- Provides a detailed list of every individual who has handled the evidence to include the dates and time it was in their possession
  - Who collected the evidence?
  - Who transported the evidence?
  - Who submitted the evidence to the laboratory?
  - Who received the evidence?
  - Who analyzed the evidence?
  - Who presented the evidence in court?
- Required to authenticate evidence in court
- Provide example of Chain of Custody form.

Reports

- Should be written in a timely manner
- Number and type of reports varies among agencies
- Often reviewed by supervisor for content and completeness
- Example crime scene investigation reports
- Provide an example of a crime scene investigation report

CRIME SCENE PROCESSING

Section Objectives

Upon completion of this section, one is expected to:

- understand the importance and benefits of following agency specific Standard Operating Procedures
- appreciate the fact that no two crime scenes are the same and the need to be creative and adapt to the current situation
- be familiar with the term "Thin Slicing" and when it is applicable
- have knowledge of various crime scene processing approaches that have been published by field experts
- understand the fundamental components of a crime scene investigation
- be familiar with general crime scene equipment needs and related resources

Standard Operating Procedures

- Key steps must be performed according to agency specific SOP's
- Defined (usually documented) set of instructions for completing key tasks
- Most agency SOP's act as general guidelines, but some are very detailed
- Benefits
  - Provides a consistent approach to be applied each and every time a crime scene is investigated
  - Serves as checks and balances on the efficiency, effectiveness, and economy of the crime scene investigation
  - Promotes confidence and credibility in court
- Example
  - Indiana State Police SOP. https://secure.in.gov/isp/files/Evidence%20Collection.pdf.
  - Milwaukee Police SOP. https://city.milwaukee.gov/ImageLibrary/Groups/mpdAuthors/SOP/740-FORENSICEVIDENCECOLLECTION.pdf.

How to Process a Scene?

- Not an exact science
- Each crime scene may require a different approach
- Published approaches provide guidance and help make processing more systematic
  - Hayden Baldwin
  - Joseph Rynearson
  - Dr. Hentry Lee

Thin Slicing

- Quick assessments and interpretations made with minimal information
- Referred to as…
  - "thinking without thinking" (Gladwell)
  - "extracting the meaning or gist of a scene" (Hallinan)
  - Response type required by First Responders
- Relies on training, experience and intuition
- Not effective once a scene is secured

Baldwin's Approach (Baldwin)

- INTERVIEW
  - to develop a theory of the case
- EXAMINE
  - to substantiate theory, identify points of entry/exit and identify potential evidence
- PHOTOGRAPH
  - for pictorial record of scene and evidence
- SKETCH
  - spatial relationship of scene elements and inventory
- PROCESS
  - collect and package physical evidence

Rynearson's Approach (Rynearson)

- SECURE
  - to preserve evidence
  - to restrict non-essential personnel
- SEARCH
  - what is critical evidence?
  - what is supporting evidence?
  - what is not evidence?
  - protect evidence from alteration or loss

- RECORD
  - using a variety of methods
- RECONSTRUCTION
  - with reliance upon the evidence as it resides within the scene as a contribution to the interviewing process

Dr. Lee's Approach (Lee et al)

Component	**Enter Brief Description**
Security	
Documentation	
Survey	
Analysis	
Evidence	
Link	
Reconstruction	

Fundamental Crime Scene Investigation Components

- Combined approach
  - Secure
  - Interview
  - Document
  - Survey
  - Analysis
  - Search
  - Collect and preserve physical evidence
  - Reconstruct
- Additional components to consider
  - Scene management
  - Debriefing
  - Final survey
  - Evidence submission
  - Reporting
  - Re-visiting

Preventing Mistakes

Avoid behaviors that can lead to errors (Hallinan)

- Working in a hurry
- Multi-tasking
- Overlooking the obscure details
- Excessively focusing on one item
- Jumping to conclusions

Materials & Equipment

- Equipment needs will be dependent upon agencies protocols
- General needs include:
  - Photography equipment (digital camera systems are preferred)
  - Measurement equipment (i.e., scales, tapes, rulers, and levels)
  - Evidence collection materials (i.e., tweezers, plastic bags, paper bags, small sterile containers, cotton swabs, and sterile swab boxes)
  - Personal protection equipment (i.e., gloves, aprons or jump suits, face shields, filter masks, booties, and head cover)
- Equipment List Resources
  - Basic Equipment for Crime Scene Investigators (Forensic Enterprises Website)
  - Section E - Crime Scene Investigation: A Guide for Law Enforcement Training

INVESTIGATIVE TOOLS FOR COLLECTING THE DOTS

Section Objectives

Upon completion, one is expected to:

