Crime Scene and Evidence Photography
CSI Academy

I. EQUIPMENT

A. Basic equipment for crime scene photography

1. Camera(s)
2. Normal lens
3. Wide angle lens
4. Close-up lenses or accessories
5. Filters
6. Electronic flash(s)
7. Remote or sync cord for electronic flash(s)
8. Extra camera and flash batteries
9. Locking cable release
10. Tripod
11. Media cards and/or film
12. Owner's manuals for camera and flash
13. Notebook and pen
14. Scales
15. Gray card
16. Index cards and felt pen
17. Flashlight

B. Lenses

1. Digital vs. Film
2. Selecting the correct lens and focal length

C. ISO and File format

II. CRIME SCENE PHOTOGRAPHY IS TECHNICAL PHOTOGRAPHY

A. Photographs must be correctly exposed, have maximum depth of field, be free from distortion and be in sharp focus

1. Correctly exposed

a) Exposure is controlled by the shutter speed, lens aperture and ISO

b) Automated camera exposure systems and automatic flash units can be fooled and give incorrect exposures

c) Front, side and back lighting

d) Light meters

e) Using a gray card

f) Bracketing exposures

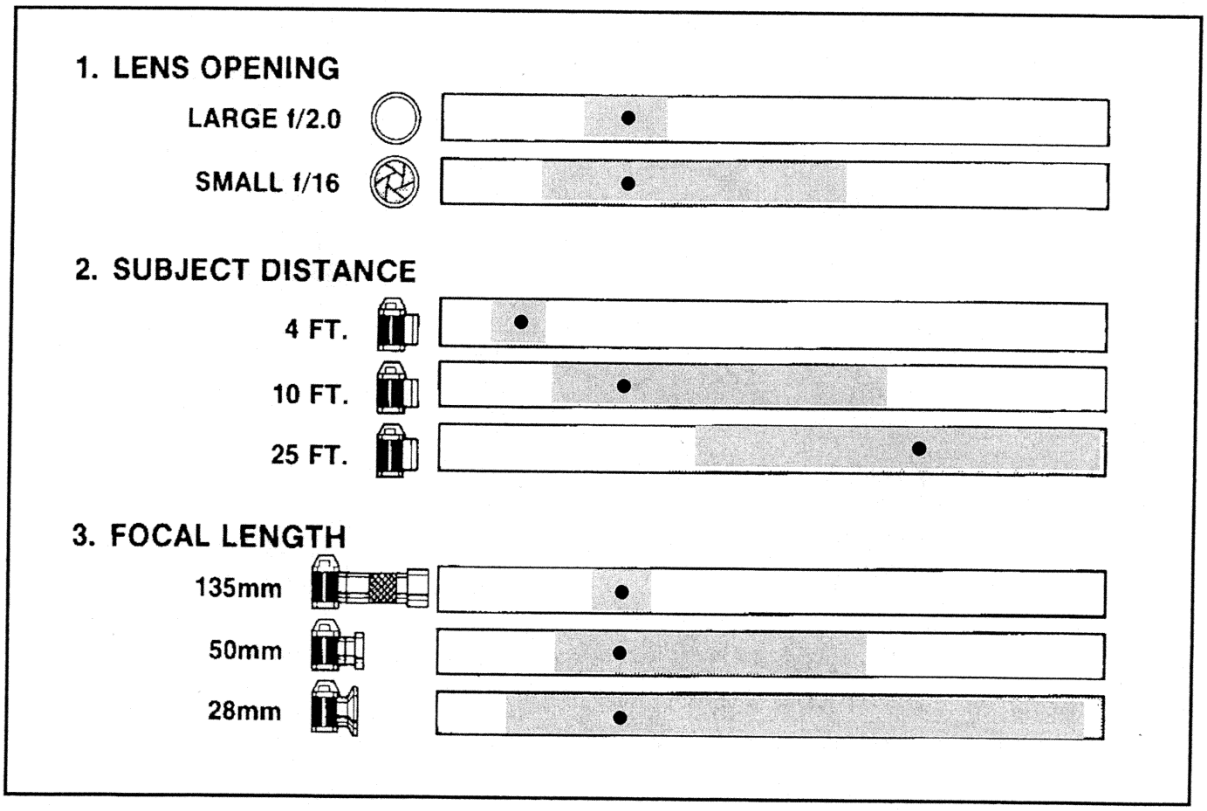
g) High Dynamic Range Photography

h) Flash Fill

2. Maximum depth of field

a) Depth of field is the area in a photograph in which objects are in sharp focus

