# Crime Scenes in the Classroom SM

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Forensic Training for the Science Educator Supplemental Training Materials

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### <u>Crime Scenes in the Classroom – Supplemental Material</u> <u>General Crime Scene</u>

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### **The Forensic Specialist**

### Role of the Forensic Specialist

Whether they are called Evidence Technicians, Crime Scene Technicians or have some other title, any person engaged in examining scenes of crimes or other incidents plays a very specific role in the criminal justice system. These individuals are expected to:

- Apply a scientific method of analysis to the examination of crime scenes for evidence.
- Be knowledgeable in a variety of areas related to evidence collection and processing.
- Collect, preserve and identify evidence for its ultimate presentation in court.
- Provide professional testimony about the evidence and its collection from the scene.
- Provide guidance to other police personnel about the value of physical evidence and the information it can provide in a criminal investigation.

### Role of Physical Evidence

Physical or real evidence plays a vital role in the investigative process. Virtually any tangible item can be used to:

- Prove that a crime was committed
- Establish the elements of a crime
- Identify a suspect or victim
- Link a suspect or victim to a crime scene
- Link a suspect or victim to one another
- Support or disprove statements made by suspects, victims or witnesses
- Provide a powerful interrogation tool

### Value of Physical Evidence

There is no Fifth Amendment protection against incrimination by physical evidence<sup>1</sup>. Unlike verbal statements or oral admissions, individuals involved in a criminal investigation can be forced (through court order) to provide samples of hair, blood, fingerprints, speech, handwriting or evidence of other personal traits.

<sup>&</sup>lt;sup>1</sup> Schmerber v. California, 384 U.S. 757 (1966)

### **Crime Scene Procedures**

### **Crime Scene Defined**

A crime scene is any location where evidence related to the crime may be recovered. This will include:

- The immediate scene
- Logical paths of access to and flight from the scene
- Locations distant from the scene
- Persons and/or objects at or some distance from the scene

#### **Crime Scene Boundaries**

Considering the above, the boundaries of any given crime scene may seem difficult to establish. In most cases, common sense will dictate what needs to be controlled as a crime scene. In an urban area, a burglary at a single family residence would typically dictate protecting the interior of the home and the exterior areas immediately surrounding the home. Adjoining areas such as neighboring yards and the street or alleyway should be searched for evidence. If nothing is located, the initial protected area established at the house will be sufficient.

First responding officers should establish the initial crime scene perimeter. When the Evidence Technician or Criminal Investigator arrives on the scene, their first priority should be to review the established boundary. If necessary, the boundary can be expanded or collapsed at this time.

It is always preferable to establish a boundary that is too large and then collapse it later. Boundaries that are too small when first set up may always be expanded but perhaps not in time to prevent the loss of evidence.

#### Crime Scene Management

#### Purpose

In its simplest sense, the phrase "crime scene management" refers to employing proper procedures in protecting a crime scene to keep it the way it was when the offender left. In reality, the moment that a witness, police officer or emergency medical personnel enter a scene, it has been altered from its original state.

"Crime scene management" then becomes a process that seeks to minimize the damage done at a scene followed by the proper application of investigative and forensic examination techniques.

### Evidence Packaging & Handling

#### **Evidence Must be Preserved for Scientific Analysis**

The proper collection, handling and packaging of physical evidence are essential to the success of a criminal investigation. Physical evidence often proves that a crime occurred. This evidence can reconstruct the events, identify suspects, victims or witnesses and corroborate witness accounts. This evidence must be handled properly to protect against contamination, loss of evidence, and preserve chain of custody.

The following information does not include all types of evidence encountered at a crime scene. It is meant as a general guideline to assist the crime scene investigator.

The student should note that accredited forensic science laboratories will require that evidence packaging be

- Sealed with tamper resistant tape.
- Initialed and dated across the seal.
- Be appropriately labeled if a biohazard is present.

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### <u>Crime Scenes in the Classroom – Supplemental Material</u> <u>Sketching & Diagramming</u>

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### Introduction

### Scene Diagramming – Purpose & Needs

Diagrams and sketches play a vital role in completing the proper documentation of crime and accident scenes. While diagrams are most commonly thought of as a form of supplemental information to the primary report, in reality they are an necessary complement to photographs.