- recognize the importance of using thought throughout the entire investigation to gather as much information as possible
- understand the terms "critical thinking" and "metacognition" and their role in crime scene investigation
- recognize how investigative paradigms and event analysis can be used to collect the dots and the benefits they provide

Collecting the Dots

- *"Connecting the dots requires collecting the dots."* (Libicki et al)
- Obtain as much information as reasonably possible to develop a believable explanation of what happened
- Obtaining information provides leads to determine the next best course of action to collect more information
- Helpful to incorporate critical thinking and investigative paradigms

Case Example

- Information
  - Victim found partially conscious and supine on bathroom floor
  - Victim told doctor that he used heroin before he died
  - Victim had necrotic injuries
- Initial theory
  - Victim overdosed on heroin and laid on his side until the tissue died
- Problem with initial theory
  - How do you explain the injuries to the victim's ear and shoulder?
- More information
  - Witness reported a street rumor that a stun gun was used on the victim
- New theory
  - Injuries were caused by the placement of the stun gun and the heat generated from the resistance of the body to the electricity
- More information
  - Search for stun gun
  - Continue to question witnesses/informants
  - Autopsy confirmed victim was electrocuted with the initial contact above the ear

What is Critical Thinking?

- "Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action." (Scriven et al)
- Based on universal values:
  - Clarity
  - Accuracy
  - Precision
  - Consistency
  - Relevance
  - Found evidence
  - Good reasons
  - Depth/Breadth
  - Fairness
- "*…an assertion must … be based on relevant, accurate facts; based on credible sources; precise; unbiased; free from logical fallacies; logically consistent; and strongly reasoned"* (Beyer)

Aspects of Critical Thinking

- Identifying, evaluating and constructing arguments
- Constantly questioning information and theories
- Critical Thinker qualities (Beyer)
  - Skeptical
  - Open-minded
  - Value fair-mindedness
  - Respect evidence and reasoning
  - Respect clarity and precision
  - Look at different points of view
  - Will change positions when reason leads them to do so

Wade's Aspects of Critical Thinking (Wade)

- Asking questions
- Defining problems
- Analyzing assumptions and biases
- Avoiding emotional reasoning
- Avoiding oversimplification
- Considering other interpretations
- Tolerating ambiguity

Investigative Critical Thinking

- Must occur continuously throughout the crime scene investigation process
- Assists with…
  - developing preliminary theories
  - identifying potential evidence
  - determining best detection and collection methods
  - interpreting information from people and things
  - crime scene reconstruction
- Apply after crime scene processing to review all information available
  - Has a cause and effect relationship been established?
  - Are there any holes in the theory?
  - Should the investigative paradigms be applied again?
  - Is a group session needed?
  - Does additional research need to be performed?

Metacognition

- The act of thinking about one's own thinking and cognitive process (Wikipedia)
- "Being aware of one's thinking as one performs specific tasks and then using this awareness to control what one is doing." (Jones et al)
- Awareness of thoughts prevents mistakes and decisions influenced by emotions and biases

What is a Paradigm?

- Definitions (Merriam-Webster)
  - A pattern or model
  - A philosophical or theoretical framework of any kind
- Systematic method using mental processing in conjunction with experience and protocols
- Investigative paradigms help successfully collect the dots

Semiotics

- *"Semiotics is concerned with everything that can be taken as a sign. A sign is everything which can be taken as significantly substituting for something else."* (Eco)
- Investigative Semiotic Paradigm
  - Evaluate crime scene in terms of signs, meaning and theory
    - Identify the signs
    - Determine the meaning of the signs
    - Develop theory based on signs and their meaning
    - Identify more signs
    - Incorporate new signs and their meaning into theory
  - Detect and collect evidence based on signs, meaning and theory

Identifying Signs

- Is anything broken, knocked over or out of place?
- Is there any damage to the furniture, floors or walls?
- Is blood present?
- Is there evidence of entry or exit?
- Could any items present have been used as a weapon?
- Is there evidence of occupancy?
- Is there anything missing?
- Could any item have been left behind unintentionally?

Applying the Semiotic Paradigm

Signs	**Enter the Appropriate Meaning**
Broken glass	
Piece of broken pipe in the shattered display case	
Presence of dirt on the broken pipe	

Document the most logical preliminary theory below:

List all of the potential items of evidence investigators might want to consider based on initial signs, meaning and preliminary theory:

An impression was found in the dirt alley next to the store with a similar shape to the pipe, which suggests the pipe used in the burglary was retrieved from the alley and someone was in the alley on foot. When incorporating the new information obtained from this additional sign, could it be theorized

that the perpetrator found the piece of pipe in the dirt alley next to the store, used it to break the glass of the store window to gain entry and then to break the display case to steal the merchandise? _____

Based on the signs, their meaning and the developing theory, list all of the following potential items of evidence the investigators might want to consider.