b) How to control depth of field



c) Zone focusing

d) Previewing depth of field

3. Free from distortion (must have good perspective)

a) Use a normal focal length lens whenever possible

b) Keep the camera as level as possible

c) Photograph with the camera at eye level whenever possible

4. Sharp focus

a) Keep the camera steady

b) Focus carefully and use maximum depth of field

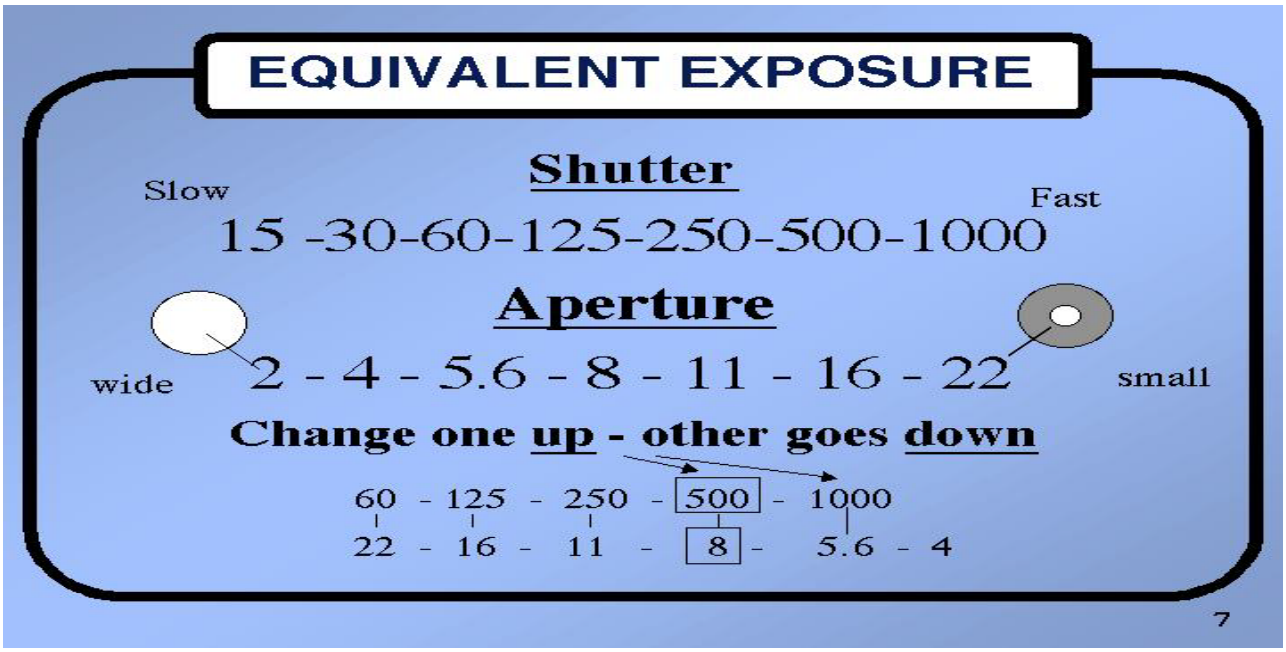
c) Look at the frame of your scene

Assignment

- Read Chapter 2 in the text book.
- Read the owner's manual for your camera.
- Practice taking photographs outdoors in the daylight.
- Watch the recommended videos.
- Bring your camera to Session 3.
- Read your electronic flash owner's manual and the section on flash photography in your camera owner's manual.
- Practice taking flash photographs.

Equivalent Exposure

Equivalent exposure is a hard concept to grasp at first. To get a handle on it first let's take a look at the shutter speed and what those numbers mean.



SHUTTER speed numbers like 1000 and 500 are all a fraction of a second of time for how long the shutter will let in light. These numbers are 1/1000 or 1/500. Looking at this as a FRACTION we see that the larger the number the less time the shutter will open to let in light. Our rule in photography is to not allow this number to go below the FOCAL LENGTH of the lens. For a normal camera this is 50mm so our minimal shutter speed is 60 or 1/60th second. For a wide angle lens of 28mm it can go to 1/30th second or 30. For a telephoto lens of 200mm length the speed moves up to a faster 250 or 1/250th of a second. The shutter speed numbers each double the amount of light they let in as we move down the dial. 1000 - 500 - 250 - 125 - 60 - 30 and so on, each lets in double the amount of light. We will see why this is important when we look at the aperture.