Properly drawn diagrams are the only method available to correctly document the spatial relationships that exist in a crime or accident scene. These relationships occur between items of evidence and fixed or moveable objects within the scene. For both reporting and courtroom purposes, diagrams communicate information to others in a manner that would be near to impossible to do with words.

Unlike photographs or video tape, a diagram can be drawn to selectively include only the necessary and relevant items within a scene. Confusing detail can be eliminated. In this manner, the scene is presented in its most basic form.

As with other aspects of the reporting process, scene diagrams will serve to:

- Refresh the memory of investigators
- Support or refute statements by witnesses and suspects
- Explain the evidence to the reader of the report
- Prepare witnesses and present evidence at trial
- Assist in event reconstruction
- Provide the basis for 3-D models

There are many types of diagrams that may be utilized by the crime scene investigator during the scene processing effort. Some may be simple thumbnail sketches like those found on the back of a fingerprint card. Other diagrams may be computer generated or professionally prepared. However they are done, the crime scene investigator should make extensive use of diagrams. Great artistic talent on the part of the investigator is not required. The most crucial aspect in preparing a diagram is that the information be properly collected and accurately represented.

Specific benefits of diagrams include:

- Simplification of the scene Confusing details left out
- Better overall depiction of the scene than photos
- Easy to show routes of travel by suspects, victims and vehicles
- Provide a permanent record of spatial relationships
- Can record some conditions better than any other means

The methods presented here are those most commonly used by crime scene investigators. They are not necessarily the only methods that can be employed. Any technique that allows for the proper collection and representation of this type of information can be used.



Sometimes referred to as the "Transecting Baseline" method, this technique is a very desirable method to use when possible.

To use the baseline method

### Establish a Reference Point

In the example above the Reference Point is the intersection of two existing curb lines. If the reference point is the intersection of two imaginary lines, mark that point before starting to measure.

#### Establish a Straight Reference Line

This line can be set up along an existing line (curb or roadway edge); established between two known and fixed points (utility poles); or along a known compass bearing from a known and fixed point. In the case of an interior reference line, establish the line perpendicular to an existing wall.

#### Collect the Needed Measurements

All measurements are recorded in relation to the reference point and reference line. Objects will typically be located in terms of their distance either north or south / east or west of the reference point or reference line. The distance measured from an object to the reference line is the shortest distance possible. This results in a measurement that is at a 90° intersection with the reference line. The direction indicated needs only to be the *nominal* direction involved. For example, if the reference line runs pretty much north and south even

# Appendix A

### **Recommended Supplies**

The following pages contain a list of basic materials that are recommended to help the investigator collect appropriate data at a scene and place it into a finished diagram. Also included is a list of materials that are needed to professionally mount a diagram for presentation.

# Appendix B

### Example Diagrams

This section contains several examples of the types of diagrams that might be completed as part of an investigation.

### **Evidence Photography Contents**

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### <u>Crime Scenes in the Classroom – Supplemental Material</u> <u>Evidence Photography</u>

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### Scene Photos – General Requirements

### Purpose & Needs

As with other methods of crime scene documentation, proper crime scene photography will:

- Aid in a reconstruction of events
- Refresh the memory of investigators
- Help relate the story to those that were not at the scene
- Create a permanent record of the scene
- Document the condition and location of items of evidence

Field notes, reports, sketches, videotape and photography are all interrelated in the scene documentation process. And while none can replace the other, photography is perhaps the most frequently used and readily accepted technique. Any person responsible for processing crime scenes must have a good working knowledge of photography or have ready access to someone who does.

Remember - photography is a means of communication. The goal of the incident scene photographer is to compile a photographic story that documents – from start to finish – what has happened at the incident scene.

### Photography Requirements

To be introduced at trial, photographs are required to be fair and accurate representations of the scene or items of evidence, as they existed when the photos were taken. Someone that is knowledgeable about what the photographs show must introduce the photos into evidence. Generally, although not necessarily, this will be the person who has taken the picture.