_____

_____

Fuzzy Logic

- Definition (BusinessDictionary.com)
  - *"Type of reasoning based on the recognition that logical statements are not only true or false (white or black areas of probability) but can also range from 'almost certain' to 'very unlikely' (gray areas of probability)."*
- Fuzzy logic and criminal investigations
  - Assumes information from "people" is not all true or false
  - Produces more possible theories and leads
  - Increases the chances of discovering evidence
  - Guards against investigative blindness

Applying Fuzzy Logic

- Witness claimed he saw the perpetrator cut the victim with a knife
  - Must consider all types of sharp objects as potential weapons
    - Knife (folding, hunting, butcher, steak, etc.)
    - Scissors
    - Broken glass
    - Box cutter
- Witness claimed the perpetrator left in a green vehicle
  - Must consider other similar colors and environmental conditions
    - Weather
    - Time of day
    - Surrounding objects

Applying Fuzzy Logic and Semiotics

Signs

- Dead body
- Advanced decomposition
- Strong odor
- Flies
- Pry marks on front door
- Unlocked door
- Broken/knocked over furniture
- Messy
- Knife
- Minimal clothing
- Blood on blinds
- Small spots

Fuzzy Logic

What could be the cause of death?

- Natural causes
- Drug overdose
- Accidental injury
- Suicide
- Homicide

Look for additional signs/potential evidence:

- Open prescription pill bottles
- Drugs and paraphernalia
- Empty alcohol containers
- Bloody weapons
- Cut marks on victim's wrists or legs
- Injuries consistent with beatings
- Head wounds

Why is the furniture knocked over and broken?

- Struggle
- Lifestyle
- Violent behavior under the influence of drugs and/or alcohol

Look for additional signs/potential evidence:

- Impressions on surfaces consistent with swinging a bat or a punch
- Open prescription pill bottles
- Drugs and paraphernalia
- Empty alcohol containers
- Injuries consistent with a beating

What could have caused the small spots?

- Gunfire
- Expiration (coughing)
- Deposited by flies
- Cast-off from beating or stabbing

How could this be determined?

- Check spots to see if any have sperm cell and tadpole characteristics of flies
- View body with an IR camera to see if there are any wounds consistent with gunfire or beating

Who left the pry marks on the front door?

- Intruder
- Guest visiting
- Owner (locked out of house)

Look for additional signs/potential evidence:

- Fresh versus established pry marks
- Previous police calls about this residence

List the possible meanings of the knife found on the kitchen floor?

_____

_____

_____

List additional signs/potential evidence that might help determine the most likely meaning?

_____

_____

_____

Information

- Victim had a history of drug and alcohol abuse
- Pry marks were from a month before the event when he had an associate force entry
- Furniture was broken a month before the event
- The spots on the shade were flies
- No weapons were found
- No injuries were found on the victim
- High levels of drugs were found in the victim's system

The cause of death was determined to be natural causes in this case.

Chaos Theory

- Described by meteorologist Edward Lorenz in an effort to predict weather
- Key Concepts (Gleick)
  - Small change in initial conditions drastically changes the long-term behavior of a system ("Butterfly Effect")
  - Long-term predictions will be unreliable or even impossible
  - End result is affected by any transition or change that occurs as the system evolves
  - No two systems undergoing change will have the same final outcome
- Application is referred to as system analysis

System Analysis

- Occurs at the final outcome of a series of events
- Investigators must work backwards to determine chain of events (cause) leading up to the crime (effect)
- Questions to consider during crime scene investigation
  - What is the system?
  - What was the system like before the crime?
    - What might be missing?
    - What might have been left behind?
    - What changed?
  - What was the "thing" to which the system was sensitive?
  - What took place during the event?
  - How did change lead to final scene?

Applying the Chaos Theory

A neighborhood experienced a series of prowling incidents. One woman reported someone peeping into her window, scratching on the door, and making other noises outside. The community and police were concerned because this type of behavior may be a precursor to a more serious crime, such as sexual assault or homicide.

List all of the potential systems to be analyzed?

_____

Signs	Potential Meaning
Shoe prints by the window	
Fingerprints on the window	
Semen and a cigarette butt on the side of the house	
Sheer curtains lining the victim's bedroom window	

Which of the following investigative thought processes and paradigms would be applied when asking the following questions? _____

- Have other houses been affected?
- Was the victim chosen randomly?
- Did the victim expose herself? If so, was it intentional or unintentional?
- Could there be more than one perpetrator?
- Does the victim have a history of reported domestic disputes and/or violence?
- Are there any other signs?