APERTURE numbers or f-stops are also a fraction. Thus the number f 16 is really 1/16th and f 2 is really 1/2. What are they a fraction of? If you take a normal lens like a 50mm lens the size of the opening in the lens that lets in the light is compared to this number. Thus f2 represents a lens opening that is 25mm wide. As we change the focal length to 200mm an aperture of f2 now represents an opening of 100mm in size. Big difference -- yes and no. The larger the lens the greater the amount of light we will need to get an equivalent amount of light hitting the film. This is more technical than we want to cover for now - so - let's just remember that this opening is a FRACTION and that the smaller the number the MORE light we will have. Each aperture or f-stop also lets in double amount of light of the next one on the setting chain, just like the shutter speed dial. So as we look at the numbers we see these: 16 - 11 - 8 - 5.6 - 4 - 2.8 - 2 which as it turns out allows for a doubling of the amount of light in each one. They do not look like they do in the math because we are talking AREA in the size of the circle or HOLE that lets in the light. Anyway....they KEY is that each is half or double its neighbor just like the shutter speed numbers.

EQUIVALENT EXPOSURE

If we have a normal light meter setting of 500 at f11 for a subject and we want to open the shutter up for a LONGER time to allow for blur and thus we set the shutter to 250 we now must adjust the aperture to KEEP THE LIGHT THE SAME as it falls on the film. The shutter was set to let in MORE light so the aperture must be set to let in LESS light to keep the amount equal. So, we move the aperture to f16 and now we have an EQUIVALENT exposure. If we move the shutter to 125 the aperture would move to f22 which is about as small as most cameras will go. All of this works because each setting of the aperture AND the shutter are each half or double the one next to it.

http://www.scphoto.com/Notes/Day_11/sld007.htm

Technical Photography Exercise

All photographs must be taken ***<u>outdoors in daylight</u>***

Photo Number	Description	Settings
1	Exposure/Bracketing Correct exposure	Shutter speed:_____ f/stop:_____
2	Exposure/Bracketing + one f/stop	Shutter speed:_____ f/stop:_____
3	Exposure/Bracketing - one f/stop	Shutter speed:_____ f/stop:_____
4	Equivalent exposure (fast shutter speed and large lens opening)	Shutter speed:_____ f/stop:_____
5	Equivalent exposure (slow shutter speed and small lens opening)	Shutter speed:_____ f/stop:_____
6	Shutter speed that shows movement in scene	Shutter speed:_____ f/stop:_____
7	Shutter speed that shows no movement	Shutter speed:_____ f/stop:_____
8	Good depth of field	Shutter speed:_____ f/stop:_____
9	Poor depth of field	Shutter speed:_____ f/stop:_____
10	Back lighting	Shutter speed:_____ f/stop:_____
11	Side lighting	Shutter speed:_____ f/stop:_____
12	Front lighting	Shutter speed:_____ f/stop:_____
13	Perspective, good	
14	Perspective, poor	
15	Perspective, wide angle distortion	Lens _____ mm
16	Normal lens	Lens _____ mm
17	Wide angle lens	Lens _____ mm
18	Telephoto lens	Lens _____ mm
19	Orientation view	
20	Intermediate view	
21	Close-up	
22	Extreme close-up	

III. FLASH AND NIGHT PHOTOGRAPHY

A. Types of flash illumination

1. Manual flash

a) Set f/stop for the flash-to-subject distance

2. Automatic flash

a) Uses distance ranges

b) A change to a new range requires a change in f/stop

c) Never work an automatic flash at its maximum range, especially in less than ideal conditions

d) When in automatic flash, make sure the shutter speed dial is set to the flash synchronization speed

e) When photographing a high key scene (light or reflective background) bracket —opening up one or two f/stops

3. Dedicated flash

a) Sets correct flash synchronization speed when the flash is in operation. Still uses automatic sensor and ranges. The photographer must set the appropriate f/stop for the distance range

b) OR Sets the correct flash synchronization speed and f/stop for the automatic range selected