There are several requirements for crime scene photography.

- Include an identifying shot in the first frame (I.D. card)
- Take photographs from a normal viewing angle
- Avoid using and extreme wide angle lens or lens setting
- Photograph from general to specific (overall & close-up photos)
- Include a scale in close-up photos of objects
- Complete a photo log

Beside the above, crime scene photos can be divided into two categories; General Scene Photos and Forensic Examination Quality Photos.

Properly taken crime scene photos should:

- Be Clear and in focus
- Exhibit a good depth of field
- Be properly lit and exposed
- Not distort the evidence
- Provide correct color balance

REMEMBER! - The photos taken of any area should be sufficient to completely document the area involved. Large objects like houses, buildings and outdoor scenes will require additional photos. The photographer should keep in mind that in addition to documenting evidence, others might later use the photos taken of the scene to prepare diagrams for court or for crime scene analysis and review.

The location of any item of evidence within a scene should be readily determined by viewing the scene photos. The path to that item should be able to be "traced" by following the overall, mid-range and close-up photos.

### Individual Evidence Items

Close-up photographs should always be taken of individual evidence items at the scene. Whenever possible, additional photos of these items should be taken after collection but before final packaging. These types of photographs are especially beneficial in cases where items are contaminated with blood or other biological fluids. Having photographs available for viewing by investigators, prosecutors and the court can help minimize the handling of these items and reduce the possibility of exposure to bloodborne pathogens.

Detailed photos should also be taken of items that are to be submitted for lab analysis when the analysis will result in the condition of the evidence being altered. A good example of this is when an item having small suspected bloodstains present is submitted for DNA analysis. The lab will generally either cut out or swab off the stains. When the item is returned it will appear much different than when the investigator originally viewed it. Photos of the item in its original condition will be invaluable in court.

Scales should be used where necessary and a card showing the evidence items identifying number should also be included. In the image below, the scale makes the size of the bullet jacket fragments readily apparent to the viewer.



# Fingerprint Evidence

### **Types of Prints**

Friction ridge detail, useful for establishing the identity of persons connected with crime scenes, is typically recovered from scenes in the form of fingerprints and palm prints. Less likely to be found, although just as valuable is friction ridge detail recovered from the soles of the feet.

There are three different form of friction ridge detail that can exist at a scene

- Patent
- Latent
- Plastic

### Patent Prints

Patent prints are those prints that can be viewed as they exist without any development processes being applied by the investigator. Typically patent impressions result when the friction ridge surface leaving the print is contaminated with some type of material. Examples of contaminants include dirt, dust, paint, grease and blood.

Depending on the contaminant, a patent print may be further enhanced through the application of appropriate chemicals. Recovery techniques for patent prints will include photographing the print and if possible, collecting the item that bears the print. Patent prints that exist in dust-like materials may frequently be lifted with conventional lifting mediums (e.g. tapes or putty).

### Latent Prints

Latent prints are those prints that are not readily visible to the naked eye. These are the prints that require the application of various development processes (e.g. powders and chemicals). Once these prints have been developed, they can be recovered through photography, lifting mediums or retention of the item bearing the print.

The method used for developing the latent print will depend on the nature of the surface being processed. There are two types of surfaces that need to be dealt with – porous and nonporous.

#### Porous Surfaces

Examples of porous surfaces are

- Paper
- Raw wood
- Cloth

In most instances, porous surfaces will require the application of chemical development processes. These processes react with the various components that make up a fingerprint (e.g. amino acids, lipids, etc.) and have been absorbed into the porous surface.

### Footwear & Tire Track Evidence

### Overview

Impression evidence is the most common type of evidence recovered from scenes of crime. This type of evidence encompasses:

- Fingerprints
- Bite Marks
- Footwear
- Tire Track
- Tool Marks
- Cloth & Fabric Impressions

Anytime one object comes in contact with another there is the likelihood of a material transfer. Or, if the contact is by a hard surface against a softer surface, the formation of indentations or striations.