System Analysis

If the neighborhood is considered the system, investigators must try to determine what the neighborhood was like before the prowling began. To do so, they question the victim about previous relationships, suspicious behavior of colleagues, individuals approaching her in public, strange phone calls or text messages and the sense of being followed. The victim claims that she didn't recently end a relationship and that she hasn't noticed anything suspicious. After speaking with officers that have patrolled the neighborhood for several years, it is determined that this prowling problem is a new occurrence. This may mean that there has not been any past intrigue and the system was stable before the prowling began. Is this a random incident or has something changed in the neighborhood? If the neighborhood has changed, what made it sensitive or vulnerable to this change? For example, are there new rental properties in the area with new residents? Did anyone in the neighborhood recently have a

domestic dispute, end a relationship or get a divorce? Is there a young man in the neighborhood that is going through puberty? Are any women in the neighborhood undressing in front of their windows?

Answering such questions leads officials to potential sources of information. Thinking about the sensitivities in this case might lead officials to the individual(s) responsible for the crime. For example, if a young man going through puberty is questioned and the prowling stops, then it might suggest the source of the prowling problem has been identified. If the prowling continues, either the young man is not concerned about the law or someone else is responsible.

Case Outcome

In this case, investigators used the neighborhood system analysis to determine where to turn for information. Specifically, the possible sensitivities were further explored. Officers that patrolled this neighborhood for several years reported that two single family homes have recently become rental properties. Thus, police began to check out the new residents. The first property was rented by three female college students without criminal records and no reports of strange behavior from the neighbors. The second property was rented by a middle-aged woman. Her boyfriend lived with her. It turned out that the boyfriend did have a past arrest for stalking. In addition, neighbors reported that he did not appear to have a job and was hanging out in and around the house most of the day and evening. After police questioned him, the prowling stopped. If the prowling started again, he might be considered one of the prime suspects.

Randal Noon's System Analysis (Noon)

- Assess the conditions that existed before the event
- Assess the conditions that exist after the event
- Search for and gather verifiable evidence and facts
- Apply scientific knowledge and investigative skill to interpret information and form a cohesive scenario of how the transformation occurred
- Report findings and conclusions

Benefits of Investigative Paradigms

- One sign or piece of information often leads to another
- Group discussions may lead to more signs, evidence and/or new theories
- Keeps investigator focused on details and their meanings
- Promotes slow and systematical approach
- Helps organize evidence to be collected and determine future analytical needs
- Help lead to all potential sources of information
- Reduce the chance of overlooking evidence
- Increases chance discovery

Event Analysis

- Method utilized to organize information from “people” and “things”
- Includes information obtained from investigative paradigms
- Lends itself to the discovery of new leads and developing theories
- Provokes thought to further identify potential evidence
- Helps clarify what needs to be done
- Increases opportunity for chance discoveries
- Information can easily be put into spreadsheet or presentation

Example Event Categories

Category	Example Information
Pre-event	Surveillance, preparation
Approach	Overt, covert, blitz, con, opportunistic
Entry	Forced, invited, skilled
Pre-contact	Surveillance, escape preparation, equipment set-up, fantasizing
Contact	Actions (direct, force, victim instruction)
Post-contact	Evidence eradication, threats, staging
Exit	Casual, hurried, same as entry
Post-exit	Re-visit scene, change appearance

Applying Event Analysis

Two armed robbers entered the store during business hours and left with a money bag filled with a small amount of cash. One shot was fired, but no one was injured. The eyewitnesses in this case included a man parked in his car outside the restaurant, two customers dining inside the restaurant, and two restaurant employees. Investigators interviewed these witnesses to obtain information leading them to potential evidence.

Event Category	Enter Brief Description of Event
Pre-event	
Approach	

Entry	
Pre-contact	
Contact	
Post-contact	
Exit	
Post-exit	

Connecting the Dots

- *"In no context known to me are hypotheses, evidence, and arguments linking them supplied at the out set for investigators and attorneys. These ingredients must be generated by imaginative or creative thinking."* (Schum)

- "*To establish a sound basis for analysis, an investigator relies upon the actual physical evidence found at the scene and verifiable facts and records related to the matter. The investigator then applies accepted methodologies and well-proven scientific principles to organize and interpret the physical evidence and facts. The investigator compares the facts and analytic results to the various statements by witnesses and participants. Facts and physical evidence place limits on what actually occurred. Like a mathematical inequality or limit, they bound what is possible and what is not possible. If the statement by a witness does not fit within these limits, it should not be trusted.*" (Noon)

Key Messages

"Neither science nor the arts can be complete without combining their separate strengths. Science needs the intuition and metaphorical power of the arts, and the arts need the fresh blood of science." (Wilson)

"…if a person asks an investigator, 'What do you think caused this to occur?' during the first part of the investigation, the person may get one answer. If the same question is asked later, the answer may change, and if he asks again when the investigation is finished, the answer may have changed yet again. The final conclusion may significantly differ from the initial hypothesis." (Noon)

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