4. Dedicated TTL (Through-the-lens)

a) Uses a sensor inside the camera

b) Use smaller f/stops for short distances, larger f/stops for long distances

c) For compensation or bracketing use the exposure compensation dial

B. Problems with electronic flash

1. Flash synchronization

2. Coverage

a) Distances—Inverse square law of light

b) Long distances when outdoors at night or at arson scenes

3. Reflective surfaces

a) Automatic flash units can shut off too soon due to reflected light

C. Lighting techniques

1. Electronic flash (NOTE: Disregard the light meter in the camera when using flash)

a) On-camera direct flash

b) Off-camera direct flash

c) Bounce flash

(1) Bounce off a white or light colored surface

(2) Manual flash: add the distance up and down for the flash-to-subject distance then figure in the absorbance loss (one to three f/stops)

d) Multiple flash

(1) Distance the flash units to provide the same f/stop for each flash

2. Available light (no electronic flash)

a) Digital noise

3. Painting with light

a) The shutter is left open while the light source is moved around until all of the scene is properly illuminated

b) Procedure

(1) Mount the camera on a sturdy tripod

(2) Equip the camera with a lens shade (if available)

(3) Screw a locking cable release into the camera shutter release

(4) Set the shutter speed dial to B (bulb)

(5) Determine the f/stop based on the flash to subject distance (not the camera to subject distance)

(6) Focus carefully

(7) Depress the cable release and lock it to hold the shutter open

(8) Fire the electronic flash to light areas of the scene. The number of flashes and angle of the flashes will depend on the size and character of the scene. Do not point the flash directly at the camera and keep yourself out of the view of the camera

(9) Unlock the cable release and allow the shutter to close

Assignment

- Read Chapters 1, 3, 4, 5, and 6 in the text book.
- Prepare for Quiz #1 (Technical photography, Flash and Night photography).
- Watch the recommended videos.
- Practice taking flash photographs.
- Bring your camera, electronic flash, locking cable release, tripod and flashlight to the Flash and Night Photography exercise.

Flash and Night Photography Exercise

Frame Number	Description	Settings
1	Available light indoors	Shutter speed:_____ f/stop:_____
2	Available light indoors	Shutter speed:_____ f/stop:_____
3	Flash photograph indoors - short distance	f/stop:_____
4	Flash photograph indoors - long distance	f/stop:_____
5	Flash photograph - bounce lighting	f/stop:_____
6	Flash photograph outdoors - short distance	f/stop:_____
7	Flash photograph outdoors - long distance	f/stop:_____
8	Flash photograph outdoors	f/stop:_____
9	Available light outdoors (night)	Shutter speed:_____ f/stop:_____
10	Flash photograph outdoors	f/stop:_____
11	Available light outdoors (night)	Shutter speed:_____ f/stop:_____
12	Flash photograph outdoors	f/stop:_____
13	Available light outdoors (night)	Shutter speed:_____ f/stop:_____
14	Flash photograph outdoors	f/stop:_____
15	Painting with light outdoors (night)	Number of flashes:_____
16	Flash photograph outdoors	f/stop:_____
17	Painting with light outdoors (night)	Number of flashes:_____
18	Flash photograph outdoors	f/stop:_____
19	Painting with light outdoors (night)	Number of flashes:_____

IV. CRIME SCENE PHOTOGRAPHY

A. Purpose of Crime Scene Photography

1. To record the original scene and related areas
2. To record the initial appearance of physical evidence
3. It will provide investigators and others with this permanent visual record of the scene for later use
4. Photographs are also used in court trials and hearings

B. Admissibility of photographic evidence

1. Three major points of qualification of a photograph in court
    a) Object pictured must be material or relevant to the point in issue
    b) The photograph must not appeal to the emotions or tend to prejudice the court or jury
    c) The photograph must be free from distortion and not misrepresent the scene or the object it purports to reproduce
2. You do not need to be an expert in photography to take crime scene photographs or testify about them

V. GENERAL CRIME SCENE PHOTOGRAPHY

A. Photographs are one way to record a crime scene

1. Field notes
2. Photographs
3. Sketches

B. Photographs

1. What photographs can show
2. What photographs do not show

C. Five steps in recording the crime scene

1. Secure the scene
2. Take preliminary notes
3. Take overview photographs
4. Make a basic sketch
5. Record each item of evidence

D. Taking overview photographs

1. Purpose

a) To show the scene exactly as it was when you first saw it

(1) If something was moved before you arrived, don't try to reconstruct the scene as it was. The photographs should show the scene as you found it

2. Major crime photography

a) First discuss the crime, evidence and photographs needed with other investigators at the scene

b) Be careful not to destroy any evidence while taking the photographs

c) Outside the scene

(1) Exterior of the building where the crime occurred and in some cases the whole locale