Footwear and tire track evidence, for many reasons, is frequently overlooked. In many instances the investigator may not be aware of the value this type of evidence has in an investigation. If not recognized and protected, this evidence is easily destroyed.

### **General Considerations**

Footwear and tire track evidence impressions can play a vital role in criminal investigations. Like most types of impression evidence they may exhibit individual characteristics and unknown impressions may be matched to known items based on these characteristics. In some instances, the significance of this match may be likened to finding the fingerprint of a suspect at a crime scene<sup>6</sup>.

Even if individual characteristics are not present in a recovered impression, the impression may supply additional information such as the manufacturer and type of a particular shoe or tire. This could lead to identifying the number of suspects present at a scene and/or their actions within a scene or potentially identifying a particular type of vehicle. The value of the information supplied by this type of evidence should not be underestimated.

### Types of Impressions

There are two types of impressions:

Imprints:These are two-dimensional impressions such as dust<br/>impressions.Indentations:These are three-dimensional impressions made by a harder object<br/>in a softer material.

<sup>&</sup>lt;sup>6</sup> People v. Campbell, 146 Ill. 2<sup>nd</sup> 363 (Illinois Supreme Ct. 1992)

### Crime Scene Exam

### Overview

Biological evidence can play an important role in the investigation of a variety of incidents. This type of evidence can be used to:

- Identify suspects or victims
- Link suspects / victims to a scene
- Links suspects / victims to each other
- Place a suspect of a victim within a scene
- Support or refute statements made by parties involved

Blood evidence is the most commonly encountered type of biological material although semen, urine, saliva, hair and fecal material may also be found.

Some examples of this type of evidence and its relation to various scenes include:

- Blood or hair evidence used to place individuals inside a motor vehicle at the time of a crash
- Blood left at a crime scene whenever sharp edged objects (knives, broken glass, etc.) are involved
- Saliva deposited on food or drink vessels (eating / drinking at burglary scenes)
- Semen, vaginal secretions, saliva and hair recovered after a sexual assault

#### Bloodstain Patterns

Properly done, the examination of bloodstain patterns present at a scene can provide valuable information that will aid the investigation. Important aspects of bloodstain pattern examination include:

- The condition of the stains when first observed
- The nature of the stain
- The surface that the stain is on
- A detailed description of the scene
- The size of the stain
- The shape of the stain
- The distribution of a group of stains within a pattern
- The specific location of a stain within a scene

# Appendix A – Chemical Formulations

### **Chemical Enhancement Techniques / Protein Stains & Presumptive Tests**

The following pages contain information on various chemicals that can be used to enhance bloody patent impressions or other impressions that are barely visible to the naked eye.

In many cases, these products are available in a ready to use form from the larger crime scene supply companies.

### Safety Precautions

The technician using these products should be familiar with their associated hazards. All chemical suppliers should provide the purchaser with a copy of the MSDS (Material Safety Data Sheet) for each product. The purchaser should read the MSDS carefully and take appropriate safety precautions. Safety equipment that the end user should have available includes gloves, eye protection, splash resistant clothing and respiratory protection if appropriate.

### Chemical Formulations

Chemical formulations are provided for the below listed enhancement techniques. These formulations as well as additional latent print development techniques can be found in the FBI's Processing Guide for Latent Prints. The complete processing guide can be found in PDF format on the Imprimus website – Downloadable Files page. (www.imprimus.net)

- Amido Black Methanol Base
- Amido Black Water Base
- Amido Black Water Base Fischer 98
- Coomassie Brilliant Blue
- Crowle's Double Stain
- LCV

### Selecting a Process

With the exception of Luminol, all other processes will enhance the impression with a color reaction. The process selected should be selected in order to develop maximum contrast between the enhanced impression and the background. Alcohol based processes are not recommended on some surfaces. The methanol in the mixture will act as a solvent and will most likely damage varnished, painted, lacquered and some other surfaces. If possible, test any alcohol-based solutions on a non-critical area of the substrate first.

### Other Precautions

Partial patent impressions (footwear, fingerprint or other type) that are going to be enhanced should be photographed using appropriate forensic photography techniques