(2) Aerial photographs of the scene and the surrounding area can be useful in some types of cases

(3) Original series of photographs should also show all doors, windows and other means of entrance or exit

d) Inside the scene

(1) Begin with a view of the entrance

(2) Then photograph the scene as it appears when you first step into the room

(3) Next, move around the room to get photographs of all the walls

(a) These photographs should also show the positions of any potential items of evidence

(4) Include photographs of other rooms connected to the actual crime scene

3. The three step approach

a) Overview photographs

b) Mid-range photographs

c) Close-up photographs

4. Using video to record the crime scene

a) Frequently valuable to show an overview of the scene

b) Techniques for crime scene video taping

(1) Start tape with a brief introduction presented by an investigator

(2) Video tape the scene, after the introduction, without recording audio

(3) Begin taping the crime scene with a general overview of the scene

(4) Continue through the scene using wide angle and close up views to show the layout of the scene, location of evidence, and the relevance of evidence within the crime scene.

E. Photographs to record items of evidence

1. Take two photographs of each item of evidence

a) One should be an orientation (midrange) shot to show how the item is related to its surroundings

b) The second photograph should be a close-up to bring out the details of the object itself

2. Fill the frame of your view with the evidence

3. Measuring and marking devices

a) Take two photographs if a marking or measuring device is used

(1) One photograph without the device, the other with the device

(2) So the defense can't claim that the scene was altered or that the device was concealing anything important

4. Position of Camera and Scales

a) Keep the film plane parallel with the evidence

b) Fill the frame of your view with the evidence

c) Place the scale on the same plane as the evidence

PHOTOGRAPHIC REPORT		CASE NO.	Scene No.	
		Media Card No.	Page No.	
Date		Location	Offense	
Make and model camera, lens, light source				
Frame No.	**Description of Photograph**	**Camera lens or light source (if different from above), filter, etc.**	**Date**	**Time**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
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24				
25				
26				
27				
28				
Comments				
Photographer		Approving Supervisor	Date	

VI. PHOTOGRAPHING SPECIFIC CRIME SCENES

Note: Each crime scene has unique characteristics and the type of photographs needed will be determined at the scene by the investigator familiar with the crime.

A. Homicide

1. Photograph in color

2. Photographs (example: homicide inside a residence)

a) Exterior of the building

b) Evidence outside the building

c) Entrance into the scene

d) Room in which the body was found

e) Adjoining rooms, hallways, stairwells

f) Body from five angles

g) Close-up of body wounds

h) Weapons

i) Trace evidence

j) Signs of activity prior to the homicide

k) Evidence of a struggle

l) View from positions witnesses had at time of the crime

(1) Use a normal lens

m) Autopsy

B. Suicide, other dead body calls

1. If there is any doubt, photograph the scene as a homicide

C. Assaults, injuries

1. Photographing injuries

a) Face of victim in the photographs

b) Bruises

c) Bite marks

(1) Orientation shot

(2) Close-up at 90 degree angle to avoid distortion

(3) ABFO #2 scale in same plane as bite mark

(4) Color scale

(5) Focus carefully

(6) Bracket exposures

2. Equipment

a) Always use color film and no filter

b) Use color charts and scales

c) Flash unit with diffused lighting

D. Burglaries

1. Photographs (residential or commercial burglaries)

a) Exterior of building

b) Point of entry

c) Entrance into scene

d) Interior views

e) Area from which valuable articles were removed

f) Damage to locks, safe, doors, tool marks

g) Articles or tools left at the scene by the suspect

h) Trace evidence

i) Other physical evidence

Assignment

- Read Chapters 7, 8 and 9 in the text book ("Evidence-Basic Concepts" "Evidence Photography at the Crime Scene" and "Evidence Photography in the Laboratory").
- Watch the recommended videos.
- Quiz #2 (crime scene photography) will be given at next.
- Bring your camera, electronic flash and tripod to the Evidence Photography Exercise.

Crime Scene Photography Exercise

One Crime Scene

Scene must have a human body

Scene must include evidence that must be photographed close-up

Use the Photographic Report on page 12 for your exercise

Evidence Photography Exercise

Five evidence photographs:

- Footwear Impression
- Fingerprint
- Knife
- Bloodstain
- Forensic Light Source
- Your choice

VII. PHOTOGRAPHING EVIDENCE

A. Basic Principles

1. Take two photographs of each item of evidence

a) One should be an orientation (midrange) shot to show how the item is related to its surroundings

b) The second photograph should be a close-up to bring out the details of the object itself

2. Measuring and marking devices

a) Take two photographs if a marking or measuring device is used

(1) One photograph without the device, the other with the device

(2) So the defense can't claim that the scene was altered or that the device was concealing anything important

3. Fill the frame of your view with the evidence

4. Position of Camera and Scales

a) Keep the film plane parallel with the evidence

b) Fill the frame with your evidence

c) Place the scale on the same plane as the evidence

5. Exposure

a) Preview lighting

b) Use a gray card for ambient light exposures

c) Bracket exposures

6. Digital image type

7. Lighting techniques

a) Direct lighting

(1) Normal copy lighting with one or more light sources at 45-degree angles

b) Oblique lighting

(1) Use light source at low angle, usually used to show detail by creating shadows in the subject surface

c) Bounce lighting

(1) Light is bounced off a white or reflective surface

d) Diffused lighting

(1) An opaque material is placed between the light source and subject

e) Transmitted lighting

(1) With transparent subjects the light source is transmitted through the subject toward the lens

f) Front directional or axis lighting

(1) Use when photographing into holes or cylinders

B. Close up photography

1. Close-up lenses and devices

2. Focusing

a) Use a copy stand or tripod when possible

3. Focusing while hand-holding the camera

a) Rough size (scale) the subject by focusing with the lens focus ring (manual focus). Then stop focusing with the focus ring.

b) Fine focus the subject be moving the camera in or out from the subject

c) While maintaining the fine focus by moving the camera in or out slightly, lightly depress the shutter button

C. Fingerprints

1. When to photograph fingerprints

a) Before lifting on major cases or if the latent may be destroyed when lifting

b) To bring out detail in a latent

2. Equipment

a) Digital SLR or 35mm cameras with macro or close-up lens attachments

b) Gray card for available light exposures

3. Photographing fingerprints with digital photography

4. Procedures

a) Establish the location of the latent

b) Close-up to show detail

(1) A scale must be included in the photograph on the same plane as the latent

(2) Photograph with the film plane parallel to the latent surface

(3) Get as much depth of field as possible, especially for curved surfaces

c) Exposure

(1) Available light exposures of latent fingerprints with normal contrast can be metered using a gray card

(2) Bracketing may reveal more detail in "low contrast" latent fingerprints.

(a) Underexposing the film will separate the steps on the white end of the gray scale. Overexposure will separate the steps on the black end of the gray scale.

(b) The latitude for black and white film is generally two stops underexposure and six stops overexposure.

d) Specific types of fingerprint subjects

(1) Normal, dusted prints

(a) Usually can be photographed with no problem

(2) Impressions in soft substances (wax, putty, clay, adhesive tape, grease, etc.) or in dust

(a) Use cross lighting at an oblique angle

(b) Preview with flashlight lighting

(3) Porous surfaces

(a) May need to use close to a 90 degree lighting angle

(b) Preview with flashlight lighting

(4) Glass and mirrors

(a) Glass — place white card or cloth behind glass, use low oblique angle of light

(5) Perspiration prints on glass

(a) Use back (transmitted) lighting and diffusion screen

D. Impressions

1. Footprints and tire tracks

a) Procedure

(1) Take an orientation photograph to show where in the scene the impression is located

(2) Take a close-up for detail

(a) Use a scale on the same plane as the impression

(b) Keep the film plane parallel to the plane of the impression

(c) Block out ambient light and use a strong light source at different angles to find the light angle(s) that shows the best detail in the impression—then put the electronic flash or light source at that angle for the photograph

(3) Photograph tire impressions in sections showing one circumference of the tire

(a) Use a tape measure for overlapping photographs

E. Bloodstain photography

1. Use color film

2. Orientation photographs to show locations of bloodstain evidence at the scene

3. Close-up photographs to show detail

a) Use a scale on the same plane as the bloodstain

b) Keep the film parallel to the plane of the bloodstain

c) Use a low oblique light angle

4. Luminol photography

5. Infrared photography

F. ALS Photography

G. Tool marks, Serial numbers, Small items, copying, etc.

1. Close-up lenses and devices

2. Lighting

H. Bullet trajectory photography

I. Digital Photography

Assignment

- Quiz #3 (evidence photography) will be given at the final session.
- Notebooks are due at the beginning of the final session.